ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Μόνιμη Αντιπροσωπεία της Ελλάδος
στο ΝΑΤΟ

Αρμόδιος:	Ασμχος (ΜΕ) Δημήτριος Κανταρτζόγλου	Βρυξέλλες,	18 Μαρτίου 2021
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ΚΟΙΝ.:	ΥΠΕΞ/Δ' Γεν. Δ/ντη	
	ΥΠΕΞ/Δ2 Δ/νση	
	ΓΕΕΘΑ/Γ2	(μ. ΓΕΕΘΑ)
	Υπουργείο Ανάπτυξης /Γενική Γραμματεία Εμπορίου Πλ.Κάνιγγος	(μ.η.)
	Υπουργείο Ανάπτυξης /Γενική Γραμματεία Βιομηχανίας /Δνση Διεθνών Βιομηχανικών Σχέσεων Πλ.Κάνιγγος	(μ.η.)
	Τεχνικό Επιμελητήριο Ελλάδος /Δνση Ε Επαγγελματικής Δραστηριότητας, Νίκης 4	(μ.η.)

ΘΕΜΑ: 6η Τροποποίηση Πρόσκλησης Υποβολής Προσφορών IFB-CO-14873-INTELFS2, Διαγωνιστικής Διαδικασίας Έργου: «Intelligence Functional Services (INTEL-FS) - Spiral 2 and BMD functions in INTEL-FS»

1. Διαβιβάζεται, συνημμένως, 6η Τροποποίηση Πρόσκλησης Υποβολής Προσφορών (Invitation for Bids/IFB), για διαγωνισμό εν θέματι έργου, εκ μέρους NCIA, ως φιλοξενούντος έθνους.

2. Καταληκτική ημερομηνία υποβολής προσφορών ορίζεται η Πέμπτη, 8η Απριλίου τ.έ., 12:00 τ.ώ.

3. Ενδιαφερόμενες εταιρίες αναζητήσουν πληροφορίες μέσω καθοριζομένου σημείου επαφής (Point of Contact/POC, βλ. παρ. 7 τροποποιήσεως).

4. Παρακαλούμε για τις ενέργειές σας.

ΛΑΜΠΡΙΔΗΣ

Συν. Σελ: 538

ΑΚΡΙΒΕΣ ΑΝΤΙΓΡΑΦΟ
Ο υπάλληλος της Μ.Α. ΝΑΤΟ
Σταύρος Τσάκωνας
ΕΠ&ΠΛ.Α΄

Acquisition Directorate

Boulevard Léopold III
B-1110 Brussels, Belgium

NCIA/ACQ/2021/6673
11 March 2021

To: All Nominated Bidders and Distribution List

Subject: Invitation For Bid IFB-CO-14783-INTELFS2 Amendment 6

                 Intelligence Functional Services (INTEL-FS) - Spiral 2 and BMD functions in INTEL-FS

References: A. AC/4-D/2261(1996 Edition), Procedures for International Competitive Bidding
                 B. AC/4-D(2008)0002-REV2, International Competitive Bidding Using Best Value
                 Evaluation Methodology, dated 15 July 2015
                 C. IFB-CO-14783-INTELFS2 NCIA/ACQ/2020/6369, dated 22 December 2020
                 D. IFB-CO-14783-INTELFS2 Amd. 1, NCIA/ACQ/2021/6475, dated 29 January 2021
                 E. IFB-CO-14783-INTELFS2 Amd. 2, NCIA/ACQ/2021/6574, dated 11 February 2021
                 F. IFB-CO-14873-INTELFS2 Amd. 3, NCIA/ACQ/2021/6587, dated 22 February 2021
                 G. IFB-CO-14873-INTELFS2 Amd. 4, NCIA/ACQ/2021/6624, dated 24 February 2021
                 H. IFB-CO-14873-INTELFS2 Amd. 5, NCIA/ACQ/2021/6660, dated 5 March 2021

Dear Prospective Bidders,

1.   The purpose of this Amendment 6 is to :

      a.   Publish Release 6 **of Bidders' questions and NCI Agency** responses;

      b.   Issue revised IFB documents (Book I and Book II);

      c.   Extend the Bid Closing Date to **Thursday, 8 April 2021**.

2.   Clarification Requests (CR) and their respective responses that were released in IFB
      Amendments 1 – 5 have been greyed out for your convenience.

3.   **Some answers to Bidders'** questions have necessitated changes to the IFB documents.

4.   Revised bidding documents provided with this **IFB** Amendment 6 are listed as Attachment 2
      and replace the previous versions in their entirety. Potential Bidders are strongly advised to
      carefully review these revised bidding documents.

5.   With the exception of the revisions made in these documents, all other IFB documents
      remain unchanged from their original version as issued on 22 December 2020, unless
      updated in Amendments 1 – 5 (References D – H).

**NATO Communications
and Information Agency**

**Agence OTAN d'information
et de communication**

Avenue du Bourget 140
1110 Brussels, Belgium

www.ncia.nato.int

6. Prospective Bidders are advised that the NCI Agency reserves the right to cancel this IFB at any time in its entirety and bears no liability for bid preparation costs incurred by firms or any other collateral costs if bid cancellation occurs.

7. The Contracting Officer responsible for this solicitation is Dan Gaertner, and all correspondence regarding this IFB should be sent via email to IFB-CO-14873-INTELFS2@ncia.nato.int.

FOR THE DIRECTOR OF ACQUISITION:

Daniel Gaertner
Digitally signed by Daniel Gaertner
Date: 2021.03.11 23:04:57 +01'00'

Daniel K. Gaertner
Senior Contracting Officer

Attachment:

1) Responses to Clarification Requests, Release Number 6

2) Revised IFB Documents:
    2.1   File # 02: Book I – Bidding Instructions
    2.2   File # 03: Book I – Bidding Sheets I2UA
    2.3   File # 04: Book I – Bidding Sheets I2BE
    2.4   File # 05: Book I – SSS I2UA
    2.5   File # 06: Book I – SSS I2BE
    2.6   File # 07: Book II – Part II, Special Provisions
    2.7   File # 09: Book II – Part IV, SOW I2UA
    2.8   File # 10: Book II – Part IV, SOW I2UA Annex A, SRS
    2.9   File # 12: Book II – Part IV, SOW I2BE
    2.10 File # 13: Book II – Part IV, SOW I2BE Annex A, SRS

Distribution List for IFB-CO-14783-INTELFS2 Amendment 6

NATO Delegations (Attn: Infrastructure Adviser):
Albania
Belgium
Bulgaria
Canada
Croatia
Czech Republic
Denmark
Estonia
France
Germany
Greece
Hungary
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United Kingdom
United States

NATO HQ
NATO Office of Resources, Management and Implementation Branch – Attn: Deputy
    Branch Chief

Director, NATO HQ C3 Staff, Attn: Executive Co-ordinator

SACTREPEUR, Attn: Infrastructure Assistant

SHAPE, Attn: J3 & J2

Strategic Commands
HQ SACT Attn: R&D Contracting Office

ACO Liaison Office

All NATEXs

Attachment 1: Responses to Clarification Requests, Release Number 6

Index no. NCI Agency	IFB Ref.	Bidder's Question	NCIA Response
CR1	N/A	Is it possible to download into the web site INTELFS-1 Spiral 1 SRS, User Manuel, SDD, etc. or any suitable project document to be able to understand the scope/coverage of the Spiral 1.	The *INTEL-FS_User_Manual* , the *INTEL-FS_Administrator_Manual* , and the *INTEL-FS_-_System_Design_Specification_-_62789015_424_-_V0.14* are available under the IFB Portal/Supporting Documents
CR2	N/A	Should be key personnel employee of the bidder or is it possible to be a sub-contractor employee?	It is acceptable for Key Personnel to be employees of either the prime contractor or subcontractors. However, for any Key Personnel that are subcontractor employees, the bid shall (as specified in SOW section 2.5.2.1) clearly explain their responsibilities and their authority within the prime contractor's organization.
CR3	N/A	Do all possible sub-contractor's employees need to possess NATO-SECRET status also?	Yes, all resumes/CVs submitted with the bid for the PMO and Technical Team (SOW 2.1.1 and 3.1) must demonstrate a NATO SECRET clearance.
CR4	N/A	What is the expected number of deployments/servers? Some of the 3rd party COTS could be licenced per CPU, how should it be reflected in price?	The solution shall be running on the SOA Platform as a PaaS and ITM as IaaS. There should not be any license constraints linked to servers.
CR5	N/A	Are the licenses of operating systems on the server-side in the scope of the BID?	The solution must run on the SOA Platform (the PaaS) so as long as the OS is supported by the SOA Platform there will be no need to include OS costs in the bid.
CR6	N/A	Who and how will be the final authority for an interface between UE and BE especially in the case that both projects will be implemented by different bidders?	An initial API will be provided by NCIA that will be an automatic forward transformation from the information model, and will be baselined as a configuration item for the initial version of the API. This initial API will be provided to both I2UA and I2BE Contractor at Contract Award. The BE contractor will in the contract period be responsible for the evolution, improvement, and maintenance of the API, but NCIA will be the approving authority for changes to the API.
CR7	N/A	According to [FBE-201]: AEDP-17 defines CORBA and WS interface for CSD. Which one should be used for NATO CSD IPL integration?	For the information going from INTEL-FS to the NATO CSD neither of the AEDP-17 interfaces will be used. The NATO CSD implements a REST API dedicated for INTEL-FS to use to share information with coalition through the NATO CSD (see NATO CSD documentation on the IFB portal). For import of data from the NATO CSD IPL to INTEL-FS, the Contractor is free to chose which interface in the NATO CSD to use.
CR8	N/A	Which edition and baseline of STANAG 4559 NSILI (CSD) implement NATO CSD IPL?	The NATO CSD is contracted to be implemented in accordance with STANAG 4559 Edition A Version 1, March 2018.
CR9	N/A	Is it possible to reuse some existing algorithm or even existing implementation e.g. for The Terrain & Mobility Analysis [FBE-159]	NCIA is is not in the possession of any such algorithms/ implementation. However, the Bi-SC AIS CoreGIS system, which is implemented on the ESRI ArcgGIS platform, may have built-in functions that can be used for implementing these functions. The resulting solution shall as stated in the SRS [FBE-160] be implemented, and the solution should be hosted on the CoreGIS (i.e. in the ESRI ArcGIS platform). It will be the bidder's responsibility to evaluate what existing support in ESRI ArcGIS that can be used for these services.
CR10	N/A	Which operating system is used on the backend side?	See answer to CR5
CR11	N/A	Is FMN compliancy expected in the scope of the project? If yes, which Spiral and which services?	The integration services to be implemented are defined by Backend SRS. FMN compliance is not a direct requirement in the contract (the SRS defines the contractual deliverables).

CR12	N/A	Is GeoView component responsible for rendering APP-6 symbols according to given code, both point and line symbols?	Yes.
CR13	N/A	Is [INTEL-FS2-InformationModel] doc for SOW I2UA, SRS I2UA, SOW I2BE and SRS I2BE fully covered by doc 14a et 14b of IFB package?	The document 14a and 14b is a documentation extract from the IBM Rational Software Architect (RSA) implementation of the information model using the IBM BIRT tool to auto-generate a PDF view of the model. The full IBM RSA information model (in UML) will be provided to the Contractor at Contract Award.
CR14	N/A	1. [IPIWG] doc as file is empty 2. [MARIX] doc as link seems to not be accessible 3. [OASIS Odata OAS 1.0, 2016] doc as there is no file neither link associated	1. The [IPIWG] documentation is downloadable as a Zip file from the IFB portal. The zipped file when downloaded can be extracted into a folder which contains 7 XML scheme documents. There are no PDF documentation of IPIWG. 2. The [MARIX] URL works, but to access the site you will need to have a user account for the NATO ACT TIDE portal. An account can be requested using this URL: https://tide.act.nato.int/request 3. The documentation identified under [OASIS Odata OAS 1.0, 2016] can be found on the internet using a Google search (e.g. at http://docs.oasis-open.org/odata/odata-openapi/v1.0/odata-openapi-v1.0.html)
CR15	General	If the same contractor wins both bids, will the execution of the two pojects be totally independent? i.e. Different Purchaser personnel, Different Contractor key personnel, separate kick-off and WP meetings etc.	Purchaser's personnel does not have to be different. However, the bid needs to demonstrate that the Contractor's Team is sufficiently resourced according to a resource plan that realistically can deliver the project in accordance with the contracted schedule. All meetings under project execution (Kick-Off, WP meetings etc.) will have to be run separately.
CR16	ok II - Part IV - SOW I2BE -	What is meant by "documented expert knowledge" mentioned in the Personnel Qualifications? Is a certificate expected which covers the topics mentioned? There may not be any certificatations for some of the topics in the qualifications.	The CV must detail the work experience for the required skill. I.e. to describe when were the skills required, what was the context of how the skill was acquired (what work was done), what was the level of involvement and duration of the person in the work in the skill area.
CR17	General	What is planned "Effective Date of Contract" approximately?	It is estimated that EDC will be Q4 2021.
CR18	N/A	How and when will the Purchaser provide INTEL-FS Spiral 1 source code and relevant documents? Will there be a handover from the Contractor of INTEL-FS Spiral 1 project?	The INTEL-FS Spiral 1 source code will be made available to the contractor through the NSF at contract award.
CR19	Book I-Bidding Sheets I2B	Does the distribution of price to the requirements affect the price bid evaluation or technical bid evaluation? Is it used as an indication of the level of understanding of the Bidder for the requirements?	The technical bid evaluation is done without any knowledge of any price information. As part of the price evaluation, if the distribution of price to requirements appears to be intentionally unbalanced, NCIA may ask the contractor to clarify.
CR20	General	Is there any limitation or preference of the Purchaser for the programming language for development of BE?	See backend SRS section 2.1.2 for SOA & IdM Platform compliancy. .Net and/ or Java are both supported by the SOA & IdM Platform
CR21	Book I-Bidding Instructions - 3.7 & 4.5.2.2.14. & 3.6.4.2.	Is Draft Delivery Plan for all WPs is the part of the Part-I Engineering Package or Part-II Management Package. In the table 3.7 it seems to be Management Pacakge, but in the other sections, it is in the Engineering Package.	It is part of the Enginering package. The table in Section 3.7 of the Bidding Instructions is corrected by IFB Amendment 1.
CR22	Book II-Part IV-SOW I2UA Annex A SRS	How will the non-functional requirements (i.e. Response time, Capacity) be verified for only UA without taking the BE into consideration? (I2UA SRS: NFR-2, NFR-3, NFR-4)	The BE NFRs are defined by the BE SRS and those can be verified through testing against the BE API. That means the BE performance will be known, and the UA performance can then be assessed (relative to the BE performance).

CR23	N/A	In Bidding Instructions, Draft Delivery Plan is included in Management Section of Volume-3 but is recommended to be moved to Engineering Section.	That was an error; the Delivery Plan is part of the Enginering package. The table in Section 3.7 of the Bidding Instructions is corrected by IFB Amendment 1.
CR24	13_CO-14873-INTELFS2-Book-II-Part IV SOW I2BE Annex A SRS section 5.4.1	Req ID: NFR-15 & NFR-16 Q// how verification analyze can be performed? There will be no "idealized" network conditions for latencies as stated in [127] and [128].	The purpose of *Inherent* is to take all factors that are not related to the quality of the delivered SW out of the equation for calculating availability. The deployed solution will then be observed under operation and the *Inherent* availability can be assessed.
CR25	13_CO-14873-INTELFS2-Book-II-Part IV SOW I2BE Annex A SRS section 5.4.2	Req ID: NFR-17 Q// is term "without loss of data" relates to persistent data only? Or also includes transient or session data at time of failure as well?	Persistent data only. The SRS in Amendment 1 clarifies this.
CR26	13_CO-14873-INTELFS2-Book-II-Part IV SOW I2BE Annex A SRS section 4.1.15	Req ID: FBE-294 & FBE-295 Q// ICD for assets of AirC2IS is required to be able to make a cost estimation on requirements	The AirC2IS ICD is available in the Referenced Documents folder on the IFB portal (see file AirC2IS_SDS_Annex_04_ICD)
CR27	N/A	In WP1.1, 1.2 and 1.3 sheets of SSS I2UA (and Bidding Sheets I2UA) and WP2.1 sheet of SSS I2BE (and Bidding Sheets I2BE), the price is required to be broken down into the given requirements (capabilities). In addition to the capability development, there are other activities (requirements) to be performed in this project. Some examples are listed below. We consider distributing the prices of those activities into the SSS requirements proportionally. If some of those SSS requirements are needed to be deleted throughout the execution of the project, the total price from the below activities will decrease by an amount which is equal to the price portion distributed to the deleted SSS requirements. We assess that the total effort/price of the below activities should not change linearly according to SSS requirements changes. Please advise how to formulate this subject in the price calculations. • Contractor support to Purchaser IV&V as given in I2UA SOW [84] and I2BE SOW [80] • Contractor attendance to UAT as given in I2UA SOW [SOWG-223] and I2BE SOW [SOWG-223] • Contractor attendance to Deliverable Acceptance Review I2UA SOW [SOWG-224] and I2BE SOW [SOWG-224] • Contractor support to Purchaser's accreditation activities as given in I2UA SOW [SOWG-227], [SOWG-228] and [SOWG-230], and I2BE SOW [SOWG-227], [SOWG-228] and [SOWG-230] • Contractor support site installation as given in I2UA SOW [SOWG-378] and [SOWG-379], and I2BE SOW [SOWG-376] and [SOWG-377] • Training material development and training delivery to Purchaser and /or End User Personnel as given in I2UA SOW Section 2.3.5 and I2BE SOW Section 2.3.5	* IV&V: Contractor should maximize the use of test automation as indicated in the SOW (BDD and ATDD) with integration with IV&V test recording system. IV&V resources will participate in the SOW defined events. The Contractor will have to respond to enquiries from IV&V. * UAT: As each increment results in a deliverable that can be submitted in a UAT, i.e. the expected number of UATs are known. * Deliverable Acceptance Review: Same as for UAT, the expected number of DARs are known. * Support to RFC: The RFC process will be mostly handled by NCIA. If the Contractor delivers SW (by increments) that is easily installed, has no major defects, and is documented in accordance with the Contract, then the Contractor's involvement with the RFC process will be low. The assistance will be required in the case when there are problems (e.g. with installation and with SW issues) * The training requirement is for the purchaser's O&M team, and training material needs to be delivered for each increment. No end user training is required, beyond what is defined for the Learnability Tests The bidder needs to estimate the costs of the non-developmental activites and factor them into the cost of individual impementation requirements. It is not anticipated that any potential deletion of requirements would significantly impact the non-developmental activities.

CR28	Book I – Bidding Instructions Annex B-C-D	Can you provide bidders with an editable document templates for all of these annexes B1-16 + C + D ?	Appendix B through D from the Bidding Instructions has been uploaded to the IFB portal in the Supporting Documents folder
CR29	N/A	What measures do you have in place to prevent the builder of SPIRAL 1 to benefit from its current incumbent provider position and ensure transparency of competition ?	There is no Contractor currently working on INTEL-FS Spiral 1. Since the handover and end of the warranty, INTEL-FS Spiral been maintained by NCIA. All bids will be evaluated against the criteria stated in the IFB, and will only be made available for review to the NCIA evaluators. The source code of INTEL-FS Spiral 1 will be provided to the contractor at contract award.
CR30	N/A	By reading the documentation and analyzing the functional requirements and user stories, we understand that our software is able to fulfill an important amount of these requirements and to integrate with specialized third parties for the parts that are not covered. Since our user interfaces are based on Angular and HTML5, would it be acceptable for NATO to be proposed highly configurable COTS (commercial off the shelf software, out of the box) products instead of bespoke development? By using software that is covering both AU and BE in an integrated manner, implementation risks are lowered, time to market shortens and maintenance is more efficient.	There is no restriction preventing a contractor from proposing highly configurable COTS, as long as all of the requirements are fulfilled. However, please note that: 1. It is important the back-end is separated from the front-end, and that the only interaction between the two happens through the BE API. 2. The bids for the back-end and front-end must be submitted separately from one another, with no caveats that NCIA must accept both bids together. A bid that deviates from these two points will be considered non-compliant.
CR31	N/A	Is NATO providing the infrastructure to meet the non-functional requirements (performance, recovery time, up time, concurrency, etc.) ?	The Purchaser will provide the infrastructure to meet the NFR. However when not ideal, the NFR measurements/ assessment will remove/ subtract the impact of the NATO infrastructure.
CR32	N/A	If T2 (above) answer is yes, is NATO open to receive our recommendations regarding the types, sizing, etc. of the hardware, operating system and possible virtualization layers?	This is a pure SW acquisition project that will rely on NATO PaaS and IaaS. The proposed solution will have to work with existing NATO PaaS and IaaS.
CR33	N/A	Can NATO indicate which of the requirements are already met in Spiral 1 and current technology used for it ?	The functionality that exists in Spiral 1 can be seen from the INTEL-FS Spiral 1 User Manual and Administrator Manual that is available under 'Supporting Documents' on the IFB portal. Also, the IFB Information model (document 14a and 14b) documents the information model for what has been implemented in Spiral 1 (see section on NATO::_Conventions and Migration::_INTEL-FS Spiral 1 Reference). However, as Spiral 1 does not meet the implementation requirements as defined by this IFB (neither for frontend, nor backend), the potential for code reuse from Spiral 1 in Spiral 2 will be limited. An "exception" to the limited SW reuse is identified in the I2UA SRS paragraph [49]: "*Note: NCI Agency is already in possession of a software (SW) tool, and its source code, that has implemented functionality in Angular 9 that interfaces with a REST abstraction layer in INTEL-FS Spiral 1 as depicted Figure 1-1. This UI software (that is also compliant with [HMI-C4ISR]) fulfils many of the acceptance criteria of several of the user stories below including [US-18], [US 21], [US 23], [US 24], [US 25], [US 26], and [US 27]. This source code will be available with the INTEL-FS Spiral 1 software* ".

CR34		Are the mentioned technologies fixed or contractor can provide technology recommendations e.g. Angular, Neo4J has been mentioned as the framework?	NCIA is striving towards SW reuse and componentization across applications and functional area services (FAS). In this effort Angular should be the UI framework chosen by most new FASes, and Angular will be the preferred framework INTEL-FS. The IFB specifies backend functional and nunfunctional requirements like advance graph queries (with fast response times) and link analysis / social nework analysis and a solution including a graph database should be able to fulfil those requirements. The choice of a graph databse (e.g. Neo4J) is not fixed and the Contractor can propose a different databases with graph support, or a different solution architecture that can fulfill the functional and non-functional requirements of the IFB. Note: Angular and Neo4J are both already used with the INTEL-FS SW.
CR35		NSF is recommended as the foundation toolchain (DevOps based) for custom software development lifecycle. Does this toolchain need to be leveraged both for Application and Backend Service development and deployment as a standard?	Yes
CR36		Please confirm the deployment preference for both I2UA (Application) and I2BE (Backend) systems viz. on-premises / private secured cloud	As stated in the I2BE SRS, the backend services shall run on the SOA & IdM Platform. The I2UA shall be able to run in a browser on any computer connected to the NATO network.
CR37		Per our understanding, there will be an transient / intermediate release for new application pointing to old backend and then a following release for new application with new backend services: a. Are the migration timelines flexible and what is the business impact in case of delays? b. There is a mention of existing REST Abstraction /API services layer (section 1.3 of I2UA SRS) which can be leveraged to support the transient state (I2UA Phase 1). Please provide the REST API, business logic and system architecture documentation.	a. The roll-out for the new backend that involves migration, will be done incrementally for a limited number of users at the time. The legacy capability will need to be available until the new capability is deemed robust and stable. The impact to the business must be minimal/ zero. b. This is still work in progress with an expected deployment to production in Q2 this year, the abstraction layer API is not stable and available yet. INTEL-FS Spiral 1 architecture information is provided through the INTEL-FS Spiral 1 System Design Specification that has been uploaded to the IFB portal under Supporting Documents.
CR38		We can see that some parties on the bidders list have been involved in INTEL-FS Spiral 1 and/or in the design of Spiral 2. Will these parties be excluded from bidding? If not, in what way will NATO guarantee a level-playing field?	No bidders will be excluded from bidding. The INTEL-FS Spiral 2 solution will architecturally be very different from Spiral 1. No Industry has been involved in the design of Spiral 2; the design of the Spiral 2 solution is solely done by NCIA.
CR39		Could you please provide the details (documentation reference) covering INTEL-FS Spiral 1 application system architecture and technology landscape	The INTEL-FS Spiral 1 System Design Specification has been uploaded to the IFB portal (file name: *INTEL-FS_-_System_Design_Specification_-_62789015_424_-_V0.14*)

CR40		How many business domains, processes, services and workflows are in scope of the target state application landscape?	The number of services can be enumerated from the IFB I2BE SRS in the sections listing the Functional Services and the Integration Services. It should be noted that some of the services are intended to perform migrations from Spiral 1 - these are idetified as "xxxx Migration Service". There are four principal processes/ workflows: Dissemination, Colation, Request and Task. In terms of Business Domains (and depending on the interpretation of "Business Domain") the target application state will provide support to the standard Intelligence Procedures found in the Allied Joint Doctrine AJP-2.1. At the highest level, these include all phases of the Intelligence Cycle; Intelligence Requirements Management; Collection Management; Intelligence Support to Targetting; The JISR Cycle; Support to Ballistic Missile Joint Intelligence Preparation of the Operating Environment; Support to Electronic Order of Battle Management; Support to IED Incident Mangement. All of these higher level procedures are supported by some or more of the services defined in the I2BE SRS.
CR41	VC-ICD 1-3	Section 3 of VC-ICD 1-3 document provides an overview of Geo-View Visualization Components (GIS, File Import/Export, NMAPI for user applications, Media services, GeoView online help, Symbology service). Please provide the approx. number of visualization component services and users for the new application platform?	NCIA foresees one VC to be used with each instantiation of the Web Client (i.e. the different UI applications as defined in the I2UA SRS will share the one instantiation of the VC). The main reason for that is that each instance of the VC will require a high amount of memory. The number of users will be several thousand.
CR42		14 loosely coupled applications are mentioned in scope. Are there any dependencies in terms of data and domain services across these applications?	There should be no need for any intra-client dependencies between these User Applications beyond the sharing of a single VC.
CR43	INTEL-FS User Manual	In the INTEL-FS User Manual (INTEL-FS 1.5.0 build cb0514b) there is a mention of IIE (Intelligence Information Entity) management workflows supported by the front end application. How many business subject areas/Intelligence Information Entity domains are in scope?	From the INTEL-FS Spiral 2 information model, in documents 14A and 14B, it can be seen that there are 172 Intelligence Information Entities in the Spiral 2 *Domain of Discourse* . There are four principal processes/ workflows: Dissemination, Colation, Request and Task. All IIEs are subject to the Dissemination Worfklow. *ProductIIEs* in conjunction with *BattlespaceIIEs* are subject to the Colation workflow. Within the IRMCM staff function, RFIs and ISRRs are the subjects of *Request* workflows; CollectionTasks and ExploitationTasks are the subject of *Task* workflows.
CR44	I2UA SRS document	Section 2.1.1 – I2UA SRS document : "[INTEL-FS2-InformationModel] implicitly includes the information managed by Spiral 1 because it extends from the principal components of Spiral 1." Please provide the Intelligence Information Entity data model documentation as per INTEL-FS2-InformationModel	IFB Documents 14A and 14B contain a complete specification of the INTEL-FS Spiral 2 Information Model. These documents both contain a section *_Conventions and Migration::INTEL-FS Spiral Reference* which shows the principal information aspects of Spiral 1: Battlespace Object Management (including support to Counter-IED); Intelligence Requiements Managment (including RFIs and Indicators); Intelligence Support to Targetting and ISR Product catalogue Management.

CR45		Could we have more information on GeoView? • On what software is this build? • If needed can an alternative be proposed or is GeoView the basis that should be used? • is GeoView an "as is" and the basis that should be used?	Information on the usage of GeoView is provided through the ICD that has been provided in the Reference Document section on the IFB portal (see document *VC ICD 1-3*). The 2D parts of the VC (which is what will be used in INTEL-FS) is implemented in OpenLayers. An alternative GeoView solution is not an option. The VC GeoView is a standardized component that will be used in multiple FASes to lower overall CAPEX and OPEX to NATO. The aim is to use the GeoView "as is", no feature gap has yet been identified in the VC.
CR46		The overall project is split in 2 contracts that can be under the leadership of 2 separate companies. Who is responsible of the overall integration and the entire function?	As defined in the I2BE SRS, the Backend Contractor is responsible for delivering backend services that support the User Stories through the API. An initial API will be provided by NCIA as a configuration item, it will be maintained and improved by the backend contractor. NCIA will be the approving authority for changes to the API (see also answer to CR6)
CR47		Can you define what is an "Apparent Successful Bidder" . Is there an additional step to go from the status of "Apparent Successful bidder" to " successful bidder"	The term "apparent" successful bidder is used, as the contract award will not be made until: a) the debrief period for unsuccessful bidders has been completed; and b) a successful pre-award meeting has been held with apparent successful bidder. The purpose of the pre-award meeting is to ensure a complete understanding of the technical requirements, schedule and contract terms and conditions, and to clarify any minor ambiguities that remain following the evaluation phase.
CR48		Can you disclose the Spiral 1 ICD document.	The Spiral 1 ICD has been uploaded to the IFB portal under Supporting Documents.
CR49		Where do the Acceptances take ? Can it be done virtually?	As stated in SOW section 2.4.5.2.6 on the Delivery Acceptance Review *"If agreed between Purchaser and Contractor, the meeting could be done as a video-conference meeting"* .
CR50	Book I Bid Instruction Section 1.2.2	Could you provide clarification or the concept, with examples, in regards to Book I Bid Instruction Section 1.2.2 "… on a fixed Price Incentive Fee (FPIF) basis" as to what would constitute the eligible targets to receive the Incentive?	The incentive fee is described in Book II, Part II, Contract Special Provisions, Section 6. There are two incentive milestone dates for each contract (CSP, Section 6.3). If all Applications/Services have passed the Initial Acceptance by this milestone date, the earned incentive will be 5% of the value of the Applications/Services for which all Requirements have been accepted.
CR51	Book I Bid Instruction Section 1.2.3	Could you define what you consider as an "Agile Methodology" in Book I Bid Instruction Section 1.2.3 and provide amplification as to what a contractor can expect during the contract period. For example how would changes in design and/or delivery using this "Agile Methodology" from the as bid FFP baseline be funded?	What some might consider as "fully agile" - a high level scope with significant room for ongoing changes - will not be implemented on INTEL FS 2. The elements of Agile methodology that apply to these contracts are defined by the DSDM principles in the SOW. Primarily, this involves frequent deliveries and acceptances, based around sprints and increments; frequent payments; and the ability to reprioritize requirements. The scope is fixed; any minor changes that are required later in the project could be partially managed by removing some of the lower priority requirements if they're no longer necessary.

CR52		With your FPIF and Agile delivery methodology, what are the Key Metrics that NATO will be using in order to measure that the Contractor has met the requirements and met the Acceptance Criteria?	The delivery acceptance requirements are defined through the SOW and SRS, see also answer to CR above.
CR53		Are the User Stories going to be sufficient for a contractor to use for Acceptance Criteria?	The acceptance criteria are defined in the SOW. User Stories are not by themselves sufficient. General functional requirements, specific functional requirements, and non-functional requirements as specified in the applicable SRS are also included in the deliverable acceptance criteria.
CR54	I2BE SRS	[GBE-6] of section 2.1.2.1 of I2BE SRS document states "All I2BE services (taken to mean the full set of Phase I, Phase II and integration services specified herein) shall be hosted upon the SOA & IdM Platform, and re- use and/ or integrate with the SOA & IdM Platform services". [15] of section 1.7 of I2BE SRS document: "..the bulk of the Spiral 2 effort concerns itself with technology refresh, migration and 're-platforming' (see [18]) of existing back end, full stack capabilities to the SOA & IdM Platform". Fig 8 – Interoperability Landscape in section 5.1 of NU_SOAIDM_Wave1and4_ICD_v8.0 document provides a logical interoperability view of SOA & IdM platform. • Please provide the details (documentation reference) of SOA and IdM platform covering: end to end physical system architecture (with supporting technologies) and ETL (Extract, Transform and Load) framework services to populate Intelligence	The documentation of the SOA and IdM Platform that is currently available has been provided on the IFB portal in the Referenced Documents section.
CR55	IFS1-ICD	Section 2 of IFS1-ICD document provides an overview of the implemented INTEL-FS Spiral 1 system. The scope covers intelligence requirements management and processing, information collection and processing and intelligence dissemination. Is the scope same for target INTEL-FS (New) backend system or there will be new functionalities/enhancements?	The scope of INTEL-FS Spiral 2 is defined through the IFB SOWs and annexes. INTEL-FS Spiral 2 will have more functionality and will have increased interoperability and integration with other Bi-SC AIS FASes.
CR56	IFS1-ICD	Section 3 of IFS1-ICD document provides an overview of INTEL-FS External Interfaces (inbound and outbound). a. How many of these interfaces are in the impact analysis scope of re-platforming? b. Are there any re-usable components (utilities, API definitions etc.) which can be leveraged for re-platforming?	Bidders should expect all interfaces to be affected by the re-platforming. The WSDL files for the SOAP services defined in Chapter 5 of the ICD should be reusable; these WSDL files will be applicable for the deliverable defined in section 4.2.4 in the Backend SRS.
CR57	IFS1-ICD	Section 4 & 5 of IFS1-ICD document provides the overview and definitions of INTEL-FS services. a. How many of these services are in the impact analysis scope of re-platforming? b. Are there any re-usable components (utilities, information data models etc.) which can be leveraged for re-platforming?	See answer above. Additionally, note that the Spiral 2 information model incorporates the Spiral 1 information model.
CR58	I2BE SRS	[14] of section 1.7 of I2BE SRS document: "The significant part of the Initial Information Model [INTEL-FS2-IM] is based on existing production systems (IRM, CM, BSO, Products, EOB, etc.) that these I2BE services will be replacing". Please provide the details (documentation reference) of Initial Information Model as per [INTEL-FS2-IM].	The Information Model is provided in document 14a_ and 14b_ of the IFB: - *14a_CO-14873-INTELFS2-Book-II-Part IV SOW I2BE Annex B Information Model - Battlespace Partition* - *14b_CO-14873-INTELFS2-Book-II-Part IV SOW I2BE Annex B Information Model - Staff Partition*)

CR59	N/A	Please provide the details (documentation reference) for Spiral 1 INTEL-FS backend data sources (description, quantity etc.) and data collection interface types (Event based, API based etc.). How many Spiral 1 data sources and interfaces are in scope of target INTEL-FS backend platform (New)?	The main data sources for INTEL-FS Spiral 1 are the CCC, MIDB, JTS, and organically created data. The CCC source/ interface is in the scope of Spiral 2 (see BE SRS section 4.1.1 and 4.2.1). The MIDB source is also in scope of Spiral 2 (see BE SRS 4.1.14). JTS (now N-JTS) will continue to be a source for INTEL-FS Spiral 2 (see BE SRS section 4.1.13)
CR60	N/A	How much data history (volume and period) needs to be migrated from Spiral 1 to the new backend platform?	There will be data from approximately 3 million information entities collected over many years that will have to be migrated. Note that the Spiral 2 information model builds upon, and incorporates, all of the Spiral 1 information model; this should ease the migration effort.
CR61	Book I-Bidding Sheets I2BE Annex B-13.	If the contractor will submit bid for both of the BE and UA, can proposed Key Personnel be the same personnel for both of the bid IFB-CO-14873-INTEL-FS2-BE and IFB-CO-14873-INTEL-FS2-UA? Or Should contractor propose different key Personnel (PM, QAM, CM, TL, TD, etc.) for both of the bid?	Contractor Key Personnel do not have to be different for each contract. However, the bid needs to demonstrate that the Contractor's Team is sufficiently resourced according to a resource plan that realistically can deliver the project in accordance with the contracted schedule. All meetings under project execution (Kick-Off, WP meetings etc.) will have to be run separately.
CR62	Book II – Part II – Contract Special Provisions - 4.4	Where are the priorities of the requirements (Must-have, Should-have or Could-have) given in the IFB? Will these priorities be decided during project execution by Purchaser?	The priorities will be provided to the Contractor as part of the pre-award discussions prior to Contract Award.
CR63	Book II – Part II – Contract Special Provisions - 7.5.3	In relation to the article 7.5.3 and 7.5.4 of the "Special provisions" could you please clarify whether the Contractor, may invoice at once the 100% of the value of the accepted Requirements but wait for the warranty payment of 10% of the total value of the accepted Requirements in four quarterly payments, or, Contractor is expected to invoice seperately each time? (e.g; 90% for acceptance, 10%*0,25 four times in the warranty period)"	The contractor will invoice 90% of the value of the accepted Requirements. The remaining 10% will be invoiced during the Warranty period. As an example, if the total value of the accepted Requirements from EDC to FSA = EUR 5,000,000, then 4,500,000 would be invoiced/paid following the Incremental acceptances; and 500,000 would be allocated to the warranty period. For this 500,000, four quarterly invoices of 125,000 would be submitted/paid during the 1-year warranty.
CR64	Book II - Part IV - SOW I2BE - 1.5 PFI	Will Contractor pay any price to the Purchaser for the NR laptop to be used for sharing of NR material?	The NR laptop will be lent to the Contractor as PFI; the Contractor does not need to pay for this.
CR65		Resesrved	Reserved
CR66	Book II - Part IV - SOW I2UA	Which NATO site INTELFS2 will be deployed? How many locations? Which countries? Will be the deployment and system activation activities under the responsibility of the Contractor or Contractor will only support the Purchaser (on-site support and/or remote support)? To be able to make detailed schedule and plan the travel for these deployment activities, it's needed to know the location of sites.	INTEL-FS Spiral 2 will be deployed to the NATO IT Modernization (ITM) data centres. The NCIA INTEL-FS Support Staff will be responsible for the deployment; the Contractor will be required to support the NCIA Support Staff. For the initial deployment(s), on-site support (at NCIA premises in Belgium or the Netherlands) will be required, for subsequent deployment (pending how successful and easy the intial deployment was) remote support should suffice.

CR67	Book I-Bidding Instructions	Will Contractor deliver Test Plan/Master Test Plan in the Volume III Technical bid package?	Bidders shall provide details on the bidders approach to testing in the Solution Description Document, which is part of the Technical Volume (Volume III) (see also BI section 4.5.2.2.9 and 4.5.2.2.10).
CR68	Bidding Instructions	The document « 02_IFB-CO-14873-INTELFS2-Book I-Bidding Instructions" mentions that 2 distinct proposals and contracts must be considered by the bidders. Can you detail how NCIA will manage the consistency and the coordination between the two parts on the final system which are linked technically and in terms of functionalities ?	Consistency and coordination will be achieved through the Contract First Development/ Approach (i.e. the API).
CR69		For "COTS" included in the solutions (Front or Back) is the annual maintenance included in the option of level 2 and 3 of maintenance ?	The IFB, for both contracts, specifies a work package of optional 3rd and 4th level support an maintenance. Maintenance costs of COTS (i.e. 4th level) must be included in the cost of the optional 3rd and 4th level Support and Maintenance WP. Please note Section 22.3 of the Contract Special Provisions, *Software Licenses* . The Purchaser may exclude from the contract the purchase of software licenses which may be procured by the Purchaser through centralized contracts.
CR70	Bidding Instructions	In "02_IFB-CO-14873-INTELFS2-Book I-Bidding Instructions" it is mentioned that "The proposed solution describes a sound approach to eventual consistency in a distributed (multi-instance) environment configuration (i.e. in a high availability and robustness configuration)". Will NCIA intend to provide high level specifications for the infrastructure which will support the Intel FS Applications (Back end and Front End) (Network bandwidth, latency, recovery points...) between implementation sites ?	NCIA requires a solution that implements eventual consistency between instances of I2BE running in availability zones of a cloud-based solution. The Contractor is not responsible for any infrastructure components.
CR71	General Provisions	In "08_CO-14873-INTELFS2-Book-II-Part III General Provisions" it is mention that : "The Contractor shall ensure the design of the system includes sufficient redundancy and other Reliability, Maintainability, Availability and Testability measures to ensure the RAM requirements in this Contract are achieved and attained at an optimal Total Cost of Ownership (TCO), minimizing preventive maintenance, manpower requirement and usage of special-to-type tools and test equipment". Can NCIA specify the infrastructure KPI underlying those applications measurement (RTO/RPO, SLA, …) ?	The RAM assessments will be done on the software's inherent qualities focusing solely on the design-related failures. Effects of the infrastructure will be excluded/ subtracted from the RAM assessments.
CR72	SOW I2UA and SOW I2BE And Contract Special provisions	The program is composed of 2 separate contracts. One for I2UA one for I2BE . We understand that for I2UA we will have either to connect to legacy BE or emulate new functions or Interface with new I2BE for BE we will have to emulate Interfaces for each "system" and then Integrate and tests with new I2UA . We can then consider the development of two Independent Subsystems. Then who will be responsible for system Integration ?	Both the I2UA and I2BE contracts will be implemented using a Contract First Development (CFD) approach through the API. When both the I2UA and I2BE are complying with the API there is no system integration (the I2UA and I2BE are "pre-integrated" through the API).
CR73	Special Clauses §10	FSA acceptance of each sub system :Please confirm that only requirements of respective SSS documents will be used to conduct FSA on each sub system	NCIA confirms that only the Requirements listed in the I2UA Front-end SSS will be used to conduct FSA for the I2UA Front-end contract, and only the Requirements listed in the I2BE Back-end SSS will be used for the FSA for the I2BE Back-end contract.
CR74	Special Clauses §10	FSA : Please confirm that there is only one FSA (Not one for each Increment) and it corresponds to the system Acceptation (system meaning either UA either BE sub system)	There will be only one FSA for each contract, and the FSA for the I2UA is independent of the FSA of I2BE and vice versa.
CR75	Special Clauses §10	FSA What is the planned duration of the FSA	Unless there are unforeseen issues that haven't previously been resolved, the FSA should not require more than a day to conduct.

CR76	SOW I2UA SOWG 155	What happens if Covid remains and we cannot invite NCIA?	All the implementation work shall be conducted using the NATO Software Factory, and meetings can be done virtually/ remotely.
CR77	SOW I2UA [97] (2)	IV&V :"Run additional tests. These additional tests may use different data sets, and may include extended system-to-system integration tests; ". Those tests are not part of the Test Plan?	The IV&V tests are not part of the Contractor's Test Plan.
CR78	SOWG I2BE SOW-361	Technical personnel qualifications : NATO Secret Clearances. When we have the requirement [SOWG-70] The Contractor shall ensure that all software implementation activities in the NSF is kept at NATO UNCLASSIFIED level and when secure software engineering environment is at NATO RESTRICTED LEVEL . ¨Please clarify which profiles really need to be NATO SECRET Level and for which task?	All software will be implemented in the NSF at NATO UNCLASSIFIED level. NATO SECRET level will be required for any on-site work at any of NCIA's premises. Such work will include testing implemented software with operational data.
CR79		Location : SOW I2BE [60] :We understand that the development will have to be done on the DevSecOps Platform (the NSF) . NCIA providing remote connection facilities to Contractor(s) . Could you please provide more details	Details on the NSF is provided in the SOW in section 2.4.1. Access to the NSF is provided through a VPN connection.
CR80	SOW I2BE Reference documents :	Reference documents : CO-14873-INTELFS2, INTEL-FS SPIRAL 2 – Information Model Book II -Part V, NCI Agency. We don't have this document in the ones provided with IFB	The files (*14a_CO-14873-INTELFS2-Book-II-Part IV SOW I2BE Annex B Information Model - Battlespace Partition* and *14b_CO-14873-INTELFS2-Book-II-Part IV SOW I2BE Annex B Information Model - Staff Partition*) were too big to send by email. The files are available to the bidders through the IFB portal.
CR81	SOW I2BE [28]	The Purchaser will provide the Contractor with the current INTEL-FS Spiral 1 software. Does it include Source code. When will it be provided ? Is it possible to have it during Bid phase?	The software, including source code, will be provided at Contract Award.
CR82	SOW I2BE [11] (4)	Sentence :"Integrating with the new backend solution into the new service-oriented architecture (SOA) as native hosted services;" Please clarify this sentence	In the updated SOW provided with this IFB Amendment, the sentence has been corrected to "*(4) Implement the new backend solution as services to be hosted on the service oriented architecture (SOA) and IdM Platform* " (only the integration services will have to be *native* hosted).
CR83	SOW I2BE [12]	The delivered SW at the end of each increment will have to have a quality at the level of being ready for deployment to production. The deployment of new software modules will be lead by the Purchaser with support from the Contractor. There might be multiple deployments to production of incrementally delivered functionality, e.g. deployment in support of the BMD tranche 25, and a final deployment prior to final system acceptance (FSA)" . The warranty starts after FSA . Does it means that Modules delivered at the end of one Increment are not supported? Or shall we include in the price the support of the first delivery until one ear after FSA ?	While incrementally delivered software to production will be supported operationally by NCIA staff, the Contractor will be responsible for correcting any software bugs found in the delivered software (see [SOWG-181] [SOWG-181] *The Sprint Work Plan shall include: ...(2) Tasks to implement bug-fixes in the case bugs has been discovered in software functionality previously delivered by the Contractor under this contract;. ..*"

CR84	IFB-CO-14873-INTELFS2 Book I - Bidding Instructions	IFB-CO-14873-INTELFS2 Book I - Bidding Instructions states: 1.5.3. The Contractor will be required to handle and store classified material to the level of "NATO RESTRICTED". and 1.5.4. The Contractor shall have the appropriate facility and personnel clearances at the date of Contract Signature. Should the Contractor be unable to perform the Contract due to the fact that the facility/security clearances have not been provided by their respective national security agency, this lack of clearance cannot be the basis for a claim of adjustment or an extension of schedule, nor the lack of clearance be considered a mitigating circumstance in the case of an assessment of Liquidated Damages or a determination of Termination For Default by the Purchaser under the Prospective Contract. but CO-14873-INTELFS2 Book II - Part II - Contract Special Provisions states: 16.10 The Contractor's facilities and personnel shall meet NATO security regulations to permit handling and storage of information classified up to and including NATO SECRET. so: which is it for the Contractor's facilities, NATO RESTRICTED or SECRET?	Contractor's facilities shall be able to handle material up to NATO RESTRICTED. Article 16, *Security*, of the Contract Special Provisions has been updated to reflect this correction by deleting paragraph 16.10. Paragraph 16.2 is correct in stating that *"the Contractor's premises shall be able to handle up to NATO Restricted."*
CR 85 start CR Release 3 here - do not include with CR Release 2	Book I-Bidding Sheets I2BE	Should Contractor deliver any HW or HW Components to any NATO deployment site of INTELFS2? Or Will Contractor deliver only SW Applications with COTS? For COTS products, how many (running) license will be delivered to the Purchaser by Contractor?	The contractor will not deliver any HW or HW components. The contractor will deliver only SW. COTS components being part of the INTEL-FS solution should not have any run-time licenses. If run-time licenses are unavoidable, then the licenses will have to be tailored for a Cloud-based environment with users accessing INTEL-FS through Web-browser. The bidder should then assume 3 data centres serving 2000 concurrent users with horizontal scaling elasticity to fulfil the INTEL-FS non-functional requirements. For any Development Licenses; 10 developer licenses will suffice.
CR86	N/A	Please describe the operational perspective of the platform: who will be using it, where (HQ, field, etc.), and when is it planned to be operationally deployed?	The solution will be deployed to the ITM data centers. Users in a number of organizations will be connecting using the NATO Communication System (NCS).
CR87	N/A	What are the main gaps of Spiral 1 solution this solution willing to solve?	As described in the Bidders Conference presentation slide 14, the primary objectives of the project are the "re-platforming", adding new capabilities, and implementing a number of integration cases with other Bi-SC AIS capabilities.

CR88	N/A	In terms of design and development - Please explain your expectations from a vendor which provides an existing intelligence platform (COTS) with high customizability to user workflows and data models?	The solution must comply with the requirements as defined in the IFB, which include: * The full Information Model must be realized; * An Odata REST API for accessing the information entities must be delivered; * The Odata REST API is forward transformed from the information model (i.e. for any API changes these are first done in the model and then forward transformed to an API specification); * The workflow models as specifed in the information model is realized; in particular supporting a seemless mediation with the STANAG 4559 workflow services; * The information platfom is hosted on the SOA & IdM Platform; * There is full support for, and integration with, the IdM mechanism of the SOA & IdM Platform (to include dynamic policy based IAM through ABAC Decision Points, XACML,etc.).
CR89	N/A	Please provide some examples of the common sources to be integrated with the I2BE. Is there a central DB to integrate with?	The integration cases are defined in Chapter 4 in the Backend SRS.
CR90	N/A	Our intelligence platform's User Interface is being developed using REACT libraries and can be integrated with external components written in Angular framework. Can this be considered as an appropriate solution for the I2UA requirements, or would this fail the key requirements?	A solution that includes existing REACT libraries could be considered appropriate (although this obviously depends on the entire Technical Volume submitted). There is nothing specific about using REACT libraries that would render the bid technically non-compliant. For implementation of new UI functionality, Angular shall be used (see Front End SRS [GUA-15]).
CR91	CR6	it is stated (CR6) that the initial API provided by NCIA will be an automatic forward transformation from the information model. Considering that is is far from being enough to define the API that will be necessary to support all US and AC from the I2UA, how will the I2UA contractor be involved in the further development of the API, which seems to be performed solely by the I2BE contractor with approval by NCIA?	The Front-end contractor's Scope and Requirements Analysis (see [SOWG 170]) at the start of each Increment Startup will need to identify potential shortcomings in the API and the API's ability to provide the backend support for the delivery of the front-end deliverables. NCIA will assess the Front end Contractor's API input and if an API change is deemed necessary, engage with the Back end Contractor to facilitate the change. As the API is mainly an OData API (SQL on URL) over a stable information model only minor refinements of the API should be expected.
CR92	Bidding Instructions 3.7.1 Bidding instructions 3.3.3.3 CR1	According to "Responses to Clarification Requests #1" Draft Delivery Plan is part of the Engineering package. This aspect is clear. Bidding Instructions 3.7.1 indicates the Draft Delivery Plan and the Solution Description Document to be part of only one PDF document. Bidding instructions 3.3.3.3 about package Making indicates the Delivery Plan to be and independent document from SDD: - 14873-UA/BE-Company Name–Vol III–Tech1-SDD - 14873-UA/BE-Company Name–Vol III–Tech4-DelPlan From our point of view it would be more clear to keep both documents separately. Therefore, we recommend to update Bidding instructions 3.7.1 to indicate Engineering package to contain 2 documents for SDD and DelPlan.	Book I, Bidding Instructions, Section 3.7.1 in IFB Amendment 3 has been updated to reflect the requirement to provide the Solution Description Document and the Draft Delivery Plan as separate documents. Section 3.3.3.3 has also been modified to update the names of the individual files submitted as part of the bid.

CR93	Bidders Conference	With the evals being done simultaneously can responses (tech and financial) be submitted together or do they still need to be submitted separately?	Yes, the technical, administrative and price volumes should all be submitted together. Please review Section 3.3.1 of Book I, Bidding Instructions: "The bid shall be consolidated into one email…" Only in the event the size of the email exceeds the limit should multiple emails be submitted. Later in Section 3.3, the names of the individual files that make up the bid are provided. Please note that the size limit of the emails in Section 3.2.2 has been increased to 15 MB.
CR94	Bidders Conference	when does the Initial acceptance takes place in this scheme	The term "Initial Acceptance" means the delivery of all Must Have requirements for any given Deliverable. Those Requirements which must be accepted in order to achieve "Initial Acceptance" will be designated in the SSS prior to contract award.
CR95	Bidders Conference	Many front end apps are using .NET so using Angular imply complete re-write?	INTEL-FS Spiral 1 will be re-written as a result of the "re-platforming", so the assumption of a complete re-write is correct.
CR96	Bidders Conference	Do you think it is possible to be more specific about the support of the contractor for the IV&V and UAT?	The SOWs in IFB Amendment 3 have been updated with the additional information provided below. The support to IV&V includes: * Presenting test plans and test cases at Increment startup meeting * Present and report on test results at sprint review meetings * Support ad hoc discussions on test results (e.g. in case IV&V identifies potential bugs) * Support NCIA in getting additional installations (on the NSF) setup (the expectation here is that the SW is easily installable and that NCIA personnel will be able to do this without contractor support) * Provide answers to question the Change Manager may have to the software submitted into the RFC process The support to UAT includes: * Participating in person for the first UAT. This first event is expected to last between 3-5 days. For this first UAT the first "production environment" will be installed and personal presence will be required. * For subsequent UATs, as long as the released software can be installed and operated by NCIA personnel Contractor's support can be provided remotely. Such remote assistance includes: Phone-support for any technical issues and Ad Hoc video/teleconference meetings to discuss UAT findings.

CR97	Bidders Conference	Bidders are encouraged to re-use existing NATO solutions. To support this, the IFB states that COTS may be provided as Purchaser Funded Items. To satisfy Intel FS 2 geospatial requirements (ie: Terrain & Mobility Analysis Service, Geospatial and Features Service), could Core GIS COTS tools (Esri ArcGIS) be provided as PFI?	* The Terrain & Mobility Service shall be implemented as OGC Web Processing Services (WPS) (see [FBE-160] in BE SRS) and it should be implemented for being hosted within the NATO CoreGIS system (see BE SRS [82]). This means that the solution should be hosted on CoreGIS (i.e. ESRI ArcGIS) instances in the Bi-SC AIS/ ITM environment. The inclusion of the WPS service in Bi-SC AIS CoreGIS instances is not expected to require additional licenses for these services in the Core GIS. However if the Contractor sees the need for any additional products/licenses the Contractor shall identify and cost them in the bid. As stated in paragraph 22.1 of the Contract Special Provisions, the Agency reserves the right to provide these licenses as PFE later on in the project. * The Geospatial and Feature service are services for managing Intelligence Information Entities, they are not geo-spatial services (even if the name could suggest so)
CR98	Bidders Conference	What AJPs are relevant for considering the process from the User perspective conducting INTEL business? AJP 2?	AJP-2.1 INTELLIGENCE PROCEDURES AJP-2.7 ALLIED JOINT DOCTRINE FOR RECONNAISSANCE AND SURVEILLANCE STANAG 4559 AEDP-19 ISR Workflow Architecture
CR99	Bidders Conference	STANAGs that need to be consider?	This question was asked within the context of the Information Model. The INTEL-FS model refers to the STANAGs listed below. Please be advised that the INTEL-FS model does not require the entirety of these other models. The INTEL-FS model imports some concepts/ types from these models. STANAG 5643 Multilateral Interoperability Programme Information Model STANAG 4559 AEDP-17, 18 & 19 STANAG 6545 Common Electronic Order of Battle Exchange Format STANAG 4774/ 4778 Confidentiality Labelling STANAG 7149/ APP-11 NATO Message Catalogue
CR100	Bidders Conference	Are these technical doctrines harmonized with the process one (AJP, AIntPs)?	AJP-2.1 INTELLIGENCE PROCEDURES AJP-2.7 ALLIED JOINT DOCTRINE FOR RECONNAISSANCE AND SURVEILLANCE STANAG 4559 AEDP-19 ISR Workflow Architecture
CR101	Bidders Conference	Do you have total number of attributes for IntelFS 1? Is this in the order of 100,000+ attributes or more like 20,000+ attributes?	The Information Model for Spiral1 has approximately 300 classes and approximately 3000 attributes. It should be noted that this is across the set of Intelligence Information Entities and it is not the total number of classes in the application. The total number of classes in the application contains also all of the framework and implementation code.
CR102	Bidders Conference	JIPOE the new IPB (Intelligence preparation of the battlespace/-ground)?	The term "JIPOE" replaces the former term "IPB".
CR103	Bidders Conference	Could we assume IntelFS 1 applications are mostly standalone and do not have online interfaces among each other as well as other Bi command systems?	Web Service interfaces INTEL-FS Spiral 1 are being consumed by other Bi-SC AIS system like TOPFAS and NCOP.

CR104	Bidders Conference	From your presentation we understand that INTEL-FS Spiral1 UI provides good UX and only requires technology refresh and not full re-design. Is this statement correct?	The INTEL-FS Spiral 1 UI originated in the NITB UI around 2005-2007 and was designed to look like Microsoft Outlook. The UX understanding has evolved a lot since then, and the UI needs modernization so that it looks more like modern Web Applications, e.g. similar to modern Web sites like Amazon.com etc. This means that the a full redesign of the UI will be required.
CR105	Bidders Conference	Work description document includes availability target value and mentions MIL-STD-1388 as a reference document. In addition to these, MTBF and MTTR values of system units/components are demanded. All of these remind us of hardware units/LRUs; however, not the software configuration items -- either developed or COTS. The answer given for CR-32 says that "This is a pure SW acquisition Project." Therefore; is it true that no hardware analysis will be needed? Secondly, do you suggest/dictate any other NATO reference document/procedure to follow for this Project, for software reliability analysis?	No HW analysis will be needed. All of the LSA and RAMT related activities will be performed on the SW product as these activities are not limited to HW components. Additional NATO standards are not mandated, so the Contractor can use the industry best practices to build the reliability models for the SW components.
CR106	Bidders Conference	During the technical evaluation i've heard that the vendors' name is stripped from al pertinent documents. true?	This is not correct. It is not feasible to remove all vendor names (including company logos, header/footer information, etc.) in the received bid documentation, so this will not be done.
CR107	Bidders Conference	There is a mistake in the last slide #96 about the weight of technical subvolumes. In the slide it said: M = Management Weighted Score (50 %); E = Engineering Weighted Score (30 %); S = Supportability Weighted Score (20%);" Shouldn't it be Management = 30% and Engineering 50% instead? According to bidding instructions "4.2. Best Value Award Approach and Bid Evaluation Factors"	Yes, this was a mistake in the presentation. The updated version of the presentation uploaded to the IFB portal under Supporting Document has corrected this mistake.
CR108	N/A	What's expected time period between Contract Award and EDC of project?	The current schedule foresees approximately two months from the notification of the successful bidder until contract award. EDC is expected within two weeks of contract award.
CR109	N/A	What configuration of Atlassian Jira tool is provided by NSF? Is it expected that Jira will be used as Configuration Management tool?	For SW configuration control GitLab will be used. The CMDB solution is for the contractor to design. The NSH Jira configuration includes: * JIRA DataCentre * Plugins: Links Hierarchy, SumUp, Misc Workflow Extensions * Jira is currently integrated with TestRail – but Testrail will most likely be replaced by (or at least augmented with) Zephyr Scale (used to be called Test Management for JIRA) (and is delivered as JIRA plugin) * Integrated with NSF GitLab (so that git commits are linked to JIRA issues and the JIRA has links to the related git commits) * Project Teams will get project admin rights on their own projects. Workflows/item types etc can be customized, but may require support from the NSF team to implement these.
CR110	N/A	Is there a set of automated tests for the current solution? Is it expected to reuse it?	In terms of automated tests, unfortunately there exists very little that could be reused.
CR111	N/A	The design of automated tests is fully in the responsibility of the Contractor?	Yes, design and implementation of automated tests is a Contractor responsibility.

CR112	N/A	There is mentioned that Purchaser will provide source code of STANAG 4609 video conditioner in "12_CO-14873-INTELFS2-Book-II-Part IV SOW I2BE Amd 1". In which language is that video conditioner?	It is written in C# as a wrapper around other off-the-shelf libraries (e.g. FFMPEG).
CR113	N/A	What is the volume of the data migrated using ETL processes? All data processed when Spiral 1 was used?	There are around 3 million information entities in INTEL-FS Spiral 1. A significant amount of that data pre-dates the INTEL-FS Spiral 1, but was migrated into Spiral 1 when this Spiral 1 was deployed to production.
CR114	N/A	ETL processes are expected to run in specific increment or until Spiral 1 services are retired?	The Spiral 1 migration services needs to be able to handle a situation of new data appearing in Spiral 1 after initial migration has taken place, i.e. until Spiral 1 services are retired.
CR115	N/A	The document „09_CO-14873-INTELFS2-Book-II-Part IV SOW I2UA Amd 1" says in point [11] „To support the BMD ORBAT functionality the Contractor will have to implement some interim backend logic". This interim backend logic will be implemented in current Spiral 1 implementation?	The backend logic to support BM OPFOR ORBAT function for early delivery to BMD Tranche 23 does not necessarily have to be implemented in the Spiral 1 legacy code. If feasible, the BM OPFOR ORBAT functionality could be implemented outside of the Spiral 1 code. The important aspect of the work is to provide BM OPFOR ORBAT management functionality in the user interface.
CR116	N/A	We understand that current implementation is .NET based but why Technical Lead needs documented expert knowledge in C# and .NET when the scope is reimplementation in Angular?	The .Net/ C# expertise will be required in Phase 1 of work. The Technical Lead needs to be able to understand how the Spiral 1 SW works.
CR117	N/A	Are Service Specifications (SOWG-292 - SOWG-295) as a part of SDD relevant for UA which is a consumer of services and does not define services?	Service Specifications are not relevant for the UA work. As stated in [SOWG-290] "The SDD shall include annexes that documents implemented server-side services (if any), ..." As the UA is not implementing server side services, no service specifications will need to be produced.
CR118	N/A	A major version of Angular framework is released in about one year period, so we can expect two or three major releases during project implementation. Is it expected that all applications will use the same version of Angular (actual in the project start), or they will be upgraded to actual version so at the end of the project all UAs will use the most actual version of Angular?	The non-functional requirements of the IFB does not mandate a common version of Angular, nor that it has to be the latest version by the end of the project.
CR119	N/A	Requirement FUA-20 says "in case … based on Windows operating system ". Should we consider other than Windows Operating systems? What is used instead of Active Directory in such case?	NATO Bi-SC AIS environment is a Windows environment and there is no need to consider any other operating systems.
CR120	N/A	There are several requirements (such as FUA-867, FUA 369, FUA-890, FUA-891) related to calculations of Launch Point error ellipse, salvotime etc. Will Purchaser provide formulas/algorithms for such calculations?	The launch point ellipses are not calculated within INTEL-FS, this information is received through the BM Firing Event Import Services (see BE SRS section 4.1.17). The salvotime calculation is very simple: the salvos are simple groupings of launch events based on a user definable salvo "time out value".

CR121	N/A	*A question was received regarding contractor eligibility, summarized as follows:* The prime contractor would be from a NATO Nation; its parent company is also based in a NATO Nation. A portion of the work, however, would be performed by a fully-owned subsidiary that is not based in a NATO nation.	The NATO eligibility rules are strict. The Agency does not have the authority to grant a waiver to the eligibility rules for a situation such as this. If a company submits a bid described in this situation, with a subsidiary from a non-NATO nation performing a portion of the work, they would not be able to sign Annex B-12 as part of the Bid Administration volume. This would render the bid non-compliant.
CR122	N/A	[GUA-49] requirement seems to indicate than 'an implementation of the eXtensible Access Control Markup Language (XACML) version 3 architecture' should be implemented within I2UA. However it seems to us than the implementation should be place within SOA & IdM services and I2UA should use it rather than implement itself. Please clarify if the XACML implementation will be in the SOA & IdM and I2UA will use it, or I2UA shall implement another XACML architecture.	XACML will be implemented within a SOA&IdM Platform's Policy Decision Point (PDP) called by a Policy Enforcement Point (PEP) in the I2UA. The I2UA SRS in IFB Amendment 5 has been updated with a new paragraph [229] that explicitly states this.
CR123	N/A	We would like to know if it is permitted to act as subcontractor for different consortia? We would like to offer our expertise via different proposal consortia. The offered expertise will be practically the same in all proposals, because we intend to bid only on 1 part. In the past there have been Invitations to Tender (from other customers) where we were only allowed to bid 1 time with 1 consortium. Does that apply for the INTELFS2 bid as well?	From the NCI Agency's perspective, companies are free to act as a subcontractor for multiple prime contractors. Any exclusivity/non-exclusivity arrangements are between the companies, and are not NCIA's responsibility. Therefore, if Company A and Company B are both submitting competing bids as prime contractors, Company Z is free to act as a subcontractor to both of them.
CR124	CSP	19 SYSTEMS WARRANTY 19.2 Following FSA, the Contractor shall provide a one-year warranty for the supplies and services delivered under this Contract in accordance with the terms and conditions stipulated in Part IV - Statement of Work, Section 13, and Clauses 27 and 31 of the Contract General Provisions There is no section 13 in SOW for I2BE . Please Indicate which part of the SOW we shall refer to	In the updated Contract Special Provisions provided with Amendment 6, Section 19 has been corrected to refer to "Statement of Work, Section 2.3.7".
CR125	SOW I2BE 1.5	In answer to CR6 it is indicated that "an Initial API will we be provided by NCIA…. ". Could you please add this PFI in chapter 1.5 of SOW I2BE	Section 1.5 of the I2BE SOW provided with Amendment 6 has been updated to reflect this.
CR126	SOW I2BE 1.5 and 2.4.1	[25] an d NCIA will provide user accounts on NSF. Could you please confirm - that all necessary development tools will be accessible on NSF . - that We just have to provide development Computers in our premises . - No specific SW (for instance for security reasons)will have to be installed on these computers	The development tools that will be provided are listed in SOW 2.4.1. The NSF will not provide the integrated development environment (IDE).
CR127	SOW I2BE [SOWG-133]	The Contractor shall ensure that the warranty conditions remain valid even if the software is relocated/ redeployed to an equivalent platform during the warranty period . Could you please explain what could be an equivalent platform	An equivalent platform will have the same amount, or better, computing resources (CPU, memory, and storage capacity), the same operating system, and a version of the Platform as a Service (PaaS) that is the same or backward compatible with the previous version of the PaaS. This clarification has been added to [SOWG-133] in the SOWs with Amendment 6.

CR128	[SOWG-135]	"The Contractor shall provide 3rd Level maintenance, when requested by the Purchaser, to define the solution to a problem (corrective maintenance) or to maintain up to date software configuration (adaptive maintenance following changes to the underpinning hardware, firmware and software environment) e.g. security patches, operating system upgrades, minor software configuration changes due to operational/interface needs" It seems that for example Operating system upgrades can not be included in 3rd level maintenance . It should be preferable that SOWG-135 shall be managed under a change Order . Please confirm that you want the Contractor to include the price of this SOWG without any detailed assumption.	There is no Change order/request foreseen for this requirement, the scope is clear and that scope is expected to be priced by the Contractor in the bidding phase already. The Contractor is expected to provide all necessary Level 3 maintenance and support to keep the SW operational in case the Purchaser makes changes in the underlying infrastructure (such Purchaser changes can be to HW, FW or SW environment and examples are given as security updates, operating system upgrades, etc.). [SOWG-135] has been updated in the SOWs in Amendment 6 to reflect that changes to the underpinning hardware, firmware and software environment will be done by the Purchaser.
CR129	[SOWG-373]	« The Contractor shall at the Deliverable Acceptance Review demonstrate that the any API implemented as part of the deliverable is fully documented " Please confirm this sentence is correct and that no word is missing	The requirement has in the I2BE SOW in Amendment 6 been rephrased to "*The Contractor shall at the Deliverable Acceptance Review demonstrate that API changes (if any) are fully documented* ".
CR130	SOA-IDM	Are only Docker and Kubernetes Pods deployment supported on the SOA&IdM Platform or also Virtual Machines?	The SOA Platform is based on the use of containers. The Platform Foundation, which provides the Container and Kubernetes infrastructure, sits on Virtual Machines provided by the underlying Infrastructure as a Service (IaaS). Therefore the platform itself does not support VMs, but the IaaS will support the deployment of VMs. "External Services" running on VMs can still take advantage of some of the Platform Services, but will not get the full benefit of deployment on the Platform. The Bidder should note the requirements in section 2.1.2.1 and the expectations for the solution to be hosted on the SOA & IdM platform.
CR131	SOA-IDM	Is JWT also supported by the IdM Platform?	Yes, the platform supports the Open ID Connect (OIDC) specification, which uses JWTs. There will be an IdP that will be able to issue JWTs.
CR132	SOA-IDM	How do the services contribute to (access) logging and audit? Which interface and schema has to be supported?	Services hosted on the platform have to implement an Observability contract to allow the platform to retrieve observability data. This is defined in the SOA Platform ICD. External Services will be monitored using the Beats family of components.
CR133	SOA-IDM	Is an API Gateway provided by the SOA IDM Platform?	No, an API Gateway is not provided by the platform.
CR134	SOA-IDM	Is the Sidecar Proxy for authorization provided by the SOA IDM Platform?	Yes, the Side Car proxy is an integral part of the Platform Foundation. Furthermore, a PEP will be provided to do authorisation for common application runtimes.
CR135	GENERAL	Is there a specific template to use for Solution Description Document(SDD)?	There is no template. The content for the SDD is described in SOW chapter 2.5.3.2
CR136	GENERAL	Solution Description Document(SDD) is expected to be single PDF file. Could extra attachments be provided for submission in case the PDF file size exceeds the specified limit?	Please note that in IFB Amendment 3, Bidding Instructions paragraph 3.2.2 increased the size limit of any emails submitted to 15 MB. It is acceptable for bidders to split the SDD (or any other document) and submit in multiple emails in case this is necessary to remain under the size limitation. Paragraph 3.3.3 of the Bidding Instructions has been updated to clarify this.
CR137	GENERAL	Could alternative solutions for the software requirements be mentioned in the Solution Description Document(SDD)?	The bidder shall propose one and only one solution.

CR138	GENERAL	What are the restrictions on using third-party javascript component libraries with paid commercial license?	There are no restrictions beyond what is stated in the IFB. The cost will need to be included in the bid, and the license shall be registered with NCIA as the end user (see SOW requirement [SOWG-124]).
CR139	SOWG-361	Is it a must for the technical leader to have documented expert experience in Angular framework? Is it acceptable to have React experience instead of Angular? Will the bid be non-compliant if some of the stated technical qualifications are not met? To be more specific, Angular, C# and .Net in paragraph 3 and social network analysis in paragraph 5?	As the I2UA contract shall be implemented in Angular (see I2UA SRS requirement [GUA-15]), expert experience in Angular will be considered a very important skill to have. If a proposed Key Personnel lacks or has inferior qualifications, this will be given a lower score without necessarily rendering the bid non-compliant. Please note paragraph 4.3.1.2.2.1.2 of the Bidding Instructions states: "Bidders are advised that any Bid whose Technical Proposal receives a score of less than 20% of the total unweighted raw score possible in any of the sub-criteria listed in Section 4.5 of this document may be determined by the Purchaser to be non-compliant and not considered for further evaluation."
CR140	SOWG-365	Is it a must for the Test Director to have all the qualifications stated in this section?	As answered above, missing or inferior qualifications may result in a lower score in that area of the bid evaluation, without necessarily rendering the bid non-compliant.
CR141	SOWG-367	Do all software developers have to have a UX design certification? Will the bid be non-compliant if some of the software developers do not meet some of the requirements in paragraphs 2,3 and 4?	No, all software developers do not need to have UX design certification. As above, for the I2UA evaluation a team that has documented strong UX experience will score better than one that does not have this documented experience and skills.
CR142	SOWG-9	Is it a must for the project manager to meet all the qualifications (i.e. having masters degree) stated in SOW ?	As answered above, missing or inferior qualifications may result in a lower score in that area of the bid evaluation, without necessarily rendering the bid non-compliant.
CR143	GENERAL	Having analyzed those four FS1 documents from the past; however, no text/evidence has been found against reliability/availability requirements of the Software. It is suspected that such analyses/measurements can be observed in one of the test procedures/reports. Is it possible that these documents/lists (samples only) are shared at this time of the bidding process?	The Agency will not share test results from previous projects at this stage.
CR144	[GUA-12], [FUA-63], [FUA-607], [FUA-224], [FUA-261], [FUA-390], [FUA-391], [FUA-392]	Will backend services be provided for PDF export operations?	Yes, see backend SRS requirement [FBE-26]
CR145	[FUA-148], [FUA-433], [FUA-474]	Will XSD schema documents be provided for XML export operations whose output will be used by external applications?	As there is no defined XML exchange formats, the purchaser cannot commit to providing such schemas. This means that the bidder needs to plan for defining the XML schemas.
CR146	[FUA-147]	Will KML import/export operations be handled by backend services? If not will any front-end library be provided?	There are no such services defined for the I2BE. However, see response to CR148 below explaining the capabilities of the C4ISR Visualization Component (VC)
CR147	[GUA-143]	Will KMZ import/export operations (zip/unzip) be handled by backend services?	There are no such services defined for the I2BE.
CR148	[GUA-143]	Will NVG import/export operations be handled by backend services? If not will any front-end library be provided?	In relation to the import/ export requirements as defined in Table 2-8 in the I2UA SRS, the C4ISR Visualization Component (VC) can import NVG and KML/ KMZ files. The VC can export NVG, KML/ KMZ, Shape, and PNG files.

CR149	[FUA-65]	[FUA-65] requires products to be exported to a file that will be used by the Joint Exercise Management Module (JEMM). Would you clarify Product export file format that will be used by the Joint Exercise Management Module (JEMM) externally?	Additional information has been added to Section 4.1.2.8 of the I2UA SRS of Amendment 6 that clarifies that the product exchange file is the product information as defined by information model exported in such a way that it can be easily re-imported using the back-end OData API. The additional clarification to requirement [FUA-65] has also been updated in the SSS and Bidding Sheet for the I2UA.
CR150	[FUA-70]	Will there be backend services for handling PDF editing and collation operations of BSO Management Application's PDF Viewer component?	There will be no PDF editing. The backend will extract the raw text from the PDF file to support the collation operations; see requirement [FBE-54] in backend SRS.
CR151	[FUA-94]	Does BSO import request function mentioned in requirement [FUA-94] involve file import?	No, I2UA will expand the graph by getting related BSOs through the I2BE API.
CR152	[FUA-135], [FUA-395]	Which file format will be used for exporting search results in the Search Application?	That will be for the contractor to define as part of the technical solution.
CR153	[FUA-155]	Is there any restriction on the file format when importing/exporting search queries?	Requirements pertaining to this is defined in I2UA SRS section 2.1.3.
CR154	[FUA-413]	Which file format will be use when exporting CR ("bag of CRs")/CRL/CTL?	This is defined in the acceptance criteria to User Story [US 79], see [AC 79-1], [AC 79-2], [AC 79-3] and [AC 79-4].
CR155	[FUA-454]	Which file format will be used when exporting Tasks ("bag of tasks") and CXP?	This is defined in the acceptance criteria to User Story [US 86], see [AC 86-1], [AC 86-2], [AC 86-3] and [AC 86-4].
CR156	[GUA-43]	Is it an expected function of the Table View component to handle pasting of tabular data with multiple rows and columns from MS Office?	This has not been defined as a requirement in the IFB.
CR157	[FUA-307]	Are the named query notifications generated when the result of the query changes (i.e. when a new item is added or removed) or when the query itself is modified?	It shall be generated when the result of a search/ query changes. See also [FBE-116] in the backend SRS.
CR158	[US 5], [FBE-172]	Does [US 5] covers with [FBE-172]? How can user management application access domain values on a specific node. Will user managemenet application get domain values from backend services of ON's or save all domain values to its own database?	[FBE-172] will cover [US 5]. The I2UA requirement [FUA-5] is removed from the I2UA SRS in Amendment 6. Also the I2BE SRS is updated in IFB Amendment 6 to emphasise that [FBE-172] will cover [US 5]. The text changes to the requirements have also been updated in the SSS and Bidding Sheet Excel files for both I2UA and I2BE in Amendment 6.
CR159	General	Will user management application has PEP, PDP, PAP implementations for authorization and authentication requirements or will they be provided by SOA/IdM platform ?	PDP and PAP services will be provided by the SOA & IdM Platform, and a PEP will be provided to do authorisation for common application runtimes. See also answer to CR122 above.
CR160	SOW Book II-Part IV-SOW I2BE	How many main Work Pacakges will be in the I2BE Contract, WP2 only or WP2.1, WP 2.2? Will Work Package Start-up Meeting be conducted only at the begining of the project after Kick-Off Meeting? Or Will WorkPackage Startup Meeting be conducted for each phase WP2.1 and WP2.2?	For the backend there will be one WP for the implementation of the I2BE (named WP2.1) and a second WP for the Maintenance and Support work (named WP 2.2). The SOW Chapter 2 defines the work to be done within the project up until FSA, so the WP start-up meeting (as defined in the SOW) is for the I2BE only applicable for WP2.1.
CR161	SOW Book II-Part IV-SOW I2BE Annex A SRS	Geospatial Services - In which format map data will be served and processed?	The geospatial services are provided by the Core GIS system which is implemented using ESRI ArcGIS. CoreGIS (ArcGIS) supports the OGC standards (see for instance https://enterprise.arcgis.com/en/server/latest/publish-services/linux/ogc-support-in-arcgis-server.htm)
CR162	SOW Book II-Part IV-SOW I2BE Annex A SRS	Geospatial Services - What type of coverage data will be provided for height calculation? For what purpose? Will there be weather?	Different formats of elevation data can be made available through Core GIS, including DTED, SRTM, and LiDAR. Weather information is provided through the NAMIS system (see ICD found in the Reference Documents folder on the IFB portal)

CR163	SOW Book II-Part IV- SOW I2BE Annex A SRS	Geospatial Services - What kind of information will it be extracted from the map data?	Map data will generally only be used for displaying in the C4ISR Visualization Component (VC) where the VC does the displaying directly. The other usage of map data will be for generating terrain and mobility overlays (see BE SRS section 3.2.7.1)
CR164	SOW Book II-Part IV- SOW I2BE Annex A SRS	In the NFR-11 ,The services shall be able to receive 2 million new IIEs per day without any critical failure for at least 99.5% of its Operational time. What will be the instant maximum data entry?	The requirement is 2 million a day; there is no instant (or burst) requirement. The I2BE shall be able to manage 2000 concurrent users/ connections (see SRS requirement [NFR-10]).
CR165	Book I-Bidding Instructions 3.3 & SOW Book II-Part IV- SOW I2UA [SOWG-231]	According to the SOW, File names should be [NU|NR]_[Contract number]_[Name of document]_[v0.x|v1.0].[filename extension] According to the BI, convention defined as "14873-UA/BE-Company Name–Vol III–Tech2-PMP" is only for e-mail subject line, not for filename. Filename should be according to the SOW-231. Could you please confirm this?	The SOW defines file name convention for files produced during *project execution* . The Bidding Instructions defines the file name convention for the files to be submitted for the bid in Section 3.3.3, and defines the email subject line in Section 3.3.1.
CR166	Book II – Part II – Contract Special Provisions 17.10	According to Contract Special Provisions 17.10, in our bid packages should'nt our files (e.g PMP, QAP, etc) include our company Logo in the header/footer/coverage page?	CSP Section 17.10 refers to software delivered under the awarded contract, not files submitted as part of the bid. Bidders are free to include their company logo in their bids.
CR167	SOW Book II-Part IV- SOW I2UA	How many main Work Pacakges will be in the I2UA Contract, WP1 only or WP1.1, WP 1.2, WP1.3 and WP1.4? Will Work Package Start-yp Meeting be conducted only at the begining of the project after Kick-Off Meeting? Or Will WorkPackage Startup Meeting be conducted for each phase WP1.1, WP1.2 and WP1.3?	There will be one WP Startup Meeting for each of the three work packages during the project execution (until FSA); that means a WP Startup Meeting for WP1.1, another startup meeting for WP1.2, and also a startup meeting for WP1.3. The optional WP1.4 that follows the Warranty will not require a WP Startup Meeting as defined by SOW 2.4.4.1.

NATO Communications and Information Agency
Agence OTAN d'information et de communication

Invitation for Bids

IFB-CO-14873-INTELFS2
Intelligence Functional Services (INTEL-FS) - Spiral 2 and BMD functions in INTEL-FS

IFB-CO-14873-INTELFS2-UA
User Applications

IFB-CO-14873-INTELFS-BE
Backend Service and Integration

GENERAL INDEX

NATO Communications and Information Agency
Agence OTAN d'information et de communication

**IFB-CO-14873-INTELFS2
Amendment 6**

**Intelligence Functional Services (INTEL-FS) - Spiral 2
and BMD functions in INTEL-FS**

BOOK I

BIDDING INSTRUCTIONS

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Annex D   Clarification Request Form

SECTION 1   INTRODUCTION

1.1.   Purpose and Scope

1.1.1.   The NATO Communications and Information (NCI) Agency has been authorized to invite bids and award two contracts to upgrade the current Intelligence Functional Services (INTEL-FS) capabilities. One contract will be for the User Applications; the second contract will be for the Backend Services and Integration with other systems.

1.1.2.   All of the technical details and requirements of the project are explained in Book II, Part IV, Statement of Work (SOW) and the SOW annexes. There is a separate SOW, SOW Annex A and SOW Annex B for each prospective contract.

1.2.   Overview of the Prospective Contracts

1.2.1.   Book II of this IFB provides the Prospective Contracts that will require the selected Contractor to deliver the INTEL-FS capabilities. The Contractor shall perform all activities required in Book II Part IV (SOW and Annexes) and shall deliver the associated deliverables as per Book II Part I (Schedule of Supplies and Services (SSS)).

1.2.2.   The Contracts resulting from this IFB shall be awarded on a Fixed Price Incentive Fee (FPIF) basis.

1.2.3.   Both contracts will use elements of the Agile methodology, with multiple increments, each consisting of several sprints, and the opportunity for frequent acceptances of functional software.

1.2.4.   The Contract will be governed by Book II, Part II (Contract Special Provisions), and Part III (Contract General Provisions).

1.2.5.   Any terms and conditions that are specific to one of the contracts will be marked as either CO-14873-INTELFS2-UA for the User Applications contract, CO-14873-INTELFS2-BE for the Backend Services contract.

1.3.   Governing Rules, Eligibility, and Exclusion Provisions

1.3.1.   This solicitation is an International Invitation for Bid (IFB) and is issued in accordance with the procedures for International Competitive Bidding (ICB) set forth in NATO document AC/4-D/2261 (1996 Edition) and its Annex X, dated 24 July 2009, with the exception explained in Section 4.3.1.2 as authorized by the Investment Committee.

1.3.2.   Pursuant to these procedures, bidding is restricted to companies from participating NATO member countries (see Para 2.1.1.6) for which a Declaration of Eligibility has been issued by their respective national authorities.

1.4.   Best Value Evaluation Method

1.4.1.   The evaluation method to be used in the selection of the successful Bidder under this solicitation will follow the Best Value Procedures set forth in AC/4-D/2261, Annex X, dated 24 July 2009, and AC/4(2008)0002-REV2-ANNEX 1, dated 15 July 2015, or deviations to the procedure, as approved by the NATO Investment Committee.

1.4.2.   The Bid evaluation criteria and the detailed evaluation procedures are described in SECTION 4

1.4.2.1.   Some of the evaluation criteria for CO-14873-INTELFS2-UA and –BE are different from one another, given that the bids are evaluated against different skills and experiences, and against different technical requirements. Bidders are encouraged to closely review all of SECTION 4 to ensure a thorough understanding of how the bids for each prospective contract will be evaluated.

1.4.2.2.   The evaluation of bids for CO-14873-INTELFS2-UA and –BE will be performed independently from one another.

1.4.2.3.   Please note that the technical and price evaluations will be conducted in parallel by independent evaluation teams.

1.4.3.   The Bidder shall refer to the Purchaser all queries for resolution of any conflicts found in information contained in this document in accordance with the procedures set forth in paragraph 2.6 "Request for IFB Clarifications".

1.5.   Security

1.5.1.   This Invitation for Bid is NATO UNCLASSIFIED.

1.5.2.   Contractor personnel will be required to possess a security clearance of "NATO SΞCRET" (NS) for the performance of the Contract.

1.5.3.   The Contractor will be required to handle and store classified material to the level of "NATO RESTRICTED".

1.5.4.   The Contractor shall have the appropriate facility and personnel clearances at the date of Contract Signature. Should the Contractor be unable to perform the Contract due to the fact that the facility/security clearances have not been provided by their respective national security agency, this lack of clearance cannot be the basis for a claim of adjustment or an extension of schedule, nor the lack of clearance be considered a mitigating circumstance in the case of an assessment of Liquidated Damages or a determination of Termination For Default by the Purchaser under the Prospective Contract.

1.5.5.   Contractor personnel working at NATO or National sites without such a clearance confirmed by the appropriate national security authority and

transmitted to the cognisant NATO or National security officer at least fourteen (14) days prior to the site visit, will be denied access to the site. Denial of such access by the Purchaser may not be used by the Contractor as the basis for a claim of adjustment or an extension of schedule nor can the denial of access be considered a mitigating circumstance in the case of an assessment of Liquidated Damages or a determination of Termination for Default by the Purchaser.

1.5.6.   Bidders are advised that Contract signature will not be delayed in order to allow the processing of NS security clearances for personnel or facilities and, should the otherwise successful Bidder not be in a position to accept the offered Contract within a reasonable period of time, due to the fact that its personnel or facilities do not possess the appropriate security clearance(s), the Purchaser may determine the Bidder's Offer to be non-compliant and offer the Contract to the next ranking Bidder. In such a case, the Bidder who would not sign the Contract shall be liable for forfeiture of the Bid Guarantee.

1.6.   Bidders Conference

1.6.1.   Prospective Bidders are invited to a Bidders Conference that will be held on-line on Thursday, 11 February 2021. The technical and logistical details of connecting to the Conference will be provided at a later date.

1.6.2.   The purpose of the Bidders Conference is to brief the Prospective Bidders on the IFB. The Conference is planned to include a briefing on the bidding process and the bidding sheets, the Prospective Contract, and the technical aspects of the project. The agenda will be sent to attendees in advance.

1.6.3.   Those companies that wish to participate in the Bidders Conference must indicate their intention to attend not later than 7 days prior to the date of the Conference to the Point of Contact stated in paragraph 2.5.1.

1.6.4.   Bidders may submit questions in writing not later than 7 days prior to the date of the Conference to the email address in paragraph 2.5.1. The Purchaser will endeavour to respond to these questions during the Bidders Conference.

1.6.5.   For any additional questions that are asked at the Conference, the Purchaser may attempt to answer them at that time, but any answer that may appear to change terms, conditions and/or specifications of the IFB shall be considered to be formally included in the IFB only after a written amendment to the IFB is issued in writing by the Purchaser.

1.6.6.   Answers to all questions will be issued in writing to all Bidders as soon as practicable after the Conference, whether or not the Bidders attended the Conference. The formal written answers will be the official response of

the Agency, even if the written answer differs from the verbal response provided at the Conference.

1.6.7.   Notwithstanding the written answers provided by the NCI Agency after the Bidders Conference, the terms and conditions of the IFB remains unchanged unless a formal IFB amendment is issued by the NCI Agency.

1.7.   Documentation

1.7.1.   All documentation – including the IFB itself, all applicable documents and any reference documents provided by the Purchaser – are solely to be used for the purpose of preparing a response to this IFB. They are to be safeguarded at the appropriate level according to their classification and reference documents are provided "as is", without any warranty as to quality or accuracy.

SECTION 2   GENERAL BIDDING INFORMATION

2.1.   Definitions

2.1.1.   In addition to the definitions and acronyms set forth in the Contract Special Provisions (Part II) and Contract General Provisions (Part III) of the prospective Contract, the following terms and acronyms, as used in this Invitation for Bid shall have the meanings specified below:

2.1.1.1.   "Bidder": a firm, consortium, or joint venture which submits an offer in response to this solicitation. Bidders are at liberty to constitute themselves into any form of Contractual arrangements or legal entity they desire, bearing in mind that in consortium-type arrangements a single judicial personality shall be established to represent that legal entity. A legal entity, such as an individual, Partnership or Corporation, herein referred to as the "Principal Contractor", shall represent all members of the consortium with the NCI Agency and/or NATO. The "Principal Contractor" shall be vested with full power and authority to act on behalf of all members of the consortium, within the prescribed powers stated in an irrevocable Power of Attorney issued to the "Principal Contractor" by all members associated with the consortium. Evidence of authority to act on behalf of the consortium by the "Principal Contractor" shall be enclosed and sent with the Bid. Failure to furnish proof of authority shall be a reason for the Bid being declared non-compliant.

2.1.1.2.   "Compliance": strict conformity to the requirements and standards specified in this IFB and its attachments.

2.1.1.3.   "Contractor": the awardee of this solicitation of offers, who shall be responsible for the fulfilment of the requirements established in the prospective Contract.

2.1.1.4.   "Firm of a Participating Country": a firm legally constituted or chartered under the laws of, and geographically located in, or falling under the jurisdiction of a Participating Country.

2.1.1.5.   "IFB": Invitation for Bid.

2.1.1.6.   "Participating Country": any of the following 29 NATO nations (in alphabetical order): ALBANIA, BELGIUM, BULGARIA, CANADA, CROATIA, CZECH REPUBLIC, DENMARK, ESTONIA, FRANCE, GERMANY, GREECE, HUNGARY, ICELAND, ITALY, LATVIA, LITHUANIA, LUXEMBOURG, MONTENEGRO, THE NETHERLANDS, NORWAY, POLAND, PORTUGAL, ROMANIA, SLOVAKIA, SLOVENIA, SPAIN, TURKEY, THE UNITED KINGDOM and THE UNITED STATES.

2.1.1.7.   "Purchaser": NATO Communications and Information Agency (NCI Agency) or its legal successor.

2.1.1.8. "Quotation" or "Bid": a binding offer to perform the work specified in the attached prospective Contract (Book II).

2.2. Eligibility and Origin of Equipment and Services

2.2.1. All Contractors, Subcontractors and manufacturers, at any tier, must be from Participating Countries.

2.2.2. None of the work, including project design, labour and services shall be performed other than by firms from and within Participating Countries.

2.2.3. No materials or items of equipment down to and including identifiable Sub-assemblies shall be manufactured or assembled by a firm other than from and within a Participating Country.

2.2.4. Unless otherwise authorised by the terms of the prospective Contract, the Intellectual Property Rights to all design documentation and related system operating software shall reside within NATO member countries, and no license fees or royalty charges shall be paid by the Contractor to firms, individuals or governments other than within the NATO member community.

2.3. Bid Delivery and Bid Closing

2.3.1.   The closing date and time for submission of bids in response to this IFB is **12h00 / 12pm (Central European Time) on 8 April 2021**.

2.3.2.   For bidders that submit a bid for both the User Applications (UA) and Back-end Services (BE) contracts, the bids shall be submitted separately. The bid openings and every aspect of the evaluations will be performed independently from one another.

2.3.3.   Bids shall be delivered to the appropriate email address below:

For bids for the User Application, Front-end contract:

IFB-CO-14873-INTELFS2-UA.Bids@ncia.nato.int

or

For bids for the Data Management, Back-end contract:

IFB-CO-14873-INTELFS2-BE.Bids@ncia.nato.int

2.3.4.   Late Bids

2.3.4.1.   Bids which are delivered to the Purchaser after the specified time and date set forth above for Bid Closing are "Late Bids" and shall not be considered for award. Such Bids will remain unopened unless the Purchaser can determine that the Bid in question meets the criteria for consideration as specified below.

2.3.4.2.   *Consideration of Late Bid* – The Purchaser considers that it is the responsibility of the Bidder to ensure that the Bid submission arrives by the specified Bid Closing time. A late Bid shall only be considered for award under the following circumstances:

2.3.4.2.1.   A Contract has not already been awarded pursuant to the Invitation for Bid, and;

2.3.4.2.2.   The Bid was sent to the correct email address specified in Section 2.3.3 and the delay was solely the fault of the Purchaser.

2.4.   Requests for Extension of Bid Closing Date

2.4.1.   Bidders are informed that requests for extension to the closing date for the IFB shall be submitted by the Bidder <u>only</u> through its respective country's NATO Delegation or Embassy to the Purchaser Point of Contact indicated in Section 2.5.1 below. Any request for extension shall be submitted by the respective NATO Delegation or Embassy **no later than fourteen (14) calendar days** prior to the established Bid closing date. Bidders are advised to submit their request in sufficient time as to allow their respective NATO Delegation or Embassy to deliver the formal request to the Purchaser within the above time limit.

2.5.   Purchaser's Point of Contact

2.5.1.   The Purchaser point of contact for all information concerning this IFB is:

   Mr. Dan Gaertner, Senior Contracting Officer
   Acquisition, NCI Agency
   Questions/Clarifications:
      IFB-CO-14873-INTELFS2@ncia.nato.int
   Bid Delivery :
      All bids shall be delivered by email as stated in paragraph 2.3.3.

2.6.   Request for IFB Clarifications

2.6.1.   Bidders, during the solicitation period, are encouraged to query and seek clarification of any matters of a contractual, administrative and technical nature pertaining to this IFB.

2.6.2.   All questions and requests for clarification shall be forwarded to the Purchaser using the Clarification Request (CR) Forms provided at Annex D of this Book I. Such questions shall be submitted by email to the point of contact specified in Section 2.5.1 above and shall arrive **not later than twenty eight (28) calendar days** prior to the stated "Bid Closing Date". The Purchaser is under no obligation to answer requests for clarification submitted after this time. Requests for clarification must address the totality of the concerns of the Bidder, as the Bidder will not be permitted to revisit areas of the IFB for additional clarification except as noted in Section 2.6.4, below.

2.6.3.   Bidders shall keep the classification of their request NATO Unclassified to facilitate a quicker review and response. Such requests shall be emailed to the point of contact specified in paragraph 2.5.1 above.

2.6.4.   Additional requests for clarification are limited only to the information provided as answers by the Purchaser to Bidder requests for clarification.

Such additional requests shall arrive not later than fourteen (14) calendar days before the established Bid Closing Date.

2.6.5. It is the responsibility of the Bidders to ensure that all Clarification Requests submitted bear no mark, logo or any other form or sign that may lead to reveal the Bidders' identity in the language constituting the clarification itself. This prescription is not applicable to the means used for the transmission of the clarification (i.e. email or form by which the clarification is forwarded).

2.6.6. The Purchaser declines all responsibilities associated to any and all circumstances regardless of the nature or subject matter arising from the Bidders' failure or inability to abide to the prescription in Section 2.6.5.

2.6.7. The Purchaser may provide for a re-wording of questions and requests for clarification where it considers the original language ambiguous, unclear, subject to different interpretation or revelatory of the Bidder's identity.

2.6.8. Bidders are advised that subsequent questions and/or requests for clarification included in a Bid shall neither be answered nor considered for evaluation.

2.6.9. Except as provided above, all questions will be answered by the Purchaser and the questions and answers (but not the identity of the questioner) will be issued in writing to all prospective Bidders.

2.6.10. Where the extent of the changes implied by the response to a clarification request is of such a magnitude that the Purchaser deems necessary to issue revised documentation, the Purchaser will do so by the means of the issuance of a formal IFB amendment pursuant to AC/4-D/2261 and in accordance with paragraph 2.8.

2.6.11. The Purchaser reserves the right to reject questions and clarification requests clearly devised or submitted for the purpose of artificially obtaining an extension of the bidding time (i.e. clarifications re-submitted using different wording where such wording does not change the essence of the clarification being requested).

2.6.12. The published responses issued by the Purchaser shall be regarded as the authoritative interpretation of the Invitation for Bid. Any amendment to the language of the IFB included in the answers will be issued as an IFB Amendment and shall be incorporated by the Bidder in his offer.

2.7. Requests for Waivers and Deviations

2.7.1. Bidders are informed that requests for alteration to, waivers or deviations from the terms and conditions of this IFB and attached prospective Contract (Book II) will not be considered after the request for clarification process. Requests for alterations to the other requirements, terms or conditions of the Invitation for Bid or the prospective Contract may only be

considered as part of the clarification process set forth in paragraph 2.6 above. Requests for alterations to the specifications, terms and conditions of the Contract which are included in a Bid as submitted may be regarded by the Purchaser as a qualification or condition of the Bid and may be grounds for a determination of non-compliance.

2.8.   Amendment of the IFB

2.8.1.   The Purchaser may amend the IFB at any time prior to the Bid Closing Date. Any and all changes will be transmitted to all Bidders by an official amendment designated as such and signed by the Purchaser. This process may be part of the clarification procedures set forth in paragraph 2.6 or may be an independent action on the part of the Purchaser.

2.8.2.   The Purchaser will consider the potential impact of amendments on the ability of prospective Bidders to prepare a Bid within the allotted time. The Purchaser may extend the "Bid Closing Date" at its discretion and such extension will be set forth in the amendment.

2.8.3.   All such IFB amendments issued by the Purchaser shall be acknowledged by the Bidder in its Bid by completing the "Acknowledgement of Receipt of IFB Amendments" certificate at Annex B-2. Failure to acknowledge receipt of all amendments may be grounds to determine the Bid to be administratively non-compliant.

2.9.   Modification and Withdrawal of Bids

2.9.1.   Bids, once submitted, may be modified by Bidders, but only to the extent that the modifications are in writing, conform to the requirements of the IFB, and are received by the Purchaser prior to the Bid Closing Date as detailed in paragraph 2.3.1. Such modifications will be considered as an integral part of the submitted Bid.

2.9.2.   Modifications to Bids which arrive after the Bid Closing Date will be considered as "Late Modifications" and will be processed in accordance with the procedure detailed in paragraph 2.3.4, except that unlike a "Late Bid", the Purchaser will retain the modification until a selection is made. A modification to a Bid which is determined to be late will not be considered in the evaluation and selection process. If the Bidder submitting the modification is determined to be the successful Bidder on the basis of the unmodified Bid, the modification may then be opened. If the modification makes the terms of the Bid more favourable to the Purchaser, the modified Bid may be used as the basis of Contract award. The Purchaser, however, reserves the right to award a Contract to the apparent successful Bidder on the basis of the Bid submitted and disregard the late modification.

2.9.3.   A Bidder may withdraw its Bid at any time prior to Bid Opening without penalty. In order to do so, an authorised agent or employee of the Bidder

must provide an original statement of the firm's decision to withdraw the Bid.

2.9.4.   Except as provided in paragraph 2.10.4.2 below, a Bidder may withdraw its Bid after Bid Opening only by forfeiture of the Bid Guarantee.

2.10.   Bid Validity

2.10.1.   Bidders shall be bound by the term of their Bid for a period of twelve (12) months starting from the Bid Closing Date specified in paragraph 2.3.1 above.

2.10.2.   In order to comply with this requirement, the Bidder shall complete the Certificate of Bid Validity set forth in Annex B-4. Bids offering less than the period of time referred to above for acceptance by the Purchaser may be determined to be non-compliant.

2.10.3.   The Purchaser will endeavour to complete the evaluation and make an award within the period referred to above. However, should that period of time prove insufficient to render an award, the Purchaser reserves the right to request an extension of the period of validity of all Bids which remain under consideration for award.

2.10.4.   Upon notification by the Purchaser of such a request for a time extension, the Bidders shall have the right to:

2.10.4.1. Accept this extension of time in which case Bidders shall be bound by the terms of their offer for the extended period of time and the Bid Guarantee and Certificate of Bid Validity extended accordingly; or

2.10.4.2. Refuse this extension of time and withdraw the Bid, in which case the Purchaser will return to the Bidder its Bid Guarantee in the full amount without penalty.

2.10.5.   Bidders shall not have the right to modify their Bids due to a Purchaser request for extension of the Bid validity unless expressly stated in such request.

2.11.   Bid Guarantee

2.11.1.   The Bid Guarantee shall be submitted by email to the Purchaser, either directly by a banking institution or from the Bidder, to the email address *NCIAFinanceTreasuryBankGuarantee@ncia.nato.int*. In either case, the Bidder shall also provide a copy of the Bid Guarantee in the Bid Administration Volume.

2.11.2.   The Bidder shall furnish with its Bid a guarantee in an amount equal to:

2.11.2.1. For IFB-CO-14873-INTELFS2-UA, One Hundred and Thirty Thousand Euro (€130,000)

2.11.2.2.   For IFB-CO-14873-INTELFS2-BE, One Hundred and Seventy Thousand Euro (€170,000).

2.11.2.3.   For any bidders submitting a bid for both UA and BE, the bid guarantees shall total €300,000 and shall be submitted separately.

2.11.2.4.   The Bid Guarantee shall be substantially similar to Annex C as an irrevocable, unqualified and unconditional Standby Letter of Credit (SLC) issued by a Belgian banking institution fully governed by Belgian legislation or issued by a non-Belgian financial institution and confirmed by a Belgian banking institution fully governed by Belgian legislation. In the latter case signed original letters from both the issuing institution and the confirming institution must be provided. The confirming Belgian bank shall clearly state that it will guarantee the funds, the drawing against can be made by the NCI AGENCY at its premises in Belgium. Bid Guarantees shall be made payable to the Treasurer, NATO Communications and Information Agency.

2.11.3.   Alternatively, a Bidder may elect to post the required Guarantee by certified cheque. If the latter method is selected, Bidders are informed that the Purchaser will cash the cheque on the Bid Closing Date or as soon as possible thereafter.

2.11.4.   If the Bid Closing Date is extended after a Bidder's financial institution has issued a Bid Guarantee, it is the obligation of the Bidder to have such Bid Guarantee (and confirmation, as applicable) extended to reflect the revised Bid Validity date occasioned by such extension.

2.11.5.   Failure to furnish the required Bid Guarantee in the proper amount, and/or in the proper form and/or for the appropriate duration by the Bid Closing Date may be cause for the Bid to be determined non-compliant.

2.11.6.   The Purchaser will make withdrawals against the amount stipulated in the Bid Guarantee under the following conditions:

2.11.6.1.   The Bidder has submitted a Bid and, after Bid Closing Date (including extensions thereto) and prior to the selection the compliant Bid determined to represent the best value, withdraws his Bid, or states that he does not consider his Bid valid or agree to be bound by his Bid, or

2.11.6.2.   The Bidder has submitted a compliant Bid determined by the Agency to represent the best value, but the Bidder declines to sign the Contract offered by the Agency, such Contract being consistent with the terms of the Invitation for Bid.

2.11.6.3.   The Purchaser has offered the Bidder the Contract for execution but the Bidder has been unable to demonstrate compliance with the security requirements of the Contract within a reasonable time,

2.11.6.4. The Purchaser has entered into the Contract with the Bidder but the Bidder has been unable or unwilling to provide the Performance Guarantee required under the terms of the Contract within the time frame required.

2.11.7. Bid Guarantees will be returned to Bidders as follows:

2.11.7.1. To non-compliant Bidders forty-five (45) days after notification by the Purchaser of a non-compliant Bid (except where such determination is challenged by the Bidder; in which case the Bid Guarantee will be returned forty-five (45) days after a final determination of non-compliance);

2.11.7.2. To all other unsuccessful Bidders within thirty (30) days following the award of the Contract to the successful Bidder;

2.11.7.3. To the successful Bidder upon submission of the Performance Guarantee required by the Contract.

2.11.7.4. pursuant to paragraph 2.10.4.2.

2.11.8. "Standby Letter of Credit" or "SLC" as used herein, means a written commitment by a Belgian financial institution either on its own behalf or as a confirmation of the Standby Letter of Credit issued by a non-Belgian bank to pay all or part of a stated amount of money, until the expiration date of the letter, upon presentation by the Purchaser of a written demand therefore. Neither the financial institution nor the Contractor can revoke or condition the Standby Letter of Credit. The term "Belgian financial institution" includes non-Belgian financial institutions licensed to operate in Belgium,

2.12. Cancellation of IFB

2.12.1. The Purchaser may cancel, suspend or withdraw for re-issue at a later date this IFB at any time prior to Contract award. No legal liability on the part of the Purchaser for payment of any sort shall arise and in no event will any Bidder have cause for action against the Purchaser for the

recovery of costs incurred in connection with preparation and submission of a Bid in response to this IFB.

2.13. Electronic Transmission of Information and Data

2.13.1.   The Purchaser will communicate answers to requests for clarification and amendments to this IFB to the prospective Bidders as soon as practicable.

2.13.2.   Bidders are advised that the Purchaser will rely exclusively on email communication to manage all correspondence related to this IFB, including IFB amendments and clarifications.

2.13.3.   Bidders are cautioned that electronic transmission of documentation which contains classified information is not allowed.

2.14. Supplemental Agreements

2.14.1.   Bidders are required, in accordance with the certificate at Annex B-7 of these Instructions to Bidders, to disclose any prospective Supplemental Agreements that are required by national governments to be executed by NATO/ NCI AGENCY as a condition of Contract performance.

2.14.2.   Supplemental Agreements are typically associated with, but not necessarily limited to, national export control regulations, technology transfer restrictions and end user agreements or undertakings.

2.14.3.   Bidders are cautioned that failure to provide full disclosure of the anticipated requirements and the terms thereof, to the best of the Bidder's knowledge and experience, may result in the Purchaser withholding award of the Contract or cancelling an executed Contract if it is discovered that the terms of such Supplemental Agreements contradict salient conditions of the Prospective Contract to the extent that either key objectives cannot be accomplished or basic Contract principles and Purchaser rights have been abridged.

2.15. Notice of Limitations on Use of Intellectual Property Delivered to the Purchaser

2.15.1.   Bidders are instructed to review Article 17, *Intellectual Property*, of the Contract Special Provisions set forth in Part III of Book II, and Clause 30, *Intellectual Property*, of the Contract General Provisions set forth in Part III of Book II. These Clauses set forth the definitions, terms and conditions regarding the rights of the Parties concerning Intellectual Property developed and/or delivered under this Contract or used as a basis of development under this Contract.

2.15.2.   Bidders are required to disclose, in accordance with the Certificates at Annex B-10 and Annex B-11, the Intellectual Property proposed to be used by the Bidder that will be delivered with either Background Intellectual Property Rights or Third Party Intellectual Property Rights. Bidders are

required to identify such Intellectual Property and the basis on which the claim of Background or Third Party Intellectual Property is made.

2.15.3.   Bidders are further required to identify any restrictions on Purchaser use of the Intellectual Property that is not in accordance with the definitions and rights set forth in Clause 30 of the Contract General Provisions, or any other provision of the Contract concerning use or dissemination of such Intellectual Property.

2.15.4.   Bidders are reminded that restrictions on use or dissemination of Intellectual Property conflicting with Article 17 of the Contract Special Provisions, Clause 30 of the Contract General Provisions or with the objectives and purposes of the Purchaser as stated in the Prospective Contract shall result in a determination of a non-compliant Bid.

2.16.   Receipt of an Unreadable Electronic Bid

2.16.1.   If a bid received at the NCI Agency's facility by electronic data interchange is unreadable to the degree that conformance to the essential requirements of the solicitation cannot be ascertained, the CO shall immediately notify the Bidder that the bid will be rejected unless the Bidder provides clear and convincing evidence:

2.16.1.1.   of the content of the bid as originally submitted, and;

2.16.1.2.   that the unreadable condition of the bid was caused by Purchaser software or hardware error, malfunction, or other Purchaser mishandling.

2.16.2.   A Bid that fails to conform to the above requirements may be declared noncompliant and may not be evaluated further by the Purchaser.

2.16.3.   If it is discovered, during either the Administrative, Price or Technical evaluation, that the Bidder has submitted an unreadable electronic bid, the Bidder may be determined to have submitted a non-compliant bid.

SECTION 3   BID PREPARATION INSTRUCTIONS

3.1.   General

3.1.1.   Bidders shall prepare and submit their bid in accordance with the requirements and format set forth in this IFB. Compliance with all bid submission requirements is mandatory. Failure to submit a bid in conformance with the stated requirements may result in a determination of non-compliance by the Purchaser and the elimination of the bid from further consideration.

3.1.2.   Bidders **shall not simply restate the IFB requirements**. A Bid shall demonstrate that the Bidder understands the terms, conditions and requirements of the IFB and shall demonstrate the Bidder's ability to provide all the services and deliverables listed in the Schedules of the prospective Contract. Bidders shall take note of paragraph 3.1.3 below in this regard.

3.1.3.   Bidders are informed that the quality, thoroughness and clarity of the Bid will affect the overall scoring of the bid. Although the Purchaser may request clarification of the bid, it is not required to do so and may make its determination on the content of the bid as written. Therefore, Bidders shall assume that inconsistencies, omissions, errors, lack of detail and other qualitative deficiencies in the submitted Bid will have a negative impact on the final Best Value score.

3.1.4.   Partial bids and/or bids containing conditional statements will be declared non-compliant. Please note that bidders are not obligated to bid on both the Front-end User Interface and the Back-end Data Management contracts. These will be separate contracts, and so bidding on only one of them is not considered partial bidding.

3.1.5.   Bidders are advised that the Purchaser reserves the right to incorporate the successful Bidder's offer in whole or in part by reference in the resulting contract.

3.1.6.   The specific format for each volume is stated in paragraph 3.2.1.

3.1.7.   All documentation submitted as part of the bid shall be classified no higher than "NATO UNCLASSIFIED".

3.1.8.   All notices and communications regarding this IFB shall be written and conducted in English. All documentation submitted as part of the bid shall be in English.

3.2. Bid Package Content

3.2.1.   A complete bid submission shall consist of three volumes as shown in the following table.

Volume	Format and Quantity Details
I: Bid Administration	2 PDF files that include: 1. The completed, signed certificates found in Annex B, provided as a single PDF file. 2. A copy of the Bid Guarantee. Note: this shall also be delivered by email directly to: *NCIAFinanceTreasuryBankGuarantee@ncia.nato.int* ➢ All of the required contents are detailed in Section 3.4.
II: Price	Two (2) files in total, that include: 1. 1 MS Excel file: The completed Bidding Sheets template provided in Annex A-3 or Annex A-4. 2. 1 PDF file: The Offer Summary sheet of the Bidding Sheets. ➢ All of the required contents are detailed in Section 3.5.
III: Technical	1. 2. 3. Eleven (11) files in total, that include: 1. Nine (9) PDF files and two (2) MS Excel files as listed in Section 3.3.3.3. 2. It is understood that Bidders may need to split documents to remain within the email size limitation stated in paragraph 3.2.2 below, in which case they will submit more than 11 files as explained in paragraph 3.3.2. ➢ All of the required contents are detailed in Section 3.6.

3.2.2.   All emails submitted to the Purchaser shall be less than 15 MB in size.

3.3.   Package Marking

3.3.1.   The bid shall be consolidated into as few emails as possible and sent to the correct Bid Delivery email address stated in paragraph 2.3.3.   The email shall have the following subject lines:

For bids for the User Application, Front-end contract:

- 14873-INTELFS-UA Front-end Bid for *Company Name*

For bids for the Data Management, Back-end contract:

- 14873-INTELFS-BE Back-end Bid for *Company Name*

3.3.2.   In the event the bid must be submitted in multiple emails to stay under the size limit stated in paragraph 3.2.2, the bidder shall add "Email 1 of 2", "Email 2 of 2" as necessary to the subject line of the email.

3.3.3.   The individual electronic files sent by email shall have the names listed below. In the event the documents must be split into more than one file (to ensure the size of the email stays within the limit stated in paragraph 3.2.2), the Bidder shall add "Part 1 of 2", "Part 2 of 2" as necessary to the file names. Bidders shall replace "UA/BE" below with *either* UA *or* BE, as applicable.

3.3.3.1.   Volume I, Bid Administration:

- 14873-UA/BE-*Company Name*–Vol I–Admin

- 14873-UA/BE-*Company Name*–Vol I–BidGuarantee

3.3.3.2.   Volume II, Price:

- 14873-UA/BE-*Company Name*–Vol II–Price

- 14873-UA/BE-*Company Name*-Vol II-OfferSum

3.3.3.3.   Volume III, Technical:

- Engineering

- 14873-UA/BE-*Company Name*–Vol III–Tech1-DelPlan

- 14873-UA/BE-*Company Name*–Vol III–Tech2-SDD

- Management

- 14873-UA/BE-*Company Name*–Vol III–Tech3-PMP

- 14873-UA/BE-*Company Name*–Vol III–Tech4-IRR

- 14873-UA/BE-*Company Name*–Vol III–Tech5-BOE

- 14873-UA/BE-*Company Name*–Vol III–Tech6-Quals

- Supportability

- 14873-UA/BE-*Company Name*–Vol III–Tech7-CMP

- 14873-UA/BE-*Company Name*–Vol III–Tech8-ILS

- 14873-UA/BE-*Company Name*–Vol III–Tech9-QP

- 14873-UA/BE-*Company Name*–Vol III–Tech10-SupCase

- 14873-UA/BE-*Company Name*–Vol III–Tech11-Training

3.3.4.   "*Company Name*" – In the subject line of the email, and in the names of the individual files, the name of the bidder shall be abbreviated to no more than 10 characters. For example, if a company's name is "Computer and Technology Research Company", the company name could be shorted to *CTRC* in the email and file names.

3.4.   Volume I: Bid Administration

3.4.1.   This volume is comprised of:

- All of the required certificates submitted as a consolidated PDF file;

- One electronic copy of the Bid Guarantee provided with the bid as well as directly to:

NCIAFinanceTreasuryBankGuarantee@ncia.nato.int

3.4.2.   No information disclosing or contributing to disclose the bid price shall be made part of the Bid Administration volume. Failure to abide to this prescription shall result in the bid being declared non-compliant.

3.4.3.   The volume shall include the certificates set forth in the Annex to these Bidding Instructions, signed in the original by an authorised representative of the Bidder. The text of the certificates must not be altered in any way. The certificates are as follows:

3.4.3.1.   Annex B-1 (Certificate of Legal Name of Bidder)

3.4.3.2.   Annex B-2 (Acknowledgement of Receipt of IFB Amendments)

3.4.3.3.   Annex B-3 (Certificate of Independent Determination)

3.4.3.4.   Annex B-4 (Certificate of Bid Validity)

3.4.3.5.   Annex B-5 (Certificate of Exclusion of Taxes, Duties and Charges)

3.4.3.6.   Annex B-6 (Comprehension and Acceptance of Contract Special and General Provisions)

3.4.3.7.   Annex B-7 (Disclosure of Requirements for NCI Agency Execution of Supplemental Agreements) with the prospective text of such Agreements, as applicable.

3.4.3.8.   Annex B-8 (Certificate of Compliance AQAP 2110 or ISO 9001:2015 or Equivalent) with a copy of the relevant quality certification attached to it.

3.4.3.9.   Annex B-9 (List of Prospective Subcontractors)

3.4.3.10.   Annex B-10 (Bidder Background IPR)

3.4.3.11.   Annex B-11 (List of Subcontractor and Third Party IPR)

3.4.3.12.   Annex B-12 (Certificate of Origin of Equipment, Services, and Intellectual Property)

3.4.3.13.   Annex B-13 (List of Proposed Key Personnel)

3.4.3.14.   Annex B-14 (Certificate of Price Ceiling)

3.4.3.15.   Annex B-15 (Disclosure of Involvement of Former NCI Agency Employment)

3.4.3.16.   Annex B-16 (Code of Conduct: Post Employment Measures)

Please note this annex does not need to be signed; it is referenced in Annex B-15.

3.5. **Volume II: Price**

3.5.1.   This volume is comprised of:

3.5.1.1.   The completed Bidding Sheets Excel file provided with this IFB:

- For the Front-end User Applications bid: 03-IFB-CO-14873-INTELFS2-UA Book I Bidding Sheets

Or

- For the Back-end Services bid: "04-IFB-CO-14873-INTELFS2-BE Book I Bidding Sheets

3.5.1.2.   The Offer Summary sheet from the Bidding Sheets, provided as a one-page PDF file.

3.5.2.   The Schedule of Supplies and Services Excel files will be completed by the Purchaser prior to contract award and does not need to be completed as part of the Bid.

3.5.3.   General Rules

3.5.3.1.   The total prices of each bid shall not exceed the ceilings stated below. Bids submitted in excess of this ceiling may be determined to be non-compliant and eliminated from further consideration. These ceilings do not include the maximum 5% incentive fee.

3.5.3.1.1.   For the User Applications bid (IFB-CO-14873-INTELFS2-UA) Bidders are advised that the total price shall not exceed a ceiling of EUR 17,510,454 for the entire contract – the development phase in CLINs 1–4 as well as the optional five years of O&M support in CLIN 5. This does not include the incentive fee.

3.5.3.1.2.   For the Backend Services bid (IFB-CO-14873-INTELFS2-BE) Bidders are advised that the total price shall not exceed a ceiling of EUR 23,178,132 for the entire contract – the development phase in CLINs1-5 as well as the optional five years of O&M support in CLIN 6. This does not include the incentive fee.

3.5.3.2.   Bidders shall prepare their Price Volume by completing the Bidding Sheets referenced in Section A-3 and/or Section A-4 in accordance with the instructions specified in Annex A.

3.5.3.3.   The structure of the Bidding Sheets shall not be changed, other than as indicated in these instructions, nor should any quantity or item description in the Bidding Sheets. The currency(ies) of each Contract Line Item and sub-item shall be shown. The prices provided shall be intended as the comprehensive total price offered for the fulfilment of all requirements as expressed in the IFB documentation including but not

limited to those expressed in the SOW and the System Requirement Specification (SRS).

3.5.3.4.　Bidders shall not change the amount of the 5% incentive.　This is a mandatory part of the bid.

3.5.3.5.　With the exception of any pre-populated Not-to-Exceed amounts, Bidders shall furnish Firm Fixed Prices for all required items in accordance with the format set forth in the Instructions for preparation of the Bidding Sheets. This includes Firm Fixed Prices for all optional CLINs.

3.5.3.6.　Offered prices shall not be "conditional" in nature.　Any comments supplied in the Bidding Sheets which are conditional in nature, relative to the offered prices, may result in a determination that the Bid is non-compliant.

3.5.3.7.　Bidders are responsible for the accuracy of their Price Quotations.　Price Quotations that have apparent computational errors may have such errors resolved in the Purchaser's favour or, in the case of gross omissions, inconsistencies or errors, may be determined to be non-compliant.

3.5.3.8.　Bidders shall quote in their own national currency or in EURO. Bidders may also submit bids in multiple currencies including other NATO member states' currencies under the following conditions:

3.5.3.8.1.　The currency is of a "Participating Country" in the project, and

3.5.3.8.2.　The Bidder can demonstrate, either through sub-contract arrangements or in its proposed work methodology, that it will have equivalent expenses in that currency.　All major subcontracts and their approximate anticipated value should be listed on a separate sheet and included with the Price Quotation.

3.5.3.9.　The Purchaser, by virtue of his status under the terms of Article IX and X of the Ottawa Agreement, is exempt from all direct and indirect taxes (incl. VAT) and all customs duties on merchandise imported or exported.

3.5.3.10.　Bidders shall therefore exclude from their price Bid all taxes, duties and customs charges from which the Purchaser is exempted by international agreement and are required to certify that they have done so through execution of the Certificate at Annex B-5.

3.5.3.11.　Unless otherwise specified in the instructions for the preparation of Bidding Sheets in Annex A, all prices quoted in the proposal shall be on the basis that all deliverable items shall be delivered "Delivery Duty Paid (DDP)" in accordance with the International Chamber of Commerce INCOTERMS ® 2010.

3.5.3.12. The Bidder's attention is directed to the fact that the Price Volume shall contain no document and/or information other than the priced copies of the Bidding Sheets. Any other document will not be considered for evaluation.

3.6. Volume III: Technical

3.6.1. This volume is submitted as eleven (11) separate documents (or more, in the event a document must be split into multiple files), as listed in Section 3.3.3.3, which contain all of the various parts described in this section.

    3.6.1.1. Part 1: Engineering Proposal, as described in section 3.6.4.

    3.6.1.2. Part 2: Management Proposal, as described in section 3.6.5.

    3.6.1.3. Part 3: Supportability Proposal, as described in section 3.6.6.

3.6.2. No information disclosing or contributing to disclose the bid price shall be made part of the Technical Volume. Failure to abide to this prescription shall result in the bid being declared non-compliant.

3.6.3. "Arial" fonts in size 12 shall be used for normal text, and "Arial Narrow" fonts not smaller than size 10 for tables and graphics.

3.6.4. PART 1: ENGINEERING SECTION

    3.6.4.1. The Engineering Proposal shall include:

    3.6.4.2. For each Work Package of the Contract (excluding the optional 3rd and 4th level SW Maintenance and Support WP) a Draft Delivery Plan that includes the Solution Description Document (SDD).

3.6.4.2.1. The Bidder shall provide a draft Solution Description Document (SDD) in accordance with SOW section 2.5.3.2 that is enabling evaluation against criteria in section 4.5.2.1 (Note: Service Specifications are not requested).

3.6.4.2.2. **For IFB-CO-14873-INTELFS2-UA only:** the Bidder shall in the draft SDD include User Interface (UI) wireframes or mock-ups for the BMD JIPOE Application, the Analysis Application, Collection Requirements Management Application, and the Collection & Exploitation Planning Application.

3.6.4.2.3. **For IFB-CO-14873-INTELFS2-BE only**: the Bidder shall in the draft SDD describe the approach to be used for round-trip engineering to ensure consistency between the information model, the source code, and domain values.

3.6.5. PART 2: MANAGEMENT SECTION

    3.6.5.1. The Management Proposal shall include:

    3.6.5.2. Bidder Qualifications

3.6.5.2.1.   The Bidder shall provide sufficient documentation on the Bidders Qualifications enabling evaluation against the criteria in section 4.5.3.4.

3.6.5.3.   Draft Project Management Plan (PMP)

3.6.5.3.1.   The Bidder shall provide a draft PMP in accordance with SOW Section 2.5.2.1 (please note that **all** information as defined by the SOW for the PMP shall be provided).

3.6.5.3.2.   The Bidder shall provide proof of the Bidder's premises being authorized and certified to handle information (physically and electronically) at the NATO Restricted level.

3.6.5.4.   Initial Risk Register

3.6.5.4.1.   The Bidder shall provide an initial Risk Register for the project in accordance with SOW Section 2.5.2.2, where identified risks shall be properly described and processed (i.e. all relevant/ feasible information for the risk shall be provided in the Risk Register).

3.6.5.5.   Basis of Estimate (BOE)

3.6.5.5.1.   The purpose of the BOE is to enable the Purchaser to accurately validate the Management Proposal outside the Price Evaluation Process.

3.6.5.5.2.   The Bidder shall provide a BOE for all Work Packages in the respective Contract (including BOE for the Optional 3rd and 4th level SW Maintenance and Support Work Package) that enables evaluation against the criteria in section 4.5.3.7.

3.6.5.5.3.   The BOE shall solely provide level of effort estimates.

3.6.5.5.4.   The BOE breakdown in accordance with the Bidding Sheet shall be all encompassing (include all efforts in delivering the deliverables). I.e. the effort estimates shall be directly correlated with the cost of the deliverables and once given the correlation factor it shall be possible to calculate the price of the deliverables.

3.6.5.5.5.   The BOE shall not reveal any pricing information; e.g. the BOE shall not include cost per function point, or unit labour rates, or the above-mentioned correlation factor, etc.

3.6.6.   PART 3: SUPPORTABILITY

3.6.6.1.   Draft Configuration Management Plan

3.6.6.1.1.   The Bidder shall provide a draft Configuration Management Plan (CMP) in accordance with SOW section 2.5.2.4 that enables evaluation against criteria in section 4.5.4.3.

> 3.6.6.2.   Draft and General Integrated Logistic Support (ILS) Plan

3.6.6.2.1.   The Bidder shall provide a draft ILS Plan in accordance with SOW section 2.3.2, including an initial Logistics Support Analysis (LSA), that enables evaluation against the criteria in section 4.5.4.4.

> 3.6.6.3.   Draft Support Case

3.6.6.3.1.   The Bidder shall provide a draft Support Case in accordance with SOW section 2.3.4.3 that enables evaluation against criteria in section 4.5.4.5.

> 3.6.6.4.   Draft Training Plan

3.6.6.4.1.   The Bidder shall provide a draft Training Plan in accordance with SOW section 2.3.5.1 that enables evaluation against criteria in section 4.5.4.6.

> 3.6.6.5.   Draft Quality Plan

3.6.6.5.1.   The Bidder shall provide a draft Quality Plan (QP) in accordance with SOW section 2.2 that enables evaluation against criteria in section 4.5.4.7.

3.7. Bidder's Checklist

3.7.1. The tables below provide an overview of all items to be delivered by the Bidder as part of this bid. Bidders are invited to use these tables to verify the completeness of their proposal.

Volume 1: Bid Administration

	Item	Format
1	Annex B-1: Certificate of Legal Name of Bidder	One PDF file
2	Annex B-1: Acknowledgment of Receipt of IFB Amendments	
3	Annex B-3: Certificate of Independent Determination	
4	Annex B-4: Certificate of Bid Validity	
5	Annex B-5: Certificate of Exclusion of Taxes, Duties, and Charges	
6	Annex B-6: Comprehension and Acceptance of Contract Special and General Provisions	
7	Annex B-7: Disclosure of Requirements for the NCI Agency Execution of Supplemental Agreements	
8	Annex B-8: Certificate of Compliance AQAP 2110 or ISO 9001:2015 or Equivalent	
9	Annex B-9: List of Prospective Sub-Contractors	
10	Annex B-10: Bidder Background IPR	
11	Annex B-11: List of Subcontractor and Third Party IPR	
12	Annex B-12: Certificate of Origin of Equipment, Services, and Intellectual Property	
13	Annex B-13: List of Proposed Key Personnel	
14	Annex B-14: Certificate of Price Ceiling	
15	Annex B-15: Disclosure of Involvement of Former NCI Agency Employment	
16	Annex B-16: NCI Agency AD. 05.00, Code of Conduct: Post Employment Measures Information only. Not required to be submitted	
17	Annex C: Bid Guarantee	One copy as a PDF file; also submitted as required in 3.2.1

Volume 2: Price

	Item	Format
1	Completed Bidding Sheets, contained in: 03_IFB-CO-14873-INTELFS2-**UA** or 04_IFB-CO-14873-INTELFS2-**BE** Book I Annex A – Bidding Sheets.xlsx	One copy of the full and complete price volume shall be in MS Excel format, which can be manipulated (i.e. not an image)
2	Offer Summary sheet from the Bidding Sheets file	One PDF copy of only the Offer Summary sheet

Volume 3: Technical

	Item	Format
1	**Engineering Section**	
	a. Draft Delivery Plans for all Work Packages	One PDF file
	b. Solution Description Document (SDD) for all Work Packages	One PDF file

2	**Management Section**	
	a. Bidder Qualifications	One PDF file
	b. Draft Project Management Plan (PMP)	One PDF file
	c. Initial Risk Register	One MS Excel file
	d. Basis of Estimate (BOE)	One MS Excel file
3	**Supportability Section**	
	a. Draft Configuration Management Plan	One PDF file
	b. Draft and General Integrated Logistic Support (ILS) Plan	One PDF file
	c. Draft Support Case	One PDF file
	d. Draft Training Plan	One PDF file
	e. Draft Quality Plan	One PDF file

SECTION 4   BID EVALUATION AND CONTRACT AWARD

4.1.   General

4.1.1.   The evaluation of bids will be made by the Purchaser solely on the basis of the requirements specified in this IFB.

4.1.2.   All bids will be evaluated solely using the formula, evaluation criteria and factors contained herein. Technical Proposals will be evaluated strictly against the technical criteria and not against other Technical Proposals submitted.

4.1.3.   The evaluation of bids and the determination as to the Best Value Score will be based only on that information furnished by the Bidder and contained in its Bid. The Purchaser shall not be responsible for locating or securing any information that is not identified in the Bid.

4.1.4.   The Bidder shall furnish with his Bid all information requested by the Purchaser in Book I, Section 3, Bid Preparation Instructions. Significant omissions and/or cursory submissions will result in a reduced Best Value Score and may result in a determination of non-compliance without recourse to further clarification. The information provided by the Bidder in its proposal shall be to a level of detail necessary for the Purchaser to fully comprehend exactly what the Bidder proposes to furnish as well as its approach and methodologies.

4.1.5.   During the evaluation, the Purchaser may request clarification of the bid from the Bidder and the Bidder shall provide sufficient detailed information in connection with such requests as to permit the Purchaser to make a final assessment of the bid based upon the facts. The purpose of such clarifications will be to resolve ambiguities in the Bid and to permit the Bidder to state his intentions regarding certain statements contained therein. The purpose of the clarification stage is not to elicit additional information from the Bidder that was not contained in the original submission or to allow the Bidder to supplement cursory answers or omitted aspects of the Bid. The Bidder is not permitted any cardinal alteration of the bid regarding technical matters and shall not make any change to his price quotation at any time.

4.1.6.   The Purchaser reserves the right, during the evaluation and selection process, to verify any statements made concerning experience, facilities, or existing designs or materials by making a physical inspection of the Bidder's facilities and capital assets. This includes the right to validate, by physical inspection, the facilities and assets of proposed subcontractors.

4.1.7.   The evaluation will be conducted in accordance with NATO Infrastructure Bidding Procedures as set forth in the document, and the Best Value evaluation procedures set forth in AC/4-D(2008)0002-REV2, "Procedures and Practices for Conducting NSIP International Competitive Bidding Using Best Value Methodology", with the exception described in paragraph 4.3.1.2. The bid evaluation methodology to be followed,

including the top-level evaluation criteria and their weighting factors, were agreed by the Host Nation.

4.2. Best Value Award Approach and Bid Evaluation Factors

4.2.1.   The Contract resulting from this IFB will be awarded to the Bidder whose conforming offer provides the Best Value to NATO, as evaluated by the Purchaser in compliance with the requirements of this IFB and according to the evaluation method specified in this section.

4.2.2.   The top level criteria are 60% Technical and 40% Price.

4.2.3.   Technical Scoring

4.2.3.1.   The 2nd level criteria for the technical evaluation are:

4.2.3.1.1.   Engineering (E): 50% weight, based on the criteria listed in order of descending importance (that is, most important listed first) in section 4.5.2.

4.2.3.1.2.   Management (M): 30% weight, based on the criteria listed in order of descending importance in section 4.5.3.

4.2.3.1.3.   Supportability (S): 20% weight, based on the criteria listed in order of descending importance in section 4.5.4.

4.2.3.2.   The Technical Score will be calculated using the following formula:
TS = (50%*Engineering Score) + (30%*Management Score) + (20%*Supportability Score)

4.2.4.   Price Scoring

4.2.4.1.   The Price Score (PS) will be calculated using the following formula:

PS = 100 * (1-(Bid Price / (2*Average Bid Price)))

4.2.4.2.   The "Bid Price" and the "Average Bid Price" will be calculated based on the sum of the proposed prices as defined in section 4.6.4.2.

4.2.4.3.   Only those bids evaluated as compliant in both the Administrative and Technical evaluations will be used in the calculation of the Price Score. Therefore, the price scores cannot be calculated until after the technical evaluations are complete.

4.2.4.4.   Bidders shall note that any Bid in excess of the stated ceiling price set forth in paragraph 3.5.3.1 may not be scored as the Bid may be determined to be non-compliant.

4.2.5.   Best Value Final Scoring

4.2.5.1.   The Best Value final score (FS) will be the sum of the weighted Technical Score (TS) and weighted Price Score (PS), according to the following formula:

$$FS = (TS*60\%) + (PS*40\%)$$

4.2.5.2.   The maximum possible Best Value Score is 100. The Bid with the highest Best Value Score will be recommended to be the Apparent Successful Bidder.

4.2.6.   A weighting scheme for sub-criteria values has been developed by Purchaser staff not associated with the Technical Evaluation. This weighting scheme has been sealed and is not known to any of the Purchaser staff beyond the originator and the Chairman of the Contracts Award Board, who are not evaluators within the framework of this IFB or in any manner or form are made privy of evaluation information throughout the course of the evaluation process. The weighting scheme remains sealed until Step 4 of the evaluation process, described in paragraph 4.7.

4.3.   Evaluation Procedure

4.3.1.   The evaluation will be done in a three-step process, as described below:

4.3.1.1.   Step 1: Administrative Compliance

4.3.1.1.1.   Bids received will be reviewed for compliance with the mandatory administrative requirements specified in paragraph 4.4. Bids not meeting all of the mandatory administrative requirements may be determined to be non-compliant and not considered for further evaluation.

4.3.1.2.   Step 2: Parallel Technical and Price Evaluations

4.3.1.2.1.   In Step 2, the Technical and Price evaluations will be performed in parallel. That is, independent teams of evaluators will evaluate the bids as described in Sections 4.5 and 4.6 at the same time, instead of waiting for the technical evaluations to be completed before opening the price volumes. However, the final price scores cannot be calculated until after the technical evaluations are complete, since the price score only includes those proposals evaluated as technically compliant.

4.3.1.2.2.   Bidders are advised that, since the evaluations are being conducted in parallel, they should not assume that they have been evaluated as technically compliant if they receive a clarification request regarding the Price volume.

4.3.1.2.2.1   Step 2A: Technical Evaluation

4.3.1.2.2.1.1   The Technical volumes will be evaluated against predetermined top-level criteria and identified sub-criteria (see paragraph 4.2.3 above), and scored accordingly. This evaluation will result in "raw" or unweighted technical scores against the criteria.

4.3.1.2.2.1.2   Bidders are advised that any Bid whose Technical Proposal receives a score of less than 20% of the total unweighted raw score possible in any of the sub-criteria listed in Section 4.5 of this document may be determined by the Purchaser to be non-compliant and not considered for further evaluation.

4.3.1.2.2.2   Step 2B: Price Evaluation

4.3.1.2.2.2.1   The Price volumes will be opened and evaluated in accordance with section 4.6.

4.3.1.2.2.3   Step 3: Determination of Apparent Successful Bidder

4.3.1.2.2.3.1   Upon completion of the Technical and Price evaluations, the scores of the Bids considered to be technically compliant will be calculated. The Apparent Successful Bid will be determined in accordance with paragraph 4.7.

4.4.   Evaluation Step 1 - Administrative Compliance

4.4.1.   Bids will be reviewed for compliance with the formal requirements for Bid submission as stated in this IFB and the content of the Bid Administration Volume. The evaluation of the Bid Administration Volume will be made on its completeness, conformity and compliance to the requested information. This evaluation will not be scored in accordance with Best Value procedures but is made to determine if a Bid complies with the requirements of the Bidding Instructions and Prospective Contract. Specifically, the following requirements shall be verified:

4.4.1.1.   The Bid was received by the Bid Closing Date and Time,

4.4.1.2.   The Bid is packaged and marked properly,

4.4.1.3.   The Bid Administration Volume contains the documentation listed in paragraph 3.3.1 and complies with the formal requirements established in paragraph 3.1.

4.4.1.4.   The Bidder has not taken exception to the Terms and Conditions of the Prospective Contract or has not qualified or otherwise conditioned his offer on a modification or alteration of the Terms and Conditions or the language of the Statement of Work.

4.4.1.5.   **Receipt of an unreadable electronic bid**. If a bid received by email is unreadable to the degree that conformance to the essential requirements of the solicitation cannot be ascertained, the CO immediately shall notify

the Bidder that the bid will be rejected unless the Bidder provides clear and convincing evidence:

4.4.1.5.1.   Of the content of the bid as originally submitted; and,

4.4.1.5.2.   That the unreadable condition of the bid was caused by Purchaser software or hardware error, malfunction, or other Purchaser mishandling.

4.4.2.   A Bid that fails to conform to the above requirements may be declared non-compliant and may not be evaluated further by the Purchaser.

4.4.3.   Bids that are determined to be administratively compliant will proceed to Step 2A, Technical Evaluation, and Step 2B, Price Evaluation.

4.4.4.   Notwithstanding paragraph 4.4.3, if it is later discovered in the evaluation of the Bid Administration Volume, Technical Volume or the Price Volume that the Bidder has taken exception to the Terms and Conditions of the Prospective Contract, or has qualified and/or otherwise conditioned his offer on a modification or alteration of the Terms and Conditions or the language of the Statement of Work, the Bidder may be determined to have submitted a non-compliant Bbd at the point in time of discovery.

4.5.   Evaluation Step 2A – Technical Evaluation

4.5.1.   The Technical Proposal will be evaluated against the criteria set forth in this section. For some sub-criteria, there may be additional supporting factors at the next lower level. These lower level factors are not published in this IFB but are predetermined and included in the Technical Evaluation Weighting Scheme sealed before Bid Opening. The following paragraphs identify the aspects to be examined in the Technical Proposal evaluation and rating.

4.5.2.   PART 1: ENGINEERING

4.5.2.1.   The criteria used to evaluate Part 1, Engineering are listed in descending order of importance.

4.5.2.2.   The criteria of high importance will have higher weighting factors than the criteria of lower importance.

4.5.2.2.1.   The draft SDD provides information on the proposed solution to a level of detail that enables the Purchaser to assess the solution's feasibility and ability to fulfil the requirements as defined by the SRS.

4.5.2.2.2.   The proposed solution describes a solution architecture that addresses, and fulfils, the non-functional requirements (NFR) as defined in the SRS. The compliance with the NFRs are individually assessed and justified through the solution design.

4.5.2.2.3.   For **IFB-CO-14873-INTELFS2-BE**: The draft SDD demonstrates a sound approach to round-trip engineering and synchronizing of the SW implementation (source code) with the maintenance of the Information Model; ideally by implementing an automatic forward-transformation from the Information Model to solution artefacts (source code, database mapping, application programming interface (API), etc.).

4.5.2.2.4.   For **IFB-CO-14873-INTELFS2-BE**: The draft SDD describes how the proposed solution to the maximum extent possible/ practicable will make use of the services provided by the Bi-SC AIS SOA Platform including:

- Identity and Security Services
- Integration Services with reference to the platform integration domain specific language (DSL) based on the well-known Enterprise Application Integration Patterns
- Hosting Services to include a description of the proposed level of hosting, scheduling, elasticity, etc.
- Service Management and Control services including logging, alerting, log aggregation/ analytics, reporting, monitoring and message tracking.
- Platform services for realization of Non-Functional Requirements with particular emphasis on Performance, Scalability, Reliability, Resilience, Continuity of Service, Disaster Recovery and Availability

4.5.2.2.5.   For **IFB-CO-14873-INTELFS2-UA**: The proposed solution includes off-the-shelf and high-performance UI components with rich functionality for the Table View, Relationship View, Gantt View, and Chart View delivering to the maximum extent off-the-shelf implementation of functionality as defined by SRS chapter 2, and where these UI components can be integrated into an Angular 9 (or higher) framework

4.5.2.2.6.   For the **IFB-CO-14873-INTELFS2-UA**: UI mock-ups/ wireframes are provided for the BMD JIPOE Application, the Analysis Application (with a detailed elaboration of the visual Graph Query Builder), Collection Requirements Management Application, and the Collection & Exploitation Planning Application. The UI mock-ups/ wireframes demonstrates a good understanding of the functionality to be implemented within these four applications, and the described UI is compliant with the general UI requirements in SRS chapter 2.

4.5.2.2.7.   For **IFB-CO-14873-INTELFS2-BE**: The proposed solution describes a sound approach to eventual consistency in a distributed (multi-instance) environment configuration (i.e. in a high availability and robustness configuration).

4.5.2.2.8.   The proposed solution demonstrates that the Bidder's technology choices have taken the risk of technology obsolescence, technology proliferation and life-cycle supportability into consideration.

4.5.2.2.9.   The draft SDD describes a sound approach to Continuous Integration (CI) and Continuous Delivery (CD) adapted for the capability to be delivered and for usage within the NATO Software Factory. The SDD describes what type of tests will be automated, and how the automated tests will be implemented, as well as how the reporting of such tests will be automated.

4.5.2.2.10.   The draft SDD demonstrates an approach to the software development that will ensure a high degree of test automation (e.g. using behaviour driven development (BDD) and/ or Acceptance Test Driven Development (ATDD) methodologies).

4.5.2.2.11.   For **IFB-CO-14873-INTELFS2-UA**: The proposed solution does not introduce any backend processing services and is implemented fully as a browser-based client application. The only exceptions from this rule will be the User Management Application where server side functionality might be required, and the maintenance of the INTEL-FS Spiral 1 legacy backend in Phase 1.

4.5.2.2.12.   The draft SDD elaborates all fundamental solution decisions in accordance with the requirements defined in SOW section 2.5.3.2.

4.5.2.2.13.   For any COTS and FOSS components and libraries used in the solution the SDD provides details on Vendor Name, Product Name, SW version, and lifecycle cost and constraints (license/ subscription fee, licence type, etc.)

4.5.2.2.14.   The draft Delivery Plan (one for each work package) includes a draft Work Breakdown Structure (WBS) with a schedule in accordance with SOW Section 2.5.3.1 for the full scope of the project (excluding the optional WP for 3rd and 4th level Maintenance and Support). I.e. identifying start and end date for each of the increments in the work package, and identifying the deliverables allocated to increments.

4.5.2.2.15.   The format and content of the draft SDD complies with the requirements defined in SOW section 2.5.3.2, and contains a confirmation that all requirements of the SRS are met by the proposed solution (Note: service specification, if applicable for the solution, are not expected for the draft SDD).

4.5.3.   PART 2: MANAGEMENT

4.5.3.1.   The criteria used to evaluate Part 2, Management are listed in descending order of importance.

4.5.3.2.   Within those criteria, all of the sub-criteria are also listed in order of descending importance.

4.5.3.3.   The criteria of high importance will have higher weighting factors than the criteria of lower importance.

4.5.3.4.   Bidder Qualifications

4.5.3.4.1.   The Bidder demonstrates strong experience in the area of design, delivery, implementation and support of similar software-based systems.

4.5.3.4.2.   The Bidder demonstrates that the members of its project technical and implementation team possess strong education, experience and qualifications directly relevant to the needs of this Contract and in accordance with the SOW Section 3.1.

4.5.3.4.3.   The Bidder demonstrates that its Project Manager, Quality Assurance Manager, and Configuration Manager possess strong education, experience and qualifications in accordance with the SOW Section 2.1.1.

4.5.3.4.4.   The Bidder provides resumes (2-page limit per resume) of the individuals designated as Key Personnel in Contract Special Provision Annex B.

4.5.3.4.5.   The Bidder provides two relevant examples (2 pages max each) including a description of the solution deployed/delivered, the expertise/experience highlighting similarities to the bid solution; the purchaser(s) of these systems; the user(s) of these systems; the Contract number(s); the start date and end date of the Contract; a point of contact for verification purposes.

4.5.3.5.   Draft Project Management Plan (PMP)

4.5.3.5.1.   The proposed project organization and project management methodology (for Agile execution) and control processes demonstrate Bidder's ability to implement the entire project in conformance with the requirements as specified in the SOW.

4.5.3.5.2.   The scope of work to be performed by the prime contractor versus subcontractors is clearly defined.

4.5.3.5.3.   The Bidder has provided proof of the Bidder's premises being authorized and certified to handle information (physically and electronically) at the NATO Restricted level.

4.5.3.5.4.   The Draft PMP is in accordance with the SOW requirements.

4.5.3.6.   Initial Risk Register

4.5.3.6.1.   The initial Risk Register level does not raise concerns. The risk level is not too high (this could indicate that the Bidder will not be able to deliver). The Bidder is taking ownership of the risks instead of making NATO responsible for the majority of them.

4.5.3.6.2.   The initial Risk Register contains a set of probable risks that demonstrates that the Bidder has a good understanding of the complexities and dependencies inherent in the project.

4.5.3.6.3.   The risks in the initial Risk Register are all properly addressed with a risk identifier, description of the risk, impact analysis, probability assessment, mitigation measures, risk owner, etc.

    4.5.3.7.   Basis of Estimate (BOE)

4.5.3.7.1.   The BOE provides realistic effort and duration estimates for all of the deliverables in the Bidding Sheet to demonstrate a good understanding of the complexity and level of effort of work to be conducted.

4.5.3.7.2.   The BOE provides level of effort estimates for all of the deliverables as defined in the Bidding Sheet.

4.5.3.7.3.   The BOE provides estimates of the duration for all of the deliverables as defined in the bidding sheet.

   4.5.4.   PART 3: SUPPORTABILITY

    4.5.4.1.   The criteria used to evaluate Part 3, Supportability, are listed in descending order of importance.

    4.5.4.2.   Within those criteria, all of the sub-criteria are also listed in order of descending importance.

    4.5.4.3.   Draft Configuration Management Plan (CMP)

4.5.4.3.1.   The CMP demonstrates that the CM function is properly resourced, and organized with well-defined roles and responsibilities in accordance with SOW 2.5.2.4.

4.5.4.3.2.   The CMP details the Configuration Management Database (CMDB) solution and demonstrates that the CMDB solution will fulfil the requirements defined in SOW 2.1.5.1.

4.5.4.3.3.   The CMP is compliant with "*ACMP-2009-SRD-41: Examples of CM Plan Requirements, Edition A, Version 1, March 2017, NATO Standardization Office (NSO)*" in format and content, and clearly identifies requirements that the bidder deems not applicable to this contract as not applicable (N/A). Note: there should not be many such N/A requirements.

4.5.4.3.4.   The CMP has been tailored to address the Agile character of this project execution.

4.5.4.3.5.   The CMP identifies and defines all top-level configuration items (CI) to be delivered under this Contract and where these top-level CIs are traced to deliverables as defined in the SSS.

4.5.4.3.6.   The CMDB solution as described in the CMP includes integration with the NATO Software Factory tooling and support DevOps

practices (e.g. including deployment configurations and automated deployment scripts as Configuration Items).

4.5.4.3.7.   The CMP includes a proposed ECP format that has been tailored to Agile project execution.

4.5.4.3.8.   The CMP includes a proposed format for Request for Deviation/ Request for Waiver that is suitable for use in the Contract.

4.5.4.4.   Draft and General Integrated Logistic Support (ILS) Plan

4.5.4.4.1.   The draft Integrated Logistics Support Plan is provided in accordance with the SOW requirements in Section 2.3 including the required sub-sections and content with sufficient details to demonstrate the Bidder's ability to perform the ILS activities.

4.5.4.4.2.   The Bidder demonstrates its understanding and compliance with all the SOW requirements by creating appropriate subsections and detailing the requirements with actual proposed activities.

4.5.4.4.3.   The Bidder provides a detailed approach for the Design Influence (RAMT and LSA) areas for the actual analyses, documenting the analysis, tools, skills and relation with SRS and design in general.

4.5.4.4.4.   The Bidder details the different Maintenance and Support Levels, the interfaces between these different levels, maintenance and support environment, constraints, locations, procedures, artefacts, organisation, personnel skills, related ITIL processes and responsibilities between different parties to maintain the delivered baselines of the system in different phases of the lifecycle, as defined in SOW Section 2.3.

4.5.4.4.5.   The Bidder details its approach for the warranty and optional support requirements, details the activities based on each party's responsibilities including the proposed services, response times, organization and planning in accordance with the SOW requirements in Section 2.3.

4.5.4.4.6.   The Bidder demonstrates that all ILS activities and milestones are integrated into the project delivery schedules.

4.5.4.5.   Draft Support Case

4.5.4.5.1.   The Bidder provides a draft Support Case, as detailed in SOW Section 2.3.4.3. The Support Case shall provide sufficient details to show the Bidder's approach and capability to perform the required LSA and RAMT studies, including how the proposed design shall take the SOW and SRS RAMT requirements into consideration.

4.5.4.5.2.   The Bidder demonstrates its understanding and compliance with the Support Case requirements by creating appropriate subsections and detailing the requirements with actual proposed activities to

show the Bidder's approach and capability to perform the required LSA and RAMT studies, including how the proposed design shall take the SOW and SRS RAMT requirements into consideration.

4.5.4.6.   Draft Training Plan

4.5.4.6.1.   The draft Training Plan defines the training courses that will be delivered and how these courses will be conducted in accordance with Section 2.3.5.1 of the SOW.

4.5.4.6.2.   The Bidder demonstrates its understanding and compliance with Training Program requirements by explaining how the Bidder will schedule, resource and manage the various training requirements (training schedule, training courses and material, training tools, media, training personnel, training reviews, meetings, assessment, evaluation and reporting) starting from the contract award until the acceptance.

4.5.4.7.   Draft Quality Plan

4.5.4.7.1.   The Draft Quality Plan (QP) demonstrates that the Quality management processes are in place for the project, in accordance with the requirements defined by AQAP-2110.

4.5.4.7.2.   The Draft QP demonstrates that the Quality Assurance Manager has sufficient responsibility, authority, organisational freedom and independence to review and evaluate activities, identify problems and initiate or recommend appropriate corrective action.

4.6.   Evaluation Step 2B – Price Evaluation

4.6.1.   As stated in Section 4.3.1.2, the Price evaluation will be done in parallel to the Technical evaluation.

4.6.2.   The Bidder's Price Quotation will be first assessed for compliance against the following standards:

4.6.2.1.   For IFB-CO-14873-INTELFS2-UA the total amount of the bid (inclusive of all work packages for the basic contract and all option years) shall not exceed a ceiling of EUR 17,510,454. This amount does not include the incentive.

4.6.2.2.   For IFB-CO-14873-INTELFS2-BE the total amount of the bid (inclusive of all work packages for the basic contract and all option years) shall not exceed a ceiling of EUR 23,178,132. This amount does not include the incentive.

4.6.2.3.   The Price Quotation meets the requirements for preparation and submission of the Price Quotation set forth in the Bid Preparation Section and the Instructions for Preparation of the Bidding Sheets in Annex A.

4.6.2.4. Detailed pricing information has been provided and is current, adequate, accurate, traceable, and complete.

4.6.2.5. The Price Quotation meets requirements for price realism and balance as described below in paragraph 4.6.5.

4.6.3. A Bid which fails to meet the compliance standards defined in this section may be declared non-compliant and may not be evaluated further by the Purchaser.

4.6.4. Basis of Price Comparison

4.6.4.1. The Purchaser will convert all prices quoted into EURO for purposes of comparison and computation of price scores. The exchange rate to be utilised by the Purchaser will be the average of the official buying and selling rates of the European Central Bank at close of business on the last working day preceding the Bid Closing Date.

4.6.4.2. The **Evaluated Bid Price** to be inserted into the formula specified at paragraph 4.2.4.1 will be derived as follows:

- For IFB-CO-14873-INTELFS2-UA User Applications: The sum of the Firm Fixed Prices proposed for CLINs 1-5 as detailed below:

CLIN Number	CLIN Name
1.0	Externalized User Account Management
2.0	Upgrade existing User Interfaces (UI) and add UI for BMD OPFOR ORBAT Management
3.0	New User Interfaces
4.0	Full integration with new backend API
5.0	3rd Level Support (SW Corrective Maintenance)

- For IFB-CO-14873-INTELFS2-BE Backend Services: The sum of the Firm Fixed Prices proposed for CLINs 1-6 as detailed below:

CLIN Number	CLIN Name
1.0	Backend services - Phase 1
2.0	Backend services - Phase 2
3.0	System Administration (SysAdm) tool
4.0	Integration services - I2BE source
5.0	Integration services – I2BE destination
6.0	3rd Level Support (SW Corrective Maintenance)

4.6.5. Price Balance and Realism

4.6.5.1. In those cases in which the prices quoted in relation with this Invitation for bid appear to be unreasonably low in relation to the performance required under the prospective Contract and/or the level of effort associated with the tasks, the Purchaser will reserve the right to request

the Bidder clarifications aimed to demonstrate the rationale for such circumstances.

4.6.5.2. Indicators of an unrealistically low bid may be the following, amongst others:

4.6.5.2.1. Labour Costs that, when amortised over the expected or proposed direct labour hours, indicate average labour rates far below those prevailing in the Bidder's locality for the types of labour proposed.

4.6.5.2.2. Direct Material costs that are considered to be too low for the amounts and types of material proposed, based on prevailing market prices for such material.

4.6.5.2.3. Numerous Line Item prices for supplies and services that are provided at no cost or at nominal prices.

4.6.5.3. If the Purchaser has reason to suspect that a Bidder has artificially debased its prices in order to secure Contract award, the Purchaser will request clarification of the Bid in this regard and the Bidder shall provide explanation on one of the following bases:

4.6.5.3.1. An error was made in the preparation of the price quotation. In such a case, the Bidder must document the nature of the error and show background documentation concerning the preparation of the price quotation that makes a convincing case that a mistake was made by the Bidder. In such a case, the Bidder shall petition the Purchaser to either remain in the competition or accept the Contract at the offered price, or to withdraw from the competition.

4.6.5.3.2. The Bidder has a competitive advantage due to prior experience or industrial/technological processes that demonstrably reduce the costs of Bidder performance and therefore the price offered is realistic. Such an argument must support the technical proposal offered and convincingly and objectively describe the competitive advantage and the net savings achieved by this advantage over standard market practices and technology.

4.6.5.3.3. The Bidder recognises that the submitted price quotation is unrealistically low compared to its cost of performance and, for business reasons, the Bidder is willing to absorb such a loss. Such a statement can only be made by the head of the business unit submitting the Bid and will normally be made at the level of Chief Operating Officer or Chief Executive Officer. In such a case, the Bidder shall estimate the potential loss and show that the financial resources of the Bidder are adequate to withstand such reduction in revenue.

4.6.5.4. If a Bidder fails to submit a comprehensive and compelling response on one of the bases above, the Purchaser may determine the Bid submitted as non-compliant. If the Bidder responds on the basis of 4.6.5.3.1 above

and requests to withdraw from the competition, the Purchaser may, depending on the nature and gravity of the mistake, allow the Bidder to withdraw.

4.6.5.5. If the Purchaser accepts the Bidder's explanation of mistake in paragraph 4.6.5.3.1 and allows the Bidder to accept the Contract at the offered price, or the Purchaser accepts the Bidder's explanation pursuant to paragraph 4.6.5.3.3 above, the Bidder shall agree that the supporting pricing data submitted with his Bid will be incorporated by reference in the resultant Contract. The Bidder shall agree as a condition of Contract signature, that the pricing data will be the basis of determining fair and reasonable pricing for all subsequent negotiations for modifications of or additions to the Contract and that no revisions of proposed prices will be made.

4.6.5.6. If the Bidder presents a convincing rationale pursuant to paragraph 4.6.5.3.2 above, no additional action will be warranted. The Purchaser, however, reserves its right to reject such an argument if the rationale is not compelling or capable of objective analysis. In such a case the Bid may be determined to be non-compliant.

4.6.5.7. The Agency reserves the right to request prime contractors or the subcontractors to separately identify each of the direct/indirect costs, advise why each is required, and provide supporting documentation to substantiate each charge, such as: 1) catalogue price lists and any applicable discounts, 2) copies of the Subcontractor's orders from others for the same or similar items, including explanations for cost variations, 3) Subcontractor's internal cost estimate, or documentation of whatever means the Subcontractor used to arrive at the charge.

4.6.6. Once the offered prices as described in paragraph 4.6.4.2 have been calculated and checked, the formula set forth in paragraph 4.2.4.1 above will be applied to derive the Price Score of each Bid.

4.7. Evaluation Step 3 – Calculation of Best Value Scores

4.7.1. Upon conclusion and approval of the Technical Evaluation and Price Evaluation results, the pre-determined weighting scheme for the Technical Evaluation will be unsealed and the scores for the Engineering, Management and Supportability factors will be calculated for each compliant bid. Then all partial scores will be fed into the formula stated in paragraph 4.2.5 in order to obtain the Best Value Score of each Bid.

4.7.2. The highest scored Bid will be recommended as the Apparent Successful Bid.

4.7.3. A statistical tie is deemed to exist when the final scores of the highest scoring bids are within one point (1.0) of each other. (For example, final scores of 67.30 and 68.30 are within one point of each other and would therefore be considered a statistical tie. Final scores of 67.30 and 68.31 are more than one point apart and would not be considered a tie.) The

Purchaser will then resolve the statistical tie by awarding the contract to the Bid with the highest weighed technical score.

4.7.4.   Prior to confirmation of award, the Purchaser shall invite the Bidder with the Apparent Successful Offer to one or more rounds of pre-award discussions. These discussions shall aim at clarifying and confirming, within the boundaries of the IFB documents, any remaining topics and results in the preparation of the final contract documents.

4.7.5.   Upon the successful completion of these pre-award discussions, to the Purchaser's full satisfaction, confirmation of final Bid compliance will be noted.

4.7.6.   The Purchaser will deliver the final set of contract documents to the Bidder for their signature. Upon the Purchaser's countersignature of those contract documents, the contract shall be considered to be in effect.

Annex A   Bidding Sheets

A-1   Introduction

1. Bid pricing requirements as addressed in this Annex are mandatory. Failure to abide to the bid pricing requirements included in this section may lead to the Bid being declared non-compliant and not being taken into consideration for award.

2. No alteration of the Bidding sheets – including, but not limited to quantity indications, descriptions, titles or pre-populated Not-to-Exceed amounts – are allowed with the sole exception of those explicitly indicated as allowed in this document or in the instructions embedded in the Bidding Sheets file.

3. Additional price columns may be added if multiple currencies are Bid, including extra provisions for all totals.

A-2   General Requirements

1. Bidders are required, in preparing their Price Volume to utilise the electronic files provided as part of this IFB and referenced in Annex A-3 and/or A-4.

2. This Excel file includes detailed instructions on each tab that will facilitate bidders' preparation of the bid pricing. These instructions are mandatory.

3. The prices and quantities entered on the document shall reflect the total items required to meet the Contractual requirements. The total price shall be indicated in the appropriate columns.

4. In preparing the Bidding Sheets, Bidders shall ensure that the prices of the Sub-items total the price of the major item of which they constitute a part.

5. All metrics (e.g., cost associated with labour) will be assumed to be standard or normalised to 7.6 hours/day, for a five-day workweek at NATO and National sites and Contractor facilities.

6. Should the Apparent Best Value Bid be in other than Euro currency, the award of the Contract will be made in the currency or currencies of the bid.

7. Bidders are advised that formulae are designed to ease evaluation of the Bidders proposal have been inserted in the electronic copies of the Bidding Sheets. Notwithstanding this, the Bidder remains responsible for ensuring that their figures are correctly calculated and should not rely on the accuracy of the formulae electronic copies of the Bidding Sheets.

8. If the Bidder identifies an error in the spreadsheet, it should notify the Purchaser through process described section 2.6. The Purchaser will then make a correction and notify all the Bidders of the update.

9. Prices shall not include any provision for taxes or duties for which the Purchaser is exempt.

A-3   Bidding Sheets for Front-end User Applications Bid

1. Bidders are required, in preparing their Price Volume to utilise the correct electronic Bidding Sheets file provided as part of this IFB. For the Front-end User Applications bid, this is:

    "03_IFB-CO-14873-INTELFS2-UA Book I Bidding Sheets I2UA.xls"

2. Bidders shall include this file in its proposal in the same Excel format in which it is provided in this IFB.

A-4   Bidding Sheets for Back-end Data Management Bid

1. Bidders are required, in preparing their Price Volume to utilise the correct electronic Bidding Sheets file provided as part of this IFB. For the Back-end Data Management bid, this is:

    "04_IFB-CO-14873-INTELFS2-BE Book I Bidding Sheets I2BE.xls"

2. Bidders shall include this file in its proposal in the same Excel format in which it is provided in this IFB.

Annex B   Prescribed Administrative Forms and Certificates

Annex B-1.   Certificate of Legal Name of Bidder

This Bid is prepared and submitted on behalf of the legal corporate entity specified below:

FULL NAME OF CORPORATION: _____

DIVISION (IF APPLICABLE):   _____

SUB DIVISION (IF APPLICABLE):   _____

OFFICIAL MAILING ADDRESS

_____
_____
_____

E-MAIL ADDRESS: _____

POINT OF CONTACT REGARDING THIS BID:

NAME: _____
POSITION: _____
TELEPHONE: _____

ALTERNATIVE POINT OF CONTACT:

NAME: _____
POSITION: _____
TELEPHONE: _____

_____   _____
Date   Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

Annex B-2.   Acknowledgement of Receipt of IFB Amendments

I confirm that the following amendments to Invitation for Bid CO-14873-INTELFS2 have been received and the Bid, as submitted, reflects the content of such amendments.

Amendment no.	Date of Issued	Date of receipt	Initials

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

Annex B-3.   Certificate of Independent Determination

It is hereby stated that:

a.   We have read and understand all documentation issued as part of IFB-CO-14873-INTELFS2. Our Bid submitted in response to the referred solicitation is fully compliant with the provisions of the IFB and the prospective Contract.

b.   Our Bid has been arrived at independently, without consultation, communication or agreement, for the purpose of restricting competition, with any other Bidder or with any competitor;

b.   The contents of our Bid have not been knowingly disclosed by the Bidder and will not knowingly be disclosed by the Bidder prior to award, directly or indirectly to any other Bidder or to any competitor; and

c.   No attempt has been made, or will be made by the Bidder to induce any other person or firm to submit, or not to submit, a Bid for the purpose of restricting competition.

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

Annex B-4.   Certificate of Bid Validity

I, the undersigned, as an authorised representative of the firm submitting this Bid, do hereby certify that the pricing and all other aspects of our Bid will remain valid for a period of twelve (12) months from the Bid Closing Date of this Invitation for Bid.

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

Annex B-5. Certificate of Exclusion of Taxes, Duties and Charges

I hereby certify that the prices offered in the price quotation of this Bid exclude all taxes, duties and customs charges from which the Purchaser has been exempted by international agreement.

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

Annex B-6.   **Comprehension and Acceptance of Contract Special and General Provisions**

The Bidder hereby certifies that he has reviewed the Contract Special Provisions and the NCI Agency Contract General Provisions set forth in the Prospective Contract, Book II, of this Invitation for Bid. The Bidder hereby provides his confirmation that he fully comprehends the rights, obligations and responsibilities of the Contractor as set forth in the Articles and Clauses of the Prospective Contract. The Bidder additionally certifies that the offer submitted by the Bidder is without prejudice, qualification or exception to any of the Terms and Conditions and he will accept and abide by the stated Contract Special Provisions and Contract General Provisions if awarded the Contract as a result of this Invitation for Bid.

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

ANNEX B-7. Disclosure of Requirements for NCI Agency Execution of Supplemental Agreements

I, the undersigned, as an authorised representative of _____, certify the following statement:

All supplemental agreements, defined as agreements, documents and/or permissions outside the body of the Contract but are expected to be required by my Government, and the governments of my Subcontractors, to be executed by the NCI Agency or its legal successor as a condition of my firm's performance of the Contract, have been identified, as part of the Bid.

These supplemental agreements are listed as follows:
(insert list of supplemental agreements or specify "none")

Examples of the terms and conditions of these agreements have been provided in our Offer. The anticipated restrictions to be imposed on NATO, if any, have been identified in our offer along with any potential conflicts with the terms, conditions and specifications of the Prospective Contract. These anticipated restrictions and potential conflicts are based on our knowledge of and prior experience with such agreements and their implementing regulations. We do not certify that the language or the terms of these agreements will be exactly as we have anticipated.

The processing time for these agreements has been calculated into our delivery and performance plans and contingency plans made in the case that there is delay in processing on the part of the issuing government(s).

We recognise that additional supplemental agreements, documents and permissions presented as a condition of Contract performance or MOU signature after our firm would be selected as the successful Bidder may be cause for the NCI Agency to determine the submitted Bid to be non-compliant with the requirements of the IFB;

We accept that should the resultant supplemental agreements issued in final form by the government(s) result in an impossibility to perform the Contract in accordance with its schedule, terms or specifications, the Contract may be terminated by the Purchaser at no cost to either Party.

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

Annex B-8.   **Certificate of Compliance AQAP 2110 or ISO 9001:2015 or Equivalent**

I hereby certify that _____(name of Company) possesses and applies Quality Assurance Procedures/Plans AQAP 2110 or ISO 9001:2015 or equivalent as evidenced through the attached documentation[1].

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

---

[1] Bidders must attach copies of any relevant quality certification.

Annex B-9.　　　　List of Prospective Subcontractors

Name and Address of Sub-Bidder	DUNS Number 2	Primary Location of Work	Items/Services to be Provided	Estimated Value of Sub-Contract

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

---

2 Data Universal Numbering System (DUNS). Bidders are requested to provide this data in order to help NCI AGENCY to correctly identify Subcontractors. If a Subcontractor's DUNS is not known this field may be left blank.

Annex B-10.   Bidder Background IPR

I, the undersigned, as an authorised representative of Bidder
_____, warrant, represent, and undertake that:

   a. The Contractor Background IPR specified in the table below will be used for the
       purpose of carrying out work pursuant to the prospective Contract.

ITEM	DESCRIPTION

   b. The stated Bidder has and will continue to have, for the duration of the
       prospective Contract, all necessary rights in and to the Background IPR
       specified above.

   c. The Background IPR stated above complies with the terms specified in Article
       8 of the Contract Special Provisions.

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

Annex B-11.   List of Subcontractor and Third Party IPR

I, the undersigned, as an authorised representative of Bidder
_____, warrant, represent, and undertake that:

   a. The Subcontractor and/or IPR specified in the table below will be used for the
      purpose of carrying out work pursuant to the prospective Contract.

OWNER OF IPR (Source/Company)	ITEM	DESCRIPTION

   b. The stated Bidder has and will continue to have, for the duration of the
      prospective Contract, all necessary rights in and to the IPR specified above
      necessary to perform the Contractor's obligations under the Contract.

   c. The Subcontractor and/or Third Party IPR stated above complies with the terms
      Clause 30 the Contract General Provisions.

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

Annex B-12. **Certificate of Origin of Equipment, Services, and Intellectual Property**

The Bidder hereby certifies that, if awarded the Contract pursuant to this solicitation, he will perform the Contract subject to the following conditions:

(a)   none of the work, including project design, labour and services shall be performed other than by firms from and within participating NATO member countries;

(b)   no material or items of equipment down to and including identifiable sub-assemblies shall be manufactured or assembled by a firm other than from and within a participating NATO member country. (A sub-assembly is defined as a portion of an assembly consisting of two or more parts that can be provisioned and replaced as an entity); and

(c)   The intellectual property rights to all design documentation and related system operating software shall reside in NATO member countries, and no license fees or royalty charges shall be paid by the Bidder to firms, individuals or Governments other than within the NATO member countries.

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

Annex B-13.   List of Proposed Key Personnel

Key Personnel are not necessarily required to work full-time in that position. Therefore, it is possible for an individual to fill more than one Key Personnel role at the same time, assuming the person is qualified to perform both roles.
Note: "SW Architect" is a Key Personnel for IFB-CO-14873-INTEL-FS2-BE (Back-End) only.

Position	SOW Reference	Labour Category	Name	Designation Period
Project Manager				
Quality Assurance Manager				
Configuration Manager				
Technical Lead				
SW Architect *(Back-end only)*				
Scrum Master				
Test Director				
Lead Software Developer 1				
Lead Software Developer 2				

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

Annex B-14. Certificate of Price Ceiling

I hereby certify that the total price offered in the Price Volume of this Bid does not exceed the price ceiling provided in paragraph 3.5.3.1 of Book I:

- EUR 17,510,454, for the Front-end User Applications contract;

- EUR 23,178,132, for the Back-end Data Management contract.

Note: All prices, or supporting pricing information, shall be included in the Price Volume only. There shall be no pricing information disclosed in the either the Bid Administration Volume or the Technical Volume.

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

Annex B-15. Disclosure of Involvement of Former NCI Agency Employment

The Bidder hereby certifies that, in preparing its Bid, the Bidder did not have access to solicitation information prior to such information being released to Bidders (e.g., draft statement of work and requirement documentation).

The Bidder hereby acknowledges the post-employment measures applicable to former NCI Agency Personnel as per the NCI Agency Code of Conduct.

The Bidder hereby certifies that:

☐ Its personnel, at any tier, working as part of the company's team preparing the Bid have not held employment with NCI Agency within the last two years.

☐ It has obtained a signed statement from the former NCI Agency personnel below, who departed the NCI Agency within the last two years, that they were not previously involved in the project under competition (as defined in the extract of the NCI Agency Code of Conduct provided in Annex B-16 of this IFB):

Employee Name	Former NCI Agency Position	Current Company Position

The Bidder also hereby certifies that it does not employ and/or receive services from former NCI Agency Personnel at grades A5 and above or ranks OF-5 and above, who departed the NCI Agency within the last 12 months. This prohibitions covers negotiations, representational communications and/or advisory activities.

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

Annex B-16. NCI Agency AD. 05.00, Code of Conduct: Post Employment Measures

1. The NCI Agency will not offer employment contracts to former NCI Agency Personnel who departed less than 2 years earlier, unless prior approval by the General Manager has been received.

2. Former NCI Agency Personnel will not be accepted as consultants or commercial counterparts for two (2) years after finalization of their employment at NCI Agency, unless the General Manager decides otherwise in the interest of the Agency and as long as NATO rules on double remuneration are observed. Such decision shall be recorded in writing. Commercial counterparts include owners or majority shareholders, key account managers, or staff members, agents or consultants of a company and/or subcontractors seeking business at any tier with the NCI Agency in relation to a procurement action in which the departing NCI Agency staff member was involved when he/she was under the employment of the NCI Agency. As per the Prince 2 Project methodology, a Project is defined as a "temporary organization that is created for the purpose of delivering one or more business products according to an agreed business case". For the purpose of this provision, involvement requires (i) drafting, review or coordination of internal procurement activities and documentation, such as statement of work and statement of requirement; and/or (ii) access to procurement information that has not yet been authorized for release for outside distribution, including draft statements of work and requirement documentations; and/or (iii) being appointed as a representative to the Project governance (e.g., Project Board) with access to procurement information as per (ii) above; and/or (iv) having provided strategic guidance to the project, with access to procurement information as per (ii) above.

3. In addition to paragraph 2 above, former NCI Agency Personnel at grades A5 and above or ranks OF-5 and above are prohibited during twelve months following the end of their employment with the NCI Agency from engaging in negotiations, representational communications and/or advisory activities with the NCI Agency on behalf of a private entity, unless this has been agreed in advance by the NCI Agency General Manager and notified to the Agency Supervisory Board (ASB).

4. NCI Agency Personnel leaving the Agency shall not contact their former colleagues in view of obtaining any information or documentation about procurement activities' not-yet-authorized release. NCI Agency Personnel shall immediately report such contacts to the Director of Acquisition.

5. The ASB Chairman will be the approving authority upon recommendation by the Legal Adviser when the NCI Agency Personnel concerned by the above is the NCI Agency General Manager and will notify the ASB.

6. NCI Agency Personnel leaving the Agency shall sign a statement that they are aware of the post-employment measures set out in this Directive.

7. The post-employment measures set out in this Directive shall be reflected in the NCI Agency procurement documents, such as IFBs, and contract provisions.

Annex C   Bid Guarantee – Standby Letter of Credit

Standby Letter of Credit Number:

Issue Date: _____

Beneficiary: NATO CI Agency,
                               Financial Management Resource Centre,
                               Boulevard Leopold III,
                               B-1110 Brussels,
                               Belgium

Expiry Date: _____

Delete whichever paragraph 1 below does not apply.

1.   We, (issuing bank) hereby establish in your favour our irrevocable standby letter of credit number {number} by order and for the account of (NAME AND ADDRESS OF BIDDER) in the original amount of € 130,000.00 (One Hundred and Thirty Thousand Euro) . We are advised this Guarantee fulfils a requirement under Invitation for Bid IFB-CO-14873-INTELFS2-UA dated _____.

1.   We, (issuing bank) hereby establish in your favour our irrevocable standby letter of credit number {number} by order and for the account of (NAME AND ADDRESS OF BIDDER) in the original amount of € 170,000.00 (One Hundred and Seventy Thousand Euro) . We are advised this Guarantee fulfils a requirement under Invitation for Bid IFB-CO-14873-INTELFS2-BE dated _____.

2.   Funds under this standby letter of credit are available to you upon first demand and without question or delay against presentation of a certificate from the NATO CI Agency Contracting Officer that:

   a)   (NAME OF BIDDER) has submitted a Bid and, after Bid Closing Date (including extensions thereto) and prior to the selection of the lowest priced, technically compliant Bid, has withdrawn his Bid, or stated that he does not consider his Bid valid or agree to be bound by his Bid, or

   b)   (NAME OF BIDDER) has submitted a Bid determined by the Agency to be the lowest priced, technically compliant Bid, but (NAME OF BIDDER) has declined to execute the Contract offered by the Agency, such Contract being consistent with the terms of the Invitation for Bid, or

   c)   The NATO CI Agency has offered (NAME OF BIDDER) the Contract for execution but (NAME OF BIDDER) has been unable to demonstrate compliance with the security requirements of the Contract within a reasonable time, or

   d)   The NATO CI Agency has entered into the Contract with (NAME OF BIDDER) but (NAME OF BIDDER) has been unable or unwilling to provide the

Performance Guarantee required under the terms of the Contract within the time frame required.

3.   This Letter of Credit is effective the date hereof and shall expire at our office located at   (Bank Address) on _____. All demands for payment must be made prior to the expiry date.

4.   It is a condition of this letter of credit that the expiry date will be automatically extended without amendment for a period of sixty (60) calendar days from the current or any successive expiry date unless at least thirty (30) calendar days prior to the then current expiry date the NATO CI Agency Contracting Officer notifies us that the Letter of Credit is not required to be extended or is required to be extended for a shorter duration.

5.   We may terminate this letter of credit at any time upon sixty (60) calendar days notice furnished to both (NAME OF BIDDER) and the NATO CI Agency by registered mail.

6.   In the event we (the issuing bank) notify you that we elect not to extend the expiry date in accordance with paragraph 4 above, or, at any time, to terminate the letter of credit, funds under this credit will be available to you without question or delay against presentation of a certificate signed by the NATO CI Agency Contracting Officer which states

"The NATO CI Agency has been notified by {issuing bank} of its election not to automatically extend the expiry date of letter of credit number {number} dated {date} pursuant to the automatic renewal clause (or to terminate the letter of credit). As of the date of this certificate, no suitable replacement letter of credit, or equivalent financial guarantee has been received by the NATO CI Agency from, or on behalf of (NAME OF BIDDER), and the NATO CI Agency, as beneficiary, hereby draws on the standby letter of credit number _____ in the amount of € (Amount up to the maximum available under the LOC), such funds to be transferred to the account of the Beneficiary number _____ (to be identified when certificate is presented)."

Such certificate shall be accompanied by the original of this letter of credit and a copy of the letter from the issuing bank that it elects not to automatically extend the standby letter of credit, or terminating the letter of credit.

7.   The Beneficiary may not present the certificate described in paragraph 6 above until 20 (twenty) calendar days prior to a) the date of expiration of the letter of credit should {issuing bank} elect not to automatically extend the expiration date of the letter of credit, b) the date of termination of the letter of credit if {issuing bank} notifies the Beneficiary that the letter of credit is to be terminated in accordance with paragraph 6 above.

8.   Multiple drawings are allowed.

9.   Drafts drawn hereunder must be marked, "Drawn under {issuing bank} Letter of Credit No. {number}" and indicate the date hereof.

10.   This letter of credit sets forth in full the terms of our undertaking, and this undertaking shall not in any way be modified, amended, or amplified by reference to any document, instrument, or agreement referred to herein (except the International Standby Practices (ISP 98) hereinafter defined) or in which this letter of credit is referred to or to which this letter of credit relates, and any such reference shall not be deemed to incorporate herein by reference any document, instrument, or agreement.

11.   We hereby engage with you that drafts drawn under and in compliance with the terms of this letter of credit will be duly honoured upon presentation of documents to us on or before the expiration date of this letter of credit.

12.   This Letter of Credit is subject to The International Standby Practices-ISP98 (1998 Publication) International Chamber of Commerce Publication No.590.

Annex D   Clarification Request Form

**INVITATION FOR BID
IFB-CO-14873-INTELFS2**

CLARIFICATION REQUEST FORM

Delete whichever does not apply:

IFB-CO-14873-INTELFS2-UA User Applications or IFB-CO-14873-INTELFS2-BE Back-end Data Management

Company Name _____   Submission Date_____

ADMINISTRATION or CONTRACTING				
Serial No.	**IFB Ref.**	**Bidder's Question**	**NCI Agency Answer**	**Status**
A.1				
A.2				
A.3				
A.4				

Delete whichever does not apply:

IFB-CO-14873-INTELFS2-UA User Applications or IFB-CO-14873-INTELFS2-BE Back-end Data Management

Company Name _____   Submission Date_____

PRICE				
Serial No.	**IFB Ref.**	**Bidder's Question**	**NCI Agency Answer**	**Status**
P.1				
P.2				
P.3				
P.4				

Delete whichever does not apply:

IFB-CO-14873-INTELFS2-UA User Applications or IFB-CO-14873-INTELFS2-BE Back-end Data Management

Company Name _____   Submission Date_____

TECHNICAL				
Serial No.	**IFB Ref.**	**Bidder's Question**	**NCI Agency Answer**	**Status**
T.1				
T.2				
T.3				
T.4				

CLIN	Deliverable	SRS reference	Description	Price	Optional Comments (Mandatory for zero costs lines)
			Declare Currency =>	-	
1		3.1	**Externalized user account management**	-	
1.1	User Management App	3.1.1	**User Management Application**	-	
1.1.1	User Management App	3.1.1.1	*UI functionalities supporting user stories*	-	
1.1.1.1	User Management App	[FUA-1]	The User Management Application shall implement functionalities to fulfil the acceptance criteria of [US 1]: As an Authorized User I want to define the policies to be used by the INTEL-FS2 policy decision point (PDP) so users can be given the correct access privileges.	-	
1.1.1.2	User Management App	[FUA-2]	The User Management Application shall implement functionalities to fulfil the acceptance criteria of [US 2]: As an Authorized User I want to create user accounts so that the new users can get access to INTEL-FS2.	-	
1.1.1.3	User Management App	[FUA-3]	The User Management Application shall implement functionalities to fulfil the acceptance criteria of [US 3]: As an Authorized User I want be able to modify user accounts so that I can keep the user accounts and their privileges current.	-	
1.1.1.4	User Management App	[FUA-4]	The User Management Application shall implement functionalities to fulfil the acceptance criteria of [US 4]: As an Authorized User I want to define default user configuration settings to establish a baseline configuration so that the users will have a baseline to start from, or return to.	-	
1.1.1.5	User Management App	[FUA-5]	Removed from scope.	-	
1.1.1.6	User Management App	[FUA-6]	The User Management Application shall implement functionalities to fulfil the acceptance criteria of [US 6]: As an Authorized User I want to be able to send email to users so that I can provide them with information relevant to their usage of INTEL-FS2 (e.g. planned outages due to maintenance, changes to the user's account settings, etc.)	-	
1.1.1.7	User Management App	[FUA-7]	The User Management Application shall implement functionalities to fulfil the acceptance criteria of [US 7]: As an Authorized User I want to be able to manage a set of standard role-based notifications so that users with specific roles can be automatically informed of any change of interest to the role.	-	
1.1.2	User Management App	3.1.1.2	*Standalone application*	-	
1.1.2.1	User Management App	[FUA-10]	The User Management Application shall be implemented as a standalone application, and where this standalone User Management application can also manage user accounts for other applications than INTEL-FS.	-	
1.1.3	User Management App	3.1.1.3	*User Accounts administration functionalities*	-	
1.1.3.1	User Management App	[FUA-12]	The User Management Application shall include a dedicated User Interface allowing users to request user accounts where the requester can select from a number of predefined user role/ type configurations.	-	
1.1.3.2	User Management App	[FUA-13]	The User Management Application shall have support for redirecting account requests to relevant ONs for processing.	-	
1.1.3.3	User Management App	[FUA-14]	The User Management Application shall include a notification mechanism that alerts the appropriate user account administrator of pending new user account requests.	-	
1.1.3.4	User Management App	[FUA-15]	The User Management Application shall upon any change to a user account automatically notify, by email, the user with information on the change to the user account (this includes a welcome email to a user for whom a new user account has just been created). The email shall contain details on the change (i.e. what was changed).	-	
1.1.3.5	User Management App	[FUA-16]	The User Management Application shall include support for resetting the password for a user with no domain account to enable the user to access INTEL-FS2 again.	-	
1.1.3.6	User Management App	[FUA-17]	The User Management Application shall manage the user's attributes (including assertions/ claims required for access control) locally to the I2UA application. This means that I2UA shall provide its own application attribute store.	-	
1.1.3.7	User Management App	[FUA-18]	The User Management Application shall backup its user account database at regular (and configurable) intervals.	-	
1.1.3.8	User Management App	[FUA-19]	It shall be possible to restore the User Management Application user account database from a backup.	-	
1.1.3.9	User Management App	[FUA-20]	In case the User Management Application is implemented using a solution based on the Windows operating System, the I2UA user accounts shall be declared in an Active Directory inheriting NATO Group Policy Object (GPO) declared at the network domain level for password policy (e.g. complexity, history, minimum age, maximum age, length).	-	
1.1.4	User Management App	3.1.1.4	*Initial policy definitions*	-	

1.1.4.1	User Management App	[FUA-21]	The User Management Application shall be populated with an access control policy set that enables user access controls to I2UA that are comparable with the mainstream access privileges currently in use in INTEL-FS Spiral 1 (see also examples in Chapter 3 of [INTEL-FS2-UserStories]).	-
2		**4.1**	**Phase 1 - Upgrade existing UI and BM OPFOR ORBAT management**	**-**
2.1	**Dashboard App**	**4.1.1**	**Dashboard Application**	**-**
2.1.1	*Dashboard App*	*4.1.1.1*	*UI functionalities supporting user stories*	*-*
2.1.1.1	Dashboard App	[FUA-22]	The Dashboard Application shall implement functionalities to fulfil the acceptance criteria of [US 8]: As an Authorized User I want to see, and have dynamically updated, information on the latest updates to IIEs of interest to me on my Dashboard so that I obtain this information without having to manually search for it.	-
2.1.1.2	Dashboard App	[FUA-23]	The Dashboard Application shall implement functionalities to fulfil the acceptance criteria of [US 9]: As an Authorized User I want to see my notifications on my Dashboard so that I can dynamically see updates to these as they are generated.	-
2.1.1.3	Dashboard App	[FUA-24]	The Dashboard Application shall implement functionalities to fulfil the acceptance criteria of [US 10]: As an Authorized User I want to access favourites/ links from my Dashboard so that I can quickly retrieve resources of relevance to my tasking.	-
2.1.1.4	Dashboard App	[FUA-25]	The Dashboard Application shall implement functionalities to fulfil the acceptance criteria of [US 11]: As an Authorized User I want to customize the information to be shown in the Table View for the latest updated IIEs so that the information shown there is of relevance to me.	-
2.1.1.5	Dashboard App	[FUA-27]	The Dashboard Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.	-
2.1.2	*Dashboard App*	*4.1.1.2*	*Table Views*	*-*
2.1.2.1	Dashboard App	[FUA-29]	The Dashboard Application shall by default display the latest-updated-products, the RFI statuses, the CR statuses, and the Notifications in different Table Views using the Table View Component as defined in chapter 2.	-
2.1.2.2	Dashboard App	[FUA-30]	It shall, in a Table View, be possible to select one or multiple notifications and flag them (i.e. mark as "to do"), and to mark them as "read" or "unread", and to archive them (and thus hide them), and to delete them.	-
2.1.3	*Dashboard App*	*4.1.2.3*	*Relationship View*	*-*
2.1.3.1	Dashboard App	[FUA-31]	The Dashboard Application shall use the Relationship View Component with all its features as defined in chapter 2.	-
2.1.3.2	Dashboard App	[FUA-32]	The Dashboard Application shall be able to display the IIEs (filtered according to the user's preferences) with the latest updates in the Relationship View. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.	-
2.1.3.3	Dashboard App	[FUA-33]	Items selected in Relationship View shall be displayed/ previewed in the Dashboard Application.	-
2.1.4	*Dashboard App*	*4.1.2.4*	*GeoView*	*-*
2.1.4.1	Dashboard App	[FUA-34]	The Dashboard Application shall integrate with and control the GeoView component as described in chapter 2.	-
2.1.4.2	Dashboard App	[FUA-35]	The Dashboard Application shall display the IIEs (filtered according to the user's preferences) with the latest updates in the GeoView.	-
2.1.4.3	Dashboard App	[FUA-36]	An item selected in GeoView shall be displayed/ previewed in the Dashboard Application.	-
2.1.5	*Dashboard App*	*4.1.1.5*	*UI functionalities for managing cross-cutting configuration settings (for all applications)*	*-*
2.1.5.1	Dashboard App	[FUA-37]	It shall be possible for the user to specify which data source (operational data, exercise data, training data) to use.	-
2.1.5.2	Dashboard App	[FUA-38]	It shall be possible to configure the default user interface customization settings as defined in the table below to be used in the user interfaces across all I2UA applications.	-
2.1.5.3	Dashboard App	[FUA-39]	Changes to configuration settings shall be persisted for each individual user, and loaded upon the start of each new user session (logon).	-
2.1.6	*Dashboard App*	*4.1.1.6*	*UI functionalities for managing configuration settings for the Dashboard views*	*-*
2.1.6.1	Dashboard App	[FUA-40]	It shall be possible to change the default time window for the latest-published-products view (Table View).	-
2.1.6.2	Dashboard App	[FUA-41]	It shall be possible to apply filters to tailor which products to be shown in the latest-published-products view. Supported filters shall include product type, geospatial coverage (location of the reported information), source/ producer of the information, a set of IRs, etc.	-
2.1.7	*Dashboard App*	*4.1.1.7*	*Messaging with INTEL-FS Backend (I2BE)*	*-*
2.1.7.1	Dashboard App	[FUA-42]	The I2UA shall implement the service-to-service messaging protocol as supported by the SOA & IdM Platform for communication with the I2BE.	-

2.2	**Products Management App**	**4.1.2**	**Products Management Application**	-
2.2.1	*Products Management App*	*4.1.2.1*	*UI functionalities supporting user stories*	-
2.2.1.1	Products Management App	[FUA-43]	The Products Management Application shall implement functionalities to fulfil the acceptance criteria of [US 15]: As an Authorized User I want to create/ update products, so that I can share intelligence and information with other users.	-
2.2.1.2	Products Management App	[FUA-44]	The Products Management Application shall implement functionalities to fulfil the acceptance criteria of [US 16]: As an Authorized User I want to be able to use templates when creating products, so that I can automatically prefill repeatable metadata for products that I create on a regular basis.	-
2.2.1.3	Products Management App	[FUA-45]	The Products Management Application shall implement functionalities to fulfil the acceptance criteria of [US 17]: As an Authorized User I want to create products with associations to other IIEs of different types and export these so that these products can be used for automated ingestion during training exercises.	-
2.2.1.4	Products Management App	[FUA-47]	The Products Management Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.	-
2.2.2	*Products Management App*	*4.1.2.2*	*Integrated search and basic actions on search results*	-
2.2.2.1	Products Management App	[FUA-48]	The Product Management Application shall include an integrated search function allowing the user to identify products that can subsequently be selected for editing and for workflow management.	-
2.2.2.2	Products Management App	[FUA-49]	From the search results it shall be possible (for an authorized user) to perform the actions as defined in the table below.	-
2.2.3	*Products Management App*	*4.1.2.3*	*Create and/ or update functionalities*	-
2.2.3.1	Products Management App	[FUA-50]	The Product Management Application shall through submitting the product file (in PDF or MS Word format) to an I2BE metadata extraction service obtain Keywords and Locations from the product file and pre-fill the Keywords and Locations in the product entry forms.	-
2.2.3.2	Products Management App	[FUA-51]	The Product Management Application shall through submitting imagery and video product files (in STANAG 4545 and STANAG 4609 format) to a I2BE metadata extraction service obtain product metadata values and pre-fill the metadata attributes in the product entry forms.	-
2.2.3.3	Products Management App	[FUA-53]	The Product Management Application shall be able to use templates to prefill values to selected metadata attributes. As a minimum it shall use default values to prefill the Authority, Classification, and Releasability attributes.	-
2.2.3.4	Products Management App	[FUA-54]	The Product Management Application shall, when a new product is linked to a RFI, IR, CR, or collection/ exploitation task, provide functionality to set the status of the linked IIE to completed or fulfilled (as appropriate for the linked IIE type).	-
2.2.3.5	Products Management App	[FUA-55]	The Product Application can create different types of products (as defined by [INTEL-FS2 InformationModel]), and the user shall have the possibility to specify the type of product when activating the create form/ panel.	-
2.2.4	*Products Management App*	*4.1.2.4*	*Application Working Data Set (ADS)*	-
2.2.4.1	Products Management App	[FUA-555]	It shall be possible to perform multiple, consecutive queries to add products to the ADS.	-
2.2.5	*Products Management App*	*4.1.2.5*	*IIE View/ Entry Panel*	-
2.2.5.1	Products Management App	[FUA-556]	The Product Management Application shall include an IIE View/ Entry Panel as defined in chapter 2 to display and edit IIEs managed by the application.	-
2.2.6	*Products Management App*	*4.1.2.6*	*Relationship View*	-
2.2.6.1	Products Management App	[FUA-56]	The Product Management Application shall use the Relationship View Component with all its features as defined in chapter 2.	-
2.2.6.2	Products Management App	[FUA-57]	The Product Management Application shall be able to display products (identified through the integrated search) in the Relationship View. The user can expand the information in the Relationship View by selecting individual products and view all IIEs (of any type) linked to the selected products.	-
2.2.6.3	Products Management App	[FUA-58]	By selecting an item in Relationship View the full detail of the item shall be displayed/ previewed in the Product Management Application (e.g. in a dialog window).	-
2.2.7	*Products Management App*	*4.1.2.7*	*GeoView*	-
2.2.7.1	Products Management App	[FUA-59]	The Product Management Application shall integrate with and control the GeoView component as described in chapter 2.	-
2.2.7.2	Products Management App	[FUA-60]	The Product Management Application shall display products (from the integrated search) in GeoView. In case a product is associated with multiple locations then all locations shall be indicated on the map while visually depicting that they all belong to the same product (e.g. by using annotation in glyphs).	-
2.2.7.3	Products Management App	[FUA-61]	The Product Management Application shall be able to use the GeoView to define the geolocation of a new product by selecting a position in GeoView.	-

2.2.8	*Products Management App*	*4.1.2.8*	*Export functionalities*	-
2.2.8.1	Products Management App	[FUA-62]	It shall be possible to search for products, select one or multiple products and export the metadata of selected products to a single XML file, and exports the products icon, symbol, or thumbnail. The resulting file shall include information of the security classification of the exported data, and the file name shall include prefix that informs about the highest classification of the information in the file (e.g. using an (NR) prefix for files with NATO RΞSTRICTED information).	-
2.2.8.2	Products Management App	[FUA-63]	It shall be possible to transform the exported data resulting from [FUA-62] into humanly readable document using a separate/ external and customizable transformations (e.g. XSLT-FO). The transformations shall use the exported XML file, icons, symbols, and thumbnails and produce a PDF file. The resulting file shall include information of the security classification of the exported data, and the file name shall include prefix that informs about the highest classification of the information in the file (e.g. using an (NR) prefix for files with NATO RΞSTRICTED information).	-
2.2.8.3	Products Management App	[FUA-64]	In support of exercises (see [FUA-45]), it shall be possible to define a new product entirely on the client side (not submitting the product to the I2BE backend) where this product includes a full set of metadata and a number of attachments. It shall be possible to export this product (metadata and attachments) in to a file in a structured format. The resulting file shall include information of the security classification of the exported data, and the file name shall include prefix that informs about the highest classification of the information in the file (e.g. using an (NR) prefix for files with NATO RΞSTRICTED information).	-
2.2.8.4	Products Management App	[FUA-65]	For the type of product export files that are used for exchange with the Joint Exercise Management Module (JEMM) system (see [FUA-45]) it shall be possible to manage these outside of the INTEL-FS repository. It shall be possible to load a previously exported product file and edit/ refine it and save it back to the same file, or to save it under another file name. The product file shall be fully compliant with the [InformationModel] and map directly to the product OData API.	-
2.3	**BSO Management App**	**4.1.3**	**BSO Management Application**	-
2.3.1	*BSO Management App*	*4.1.3.1*	*UI functionalities supporting user stories*	-
2.3.1.1	BSO Management App	[FUA-66]	The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 18]: As an Authorized User I want to create or update a BSO or a BSR so that this new intelligence can be used in analysis and shared with other users.	-
2.3.1.2	BSO Management App	[FUA-67]	The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 19]: As an Authorized User I want to manage reporting on IED incidents in order to build a complete picture of adversary IED activities in the area of intelligence interest (AOII) and thereby contribute to the counter-IED (C-IED) mission.	-
2.3.1.3	BSO Management App	[FUA-68]	The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 21]: As an Authorized User I want to use the Relationship View for creating/ updating BSOs and relationships between BSOs and other IIEs as this is a highly efficient way of managing BSOs and their relationships.	-
2.3.1.4	BSO Management App	[FUA-69]	The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 22]: As an Authorized User I want to use the Map View for creating/ relationships between BSOs and other IIEs.	-
2.3.1.5	BSO Management App	[FUA-70]	The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 23]: As an Authorized User I want to have the report to be collated imported into an editable scratch panel and the original and formatted report available in a PDF viewer so that I can start executing the collation work.	-
2.3.1.6	BSO Management App	[FUA-71]	The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 24]: As an Authorized User I want to use the report extracted to a scratch panel as the source for my collation work so that I can efficiently identify BSOs and copy/ paste text into BSRs.	-
2.3.1.7	BSO Management App	[FUA-72]	The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 25]: As an Authorized User I want to be able to compare BSOs to detect if they are duplicates so that I can subsequently merge the BSOs (and their reports) into a single BSO.	-
2.3.1.8	BSO Management App	[FUA-73]	The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 26]: As an Authorized User I want to have my collation tasks organized in a task list so that I can better plan my collation work.	-
2.3.1.9	BSO Management App	[FUA-74]	The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 27]: As an Authorized User I want to manage the collation tasking so that I can plan, prioritize, and track the progress of the collation work.	-

2.3.1.10	BSO Management App	[FUA-75]	The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 28]: As an Authorized User I want to create or update an OPFOR ORBAT in order to model a real world ORBAT so that this can be persisted, used in analysis and shared with other users.		-
2.3.1.11	BSO Management App	[FUA-76]	The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 29]: As an Authorized User I want to inspect the OPFOR ORBAT in order to track changes, understand and analyse the ORBAT.		-
2.3.1.12	BSO Management App	[FUA-78]	The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.		-
2.3.2	*BSO Management App*	*4.1.3.2*	*Integrated search and basic actions on search results*		-
2.3.2.1	BSO Management App	[FUA-80]	The BSO Management Application shall include an integrated search function allowing the user to identify IIEs that can subsequently be selected for BSO management and for workflow management. I.e. it shall be possible to search for all OPFOR ORBATs, BSO types, IED incidents, products, etc.		-
2.3.2.2	BSO Management App	[FUA-81]	The BSO Management Application shall when displaying a BSO show the latest assessed status information.		-
2.3.2.3	BSO Management App	[FUA-82]	It shall be possible from the integrated search function to use an OPFOR ORBAT as a search criteria and find all IIEs (e.g. BSOs, Products, RFIs and RFI Responses, Collection Requirements, etc.) associated with elements of the ORBAT.		-
2.3.2.4	BSO Management App	[FUA-83]	From the search results it shall be possible (for an authorized user) to perform the actions as defined in the table below.		-
2.3.3	*BSO Management App*	*4.1.3.3*	*Application Working Data Set (ADS)*		-
2.3.3.1	BSO Management App	[FUA-84]	It shall be possible to perform multiple, consecutive queries to add data to the data set (OPFOR ORBATs, BSOs, IED Incidents, and other IIEs). I.e. the user can chose whether to use the result of the new query to augment or replace the content of the application data set. When a new query is adding to the content of the data set, any duplicate IIEs from the multiple queries shall be resolved. Any change to the data set shall be reflected in all the application views.		-
2.3.3.2	BSO Management App	[FUA-85]	It shall be possible to filter the data set based on IIE types, and attributes of the IIEs and remove/ hide IIEs of "unwanted" types in all views. It shall be possible to filter on OPFOR ORBAT attributes, all BSO types, all attributes of the individual BSO types, and IED Incidents, as defined in [INTEL-FS2-InformationModel].		-
2.3.3.3	BSO Management App	[FUA-86]	It shall be possible to filter the OPFOR ORBAT to a specified level (e.g. only down to Battalion level) remove/ hide ORBAT elements below that level in all views.		-
2.3.3.4	BSO Management App	[FUA-87]	It shall be possible to apply a geographical coverage area filter to filter out information from the application data set, and dynamically update all the views.		-
2.3.3.5	BSO Management App	[FUA-88]	It shall be possible to filter the application data set based on a time window (e.g. using a time slider UI widget) and remove/ hide IIEs outside the of the active time window and dynamically update all the views. It shall be possible to dynamically shrink, expand, and shift the time window in time (backwards and forwards in time).		-
2.3.4	*BSO Management App*	*4.1.3.4*	*IIE View/ Entry Panel*		-
2.3.4.1	BSO Management App	[FUA-588]	The BSO Management Application shall include an IIE View/ Entry Panel as defined in chapter 2 to display and edit IIEs managed by the application.		-
2.3.5	*BSO Management App*	*4.1.3.5*	*Table Views*		-
2.3.5.1	BSO Management App	[FUA-89]	The BSO Management Application shall use the Table View Component with all its features as defined in chapter 2.		-
2.3.5.2	BSO Management App	[FUA-90]	The Table View shall show the maximum set of IIE attributes that are common across all IIEs in the application data set and support editing of the attributes within the table.		-
2.3.5.3	BSO Management App	[FUA-91]	When the data set only contains IIE of one particular data type, then all attributes of that type shall be shown in the table (e.g. if the data set only contains BM TECHINT of a certain equipment type, all parameters of that particular equipment type shall be shown in the Table View).		-
1.4.5.4	BSO Management App	[FUA-92]	It shall, when the Table View is showing IIEs grouped by ORBATs, be possible to copy data from one ORBAT to another and update and save (and subsequently approve and publish) the changed ORBAT.		-
2.3.6	*BSO Management App*	*4.1.3.6*	*Relationship Views*		-
2.3.6.1	BSO Management App	[FUA-93]	The BSO Management Application shall use the Relationship View Component with all its features as defined in chapter 2.		-

2.3.6.2	BSO Management App	[FUA-94]	It shall be possible, from within the BSO Application, to expand the view with additional BSOs by specifying a degree of separation from the original BSO set and request import (note: a degree of separation greater than 2 is probably not practical). The Relationship View shall automatically re-render its layout and display all the BSOs including the newly added ones.	-
2.3.6.3	BSO Management App	[FUA-95]	It shall be possible to select an IIEs in the Relationship View and get all details of the IIE presented within the BSO Management Application.	-
2.3.6.4	BSO Management App	[FUA-96]	It shall be possible to animate the change over time of the ORBAT e.g. using a time slider UI widget) in the Relationship View (using a hierarchical layout).	-
2.3.6.5	BSO Management App	[FUA-97]	Items selected in Relationship View shall be displayed/ previewed in the BSO Management Application.	-
2.3.7	*BSO Management App*	*4.1.3.7*	*Timeline Views*	-
2.3.7.1	BSO Management App	[FUA-98]	The BSO Management Application shall use a Timeline View Component with all its features as defined in chapter 2.	-
2.3.7.2	BSO Management App	[FUA-99]	It shall be possible to view the entire history of a selected BSO's status reports in a Timeline View that shows when changes occurred. For each change, it shall be possible to identify what was changed. It shall be possible to hide (and unhide) status reports classified as 'contributing' from this history view (reports classified as 'assessed' shall always be shown).	-
2.3.7.3	BSO Management App	[FUA-100]	It shall be possible to view the entire change history for a selected OPFOR ORBAT in a Timeline View that shows all changes in the ORBAT and when the changes occurred. For each change, it shall be possible to identify what was changed.	-
2.3.7.4	BSO Management App	[FUA-101]	An Item selected in Timeline View shall be displayed/ previewed in the BSO Management Application.	-
2.3.8	*BSO Management App*	*4.1.3.8*	*GeoView*	-
2.3.8.1	BSO Management App	[FUA-102]	The BSO Management Application shall integrate with and control the GeoView component as described in chapter 2.	-
2.3.8.2	BSO Management App	[FUA-103]	The BSO Management Application shall display BSOs and Relationships in GeoView.	-
2.3.8.3	BSO Management App	[FUA-104]	The BSO Management Application shall be able to create new, or update, relationships between BSOs from within the GeoView.	-
2.3.8.4	BSO Management App	[FUA-105]	An Item selected in GeoView shall be displayed/ previewed in the BSO Management Application.	-
2.3.9	*BSO Management App*	*4.1.3.9*	*ORBAT View*	-
2.3.9.1	BSO Management App	[FUA-106]	It shall be possible to view the ORBAT with all its information as defined in the [INTEL-FS2-InformationModel] in a human readable document format.	-
2.3.9.2	BSO Management App	[FUA-107]	The BSO Management Application shall in the ORBAT View be able to display the historical changes of the ORBAT over time.	-
2.3.9.3	BSO Management App	[FUA-607]	The BSO Management Application shall be able to export the ORBAT View as a PDF file.	-
2.3.10	*BSO Management App*	*4.1.3.10*	*Report Collation View*	-
2.3.10.1	BSO Management App	[FUA-608]	It shall be possible from within the Report Collation View (as described by [FUA-71]), at any time, to close down the collation of a report by setting the status of the report collation to Completed, Aborted, NoInformationValue, or ReviewedNotCollated. When setting the collation status to any of these values, the BSO Management Application shall exit from the Report Collation View and return to the Collation Task List (as described by [FUA-73]).	-
2.3.10.2	BSO Management App	[FUA-609]	It shall be possible to sort the list of automatically identified BSOs (from the report) BSO Name and by BSO type.	-
2.3.10.3	BSO Management App	[FUA-610]	It shall be possible to collapse multiple findings of a particular BSO in the report text in the list of identified BSOs, and it shall be possible to expand the collapsed findings for a BSO to see all matches (as text snippets) in the report text.	-
2.3.10.4	BSO Management App	[FUA-611]	It shall be possible to select any of the multiple matches for each of the BSOs in the list of identified BSOs and have that particular text match highlighted in the text in the scrap panel, and to reposition the curser in the scrap panel on the matched text (i.e. center the scrap panel view on the matched text).	-
2.5	**INTEL Situation App**	**4.1.5**	**Intelligence Situation Application**	-
2.5.1	*INTEL Situation App*	*4.1.5.1*	*UI functionalities supporting user stories*	-
2.5.1.1	INTEL Situation App	[FUA-108]	The Intelligence Situation Application shall implement functionalities to fulfil the acceptance criteria of [US 34]: As an Authorized User I want to create/ load overlays so that I can study the Intelligence Situation.	-
2.5.1.2	INTEL Situation App	[FUA-109]	The Intelligence Situation Application shall implement functionalities to fulfil the acceptance criteria of [US 35]: As an Authorized User I want to expose a named overlay as the Intelligence Situation so that it becomes available at all Organizational Nodes (ON) and can be shared with other applications such as NATO Common Operating Picture (NCOP).	-

2.5.1.3	INTEL Situation App	[FUA-111]	The Intelligence Situation Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.	-
2.5.2	INTEL Situation App	4.1.5.2	Integrated search and basic actions on search results	-
2.5.2.1	INTEL Situation App	[FUA-112]	The Intelligence Situation Application shall include an integrated search function allowing the user to identify IIEs where one or many of the identified IIEs can be selected and added to dedicated overlays.	-
2.5.2.2	INTEL Situation App	[FUA-113]	From the search results it shall be possible (for an authorized user) to perform the actions as defined in the table below.	-
2.5.3	INTEL Situation App	4.1.5.3	Application Data Set (ADS)	-
2.5.3.1	INTEL Situation App	[FUA-114]	The Intelligence Situation Application shall be able to work with multiple overlays concurrently.	-
2.5.3.2	INTEL Situation App	[FUA-115]	It shall be possible to search for and load an existing overlay into an overlay data set.	-
2.5.3.3	INTEL Situation App	[FUA-116]	It shall be possible to perform multiple, consecutive queries to add data to an overlay data set. I.e. the user can chose whether to use the result of the new query to augment or replace the content of the application data set. When a new query is adding to the content of the data set, any duplicate IIEs from the multiple queries shall be resolved.	-
2.5.3.4	INTEL Situation App	[FUA-117]	It shall be possible to filter an overlay data set based on IIE types, and attributes of the IIEs.	-
2.5.3.5	INTEL Situation App	[FUA-118]	It shall be possible from the overlay data set to create, or update, and submit for approval, the new/ changed overlay.	-
2.5.4	INTEL Situation App	4.1.5.4	IIE View/ Entry Panel	-
2.5.4.1	INTEL Situation App	[FUA-618]	The Intelligence Situation Application shall include an IIE View/ Entry Panel as defined in chapter 2 to display and edit IIEs managed by the application.	-
2.5.5	INTEL Situation App	4.1.5.5	Table Views	-
2.5.5.1	INTEL Situation App	[FUA-119]	The Intelligence Situation Application shall be able to visualize and edit overlays in the Table View Components as defined in chapter 2, and support editing of the overlay attributes within the table.	-
2.5.6	INTEL Situation App	4.1.5.6	Relationship View	-
2.5.6.1	INTEL Situation App	[FUA-120]	The Intelligence Situation Application shall use the Relationship View Component with all its features as defined in chapter 2.	-
2.5.6.2	INTEL Situation App	[FUA-121]	The Intelligence Situation Application shall be able to display the IIEs of an overlay in the Relationship View. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.	-
2.5.6.3	INTEL Situation App	[FUA-122]	Items selected in Relationship View shall be displayed/ previewed in the Intelligence Situation Application.	-
2.5.7	INTEL Situation App	4.1.5.7	GeoView	-
2.5.7.1	INTEL Situation App	[FUA-123]	The Intelligence Situation Application shall integrate with and control the GeoView component as described in chapter 2.	-
2.5.7.2	INTEL Situation App	[FUA-124]	The Intelligence Situation Application shall be able to create, update, or delete overlays from within the GeoView where subsequently the overlays changes are persisted in INTEL-FS2 and processed through the approval workflow process.	-
2.5.7.3	INTEL Situation App	[FUA-125]	The Intelligence Situation Application shall be able to visualize its overlay data set in GeoView and control how the overlays are visualized in GeoView (e.g. hide/ unhide, hierarchical ordering, remove overlay, etc.)	-
2.5.7.4	INTEL Situation App	[FUA-126]	The Intelligence Situation Application shall be able to dynamically update GeoView's visualization of overlays whenever there is a change to the overlay's data set (e.g. an IIE is added or removed, the position of an IIE is changed, etc.)	-
2.5.7.5	INTEL Situation App	[FUA-127]	It shall be possible to multi-select IIEs in the GeoView and copy or move the selected IIEs from one overlay to another overlay.	-
2.5.7.6	INTEL Situation App	[FUA-128]	The Intelligence Situation Application shall be able to obtain graphical representation of the recognized maritime picture (RMP) as NVG or KML from NCOP (see [NCOP-ICD]), display it in GeoView, and regularly update the RMP overlay in GeoView.	-
2.5.7.7	INTEL Situation App	[FUA-129]	The Intelligence Situation Application shall be able to obtain graphical representation of the recognized ground picture (RGP) as NVG from the NCOP system (see [NCOP-IDC]), display it in GeoView, and regularly update the RGP overlay in GeoView.	-
2.5.7.8	INTEL Situation App	[FUA-130]	The Intelligence Situation Application shall be able to obtain graphical representation of the chemical, biological, radiological and nuclear (CBRN) hazard areas (as NVG) from services in the CBRN FS system, display the areas in GeoView, and regularly update the hazard areas overlay in GeoView.	-

2.5.7.9	INTEL Situation App	[FUA-131]	The Intelligence Situation Application shall be able to obtain graphical representation of the weather situation through OpenGIS® Web Map Service (WMS) Interface provided by the NATO Automated Meteorological Information System [NAMIS] and display the data in GeoView, and regularly update this overlay in GeoView. If the information is available from NAMIS the application shall be able to display: Cloud Cover, Humidity data, Atmospheric Pressure data, Precipitation data, Thunderstorm data, Temperature data, and Wind Speed data at different altitudes.	-
2.7	**Search App**	**4.1.7**	**Search Application**	**-**
2.7.1	*Search App*	*4.1.7.1*	*UI functionalities supporting user stories*	*-*
2.7.1.1	Search App	[FUA-132]	The Search Application shall implement functionalities to fulfil the acceptance criteria of [US 48]: As an Authorized User I want to combine free-text search with specific metadata search so that I can narrow down the search result set.	-
2.7.1.2	Search App	[FUA-133]	The Search Application shall implement functionalities to fulfil the acceptance criteria of [US 49]: As an Authorized User I want to save the combined search so that this specific combined search can be repeated and subscribed to.	-
2.7.1.3	Search App	[FUA-134]	The Search Application shall implement functionalities to fulfil the acceptance criteria of [US 51]: As an Authorized User I want to preview IIEs and their attachments and related files so that I can precisely identify and select existing data, information and intelligence.	-
2.7.1.4	Search App	[FUA-135]	The Search Application shall implement functionalities to fulfil the acceptance criteria of [US 52]: As an Authorized User I want to export search results to support further analysis of the selected information to be done externally to INTEL-FS2.	-
2.7.1.5	Search App	[FUA-137]	The Search Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.	-
2.7.2	*Search App*	*4.1.7.2*	*Relationship View*	*-*
2.7.2.1	Search App	[FUA-138]	The Search Application shall use the Relationship View Component with all its features as defined in chapter 2.	-
2.7.2.2	Search App	[FUA-139]	The Search Application shall be able to display the search results in the Relationship View while using some form of extent management or lazy loading to provide the search results to the user within a minimum response time. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.	-
2.7.3	*Search App*	*4.1.7.3*	*GeoView*	*-*
2.7.3.1	Search App	[FUA-140]	The Search Application shall integrate with and control the GeoView component as described in chapter 2.	-
2.7.3.2	Search App	[FUA-141]	The Search Application shall be able to use GeoView to define geo-location constraints to be used in the search criteria.	-
2.7.3.3	Search App	[FUA-142]	The Search Application shall be able to display search results in GeoView as thumbnails or icons while using some form of extent management or lazy loading to provide the search results to the user within a minimum response time.	-
2.7.3.4	Search App	[FUA-143]	An Item selected in GeoView shall be displayed/ previewed in the Search Application.	-
2.7.4	*Search App*	*4.1.7.4*	*Search Results functionalities*	*-*
2.7.4.1	Search App	[FUA-144]	The search result list shall include icons for each of the IIEs in the list using file type symbols (e.g. standard PDF icon, MS Office icons, etc) and for non-file-type IIEs use APP-6 symbols when applicable (e.g. for BSOs). The icons and symbols shall be decorated with the workflow status of the IIE.	-
2.7.4.2	Search App	[FUA-644]	It shall be possible to decorate the APP-6 symbols in the search list with nationality flags, including fictitious and configurable country flags (when running in exercise mode).	-
2.7.4.3	Search App	[FUA-145]	It shall be possible to rearrange the sequence of the columns in the search result list.	-
2.7.4.4	Search App	[FUA-146]	It shall be possible to customize the information being shown in the result list (hide and unhide/add columns).	-

2.7.4.5	Search App	[FUA-147]	The Search Application shall from the result set support selection of single, or multiple, video products and/ or image products and export these for use by Google Earth. I.e. the products (metadata and videos/ images) are exported in the KML file format. The resulting file shall include information of the security classification of the exported data, and the file name shall include prefix that informs about the highest classification of the information in the file (e.g. using an (NR) prefix for files with NATO RΞSTRICTED information).	-
2.7.4.6	Search App	[FUA-148]	The Search Application shall from the result set support selection of single, or multiple BSOs and export those BSOs with their BSRs, and with their relationships to other BSOs (and their BSRs) to a user-specified degree of relationship separation from the selected set of BSOs. The export file shall be in XML format and shall preserve all relationships between all BSOs exported format.	-
2.7.5	Search App	4.1.7.5	Report Reader	-
2.7.5.1	Search App	[FUA-150]	The Search Application shall implement a dedicated Report Reader Component that can load a result document attachment in PDF format and thus enable the user to read the entire document.	-
2.7.5.2	Search App	[FUA-151]	The Report Reader Component shall be implemented such that it can be reused by other I2UA applications.	-
2.7.5.3	Search App	[FUA-152]	The Previewing Report Reader shall support text search within the previewed document.	-
2.7.5.4	Search App	[FUA-153]	The Previewing Report Reader shall support identification of existing BSOs in the text (an example of a Report Reader with BSO identification is shown in the figure below. For BSOs that already exist as objects in the INTEL-FS repository, and that are found in the text, the user can use the automatically created list (to the right in the example Report Reader) to navigate to that entity.	-
2.7.5.5	Search App	[FUA-154]	It shall be possible to extend the Report Reader with a Relationship View in another Panel. The Relationship View shall be implemented using, or including, the Relationship View Component with all its features as defined in chapter 2. The Relationship View shall show the BSOs found in the report and include relationships between these (if any), as shown in the figure below.	-
2.7.6	Search App	4.1.7.6	Saved searches and search history functionalities	-
2.7.6.1	Search App	[FUA-155]	The Search Application can export and import saved searches allowing users to share defined searches without using the global/ published search mechanism (i.e. the saved searches stays private to the individual users).	-
2.7.6.2	Search App	[FUA-156]	It shall be possible to manage (rename or delete) saved searches.	-
2.7.6.3	Search App	[FUA-157]	The user shall be able to access his search history to be able to redo a search.	-
2.8	Analysis App	4.1.8	Analysis Application	-
2.8.1	Analysis App	4.1.8.1	UI functionalities supporting user stories	-
2.8.1.1	Analysis App	[FUA-158]	The Analysis Application shall implement functionalities to fulfil the acceptance criteria of [US 53]: As an Authorized User I want to be able to build advanced queries so that I can perform analysis to obtain answers to intelligence questions.	-
2.8.1.2	Analysis App	[FUA-159]	The Analysis Application shall implement functionalities to fulfil the acceptance criteria of [US 54]: As an Authorized User I want to save the results of a query-based analysis so that I can revisit the results at a later time, repeat the analysis, and share the analysis.	-
2.8.1.3	Analysis App	[FUA-160]	The Analysis Application shall implement functionalities to fulfil the acceptance criteria of [US 55]: As an Authorized User I want to perform additional link analysis in ANB on the query-based analysis data set so that I exploit the full functionality of ANB to enhance my analysis.	-
2.8.1.4	Analysis App	[FUA-161]	The Analysis Application shall implement functionalities to fulfil the acceptance criteria of [US 56]: As an Authorized User I want to have tool support to find connection path between entities so that I can investigate if a connection between the entities exist.	-
2.8.1.5	Analysis App	[FUA-162]	The Analysis Application shall implement functionalities to fulfil the acceptance criteria of [US 57]: As an Authorized User I want to perform pattern of life analysis on events so that I can understand historical activity.	-
2.8.1.6	Analysis App	[FUA-164]	The Analysis Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.	-
2.8.2	Analysis App	4.1.8.2	Application Data Set (ADS)	-
2.8.2.1	Analysis App	[FUA-166]	It shall be possible to perform multiple, consecutive queries to add data to the set of IIEs to Analysis Data Set (ADS). I.e. the user can chose whether to use the result of the new query to augment the ADS or to replace the ADS with the new query result. When a new query is adding to the ADS, any duplicate IIEs from the multiple queries shall be resolved. Any change to the ADS shall be reflected in all ADS views.	-

2.8.2.2	Analysis App	[FUA-167]	In case of BSO data in the ADS, it shall be possible to expand the ADS by adding linked BSOs to a user-selected degree of separation from the original BSO set and dynamically update all ADS Views.	-
2.8.2.3	Analysis App	[FUA-168]	It shall be possible to filter the ADS based on IIE types and remove/ hide IIEs of "unwanted" types and dynamically update all ADS View.	-
2.8.2.4	Analysis App	[FUA-169]	It shall be possible to filter the ADS based on relationship types and remove/ hide relationships of "unwanted" types and dynamically update all ADS View.	-
2.8.2.5	Analysis App	[FUA-170]	It shall be possible to filter the ADS based on a Degree Centrality and remove/ hide IIEs falling outside a Degree Centrality window (defined by a lower and an upper and lower limit) and dynamically update all ADS View.	-
2.8.2.6	Analysis App	[FUA-171]	It shall be possible to select individual IIEs from either of the Table View, GeoView, Relationship View, or Timeline View and remove/ hide such IIEs from the ADS and dynamically update all ADS views.	-
2.8.2.7	Analysis App	[FUA-172]	It shall be possible to apply a geographical coverage area filter to filter out information from the ADS and dynamically update all ADS views.	-
2.8.2.8	Analysis App	[FUA-173]	It shall be possible to filter the ADS based on a time window (e.g. using a time slider UI widget) and remove/ hide IIEs falling outside the of the active time window and dynamically update all ADS views. It shall be possible to dynamically shrink, expand, and shift the time window in time (backwards and forwards in time).	-
2.8.2.9	Analysis App	[FUA-174]	It shall be possible to apply temporal interval filters. Supported interval filters shall include: filtering out information for specific months of the year in the Gregorian and/ or in the Islamic calendar, and filtering out information from specific weekdays.	-
2.8.3	*Analysis App*	*4.1.8.3*	*Table Views*	-
2.8.3.1	Analysis App	[FUA-175]	It shall be possible view all common metadata attributes for ADS IIEs in a Table View Component with all its features as defined in chapter 2.	-
2.8.3.2	Analysis App	[FUA-176]	The Analysis Application shall support in-place editing of single fields in the Table View (to correct data mistakes that is preventing or hampering the analysis). It shall be possible to handle the edit as local to the analysis, and it shall also be possible (for an authorized user) to commit the edit back to the INTEL-FS repository.	-
2.8.3.3	Analysis App	[FUA-676]	It shall be possible to calculate centrality values for the data in the ADS and have the centrality values presented in a Table View for all the ADS items where a centrality value can be calculated. The table shall include centrality values for Degree Centralities, Betweenness Centrality, and Closeness Centralities, where the table can be sorted on any of the centrality types and on IIE/ BSO name.	-
2.8.3.4	Analysis App	[FUA-677]	It shall be possible to select any IIE in the table showing centrality values and have the Relationship View centre on this IIE, and highlight the selected IIE in the Relationship View.	-
2.8.4	*Analysis App*	*4.1.8.4*	*Relationship Views*	-
2.8.4.1	Analysis App	[FUA-177]	The Analysis Application shall be able to render the entire ADS and the relationships between the ADS IIEs in a Relationship View using the Relationship View Component with all its features as defined in chapter 2.	-
2.8.4.2	Analysis App	[FUA-178]	Items selected in Relationship View shall be displayed/ previewed in the Analysis Application.	-
2.8.5	*Analysis App*	*4.1.8.5*	*Timeline Views*	-
2.8.5.1	Analysis App	[FUA-179]	The Analysis Application shall use a Timeline View Component with all its features as defined in chapter 2.	-
2.8.5.2	Analysis App	[FUA-180]	The Analysis Application shall plot the temporal updates to the IIEs in the ADS. The plot shall include relationships between the objects (e.g. see example in the figure below where relationships drawn between an event and two persons). Normally the BSOs shall be placed on the timeline according to the relevant status report ASAT time. However, for some BSO types it shall be possible to select the time value to use for the "placing" of the BSO on the timeline; this include for event BSOs the option of selecting between ASAT time and the event start time for placing the event.	-
2.8.5.3	Analysis App	[FUA-680]	It shall be possible from within the Timeline View to suppress/ remove IIEs from the view. It shall be possible to select a single or multiple BSOs and remove all updates for the BSO (or BSOs) in the view.	-
2.8.6	*Analysis App*	*4.1.8.6*	*GeoView*	-
2.8.6.1	Analysis App	[FUA-181]	It shall be possible to render the entire ADS and the relationships between the ADS IIEs in GeoView defined in chapter 2.	-
2.8.6.2	Analysis App	[FUA-182]	The Analysis Application shall be able to display all its data (in the ADS) in GeoView.	-
2.8.6.3	Analysis App	[FUA-183]	It shall be possible to enable and disable a "dynamic update mode" in the Analysis Application where in enabled mode the Analysis Application dynamically updates GeoView whenever there is an update to any of the entities in the ADS.	-
2.8.6.4	Analysis App	[FUA-184]	An Item selected in GeoView shall be displayed/ previewed in the Analysis Application.	-

2.8.7	*Analysis App*	4.1.8.7	*Animation*	-	
2.8.7.1	Analysis App	[FUA-185]	It shall be possible to dynamically animate the visualization of the ADS in the GeoView and in the Relationship View and in the Timeline View by dragging a time "handle" in the time slider tool.	-	
2.8.7.2	Analysis App	[FUA-685]	During animation, the BSO location on the GeoView shall be the location of the last location update in the status reports. It shall be possible to specify if only 'assessed' reports will be used to update BSO locations or if location from 'contributing' status reports will also be used.	-	
2.8.8	*Analysis App*	4.1.8.8	*Pattern of life (PoL) analysis functionalities*	-	
2.8.8.1	Analysis App	[FUA-186]	It shall be possible to render/ plot temporal information in a Histogram vs Timeline View as shown in example in the figure below.	-	
2.8.8.2	Analysis App	[FUA-187]	It shall be possible to render/ plot temporal information in a Polar Coordinate System View as shown in example in the figure below.	-	
2.8.8.3	Analysis App	[FUA-188]	It shall be possible to plot any type/ category of data in the Polar Coordinate System View both with and without visually distinguishing between the types/ categories (in the figure above the types are visually distinguishable). When distinguishing types/ categories it shall be able to visually distinguish up to 10 different types/ categories of in the diagram.	-	
2.8.8.4	Analysis App	[FUA-189]	It shall be possible from the temporal information to calculate statistics (occurrences by type or other classifier) that is shown in a Radar Plot View as shown in example in the figure below.	-	
2.8.8.5	Analysis App	[FUA-190]	The three Pattern of Life Views (Histogram, Polar Coordinate System, and Radar Chart) shall have support for using different date-time types and intervals to include hours of the day, days of the week (Sunday through Saturday), days of the year, and months of the year in both Gregorian and Islamic calendar. In particular the Polar Coordinate System shall include the five different radial/circumference coordinate pairs as defined in the table below.	-	
2.8.8.6	Analysis App	[FUA-191]	It shall be possible to toggle between the supported date-time types when viewing the temporal data in any of the three pattern of life diagrams (histogram, polar coordinate, and radar chart).	-	
2.8.8.7	Analysis App	[FUA-192]	It shall be possible to compute frequency-based heat maps from temporal information (events) and have the heat-map visualized in GeoView.	-	
2.8.8.8	Analysis App	[FUA-193]	It shall be possible to compute and display a concentration-based heat-map based on the geo-locations of the IIEs in the ADS and have the heat-map visualized in GeoView.	-	
2.8.9	*Analysis App*	4.1.8.9	*Save and export functionalities*	-	
2.8.9.1	Analysis App	[FUA-194]	When saving an Analysis it shall be possible to save the visual layout of the Relationship View including manual adjustments and recreate the layout when re-loading the Analysis.	-	
2.8.9.2	Analysis App	[FUA-195]	It shall be possible to save the ADS as a set of queries and filter operations such that the Analysis Application is able to recreate the ADS (by re-running the queries and filter operations).	-	
2.9	**ISR Organization Mgmt App**	**4.1.9**	**ISR Organization Management Application**	**-**	
2.9.1	*ISR Organization Mgmt App*	4.1.9.1	*UI functionalities supporting user stories*	-	
2.9.1.1	ISR Organization Mgmt App	[FUA-196]	The ISR Organization Management Application shall implement functionalities to fulfil the acceptance criteria of [US 58]: As an Authorized User I want to create, update, and delete an operation and/ or a named collection so it can be used as mechanism for INTEL-FS2 to support multiple ongoing operations.	-	
2.9.1.2	ISR Organization Mgmt App	[FUA-197]	The ISR Organization Management Application shall implement functionalities to fulfil the acceptance criteria of [US 59]: As an Authorized User I want to create, update and delete ISR units and/or ISR systems so that the ISR unit/ ISR system can be tasked appropriately.	-	
2.9.1.3	ISR Organization Mgmt App	[FUA-198]	The ISR Organization Management Application shall implement functionalities to fulfil the acceptance criteria of [US 61]: As an Authorize User I want to create/ update an ISR ORBAT so Collection Requirements (CR) and collection and exploitation tasks can be distributed to the appropriate ISR units and ISR systems.	-	
2.9.1.4	ISR Organization Mgmt App	[FUA-199]	The ISR Organization Management Application shall implement functionalities to fulfil the acceptance criteria of [US 62]: As an Authorized User I want to view the details of the ISR ORBAT for my situational awareness.	-	
2.9.1.5	ISR Organization Mgmt App	[FUA-201]	The ISR Organization Management Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.	-	
2.9.2	*ISR Organization Mgmt App*	4.1.9.2	*Integrated search and basic actions on search results*	-	
2.9.2.1	ISR Organization Mgmt App	[FUA-202]	The ISR Organization Management Application shall include an integrated search function allowing the user to identify Operational Activities, ISR ORBATs, Units, and ISR Systems can subsequently be selected for inspection and editing.	-	

2.9.2.2	ISR Organization Mgmt App	[FUA-203]	From the search results it shall be possible (for an authorized user) to perform the actions as defined in the table below.	-
2.9.3	*ISR Organization Mgmt App*	*4.1.9.3*	*Application Data Set (ADS)*	-
2.9.3.1	ISR Organization Mgmt App	[FUA-704]	It shall be possible to filter the ADS on attributes of the IIEs in the ADS.	-
2.9.3.2	ISR Organization Mgmt App	[FUA-705]	It shall be possible to apply a geographical coverage area filter to filter out information from the ADSs, and dynamically update all the views of the ADS.	-
2.9.4	*ISR Organization Mgmt App*	*4.1.9.4*	*IIE View/ Entry Panel*	-
2.9.4	ISR Organization Mgmt App	[FUA-706]	The ISR Organization Application shall include an IIE View/ Entry Panel as defined in chapter 2 to display and edit IIEs managed by the application.	-
2.9.5	*ISR Organization Mgmt App*	*4.1.9.5*	*Table Views*	-
2.9.5.1	ISR Organization Mgmt App	[FUA-204]	The ISR Organization Management Application shall use the Table View Component with all its features as defined in chapter 2.	-
2.9.5.2	ISR Organization Mgmt App	[FUA-205]	It shall be possible to view ISR Systems in a Table View where each row represents an ISR System, and the systems attribute values are shown across multiple columns in the table. The Unit that the ISR System is assigned to shall be included as one of the column attributes.	-
2.9.5.3	ISR Organization Mgmt App	[FUA-206]	It shall be possible to view Units in a Table View where each row represents a Unit, and the Unit attribute values are shown across multiple columns in the table.	-
2.9.5.4	ISR Organization Mgmt App	[FUA-707]	It shall be possible to select an ISR ORBAT and populate the Table View with all ISR Units in the ISR ORBAT, and by selecting an ISR ORBAT populate the Table View with all ISR Systems in the ISR ORBAT.	-
2.9.5.5	ISR Organization Mgmt App	[FUA-207]	It shall be possible from a Table View of Units to create/ add new Units and to edit, in-place in the Table, existing Units.	-
2.9.5.6	ISR Organization Mgmt App	[FUA-208]	It shall be possible from a Table View of ISR Systems to create/ add new ISR Systems and to edit, in-place in the Table, existing ISR Systems.	-
2.9.5.7	ISR Organization Mgmt App	[FUA-209]	It shall be possible from a Table View of ISR Systems to reassign ISR Systems from one Unit to another by dragging and dropping ISR Systems from one Unit group to another Unit group.	-
2.9.6	*ISR Organization Mgmt App*	*4.1.9.6*	*Relationship Views*	-
2.9.6.1	ISR Organization Mgmt App	[FUA-210]	The ISR Organization Management Application shall use the Relationship View Component with all its features as defined in chapter 2.	-
2.9.6.2	ISR Organization Mgmt App	[FUA-211]	It shall be possible from a Hierarchy (organigram) layout of the ISR ORBAT in the Relationship View to move a Unit's position in the command hierarchy by dragging and dropping a Unit (and its subordinate Units) with the ISR ORBAT hierarchy.	-
2.9.6.3	ISR Organization Mgmt App	[FUA-212]	Items selected in Relationship View shall be displayed/ previewed in the ISR Organization Management Application.	-
2.9.7	*ISR Organization Mgmt App*	*4.1.9.7*	*GeoView*	-
2.9.7.1	ISR Organization Mgmt App	[FUA-213]	The ISR Organization Management Application shall integrate with and control the GeoView component as described in chapter 2.	-
2.9.7.2	ISR Organization Mgmt App	[FUA-214]	The ISR Organization Management Application shall be able to display Units and ISR Systems the GeoView.	-
2.9.7.3	ISR Organization Mgmt App	[FUA-215]	An item selected in GeoView shall be displayed/ previewed in the ISR Organization Management Application.	-
2.10	**IRM App**	**4.1.10**	**IRM Application**	**-**
2.10.1	*IRM App*	*4.1.10.1*	*UI functionalities supporting user stories*	-
2.10.1.1	IRM App	[FUA-216]	The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 64]: As an Authorized User I want to be able to create and update PIRs, SIRs, EEIs, and Indicators to guide/ direct the intelligence collection process.	-
2.10.1.2	IRM App	[FUA-217]	The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 65]: As an Authorized User I want to track the status of PIRs, SIRs, EEIs and indicators so I can understand whether they are being addressed or not.	-
2.10.1.3	IRM App	[FUA-218]	The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 66]: As an Authorized User I want to create/ update an Intelligence Collection Plan (ICP) so I can capture all related PIRs, SIRs, EEIs, and indicators relevant to an operation.	-

2.10.1.4	IRM App	[FUA-219]	The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 67]: As an Authorized User I want to create/ update an RFI so that I can formulate a question to be answered by a higher, lower, adjacent command, or by a nation to address my intelligence gap.	-
2.10.1.5	IRM App	[FUA-220]	The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 69]: As an Authorized User I want to forward a RFI that cannot be answered within my own organization to a different organization so that the RFI can be answered.	-
2.10.1.6	IRM App	[FUA-221]	The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 70]: As an Authorized User I want to update the status of an RFI to control the workflow of the RFI (e.g. to cancel RFIs that will no longer provide any value).	-
2.10.1.7	IRM App	[FUA-222]	The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 71]: As an Authorized User I want to be able to view the status of the RFIs to check that the RFIs are being actioned.	-
2.10.1.8	IRM App	[FUA-223]	The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 72]: As an Authorized User I want to create/ update a response to the RFI so the RFI originator can receive the relevant intelligence to answer the intelligence gap.	-
2.10.1.9	IRM App	[FUA-224]	The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 73]: As an Authorized User I want to transform RFI to a readable format (PDF) so that the RFI can be shared with users not having access to INTEL-FS2.	-
2.10.1.10	IRM App	[FUA-225]	The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.	-
2.10.2	IRM App	4.1.10.2	Integrated search and basic actions on search results	-
2.10.2.1	IRM App	[FUA-226]	The IRM Application shall include an integrated search function that supports searching for ICPs, PIRs, SIRs, EEIs, Indicators, RFIs, RFI responses, NAIs, Products, BSOs and Targets in different workflow states (see NATO::JISR::Metadata::PublishedStatusType in [INTEL-FS2-InformationModel]). It shall be possible to add all search results to the ADS.	-
2.10.2.2	IRM App	[FUA-227]	From the search results it shall be possible (for an authorized user) to perform the actions as defined in the table below.	-
2.10.3	IRM App	4.1.10.3	Application Data Set (ADS)	-
2.10.3.1	IRM App	[FUA-228]	It shall be possible to filter the ADS on attributes of the IIEs in the ADS, including constraining the ADS to a specific operation or named collection, to a specific ICP, originator of the data, status values of IRs and RFIs, etc. and dynamically update all the views of the ADS.	-
2.10.3.2	IRM App	[FUA-229]	It shall be possible to apply a geographical coverage area filter to filter out information from the ADSs, and dynamically update all the views of the ADS.	-
2.10.3.3	IRM App	[FUA-230]	It shall be possible to filter the ADS based on a time window (e.g. using a time slider UI widget) and remove/ hide IIEs falling outside the of the active time window (e.g. using Last Report Date and latest time information is of value (LTIOV) attributes, BSO ASAT times, product modification times, etc.) and dynamically update all the views of the ADS. It shall be possible to dynamically shrink, expand, and shift the time window in time (backwards and forwards in time).	-
2.10.3.4	IRM App	[FUA-231]	It shall be possible to save search + filter settings as named user-specific filters for the IRM Application to be able to recreate the ADS.	-
2.10.4	IRM App	4.1.10.4	IIE View/ Entry Panel	-
2.10.4.1	IRM App	[FUA-731]	The IRM Management Application shall include an IIE View/ Entry Panel as defined in chapter 2 to display and edit IIEs managed by the application.	-
2.10.5	IRM App	4.1.10.5	Table Views	-
2.10.5.	IRM App	[FUA-232]	The IRM Application shall use the Table View Component with all its features as defined in chapter 2.	-
2.10.5.2	IRM App	[FUA-233]	It shall be possible to view a set of IRs in a Table View where each row represents an IR, and the IR attribute values are shown across multiple columns in the table. The operation or named collection, the ICP, the indicator (in case a IR is linked to more than one indicator then the indicator shall be delimited within the same column, etc. shall all be included as column attributes.	-
2.10.5.3	IRM App	[FUA-234]	It shall be possible to select between a set of standard and predefined layouts of the Table View (the purpose of this is to allow the user to quickly organize the Table View for the task at hand; e.g. there might be a particular layout for the export to comma-separated values (CSV) files, etc.)	-
2.10.5.	IRM App	[FUA-235]	It shall be possible to edit (including deleting) IRs directly in a Table View.	-

2.10.5.5	IRM App	[FUA-236]	It shall be possible to view a set of Indicators in an (Indicator) Table View where each row represents an Indicator and the Indicator attribute values are shown across multiple columns in the table. The IR that the Indicator is linked to, and all other IIEs of different types that the Indicator is linked to shall all be included as column attributes.	-
2.10.5.6	IRM App	[FUA-237]	It shall be possible to select the IIEs the Indicator is linked to within the Table View and have all the details of the IIE presented previewed in a dialog window.	-
2.10.5.7	IRM App	[FUA-238]	It shall be possible to view a set of RFIs in a Table View where each row represents an RFI, and the RFI attribute values are shown across multiple columns in the table. The IR that the RFI is linked to shall be included as one of the column attributes. RFI responses shall also be reported on in each row.	-
2.10.5.	IRM App	[FUA-239]	It shall be possible display the RFI responses grouped by RFIs in a Table View.	-
2.10.5.	IRM App	[FUA-240]	It shall be possible to export the content of the Table View to a file in XML format.	-
2.10.6	*IRM App*	*4.1.10.6*	*Relationships View*	-
2.10.6.1	IRM App	[FUA-241]	The IRM Application shall use the Relationship View Component with all its features as defined in chapter 2.	-
2.10.6.2	IRM App	[FUA-242]	The IRM Application shall be able to display an ICP with its PIRs, SIRs, EEIs and indicators in the Relationship View. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.	-
2.10.6.3	IRM App	[FUA-243]	The IRM Application shall be able to display RFIs, RFI responses and EEIs in the Relationship View. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.	-
2.10.6.4	IRM App	[FUA-244]	It shall be possible to use Degree Centrality filtering to filter out all RFIs with more than a specified number of RFI responses (e.g. to show only unanswered RFIs in the Relationship View), and to filter out RFIs with less than a specified number of RFI responses.	-
2.10.6.	IRM App	[FUA-245]	Items selected in Relationship View shall be displayed/ previewed in the IRM Application.	-
2.10.7	*IRM App*	*4.1.10.7*	*Gantt Views*	-
2.10.7.1	IRM App	[FUA-246]	The IRM Application Gant View shall be implemented using, or including, the Gant View Component with all its features as defined in chapter 2.	-
2.10.7.2	IRM App	[FUA-247]	It shall be possible to visualize the selected set of IRs in a Gantt View grouped by IR hierarchy (PIR/SIR/EEI) where also linked Indicators at all levels in the IR hierarchy is visualized.	-
2.10.7.3	IRM App	[FUA-747]	It shall be possible to delete an IR in an IR hierarchy and have also all child IRs of the IR deleted (e.g. by deleting a PIR, all SIRs linked to that PIR shall be deleted, and all EEIs linked to these SIRs are also deleted), pending that the child IRs are not linked to any other superior IRs (e.g. EEIs can be typically reused in different SIRs that may be subordinate to different PIRs).	-
2.10.7.4	IRM App	[FUA-248]	It shall be possible to visualize the selected set of IRs in the Gantt View grouped by multiple ICPs.	-
2.10.7.5	IRM App	[FUA-249]	It shall be possible when visualizing the selected IRs in the Gantt View to also present information on the IRs' associated BSOs and Targets.	-
2.10.7.6	IRM App	[FUA-250]	It shall be possible within the timeline part of the Gantt View to display IR time-based attributes (e.g. Latest Report Time and LTIOV as milestone symbols).	-
2.10.7.7	IRM App	[FUA-251]	The Gantt View shall show the RFIs (and RFI responses) grouped by IRs (when the RFI is linked to an IR) and where the IR hierarchy (PIR/SIR/EEI) is also shown/depicted. RFIs with no IR association shall be grouped under a "no IR" group. RFI responses shall be grouped under their respective RFIs in the Gantt View.	-
2.10.7.8	IRM App	[FUA-252]	It shall be possible within the timeline part of the Gantt View to display status value changes as annotated events/ milestones.	-
2.10.8	*IRM App*	*4.1.10.8*	*GeoView*	-
2.10.8.	IRM App	[FUA-253]	The IRM Application shall integrate with and control the GeoView component as described in chapter 2.	-
2.10.8.2	IRM App	[FUA-254]	The IRM Application shall be able to show PIRs, SIRs, EEI, indicators, and RFIs in GeoView where status values of the IRs and RFIs can be used to select how they are rendered (options to include symbols vs shapes and colour coding). E.g. using colours based on the RFIs status values (SUBMITTED, RESUBMITTED, FULFILLED or STOPPED)	-
2.10.8.3	IRM App	[FUA-255]	The IRM Application shall display geographical areas of interests, BSOs, Targets, and Products linked to IRs and/ or RFIs in GeoView.	-
2.10.8.	IRM App	[FUA-256]	Items selected in GeoView shall be displayed/ previewed in the IRM Application.	-
2.10.9	*IRM App*	*4.1.10.9*	*Chart Views (statistical analysis)*	-
2.10.9.1	IRM App	[FUA-257]	The IRM Application Chart View shall use the Chart View Component with all its features as defined in chapter 2.	-

2.10.9.2	IRM App	[FUA-258]	From the set of RFIs identified through search and filtering operations it shall be possible to plot Number of RFIs (in the set) by Status values, and by Organization, as bar charts and pie charts.	-
2.10.9.3	IRM App	[FUA-259]	From the set of RFIs identified through search and filtering operations it shall be possible to plot Number of RFI Responses (in the set) by Status, and by Organization, as bar charts and pie charts.	-
2.10.9.4	IRM App	[FUA-260]	It shall be possible to turn developed charts into named templates to be reused again and again to reproduce statistical diagrams with the same layout for other sets of RFIs.	-
2.10.10	*IRM App*	*4.1.10.10*	*Document View*	-
2.10.10.1	IRM App	[FUA-261]	The IRM Application Document View shall be able to collect all information about an RFI (including all ForAction information and RFI responses) and present the information in a readable form. It shall be possible to export this RFI document view to a PDF file.	-
2.11	**CRM App**	**4.1.11**	**CRM Application**	-
2.11.1	*CRM App*	*4.1.11.1*	*Basic CR functionalities using STANAG 4559 services*	-
2.11.1.1	CRM App	[FUA-283]	The CRM Application shall enable the user to create ISR Requests (i.e. a CR with addressee information) and submit these to the STANAG 4559/AEDP-19 workflow services.	-
2.11.1.2	CRM App	[FUA-284]	The CRM Application shall enable the user to link ISR Requests to resulting exploitation products using the STANAG 4559/AEDP-19 workflow services.	-
2.11.1.3	CRM App	[FUA-285]	The CRM Application shall enable the user to view the status of ISR Requests using the STANAG 4559/AEDP-19 workflow services.	-

CLIN	Deliverable	SRS reference	Description	Price	Optional Comments (Mandatory for zero costs lines)
			Declare Currency =>	-	
1		3.1	**Backend services - Phase 1**	-	
1.1	**Association Svc**	3.1.1	**IIE to IIE Association Service**	-	
1.1.1	*Association Svc*	*3.1.1.1*	*API*	-	
1.1.1.1	Association Svc	[FBE-1]	The IIE to IIE Association Service shall through the OData REST API support all IIE access actions on inter-service IIE relationships (for an authorized client).	-	
1.1.1.2	Association Svc	[FBE-2]	The IIE to IIE Association Service shall implement server-side functionality that enables the I2UA client though service's API to fulfil any acceptance criteria defined in [INTEL-FS2-UserStories] that describes management of associations between IIEs (this includes [US 15], [US 17], [US 18], [US 22], [US 33], [US 36], [US 38], [US 39], [US 40], [US 43], [US 47], [US 48], [US 53], [US 58], [US 61], [US 64], [US 65], [US 67], [US 72], [US 75], [US 76], [US 77], and [US 83]). This means that the IIE to IIE Association Service shall though a REST API enable clients to create and manage (update and delete) associations as defined in [INTEL-FS2-IM].	-	
1.1.1.3	Association Svc	[FBE-3]	The IIE to IIE Association Service shall after a create, update or delete change to an association, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message identifies the changed association, and the type of change.	-	
1.1.1.4	Association Svc	[FBE-4]	The IIE to IIE Association Service API shall have support for creating associations from an IIE to a temporarily non-existing IIE (i.e. an IIE that has not yet been established in the I2BE, but that will be established).	-	
1.1.1.5	Association Svc	[FBE-5]	The IIE to IIE Association Service API shall have support for creating associations to externally hosted information entities identified by an endpoint identifier (e.g. a URL) to the external entity.	-	
1.1.1.6	Association Svc	[FBE-6]	The IIE to IIE Association Service API shall for clients accessing dangling/ incomplete associations inform (indicate to) the client about the dangling endpoint(s).	-	
1.1.1.7	Association Svc	[FBE-7]	The IIE to IIE Association Service API shall implement a query function to find, and return to a requesting client, all IIEs that are associated to a specific IIE (as identified in the client request). The returned information shall provide all details on the individual associations.	-	
1.1.1.8	Association Svc	[FBE-8]	The IIE to IIE Association Service API shall implement a query function that returns a list of incomplete associations (i.e. containing a dangling endpoint).	-	
1.1.1.9	Association Svc	[FBE-9]	The IIE to IIE Association Service API shall implement a function that checks associations to external information endpoints and report on the endpoints that are found not to be reachable.	-	
1.2	**Geographic Area Svc**	3.1.2	**Geospatial and Features Service**	-	
1.2.1	*Geographic Area Svc*	*3.1.2.1*	*API*	-	
1.2.1.1	Geographic Area Svc	[FBE-10]	The Geospatial and Features Service shall through the OData REST API support all IIE access actions on Features (for an authorized client)	-	
1.2.1.2	Geographic Area Svc	[FBE-11]	The Geospatial and Features Service shall implement over the OData REST API support for geospatial querying consistent with the OData specification for geospatial support.	-	
1.2.1.3	Geographic Area Svc	[FBE-12]	The Geospatial and Features Service shall implement general geospatial support at the IIE level. For example it should be possible to query for Units that are within a Named Area of Interest.	-	
1.2.1.4	Geographic Area Svc	[FBE-13]	Geospatial and Features Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 33] and [US 47] with backend-relevant acceptance criteria for geographic areas as defined in [INTEL-FS2-UserStories].	-	
1.2.1.5	Geographic Area Svc	[FBE-14]	The Geospatial and Features Service shall after a create, update or delete change to a geographical feature, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.	-	
1.2.1.6	Geographic Area Svc	[FBE-15]	The Geospatial and Features Service API shall support uploading of one or many attachments to geographical feature.	-	
1.3	**IFS1 Geo-Area Migration**	3.1.3	**Intel-FS Spiral 1 Geospatial and Features Migration Service**	-	
1.3.1	*IFS1 Geo-Area Migration*	*3.1.3.1*	*Extract, transform, load geographical areas*	-	
1.3.1.1	IFS1 Geo-Area Migration	[FBE-16]	The INTEL-FS Spiral1 Geospatial and Features Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new geographic areas (features). It shall be possible through a configurable filter setting to filter the geographic areas that are extracted from INTEL-FS Spiral1.	-	
1.3.1.2	IFS1 Geo-Area Migration	[FBE-17]	The INTEL-FS Spiral1 Geospatial and Features Migration Service shall transform the extracted geographic areas into a format that is compliant with the OData REST API implemented by the Geospatial and Features Service and load the transformed Geospatial and Features into the I2BE through the Geospatial and Features Service.	-	

1.3.1.3	IFS1 Geo-Area Migration	[FBE-18]	The INTEL-FS Spiral1 Geospatial and Features Migration Service shall identify associations to other IIEs in the extracted geographic areas and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.	-
1.3.1.4	IFS1 Geo-Area Migration	[FBE-19]	Using this ETL process, it shall be possible to migrate all geographic areas, without any data loss, from INTEL-FS Spiral 1 into the I2BE.	-
1.4	**Product Mgmt Svc**	**3.1.4**	**Products Management Service**	**-**
1.4.1	*Product Mgmt Svc*	*3.1.4.1*	*API*	-
1.4.1.1	Product Mgmt Svc	[FBE-20]	The Products Management Service shall through the OData REST API support all IIE access actions on products (for an authorized client).	-
1.4.1.2	Product Mgmt Svc	[FBE-21]	The Products Management Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 15], [US 16], and [US 17] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].	-
1.4.1.3	Product Mgmt Svc	[FBE-22]	The Products Management Service shall after a create, update or delete change to a product, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.	-
1.4.1.4	Product Mgmt Svc	[FBE-23]	The Products Management Service API shall support uploading of one or many attachments to a product in addition to the product file.	-
1.4.1.5	Product Mgmt Svc	[FBE-24]	The Products Management Service shall have support for management (create, read, update, and delete) of templates for creation of products. The template shall contain product metadata, but no product file.	-
1.4.1.6	Product Mgmt Svc	[FBE-25]	The Products Management Service shall upon a client request return a template product metadata set where some text is dynamically set through usage of "tags" where the tags are replaced by actual values, as shown in the example below.	-
1.4.2	*Product Mgmt Svc*	*3.1.4.2*	*Transformation of files to PDF service*	-
1.4.2.1	Product Mgmt Svc	[FBE-26]	The Products Management Service shall, upon a client request, convert a client-specified Microsoft Office file (MS Word or PowerPoint) or an image file (in common image formats) to a PDF file, and return the PDF file to the client.	-
1.4.3	*Product Mgmt Svc*	*3.1.4.3*	*Automatic metadata extraction from files (support to product creation)*	-
1.4.3.1	Product Mgmt Svc	[FBE-27]	The Product Management Service shall, upon a client request, processes document product files (in either PDF or MS Word format) to detect Keywords (mapping terms in the report to Keywords) and Locations, and return the found Keywords and Locations to the client.	-
1.4.3.2	Product Mgmt Svc	[FBE-28]	The rules for mapping terms in the report to Keywords shall be dynamically configurable. I.e. it shall be possible to update the mapping rule set and dictionaries, and activate the updates, without restarting the I2BE.	-
1.4.3.3	Product Mgmt Svc	[FBE-29]	The rule set for identifying Keywords and Locations shall be extendable and configurable through configurations (i.e. not requiring SW re-build).	-
1.4.3.4	Product Mgmt Svc	[FBE-30]	The Products Management Service shall, upon a client request, extract metadata attributes from a client-specified STANAG 4545 image file, map relevant metadata to INTEL-FS2 metadata attributes, and return the metadata mapping to the client.	-
1.4.3.5	Product Mgmt Svc	[FBE-31]	The Products Management Service shall, upon a client request, extract metadata attributes from a client-specified STANAG 4609 video file, map relevant metadata to INTEL-FS2 metadata attributes, and return the metadata mapping to the client.	-
1.5	**IFS1 Product Migration**	**3.1.5**	**Intel-FS Spiral 1 Products Migration Service**	**-**
1.5.1	*IFS1 Product Migration*	*3.1.3.1*	*Extract, transform, load geographical areas*	-
1.5.1.1	IFS1 Product Migration	[FBE-32]	The INTEL-FS Spiral1 Products Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new products. It shall be possible through a configurable filter setting to filter the products that are extracted from INTEL-FS Spiral1.	-
1.5.1.2	IFS1 Product Migration	[FBE-33]	The INTEL-FS Spiral1 Products Migration Service shall transform the extracted products into a format that is compliant with the OData REST API implemented by the Products Management Service and load the transformed products into the I2BE through the Products Management Service.	-
1.5.1.3	IFS1 Product Migration	[FBE-34]	The INTEL-FS Spiral1 Products Migration Service shall identify associations to other IIEs in the extracted products and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.	-
1.5.1.4	IFS1 Product Migration	[FBE-35]	Using this ETL process, it shall be possible to migrate all products, without any data loss, from INTEL-FS Spiral 1 into the I2BE.	-
1.6	**Collation Tasking Svc**	**3.1.6**	**Collation Tasking Management Service**	**-**

1.6.1	*Collation Tasking Svc*	*3.1.6.1*	*API*	-
1.6.1.1	Collation Tasking Svc	[FBE-36]	The Collation Tasking Service shall through the OData REST API support all IIE access actions on collation tasking information (for an authorized client).	-
1.6.1.2	Collation Tasking Svc	[FBE-37]	The Collation Tasking Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 26] and [US 27] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].	-
1.6.1.3	Collation Tasking Svc	[FBE-38]	The Collation Tasking Service shall after a create, update or delete change to a product post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.	-
1.6.1.4	Collation Tasking Svc	[FBE-39]	The Collation Tasking Service shall maintain lists of collation status on document products (i.e. reports) as defined by the collation tasking choreography as defined in [INTEL-FS2-IM].	-
1.6.1.5	Collation Tasking Svc	[FBE-40]	The Collation Tasking Service shall enable clients to search for, filter, and retrieve lists of document products (reports) according to their collation status (e.g. to retrieve reports needing collation, reports assigned for collation, etc.). The filtering mechanism shall support filtering on collation status, assigned user, source of product, product creation/ modification time, etc.	-
1.6.1.6	Collation Tasking Svc	[FBE-41]	The Collation Tasking Service shall enable clients to specify rules for automatically identifying which ON that will be responsible for collating which products. The rules shall identify the ON responsible for a product collation based on product metadata including Keyword, producer, and title (e.g. using regular expression against the title to look for a certain clue).	-
1.6.1.7	Collation Tasking Svc	[FBE-42]	The Collation Tasking Service shall manage collation task assignments (i.e. which user is assigned to collate which product).	-
1.7	**BSO Mgmt Svc**	**3.1.7**	**Battlespace Object (BSO) Management Service**	**-**
1.7.1	*BSO Mgmt Svc*	*3.1.7.1*	*API*	-
1.7.1.1	BSO Mgmt Svc	[FBE-43]	The BSO Management Service shall through the OData REST API support all IIE access actions on BSO/ BSRs (for an authorized client).	-
1.7.1.2	BSO Mgmt Svc	[FBE-44]	The BSO Management Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 18] through [US 25] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].	-
1.7.1.3	BSO Mgmt Svc	[FBE-45]	The BSO Management Service shall after a create, update or delete change to a BSO/ BSR, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.	-
1.7.1.4	BSO Mgmt Svc	[FBE-46]	The BSO Management Service API shall support uploading of one or many attachments to a BSO and/ or a BSR.	-
1.7.1.5	BSO Mgmt Svc	[FBE-47]	The BSO Management Service shall, upon a client request, be able to move a BSR from one BSO to another BSO (to rectify situations where a BSR has been created for the wrong BSO).	-
1.7.1.6	BSO Mgmt Svc	[FBE-48]	The BSO Management Service shall have support for management (create, read, update, and delete) of templates for creation of BSOs and BSRs, and for creation of BSO relationships.	-
1.7.1.7	BSO Mgmt Svc	[FBE-49]	The BSO Management Service shall, to support link analysis, manage associations to other IIEs at the BSO level in accordance with [INTEL-FS2-IM] (in addition to tracking associations at status report level).	-
1.7.2	*BSO Mgmt Svc*	*3.1.7.2*	*Merging of BSOs*	-
1.7.2.1	BSO Mgmt Svc	[FBE-50]	The BSO Management Service shall implement a function in the REST API for merging of two or more BSOs into one consolidated BSO (consolidating BSO attributes across the different BSOs) and aggregating all BSRs (with attachments) in a chronological order based on the ASAT time.	-
1.7.2.2	BSO Mgmt Svc	[FBE-51]	The BSO Management Service shall move all associations that involved the original BSOs onto the new merged BSO.	-
1.7.2.3	BSO Mgmt Svc	[FBE-52]	The BSO Management Service shall for client access requests through the REST API to a de-duplicated BSO (i.e. a BSO that can no longer be used) inform the client that the BSO has been replaced by the new BSO with the identification details of the new merged BSO (e.g. trough throwing an exception).	-
1.7.3	*BSO Mgmt Svc*	*3.1.7.3*	*Identification of existing BSOs in document products*	-
1.7.3.1	BSO Mgmt Svc	[FBE-53]	The BSO Management Service shall maintain dynamically updated dictionaries of existing BSOs of type Persons, Organizations, Units, Events, Places, and Equipment. Note: Dynamically updated means that whenever BSOs are updated the dictionaries are automatically and immediately updated.	-

1.7.3.2	BSO Mgmt Svc	[FBE-54]	The BSO Management Service shall, upon a client request, extract raw text from the file of a DocumentProduct and match it against dictionaries to identify existing BSOs of type Persons, Organizations, Units, Places, Events, and Equipment using a rule set that as a minimum includes the rules identified in the table below. The processed text shall be returned a marked-up format (e.g. XML) where each of the found BSOs are tagged with BSO identifying information (enabling client applications to display and retrieve information on the identified BSOs). The extracted text, shall to the maximum extent have the same structure of paragraphs as the original document report with clear and distinct separation between the paragraphs. A line-break in the original report shall not result in a new paragraph in the extracted text.	-
1.7.3.3	BSO Mgmt Svc	[FBE-55]	The rule set for identifying existing BSOs shall be extendable and configurable through configurations (i.e. not requiring SW re-build).	-
1.7.3.4	BSO Mgmt Svc	[FBE-56]	The dictionary matching shall implement Fuzzy Search techniques (like Levenshtein, SoundEx, and Metaphone) to be able to identify existing BSOs that are differently spelled in the report texts.	-
1.7.3.5	BSO Mgmt Svc	[FBE-57]	The dictionary matching shall implement the NEAR search-operator (e.g. this will allow a person to be found even if the raw text introduces a new/ unknown middle name for a person).	-
1.8	**ORBAT Mgmt Svc**	**3.1.8**	**ORBAT Management Service**	**-**
1.8.1	*ORBAT Mgmt Svc*	*3.1.8.1*	*API*	*-*
1.8.1.1	ORBAT Mgmt Svc	[FBE-58]	The ORBAT Management Service shall through the OData REST API support all IIE access actions on ORBATs (for an authorized client) including Basic Intel ORBAT - NATO::JISR::Staff::ORBAT package, Ballistic Missile ORBAT: NATO::JISR::Staff::ORBAT::BMORBAT package, and Electromagnetic ORBAT: NATO::JISR::Staff::ORBAT::EOBORBAT package.	-
1.8.1.2	ORBAT Mgmt Svc	[FBE-59]	The ORBAT Management Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 28] and [US 29] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].	-
1.8.1.3	ORBAT Mgmt Svc	[FBE-60]	The ORBAT Management Service API shall support uploading of one or many attachments to an ORBAT.	-
1.8.1.4	ORBAT Mgmt Svc	[FBE-61]	The ORBAT Management Service shall after a create, update or delete change to a ORBAT, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.	-
1.9	**IFS1 BSO Migration**	**3.1.9**	**Intel-FS Spiral 1 BSO Migration Service**	**-**
1.9.1	*IFS1 BSO Migration*	*3.1.9.1*	*Extract, transform, load BSO data*	*-*
1.9.1.1	IFS1 BSO Migration	[FBE-62]	The INTEL-FS Spiral1 BSO Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new BSO/ BSR data. It shall be possible through a configurable filter setting to filter the BSOs/ BSRs that are extracted from INTEL-FS Spiral1	-
1.9.1.2	IFS1 BSO Migration	[FBE-63]	The INTEL-FS Spiral1 BSO Migration Service shall transform the extracted BSO/ BSR data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.	-
1.9.1.3	IFS1 BSO Migration	[FBE-64]	The INTEL-FS Spiral1 BSO Migration Service shall identify associations to other IIEs in the extracted BSO/ BSR data and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.	-
1.9.1.4	IFS1 BSO Migration	[FBE-65]	The INTEL-FS Spiral1 BSO Migration Service shall through inspection of the extracted BSO/ BSR data identify ORBATs and transform the ORBAT data into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed ORBATs into the I2BE through the ORBAT Management Service.	-
1.9.1.5	IFS1 BSO Migration	[FBE-66]	Using this ETL process, it shall be possible to migrate all BSO data and all ORBAT information, without any data loss, from INTEL-FS Spiral 1 into the I2BE.	-
1.10	**ISR Organization Svc**	**3.1.10**	**ISR Organization Service**	**-**
1.10.1	*ISR Organization Svc*	*3.1.10.1*	*API*	*-*
1.10.1.1	ISR Organization Svc	[FBE-67]	The ISR Organization Service shall through the OData REST API support all IIE access actions on ISR organizations (for an authorized client).	-
1.10.1.2	ISR Organization Svc	[FBE-68]	The ISR Organization Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 58] through [US 61] and [US 63] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].	-
1.10.1.3	ISR Organization Svc	[FBE-69]	The ISR Organization Service shall after a create, update or delete change to any ISR organization data, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.	-
1.11	**Targets Svc**	**3.1.11**	**Targets Service**	**-**
1.11.1	*Targets Svc*	*3.1.11.1*	*API*	*-*

ID	Component	Ref	Requirement	
1.11.1.1	Targets Svc	[FBE-70]	The Target Service shall through the OData REST API support all IIE access actions on target data (for an authorized client).	-
1.11.1.2	Targets Svc	[FBE-71]	The Target Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 30], [US 31] and [US 32] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].	-
1.11.1.	Targets Svc	[FBE-72]	The Target Service API shall support uploading of one or many attachments to the target-related IIEs.	-
1.11.1.4	Targets Svc	[FBE-73]	The Targets Service shall after a create, update or delete change to target data, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.	-
1.11.1.5	Targets Svc	[FBE-74]	The Targets Service shall manage Candidate No-strike BSOs (as per [INTEL-FS2-InformationMode] NATO::JISR::Staff::Target).	-
1.12	**IFS1 Target Migration**	**3.1.12**	**Intel-FS Spiral 1 Target Data Migration Service**	**-**
1.12.1	*IFS1 Target Migration*	*3.1.12.1*	*Extract, transform, load target areas*	*-*
1.12.1.1	IFS1 Target Migration	[FBE-75]	The INTEL-FS Spiral1 Target Data Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new target data. It shall be possible through a configurable filter setting to filter the target data that are extracted from INTEL-FS Spiral1.	-
1.12.1.2	IFS1 Target Migration	[FBE-76]	The INTEL-FS Spiral1 Target Data Migration Service shall transform the extracted target data into a format that is compliant with the OData REST API implemented by the Target Service and load the transformed target data into the I2BE through the Target Service.	-
1.12.1.3	IFS1 Target Migration	[FBE-77]	The INTEL-FS Spiral1 Target Data Migration Service shall identify associations to other IIEs in the extracted target data and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.	-
1.12.1.4	IFS1 Target Migration	[FBE-78]	Using this ETL process, it shall be possible to migrate all target information, without any data loss, from INTEL-FS Spiral 1 into the I2BE.	-
1.13	**Overlay Svc**	**3.1.13**	**Overlays Service**	**-**
1.13.1	*Overlay Svc*	*3.1.13.1*	*API*	*-*
1.13.1.1	Overlay Svc	[FBE-79]	The Overlays Service shall through the OData REST API support all IIE access actions on overlays (for an authorized client).	-
1.13.1.2	Overlay Svc	[FBE-80]	The Overlays Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 34] and [US 35] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].	-
1.13.1.3	Overlay Svc	[FBE-81]	The Overlays Service shall after a create, update or delete change to an overlay, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.	-
1.14	**IFS1 Overlay Migration**	**3.1.14**	**Intel-FS Spiral 1 Overlays Migration Service**	**-**
1.14.1	*IFS1 Overlay Migration*	*3.1.14.1*	*Extract, transform, load overlays*	*-*
1.14.1.1	IFS1 Overlay Migration	[FBE-82]	The INTEL-FS Spiral 1 Overlays Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new overlays. It shall be possible through a configurable filter setting to filter the overlays that are extracted from INTEL-FS Spiral1.	-
1.14.1.2	IFS1 Overlay Migration	[FBE-83]	The INTEL-FS Spiral 1 Overlays Migration Service shall transform the extracted overlays into a format that is compliant with the OData REST API implemented by the Overlay Service and load the transformed overlays into the I2BE through the Overlay Service.	-
1.14.1.3	IFS1 Overlay Migration	[FBE-84]	The INTEL-FS Spiral 1 Overlays Migration Service shall identify associations to other IIEs in the extracted overlays and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.	-
1.14.1.4	IFS1 Overlay Migration	[FBE-85]	Using this ETL process, it shall be possible to migrate all overlays, without any data loss, from INTEL-FS Spiral 1 into the I2BE.	-
1.15	**IRM Svc**	**3.1.15**	**Intelligence Requirements Management (IRM) Service**	**-**
1.15.1	*IRM Svc*	*3.1.15.1*	*API*	*-*
1.15.1.1	IRM Svc	[FBE-86]	The IRM Service shall through the OData REST API support all IIE access actions on IRM data (for an authorized client).	-
1.15.1.2	IRM Svc	[FBE-87]	The IRM Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 47], and [US 64] through [US 72] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].	-

1.15.1.3	IRM Svc	[FBE-88]	The IRM Service shall after a create, update or delete change to IRM data, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.	-
1.15.1.4	IRM Svc	[FBE-89]	The IRM Service API shall enable clients to manage a distributed RFI process (through the underlying choreography tasking message mechanism) that includes starting and stopping a request, forwarding the request to other ONs for action (or for information), etc.	-
1.16	**IFS1 IRM Migration**	**3.1.16**	**Intel-FS Spiral 1 IRM Data Migration Service**	**-**
1.16.1	*IFS1 IRM Migration*	*3.1.16.1*	*Extract, transform, load IRM data*	*-*
1.16.1.1	IFS1 IRM Migration	[FBE-90]	The INTEL-FS Spiral 1 IRM Data Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral 1 for new IRM data. It shall be possible through a configurable filter setting to filter the target data that are extracted from INTEL-FS Spiral 1.	-
1.16.1.2	IFS1 IRM Migration	[FBE-91]	The INTEL-FS Spiral1 IRM Data Migration Service shall transform the extracted IRM data into a format that is compliant with the OData REST API implemented by the IRM Service and load the transformed IRM data into the I2BE through the IRM Service.	-
1.16.1.3	IFS1 IRM Migration	[FBE-92]	The INTEL-FS Spiral1 IRM Data Migration Service shall identify associations to other IIEs in the extracted target data and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.	-
1.16.1.4	IFS1 IRM Migration	[FBE-93]	Using this ETL process, it shall be possible to migrate all IRM information (i.e. ICPs, indicators, RFIs, and RFI Responses), without any data loss, from INTEL-FS Spiral 1 into the I2BE.	-
1.17	**Search Svc**	**3.1.17**	**Search Service**	**-**
1.17.1	*Search Svc*	*3.1.17.1*	*API*	*-*
1.17.1.1	Search Svc	[FBE-94]	The Search Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 8], [US 48], [US 49], and [US 50] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].	-
1.17.1.2	Search Svc	[FBE-95]	The Search Service shall expose its functionalities though a REST API.	-
1.17.1.3	Search Svc	[FBE-96]	The Search Service shall have support for saving and managing (create, read, update, delete, rename) search criteria as named searches. The named searches can be private to the client (security principal) or public (available to all users).	-
1.17.1.4	Search Svc	[FBE-97]	The Search Service shall constrain the search result set to match the policy for the particular client's (security principal) privileges (i.e. the client shall never receive search results that he/ she is not authorized to access).	-
1.17.2	*Search Svc*	*3.1.17.2*	*Searchable data*	*-*
1.17.2.1	Search Svc	[FBE-98]	The Search Service shall support searching against all metadata attributes and on all IIE types.	-
1.17.2.2	Search Svc	[FBE-99]	The Search Service shall index and support full-text searches against all products files, all IIE attachments of textual type and all IIE metadata including inner objects and BSO status reports and choreography task messages (CTM).	-
1.17.2.3	Search Svc	[FBE-100]	The Search Service shall support searches against soft-deleted data and IIEs in different workflow state (see PublishedStatusType in [INTEL-FS2-IM]).	-
1.17.2.4	Search Svc	[FBE-101]	The Search Service shall never return search results for hard-deleted IIEs (this may require search re-indexing whenever an IIE is hard-deleted).	-
1.17.3	*Search Svc*	*3.1.17.3*	*Search engine*	*-*
1.17.3.1	Search Svc	[FBE-102]	The Search Service shall support matching against strings as exact matches, and as pattern matches (using wildcards and a "LIKE operator").	-
1.17.3.2	Search Svc	[FBE-103]	The Search Service shall support fuzzy matches (e.g. using the Levenshtein distance, and/ or the Soundex algorithm, and/ or Metaphone algorithm).	-
1.17.3.3	Search Svc	[FBE-104]	The Search Service shall support the NEAR (proximity) operator with client specified maximum distance between search tokens.	-
1.17.3.4	Search Svc	[FBE-105]	The Search Service shall support logical operators ('AND', 'OR', 'NOT' including grouping of logical expressions using parenthesis).	-
1.17.3.5	Search Svc	[FBE-106]	The Search Service shall support numerical equality test, greater than and smaller than tests, and timestamp tests (earlier than, within time window, later than).	-
1.17.3.6	Search Svc	[FBE-107]	The Search Service shall have support for geospatial searches.	-
1.17.3.7	Search Svc	[FBE-108]	The Search Service shall support geospatial coverage queries with standard geospatial primitives and operators including testing for a point being inside or outside an area (ellipse, rectangle, polygon, etc.)	-
1.17.3.8	Search Svc	[FBE-109]	The Search Service shall support client applications in implementing facetted search based on classifications derived from the [INTEL-FS2-IM].	-

1.17.3.9	Search Svc	[FBE-110]	The Search Service shall implement document clustering based on content of attachment and IIE metadata. The Search Engine shall have support for grouping the search results into different categories.		-
1.17.3.10	Search Svc	[FBE-111]	The Search Service shall have support for synonym searches using configurable synonym rules (preferably using search-time synonym analysis).		-
1.17.3.11	Search Svc	[FBE-112]	The Search Service shall have support for returning search results as metadata and also text-snippets where the search token was found where the search token is tagged (to enable the client application to highlight the token in context of the document fragment it was found).		-
1.18	**Named Collection Svc**		**3.1.18**	**Named Collections Service**	**-**
1.18.1	*Named Collection Svc*		*3.1.18.1*	*API*	-
1.18.1.1	Named Collection Svc	[FBE-113]	The Named Collections Service shall through the OData REST API enable clients to group IIEs together as named collections where such named collections can be created, updated, and deleted (as required by for instance the user story [US 58]).		-
1.18.1.	Named Collection Svc	[FBE-114]	The Named Collections Service shall have support private named collections and shared public collections.		-
1.19	**Notification Svc**		**3.1.19**	**Notification Service**	**-**
1.19.1	*Notification Svc*		*3.1.19.1*	*API requirements*	-
1.19.1.1	Notification Svc	[FBE-115]	The Notification Service shall implement server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 9], [US 12], and [US 14] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].		-
1.19.1.2	Notification Svc	[FBE-116]	The Notification Service shall enable clients to register subscriptions in the form of a search criteria with the identification of the subscriber, a subscription channel/ queue on the SOA & IdM Platform, and a subscription identifier/ tag. The Notification Service shall dynamically detect when the search criteria is fulfilled, and send the search result on the specified subscription channel with the subscription identifier/ tag and the subscriber identification.		-
1.19.1.3	Notification Svc	[FBE-117]	The Notification Service shall enable clients to register subscriptions in the form of a search criteria with the identification of the subscriber, an email address, and a subscription identifier/ tag. The Notification Service shall dynamically detect when the search criteria is fulfilled, and send the search result by email to the specified recipient with the subscription identifier/ tag.		-
1.19.1.	Notification Svc	[FBE-118]	The Notification Service shall enable clients to delete/ de-register subscriptions.		-
1.19.1.5	Notification Svc	[FBE-119]	The Notification Service shall include a broadcast message function enabling (authorized) clients to push broadcast messages to all clients of the I2BE.		-
2			**3.2**	**Backend services - Phase 2**	**-**
2.1	**I2BE Sync Svc**		**3.2.1**	**IIE to IIE Synchronization Service**	**-**
2.1.1	*I2BE Sync Svc*		*3.2.1.1*	*General synchronization requirements*	-
2.1.1.1	I2BE Sync Svc	[FBE-120]	The I2BE to I2BE Synchronization Service shall exchange data between I2BE instances so that each I2BE instance has the same replica.		-
2.1.1.2	I2BE Sync Svc	[FBE-121]	It shall be possible, through configuration settings, to filter the type of data to be synchronized between I2BE instances (by IIE type, releasability/ dissemination constraints, location and time of information, etc.) and it shall be possible to constrain product files and attachment files that can be synchronized (typically by defining a maximum file size).		-
2.1.1.3	I2BE Sync Svc	[FBE-122]	The I2BE to I2BE Synchronization Service shall implement checks preventing circular replication situations (avoiding using unnecessary bandwidth), and it shall prevent creating duplicate entries in the repositories.		-
2.1.1.4	I2BE Sync Svc	[FBE-123]	The I2BE to I2BE Synchronization Service shall log information about data transferred between I2BE instances enabling full audit trail of dissemination of I2BE data.		-
2.1.2	*I2BE Sync Svc*		*3.2.1.2*	*Direct synchronization*	-
2.1.2.1	I2BE Sync Svc	[FBE-124]	The I2BE to I2BE Synchronization Service shall support different synchronization configurations including point-to-point, one-to many, many-to-one, many-to-many transfers.		-
2.1.2.2	I2BE Sync Svc	[FBE-125]	The synchronization service shall work over high-speed/ low-latency networks as well as over high latency SATCOM links where the latter may need special Transmission Control Protocol (TCP) tuning.		-
2.1.2.3	I2BE Sync Svc	[FBE-126]	The I2BE to I2BE Synchronization Service shall be able to handle cases where one of the I2BE instances is offline for a long period of time. The synchronization function shall identify the correct resume-point so that synchronicity can be achieved once the offline I2BE comes online. An example of a paused/ resumed synchronization could be when an I2BE instance is running on a ship with no network connection.		-
2.1.3	*I2BE Sync Svc*		*3.2.1.3*	*Air-gapped synchronization*	-
2.1.3.1	I2BE Sync Svc	[FBE-127]	The I2BE to I2BE Synchronization Service shall support air-gapped import/ export through configurable export "drop point" and import "pull point". The exporting I2BE shall in this case keep track of what has previously been exported to the receiving I2BE such that each incremental export only contains previously un-exported data.		-

2.1.3.2	I2BE Sync Svc	[FBE-128]	The data that is exchanged through the synchronization shall be wrapped in an "electronic envelope" that contains metadata on the data set to be synchronized. The envelop metadata attributes shall include the highest security classification and the most restrictive releasabilty constraint of the data within the data set.	-	
2.2	**Presentation Svc**	**3.2.2**	**Presentation-conditioning Service**	**-**	
2.2.1	*Presentation Svc*	*3.2.2.1*	*API*	*-*	
2.2.1.1	Presentation Svc	[FBE-129]	The Presentation-conditioning Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 51] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].	-	
2.2.1.2	Presentation Svc	[FBE-130]	The Presentation-conditioning Service shall implement a function that - upon a client request - extracts the images and the associated metadata from STANAG 4545 files and return to the client the images in a browser-supported format (e.g. JPEG) and all the image metadata (in XML format). This functionality shall be available through a REST API.	-	
2.2.1.3	Presentation Svc	[FBE-131]	The Presentation-conditioning Service shall include (see Note below) a video conditioning service that implements Dynamic Adaptive Streaming over HTTP (DASH), i.e. MPEG-DASH (ISO/IEC 23009-1:2012) for streaming video and STANAG 4609 metadata to web browser client applications.	-	
2.3	**Data Analytics Svc**	**3.2.3**	**Data Analytics Service**	**-**	
2.3.1	*Data Analytics Svc*	*3.2.3.1*	*API*	*-*	
2.3.1.1	Data Analytics Svc	[FBE-132]	The Data Analytics Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 53], [US 54], [US 56] and [US 57] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].	-	
2.3.1.2	Data Analytics Svc	[FBE-133]	The Data Analytics Service shall expose its functionalities though a REST API.	-	
2.3.1.3	Data Analytics Svc	[FBE-134]	The Data Analytics Service shall support common graph analytic functions by exposing a graph query language (preferably compliant with the emerging Graph Query Language (GQL) standard) through the REST API.	-	
2.3.1.4	Data Analytics Svc	[FBE-135]	The Data Analytics Service shall have support for saving and managing (create, read, update, delete, rename) graph query criteria as named queries. The named graph queries can be private to the client (security principal) or public (available to all users).	-	
2.3.1.5	Data Analytics Svc	[FBE-136]	The Data Analytics Service shall have support for saving and managing (create, read, update, delete, rename) specific analysis and the analysis results in containers file (e.g. zip file). The analysis file shall be able to store the queries and filters applied to the I2BE repository to define and constrain the data set to be used for the analysis, miscellaneous text segments/ reports (e.g. as Microsoft Word file) describing analysis findings, images/ screenshots, and other client requested files (e.g. layout information for analysis views). The analysis files shall be private to the client (security principal).	-	
2.3.1.6	Data Analytics Svc	[FBE-137]	The Data Analytics Service shall constrain the graph query result set to match the client's (security principal) privileges (e.g. the client shall never receive a graph query results that he/ she is not authorized for).	-	
2.3.2	*Data Analytics Svc*	*3.2.3.2*	*Data analytics*	*-*	
2.3.2.1	Data Analytics Svc	[FBE-138]	The Data Analytics Service shall have support for synonym searches using configurable synonym rules.	-	
2.3.2.2	Data Analytics Svc	[FBE-139]	The Data Analytics Service shall include centrality function, for a specified set of nodes (IIEs), to support calculation of Betweeness Centrality, Closeness Centrality, Degree Centrality, and Eigenvector Centrality.	-	
2.3.2.3	Data Analytics Svc	[FBE-140]	The Data Analytics Service shall include a shortest path function that for two nodes (IIEs) calculate the shortest path between them.	-	
2.3.2.4	Data Analytics Svc	[FBE-141]	The Data Analytics Service shall include a nodes similarity function that compares a set of nodes based on the nodes they are connected to (i.e. two nodes are considered similar if they share many of the same neighbours).	-	
2.3.2.5	Data Analytics Svc	[FBE-142]	The Data Analytics Service shall include a function for generating geo-referenced heat maps in a common format (e.g. in KML). The heat maps generation shall be possible for any IIE type with temporal and spatial attributes. Two types of heat maps shall be supported: frequency-based and concentration-based.	-	
2.3.2.6	Data Analytics Svc	[FBE-143]	The Data Analytics Service shall have support for calculating intersections between one or many nodes and one or many Geospatial and Features and report whether nodes are inside or outside the specified areas. Supported area types shall include circles/ ellipse, rectangles, and polygons.	-	
2.4	**CRM Svc**	**3.2.4**	**Collection Requirement Management (CRM) Service**	**-**	
2.4.1	*CRM Svc*	*3.2.4.1*	*API*	*-*	
2.4.1.1	CRM Svc	[FBE-144]	The CRM Service shall through the OData REST API support all IIE access actions on CRM data (for an authorized client).	-	
2.4.1.2	CRM Svc	[FBE-145]	The CRM Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 47], and [US 74] through [US 79] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].	-	

2.4.1.3	CRM Svc	[FBE-146]	The CRM Service shall after a create, update or delete change to CRM data, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.	-
2.4.1.4	CRM Svc	[FBE-147]	The CRM Service API shall enable clients to manage a distributed CR requesting process (through the underlying choreography tasking message mechanism) that includes submitting and stopping a request, forwarding the request to other ONs for action (or for information), etc.	-
2.4.2	*CRM Svc*	*3.2.4.2*	*Priority scheme calculation*	-
2.4.2.1	CRM Svc	[FBE-148]	The CRM Service shall calculate the requirement ranking and scores for a set of CRs based on the chosen prioritization scheme. The ranking and score shall be available for clients through the OData client API.	-
2.4.3	*CRM Svc*	*3.2.4.3*	*Transformation of CRs to NVG*	-
2.4.3.1	CRM Svc	[FBE-149]	The CRM Services shall, upon a client request, transform a set of client specified CRs, transform the set of CRs with all relevant attributes to the [NVG] format and return the transformed data as a [NVG] file to the client.	-
2.5	**COM Svc**	**3.2.5**	**Collection Operations Management (COM) Service**	**-**
2.5.1	*COM Svc*	*3.2.5*	*API*	-
2.5.1.1	COM Svc	[FBE-150]	The COM Service shall through the OData REST API support all IIE access actions on COM data (for an authorized client).	-
2.5.1.2	COM Svc	[FBE-151]	The COM Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 82] through [US 87] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].	-
2.5.1.3	COM Svc	[FBE-152]	The COM Service shall after a create, update or delete change to COM data, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.	-
2.5.1.4	COM Svc	[FBE-153]	The COM Service API shall enable clients to manage a distributed COM tasking process (through the underlying choreography tasking message mechanism).	-
2.6	**JIPOE Svc**	**3.2.6**	**JIPOE Service**	**-**
2.6.1	*JIPOE Svc*	*3.2.6.1*	*API*	-
2.6.1.1	JIPOE Svc	[FBE-154]	The JIPOE Service shall through the OData REST API support all access actions on JIPOE-type IIEs (for an authorized client).	-
2.6.1.1	JIPOE Svc	[FBE-155]	The JIPOE Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US-36] through [US-46] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].	-
2.6.1.1	JIPOE Svc	[FBE-156]	The JIPOE Service shall after a create, update or delete change to any JIPOE-type IIE, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.	-
2.6.1.1	JIPOE Svc	[FBE-157]	The JIPOE services shall provide a service for creating and managing (update and delete) named multi-criteria comparison rule sets.	-
2.7	**Terrain & Mobility Svc**	**3.2.7**	**Terrain & Mobility Analysis Service**	**-**
2.7.1	*Terrain & Mobility Svc*	*3.2.7.1*	*Generating terrain & mobility analysis overlays*	-
2.7.1.1	Terrain & Mobility Svc	[FBE-158]	The Terrain & Mobility Analysis Service shall implement a Terrain Analysis function that upon a client request generates one or several overlays that depicts the areas where BM Units can reach and from which BM Units can operate. The service shall use the input parameters as defined in the table below and matching against geographical data calculate the possible operational areas (e.g. by greying out the no-go areas).	
2.7.1.1	Terrain & Mobility Svc	[FBE-159]	The Service shall implement a Mobility Analysis function that upon a client request generates one or several overlays that depicts how far the BM Units can reach for a set of time intervals (e.g. within 1 hour, within 1 day, within a week etc.) as illustrated in the figure below (in this example the ranges are in minutes). The function shall use the input parameters as defined in the table below and matching against geographical data calculate the mobility ranges. The coloured range areas shall only depict areas that is accessible by the vehicles from the starting position (e.g. if a bridge is not dimensioned to support the vehicles, the mobility analysis shall show that the vehicles cannot cross the bridge).	-
2.7.1.1	Terrain & Mobility Svc	[FBE-160]	The Service shall be implemented as OGC Web Processing Services (WPS).	-
2.7.1.1	Terrain & Mobility Svc	[FBE-161]	The JIPOE services shall support collaboration on Courses of Action artefacts prior to these being approved and published.	-
3		**3.3**	**System Administration (SysAdm) tool**	**-**
3.1	**SysAdm Tool**	**3.3.1**	**Configurations and setup management functions**	**-**
3.1.1	*SysAdm Tool*	*3.3.1.1*	*Manage data repositories*	-

3.1.1.1	SysAdm Tool	[FBE-162]	The SysAdm tool shall enable an Authorized Administrator to create many data repositories where each repository is identified by a name (e.g., 'Exercise XYZ')).	-
3.1.1.2	SysAdm Tool	[FBE-163]	The SysAdm tool shall enable an Authorized Administrator to archive a data repository, be able to restore a previously archived data repository (without any data loss or data alteration), and be able to delete a data repository.	-
3.1.2	*SysAdm Tool*	*3.3.1.2*	*Manage Organizational Nodes (ON)*	-
3.1.2.1	SysAdm Tool	[FBE-164]	The SysAdm tool shall enable an Authorized Administrator to create ONs and to configure the ON Zulu offset to ensure that timestamps are correctly captured at the ON.	-
3.1.3	*SysAdm Tool*	*3.3.1.3*	*Manage report templates*	-
3.1.3.1	SysAdm Tool	[FBE-165]	The SysAdm tool shall enable an Authorized Administrator to create and update report templates to provide users with templates for producing reports.	-
3.1.3.1	SysAdm Tool	[FBE-166]	The SysAdm tool shall enable an Authorized Administrator to create, update, delete, and name global search criteria that will be accessible to users to use for their searches.	-
3.1.4	*SysAdm Tool*	*3.3.1.4*	*Manage synonym rules*	-
3.1.4.1	SysAdm Tool	[FBE-167]	The SysAdm tool shall enable an Authorized Administrator to update synonym rules used for searching and graph querying.	-
3.1.5	*SysAdm Tool*	*3.3.1.5*	*Manage gazetteers*	-
3.1.5.1	SysAdm Tool	[FBE-168]	The SysAdm tool shall enable an Authorized Administrator to add or delete a gazetteer for an ON, and to specify the default gazetteer for the ON.	-
3.1.5.2	SysAdm Tool	[FBE-169]	The SysAdm tool shall enable an Authorized Administrator to create, edit and maintain gazetteer information, including maintaining gazetteer entries (i.e. Place Name, Country, Region, Sub-region, Location).	-
3.1.5.3	SysAdm Tool	[FBE-170]	The SysAdm tool shall enable an Authorized Administrator to import a gazetteer from a file.	-
3.1.5.4	SysAdm Tool	[FBE-171]	The SysAdm tool shall enable an Authorized Administrator to configure the I2BE to use gazetteer with fictitious nation data sets, including fictitious country names and fictitious country codes.	-
3.2	**SysAdm Tool**	**3.3.2**	**Domain-values management functions**	**-**
3.2.1	*SysAdm Tool*	*3.3.2.1*	*Create/ update domain values*	-
3.2.1.1	SysAdm Tool	[FBE-172]	The SysAdm tool shall enable an Authorized Administrator to centrally manage domain tables and domain values for all ONs. This includes the ability to create new domain values, and configuring which domain values that shall be hidden/ unhidden for individual ONs. Note: The latter part shall ensure that the acceptance criteria of user story [US 5] is fulfilled.	-
3.2.1.1	SysAdm Tool	[FBE-173]	The SysAdm tool shall enable an Authorized Administrator to view all domain values in table views where the hidden/ unhidden state of each value for each of the ONs are displayed. The Authorized Administrator shall be able to sort and filter these table views, and be able to make changes to one or many values in the table in a single operation.	-
3.2.1.1	SysAdm Tool	[FBE-174]	The SysAdm tool shall enable an Authorized Administrator or Authorized Reference Data Manager to search for and filter domain values to ease the maintenance work (find and update).	-
3.2.2	*SysAdm Tool*	*3.3.2.2*	*Import/ export of domain values*	-
3.2.2.1	SysAdm Tool	[FBE-175]	The SysAdm tool shall enable an Authorized Administrator to import domain values from files in a structured file format and export domain values to files in structured file formats.	-
3.2.3	*SysAdm Tool*	*3.3.2.3*	*Synchronization with Information Model*	-
3.2.3.1	SysAdm Tool	[FBE-176]	The SysAdm tool shall have support for synchronizing updates to the domain tables and domain values with the Information Model (see [INTEL-FS2-IM]).	-
3.3	**SysAdm Tool**	**3.3.3**	**Content management functions**	**-**
3.3.1	*SysAdm Tool*	*3.3.3.1*	*Import from files*	-
3.3.1.1	SysAdm Tool	[FBE-177]	The SysAdm tool shall enable an Authorized Administrator to import an ORBAT (e.g. an ISR ORBAT) consisting of Actors and Assets/ Systems with subordination information from a set of comma separated files (CSV), XML or JSON, into a specified data set (Operational Exercise, Training, etc.). The tool shall allow the System Administrator to map columns in the files to the appropriate IIE attribute and automatically extract the BSOs representing Units, the Assets/ Systems, and extract the relationships between the BSOs. Ultimately, the tool shall allow the System Administrator to verify that there is no conflict with the information already in the I2BE data set and subsequently "bulk import" the entire ORBAT and associated Units and Assets/ Systems. In case the validation of the data prior to import finds issue with the data, then the issues shall be identified and reported to the System Administrator to enable corrective actions.	-

3.3.1.2	SysAdm Tool	[FBE-178]	The SysAdm tool shall enable an Authorized Administrator to import BSO data, including relationships between the BSOs, and all BSRs associated with the BSOs from files in a structured data format into a specified data set (Operational Exercise, Training, etc.) The tool shall allow the System Administrator to map elements in the files to the appropriate IIE attribute and automatically extract the BSOs, their BSRs, and the relationships between the BSOs. Ultimately, the tool shall allow the System Administrator to verify that there is no conflict with the information already in the I2BE data set and subsequently "bulk import" all the BSOs with BSRs and also BSO-BSO relationships. In case the validation of the data prior to import finds issue with the data, then the issues shall be identified and reported to the System Administrator to enable corrective actions.	-
3.3.1.3	SysAdm Tool	[FBE-179]	The SysAdm tool shall enable an Authorized Administrator to import Products from comma separated files (CSV), XML or JSON, into a specified data set (Operational Exercise, Training, etc.). The tool shall allow the System Administrator to map columns in the files to the appropriate IIE attribute and automatically extract the Product. Ultimately the tool shall allow the System Administrator to verify that there is no conflict with the information already in the I2BE data set and subsequently "bulk import" a potentially large set of Products where also the Product attachments are fetched and pushed into the I2BE data set. In case the validation of the data prior to import finds issue with the data, then the issues shall be identified and reported to the System Administrator to enable corrective actions.	-
3.3.1.4	SysAdm Tool	[FBE-180]	The SysAdm tool shall include an "undo function" that restores the data repository to the state before the bulk upload was executed (i.e. completely removes all the bulk-uploaded items).	-
3.3.2	*SysAdm Tool*	*3.3.3.2*	*Delete and undelete*	-
3.3.2.1	SysAdm Tool	[FBE-181]	The SysAdm tool shall enable an Authorized Administrator to search and filter for soft-deleted entities, and then multi-select and hard-delete (permanently delete) such soft-deleted entities.	-
3.3.3	*SysAdm Tool*	*3.3.3.3*	*Backup & restore*	-
3.3.3.1	SysAdm Tool	[FBE-182]	The SysAdm tool shall enable an Authorized Administrator to configure automatic backup of the entirety of an I2BE instance. It shall be possible to configure the frequency of and/ or time of day incremental backups and full backups.	-
3.3.3.2	SysAdm Tool	[FBE-183]	The SysAdm tool shall enable an Authorized Administrator to manually command an incremental backup, and to manually command a full backup.	-
3.3.3.3	SysAdm Tool	[FBE-184]	The SysAdm tool shall enable an Authorized Administrator to fully restore an I2BE instance from backups.	-
3.4	**SysAdm Tool**	**3.3.4**	**Diagnostics functions**	**-**
3.4.1	*SysAdm Tool*	*3.3.4.1*	*Log files*	-
3.4.1.1	SysAdm Tool	[FBE-185]	The SysAdm tool shall enable an Authorized Administrator to access log created by all I2BE produced Integration Services. (Note: This is particularly important for the audit trail checks of cross domain exchange between I2BE instances).	-
3.4.1.2	SysAdm Tool	[FBE-186]	The SysAdm tool shall enable the System Administrator to access and inspect/ analyse log data from all the I2BE services.	-
3.4.1.3	SysAdm Tool	[FBE-187]	The SysAdm tool shall enable an Authorized Administrator to configure the services logging functions (e.g. logging level, log file sizes, log file retention, etc.)	-
3.4.1.4	SysAdm Tool	[FBE-188]	The SysAdm tool shall enable an Authorized Administrator to archive log files from each of the I2BE services and I2BE provided Integration Services.	-
3.4.2	*SysAdm Tool*	*3.3.4.2*	*Usage and performance indicators statistics*	-
3.4.2.1	SysAdm Tool	[FBE-189]	The SysAdm tool shall enable an Authorized Administrator to analyse the usage of the I2BE services OData API by accessing usage statistics; e.g. which part of the API is heavily used, which parts are not used much, usage peaks, average number of activation calls, historical trends, etc. The statistical numbers must be separable by access operations (Create, Read, Update, and Delete) and by ONs.	-
3.4.2.1	SysAdm Tool	[FBE-190]	The SysAdm tool shall enable an Authorized Administrator to analyse the performance of the individual I2BE services. In particular statistical data measuring the I2BE compliance with the NFR response time requirements shall be available for analysis through the SysAdm tool.	-
3.4.2.1	SysAdm Tool	[FBE-191]	The SysAdm tool shall enable an Authorized Administrator to specify relevant performance thresholds/ criteria for the services. I.e. thresholds that triggers corrective actions through the Enterprise SMC.	-
3.4.3	*SysAdm Tool*	*3.3.4.3*	*Synchronization health check*	-
3.4.3.1	SysAdm Tool	[FBE-192]	The SysAdm tool shall enable an Authorized Administrator to select any two I2BE instances and perform repository comparisons. It shall be possible check the entire repositories, and it shall be possible with more focussed comparisons limited by IIE type, time window, and other IIE filtering attributes. Any discrepancies in these checks shall be reported by the tool including the option to repair the discrepancy.	-
3.5	**SysAdm Tool**	**3.3.5**	**Notification function**	**-**
3.5.1	*SysAdm Tool*	*3.3.5.1*	*Broadcasting notification messages*	-

3.5.1.1	SysAdm Tool	[FBE-193]	The SysAdm tool shall enable an Authorized Administrator to write messages (intended to be read by users) and broadcast them using the I2BE Notification Service.		-
4		4.1	**Integration services - I2BE destination**		-
4.1	**CCC Import**	**4.1.1**	**Central Card Catalogue (CCC) Import Service**		-
4.1.1	*CCC Import*	*4.1.1.1*	*Extract, transform, load products*		-
4.1.1.1	CCC Import	[FBE-194]	The CCC Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the CCC for new products (i.e. product metadata, product file, and other attachments). It shall be possible through a configurable filter setting to filter the products that are extracted from the CCC.		-
4.1.1.2	CCC Import	[FBE-195]	The CCC Import Service shall transform the extracted product metadata into a format that is compliant with the OData REST API implemented by the Products Management Service and load the products (i.e. the metadata, the product file, and any attachments) into the I2BE through the Products Management Service.		-
4.1.1.3	CCC Import	[FBE-196]	The CCC Import Service shall identify associations the extracted products are part of, collect additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.		-
4.1.2	*CCC Import*	*4.1.1.2*	*Extract, transform, load RFI data*		-
4.1.2.1	CCC Import	[FBE-197]	The CCC Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the CCC for new RFI data. It shall be possible through a configurable filter setting to filter the RFI data that are extracted from CCC.		-
4.1.2.2	CCC Import	[FBE-198]	The CCC Import Service shall transform the extracted RFI data into a format that is compliant with the OData REST API implemented by the IRM Service and load the transformed RFI data into the I2BE through the IRM Service.		-
4.1.2.3	CCC Import	[FBE-199]	The Import Service shall identify associations the extracted RFI data are part of, collect additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.		-
4.2	**ETEE Import**	**4.1.2**	**ETEE Import Service**		-
4.2.1	*ETEE Import*	*4.1.2.1*	*Extract, transform, load products from ETEE messages*		-
4.1.2.1	ETEE Import	[FBE-200]	The ETEE Import Service shall when receiving a ETEE message (dedicated for INTEL-FS), transform (if required) the information in the message into a format that is compliant with the OData REST API implemented by the Products Management Service and load the transformed products into the I2BE through the Products Management Service.		-
4.3	**CIPL Import**	**4.1.3**	**NATO CSD IPL Import Service**		-
4.3.1	*CIPL Import*	*4.1.3.1*	*Extract, transform, load products*		-
4.3.1.1	CIPL Import	[FBE-201]	The NATO CSD IPL Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the NATO CSD IPL for products or product updates that are not already in the I2BE. It shall be possible through a configurable filter setting to filter the products to be extracted from NATO CSD IPL. Note: in this context 'product' means the product metadata, product file, and all attachments (e.g. related files).		-
4.3.1.2	CIPL Import	[FBE-202]	The NATO CSD IPL Import Service shall transform the extracted product metadata into a format that is compliant with the OData REST API implemented by the Products Management Service and load the products (i.e. the metadata, the product file, and any attachments) into the I2BE through the Products Management Service.		-
4.3.1.3	CIPL Import	[FBE-203]	The NATO CSD IPL Import Service shall identify associations the extracted products are part of, collect additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.		-
4.4	**CIWS Geo-Area Import**	**4.1.4**	**NATO CSD Geospatial and Features Import Service**		-
4.4.	*CIWS Geo-Area Import*	*4.1.4.1*	*Extract, transform, load geographical areas*		-
4.4.1.1	CIWS Geo-Area Import	[FBE-204]	The NATO CSD Geospatial and Features Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD Geospatial and Features Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.		-
4.4.1.2	CIWS Geo-Area Import	[FBE-205]	The NATO CSD Geospatial and Features Import Service shall be able to extract Geospatial and Features from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).		-

4.4.1.3	CIWS Geo-Area Import	[FBE-206]	The NATO CSD Geospatial and Features Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for changes to geographic areas of interest (GAOI) in the NATO CSD and upon detecting a GAOI changes, extract the Geospatial and Features from the NATO CSD.	-	
4.4.1.4	CIWS Geo-Area Import	[FBE-207]	It shall be possible through a configurable filter setting, to filter the geographic areas that shall be extracted from NATO CSD. The service shall be able to detect Geospatial and Features updates originating from the I2BE and not import those (to prevent export-import loops).	-	
4.4.1.5	CIWS Geo-Area Import	[FBE-208]	The NATO CSD Geospatial and Features Import Service shall transform the extracted geographic areas into a format that is compliant with the OData REST API implemented by the Geospatial and Features Service and load the transformed Geospatial and Features into the I2BE through the Geospatial and Features Service.	-	
4.4.1.6	CIWS Geo-Area Import	[FBE-209]	The NATO CSD Geospatial and Features Service shall identify associations the extracted geographic areas are part of, extract additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.	-	
4.5	**CIWS ISR-Org. Import**	**4.1.5**	**NATO CSD ISR Organizations Import Service**	**-**	
4.5.1	*CIWS ISR-Org. Import*	*4.1.5.1*	*Extract, transform, load ISR organizations*	*-*	
4.5.1.1	CIWS ISR-Org. Import	[FBE-210]	The NATO CSD Organizations Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD Organizations Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.	-	
4.5.1.2	CIWS ISR-Org. Import	[FBE-211]	The NATO CSD ISR Organizations Import Service shall be able to extract ISR organization data from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).	-	
4.5.1.3	CIWS ISR-Org. Import	[FBE-212]	The NATO CSD ISR Organizations Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for changes to ISR organizations in the NATO CSD and upon detecting ISR organization changes, extract the ISR organization data from the NATO CSD.	-	
4.5.1.4	CIWS ISR-Org. Import	[FBE-213]	It shall be possible through a configurable filter setting, to filter the ISR organizations that shall be extracted from NATO CSD. The service shall be able to detect ISR organization data updates originating from the I2BE and not import that data (to prevent export-import loops).	-	
4.5.1.5	CIWS ISR-Org. Import	[FBE-214]	The NATO CSD ISR Organizations Import Service shall transform the extracted ISR organization data (with all its substructures including ORBAT, units, ISR systems, ISR asset status, command relationships, and locations) into a format that is compliant with the OData REST API implemented by the ISR Organizations Service and load the transformed ISR organization data into the I2BE through the ISR Organizations Service.	-	
4.5.1.6	CIWS ISR-Org. Import	[FBE-215]	The NATO CSD ISR Organizations Import Service shall identify associations the extracted ISR organization data are part of, extract additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.	-	
4.6	**CIWS IRM Import**	**4.1.6**	**NATO CSD IRM Data Import Service**	**-**	
4.6.1	*CIWS IRM Import*	*4.1.6.1*	*Extract, transform, load IRM data*	*-*	
4.6.1.1	CIWS IRM Import	[FBE-216]	The NATO CSD IRM Data Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD IRM Data Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.	-	
4.6.1.2	CIWS IRM Import	[FBE-217]	The NATO CSD IRM Import Service shall be able to extract IRM data (ICP, RFIs, RFI choreography tasking information, and products associated with requirements and RFIs) from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).	-	
4.6.1.3	CIWS IRM Import	[FBE-218]	The NATO CSD IRM Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for all types of changes to IRM data in the NATO CSD and upon detecting IRM data changes, extract the IRM data from the NATO CSD.	-	
4.6.1.4	CIWS IRM Import	[FBE-219]	It shall be possible through a configurable filter setting, to filter the IRM data that shall be extracted from NATO CSD. The service shall be able to detect IRM data updates originating from the I2BE and not import that data (to prevent export-import loops).	-	
4.6.1.5	CIWS IRM Import	[FBE-220]	The NATO CSD IRM Import Service shall transform the extracted IRM data into a format that is compliant with the OData REST API implemented by the IRM Service and load the transformed IRM data into the I2BE through the IRM Service.	-	

4.6.1.6	CIWS IRM Import	[FBE-221]	The NATO CSD IRM Import Service shall identify associations the extracted IRM data are part of, extract additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.	-
4.7	**CIWS CRM Import**	**4.1.7**	**NATO CSD CRM Data Import Service**	**-**
4.7.1	*CIWS CRM Import*	*4.1.7.1*	*Extract, transform, load CRM data*	*-*
4.7.1.1	CIWS CRM Import	[FBE-222]	The NATO CSD CRM Data Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD CRM Data Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.	-
4.7.1.2	CIWS CRM Import	[FBE-223]	The NATO CSD CRM Import Service shall be able to extract CRM data (CRs, ISR Requests, and ISR Request choreography tasking information) from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).	-
4.7.1.3	CIWS CRM Import	[FBE-224]	The NATO CSD CRM Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for all types of changes to CRM data in the NATO CSD and upon detecting CRM data changes, extract the CRM data from the NATO CSD.	-
4.7.1.4	CIWS CRM Import	[FBE-225]	It shall be possible through a configurable filter setting, to filter the CRM data that shall be extracted from NATO CSD. The service shall be able to detect CRM data updates originating from the I2BE and not import that data (to prevent export-import loops).	-
4.7.1.5	CIWS CRM Import	[FBE-226]	The NATO CSD CRM Import Service shall transform the extracted CRM data into a format that is compliant with the OData REST API implemented by the CRM Service and load the transformed CRM data into the I2BE through the CRM Service.	-
4.7.1.6	CIWS CRM Import	[FBE-227]	The NATO CSD CRM Import Service shall identify associations the extracted CRM data are part of, extract additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.	-
4.8	**CIWS COM Import**	**4.1.8**	**NATO CSD COM Data Import Service**	**-**
4.8.1	*CIWS COM Import*	*4.1.8.1*	*Extract, transform, load COM data*	*-*
4.8.1.1	CIWS COM Import	[FBE-228]	The NATO CSD COM Data Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD COM Data Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.	-
4.8.1.2	CIWS COM Import	[FBE-229]	The NATO CSD COM Import Service shall be able to extract COM data (CXPs, collection tasks, exploitation tasks, and the choreography tasking information) from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).	-
4.8.1.3	CIWS COM Import	[FBE-230]	The NATO CSD COM Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for all types of changes to COM data in the NATO CSD and upon detecting COM data changes, extract the COM data from the NATO CSD.	-
4.8.1.4	CIWS COM Import	[FBE-231]	It shall be possible through a configurable filter setting, to filter the COM data that shall be extracted from NATO CSD. The service shall be able to detect COM data updates originating from the I2BE and not import that data (to prevent export-import loops).	-
4.8.1.5	CIWS COM Import	[FBE-232]	The NATO CSD COM Import Service shall transform the extracted COM data into a format that is compliant with the OData REST API implemented by the COM Service and load the transformed COM data into the I2BE through the COM Service.	-
4.8.1.6	CIWS COM Import	[FBE-233]	The NATO CSD COM Import Service shall identify associations the extracted COM data are part of, extract additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.	-
4.9	**APP11-D Report Import**	**4.1.9**	**APP11-D Reports Import Service**	**-**
4.9.1	*APP11-D Report Import*	*4.1.9.1*	*Extract, transform, load APP11-D reports*	*-*
4.9.1.1	APP11-D Report Import	[FBE-234]	The APP11-D Reports Import Service shall be able to receive/ obtain the set of ADatP-3 messages in APP11-D XML format defined in the table below as messages from the SOA & IdM Platform.	-

4.9.1.2	APP11-D Report Import	[FBE-235]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-AEW_MISREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM], and subsequently load the transformed message into the I2BE through the Products Management Service.	-
4.9.1.3	APP11-D Report Import	[FBE-236]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-AEW_MISREP] messages and publish/ send them on the SOA & IdM Platform.	-
4.9.1.4	APP11-D Report Import	[FBE-237]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-AIRINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.	-
4.9.1.5	APP11-D Report Import	[FBE-238]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-AIRINTREP] messages and publish/ send them on the SOA & IdM Platform.	-
4.9.1.6	APP11-D Report Import	[FBE-239]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-ASSESSREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.	-
4.9.1.7	APP11-D Report Import	[FBE-240]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-ASSESSREP] messages and publish/ send them on the SOA & IdM Platform.	-
4.9.1.8	APP11-D Report Import	[FBE-241]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-BOMBWARN] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.	-
4.9.1.9	APP11-D Report Import	[FBE-242]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-BOMBWARN] messages and publish/ send them on the SOA & IdM Platform.	-
4.9.1.10	APP11-D Report Import	[FBE-243]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-CIINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.	-
4.9.1.11	APP11-D Report Import	[FBE-244]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-CIINTREP] messages and publish/ send them on the SOA & IdM Platform.	-
4.9.1.12	APP11-D Report Import	[FBE-245]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-CIINTSUM] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.	-
4.9.1.13	APP11-D Report Import	[FBE-246]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-CIINTSUM] messages and publish/ send them on the SOA & IdM Platform.	-
4.9.1.14	APP11-D Report Import	[FBE-247]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-CISUPINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.	-
4.9.1.15	APP11-D Report Import	[FBE-248]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-CISUPINTREP] messages and publish/ send them on the SOA & IdM Platform.	-
4.9.1.16	APP11-D Report Import	[FBE-249]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-DIR] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.	-
4.9.1.17	APP11-D Report Import	[FBE-250]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-DIR] messages and publish/ send them on the SOA & IdM Platform.	-

4.9.1.1 8	APP11-D Report Import	[FBE-251]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-ENSITREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.	-
4.9.1.1 9	APP11-D Report Import	[FBE-252]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-ENSITREP] messages and publish/ send them on the SOA & IdM Platform.	-
4.9.1.2 0	APP11-D Report Import	[FBE-253]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-EVENTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.	-
4.9.1.2 1	APP11-D Report Import	[FBE-254]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-EVENTREP] messages and publish/ send them on the SOA & IdM Platform.	-
4.9.1.2 2	APP11-D Report Import	[FBE-255]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-FHOSTILEACT] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.	-
4.9.1.2 3	APP11-D Report Import	[FBE-256]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-FHOSTILEACT] messages and publish/ send them on the SOA & IdM Platform.	-
4.9.1.2 4	APP11-D Report Import	[FBE-257]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-INCREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.	-
4.9.1.2 5	APP11-D Report Import	[FBE-258]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-INCREP] messages and publish/ send them on the SOA & IdM Platform.	-
4.9.1.2 6	APP11-D Report Import	[FBE-259]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-INCSPOTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.	-
4.9.1.2 7	APP11-D Report Import	[FBE-260]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-INCSPOTREP] messages and publish/ send them on the SOA & IdM Platform.	-
4.9.1.2 8	APP11-D Report Import	[FBE-261]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-INTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.	-
4.9.1.2 9	APP11-D Report Import	[FBE-262]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-INTREP] messages and publish/ send them on the SOA & IdM Platform.	-
4.9.1.3 0	APP11-D Report Import	[FBE-263]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-INTSUM] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.	-
4.9.1.3 1	APP11-D Report Import	[FBE-264]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-INTSUM] messages and publish/ send them on the SOA & IdM Platform.	-
4.9.1.3 2	APP11-D Report Import	[FBE-265]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-MARINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.	-
4.9.1.3 3	APP11-D Report Import	[FBE-266]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-MARINTREP] messages and publish/ send them on the SOA & IdM Platform.	-

4.9.1.3 4	APP11-D Report Import	[FBE-267]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-MARINTSUM] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.		-
4.9.1.3 5	APP11-D Report Import	[FBE-268]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-MARINTSUM] messages and publish/ send them on the SOA & IdM Platform.		-
4.9.1.3 6	APP11-D Report Import	[FBE-269]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-MISREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.		-
4.9.1.3 7	APP11-D Report Import	[FBE-270]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-MISREP] messages and publish/ send them on the SOA & IdM Platform.		-
4.9.1.3 8	APP11-D Report Import	[FBE-271]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-OWNSITREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.		-
4.9.1.3 9	APP11-D Report Import	[FBE-272]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-OWNSITREP] messages and publish/ send them on the SOA & IdM Platform.		-
4.9.1.4 0	APP11-D Report Import	[FBE-273]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-PWINTERREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.		-
4.9.1.4 1	APP11-D Report Import	[FBE-274]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-PWINTERREP] messages and publish/ send them on the SOA & IdM Platform.		-
4.9.1.4 2	APP11-D Report Import	[FBE-275]	The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-SUPINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.		-
4.9.1.4 3	APP11-D Report Import	[FBE-276]	To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-SUPINTREP] messages and publish/ send them on the SOA & IdM Platform.		-
4.10	**Air ORBAT Import**	**4.1.10**	**Air ORBAT Import Service**		**-**
4.10.1	*Air ORBAT Import*	*4.1.10.1*	*Extract, transform, load ORBATAIR*		-
4.10.1. 1	Air ORBAT Import	[FBE-277]	The Air ORBAT Import Service shall when receiving a [APP11D-ORBATAIR] message on the SOA & IdM Platform, transform the message into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed Air ORBAT into the I2BE through the ORBAT Management Service.		-
4.10.1. 2	Air ORBAT Import	[FBE-278]	To support testing, the Air ORBAT Import Service shall also include a separate test function that fully populates and send [APP11D-ORBATAIR] messages on the SOA & IdM Platform.		-
4.11	**Land ORBAT Import**	**4.1.11**	**Land ORBAT Import Service**		**-**
4.11.1	*Land ORBAT Import*	*4.1.11.1*	*Extract, transform, load ORBATLAND*		-
4.11.1. 1	Land ORBAT Import	[FBE-279]	The Land ORBAT Import Service shall when receiving a [APP11D-ORBATLAND] message on the SOA & IdM Platform, transform the message into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed Land ORBAT into the I2BE through the ORBAT Management Service.		-
4.11.1. 2	Land ORBAT Import	[FBE-280]	To support testing, the Land ORBAT Import Service shall also include a separate test function that fully populates and send [APP11D-ORBATLAND] messages on the SOA & IdM Platform.		-
4.12	**Maritime ORBAT Import**	**4.1.12**	**Maritime Task Organization Import Services**		**-**
4.12.1	*Maritime ORBAT Import*	*4.1.12.1*	*Extract, transform, load Maritime Task Organization*		-
4.12.1. 1	Maritime ORBAT Import	[FBE-281]	The Maritime Task Organization Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the [MARIX] services for updates to the maritime task organization. It shall be possible through a configurable filter setting to filter the maritime task organization data to be extracted through the [MARIX] services.		-

4.12.1.2	Maritime ORBAT Import	[FBE-282]	The Maritime Task Organization Import Service shall transform the extracted maritime task organization data into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed maritime task organization data into the I2BE through the ORBAT Management Service.		-
4.13	**NJTS Import**	**4.1.13**	**NJTS Import Service**		**-**
4.13.1	*NJTS Import*	*4.1.13.1*	*Extract, transform, load NJTS target data*		*-*
4.13.1.1	NJTS Import	[FBE-283]	The NJTS Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the NJTS for new target data (including target lists and target folders with all their content). In the case that NJTS publishes event messages to the SOA & IdM Platform whenever there is a change to its target data, then the NJTS Import Service shall subscribe to the NJTS messages to obtain the target data and/ or to trigger the polling of the target data. It shall be possible through a configurable filter setting to filter the target data to be extracted from NJTS.		-
4.13.1.2	NJTS Import	[FBE-284]	The NJTS Import Service shall transform the extracted target data into a format that is compliant with the OData REST API implemented by the Target Service and load the transformed target data into the I2BE through the Target Service.		-
4.13.1.3	NJTS Import	[FBE-285]	The NJTS Import Service shall identify associations to other IIEs in the extracted target data and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.		-
4.14	**MIDB Import**	**4.1.14**	**MIDB Import Service**		**-**
4.14.1	*MIDB Import*	*4.1.14.1*	*Extract, transform, load MIDB Unit and Equipment Holdings data*		*-*
4.14.1.1	MIDB Import	[FBE-286]	The MIDB Import Service shall at regular intervals (where the interval frequency shall be configurable), or at discrete manually controlled points in time, poll the MIDB for new BSO data of type Units and Equipment Holdings. It shall be possible through a configurable filter setting to filter the BSO data to be extracted from MIDB (filtering options shall include timestamps, and location).		-
4.14.1.2	MIDB Import	[FBE-287]	The MIDB Import Service shall transform the extracted Unit and Equipment Holdings data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.		-
4.14.2	*MIDB Import*	*4.1.14.2*	*Extract, transform, load MIDB Places/ Facilities and Equipment Holdings data*		*-*
4.14.2.1	MIDB Import	[FBE-288]	The MIDB Import Service shall at regular intervals (where the interval frequency shall be configurable), or at discrete manually controlled points in time, poll the MIDB for new BSO data of type Places/Facilities and Equipment Holdings. It shall be possible through a configurable filter setting to filter the BSO data that are extracted from MIDB (filtering options shall include timestamps, and location).		-
4.14.2.2	MIDB Import	[FBE-289]	The MIDB Import Service shall transform the extracted Places/Facilities and Equipment Holdings data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.		-
4.14.3	*MIDB Import*	*4.1.14.3*	*Extract, transform, load MIDB Events*		*-*
4.14.3.1	MIDB Import	[FBE-290]	The MIDB Import Service shall at regular intervals (where the interval frequency shall be configurable), or at discrete manually controlled points in time, poll the MIDB for new BSO data of type Event. It shall be possible through a configurable filter setting to filter the BSO data that are extracted from MIDB (filtering options shall include timestamps, and location).		-
4.14.3.2	MIDB Import	[FBE-291]	The MIDB Import Service shall transform the extracted Events data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.		-
4.14.4	*MIDB Import*	*4.1.14.4*	*Extract, transform, load MIDB Persons*		*-*
4.14.4.1	MIDB Import	[FBE-292]	The MIDB Import Service shall at regular intervals (where the interval frequency shall be configurable), or at discrete manually controlled points in time, poll the MIDB for new BSO data of type Person. It shall be possible through a configurable filter setting to filter the BSO data that are extracted from MIDB (filtering options shall include timestamps, and location).		-
4.14.4.2	MIDB Import	[FBE-293]	The MIDB Import Service shall transform the extracted Persons data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.		-
4.15	**Asset Lists Import**	**4.1.15**	**Asset Lists Import Service**		**-**
4.15.1	*Asset Lists Import*	*4.1.15.1*	*Extract, transform, load asset lists*		*-*
4.15.1.1	Asset Lists Import	[FBE-294]	The Asset Lists Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the AirC2IS Asset List Services (see [AirC2IS ICD]) for updates to the asset lists. It shall be possible through a configurable filter setting to filter the asset list data to be extracted from AirC2IS.		-
4.15.1.2	Asset Lists Import	[FBE-295]	The Asset Lists Import Service shall transform the extracted asset list data into a format that is compliant with the OData REST API implemented by the JIPOE Service and load the transformed maritime task organization data into the I2BE through the JIPOE Service.		-

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4.16	EOB Import	4.1.16		Electronic Order of Battle (EOB) Import Service	-
4.16.1	EOB Import	4.1.16.1		Extract, transform, load EOB data	-
4.16.1.1	EOB Import	[FBE-296]	The EOB Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the NEDB-NG system (see [CEOB-EF]) for new EOB data. It shall be possible through a configurable filter setting to filter the EOB data that are extracted from NEDB-NG.		-
4.16.1.2	EOB Import	[FBE-297]	The EOB Import Service shall transform the extracted EOB data into a BSO and BSO status report format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed EOB data into the I2BE through the BSO Management Service.		-
4.16.1.3	EOB Import	[FBE-298]	The INTEL-FS Spiral1 BSO Migration Service shall through inspection of the extracted EOB data construct electronic ORBATs and transform the ORBAT data into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed electronic ORBAT into the I2BE through the ORBAT Management Service.		-
4.17	CIWS COM Import	4.1.17		BM Firing Event Import Service	-
4.17.1	CIWS COM Import	4.1.17.1		Extract, transform, load NIRIS missile track data	-
4.17.1.1	EOB Import	[FBE-299]	The BM Firing Event Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the NIRIS RESTful Track Service for missile launch tracks, missile in-flight tracks, and missile impact tracks. It shall be possible through a configurable filter setting to filter the missile track data to be extracted from NIRIS.		-
4.17.1.2	EOB Import	[FBE-300]	The BM Firing Event Import Service shall combine missile launch track data, missile in-flight track data, and missile impact data, and transform this combined data into a historical firing event format (see NATO::BMD::Battlespace::Action::Event::HFE in the [INTEL-FS2-IM]) that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed missile track data into the I2BE through the BSO Management Service.		-
5		4.2		Integration services – I2BE source	-
5.1	CCC Export	4.2.1		Central Card Catalogue (CCC) Export Service	-
5.1.1	CCC Export	4.2.1.1		Export of products to CCC	-
5.1.1.1	CCC Export	[FBE-301]	The CCC Export Services shall detect new products and updates to existing products, and then read the product information through the Product Management Services OData REST API, transform the product information (that includes embedding product files) to the [IPIWG] format and post the information to the CCC.		-
5.1.1.2	CCC Export	[FBE-302]	It shall be possible to specify and refine filters for which products to export from I2BE to the CCC. The filtering options shall include filtering on data set (operational, training, exercise, etc.), geographical coverage areas, temporal data, source/ publisher, and classification/ releasability, etc.		-
5.1.2	CCC Export	4.2.1.2		Export of RFI data to CCC	-
5.1.2.1	CCC Export	[FBE-303]	The CCC Export Services shall detect new RFIs and RFI responses, and updates to existing RFI and RFI responses, and then read the RFI and RFI responses information through the IRM Management Service OData REST API, transform the information (that includes embedding any attachments) to the [IPIWG] format and post the information to the CCC.		-
5.1.2.2	CCC Export	[FBE-304]	It shall be possible to specify and refine filters for which RFIs and RFI responses to export from I2BE to the CCC. The filtering options shall include filtering on data set (operational, training, exercise, etc.), geographical coverage areas, temporal data, source/ publisher, and classification/ releasability, etc.		-
5.2	CSD Export	4.2.2		NATO CSD Export Service	-
5.2.1	CSD Export	4.2.2.1		Export of products to NATO CSD IPL	-
5.2.1.1	CSD Export	[FBE-305]	The NATO CSD Export Services shall detect new products and updates to existing products, and then read the product information through the Product Management Service OData REST API, transform the product information (that includes embedding product files and other attachments) into a format that is compliant with the NATO CSD "IntelFS REST API" (see section 5.2.3.3 and appendix A.2.3 in [NCSD-IPL-SDS]), and upload the product to the NATO CSD IPL.		-
5.2.1.2	CSD Export	[FBE-306]	It shall be possible to specify and refine filters for which products to export from I2BE to the NATO CSD IPL. The filtering options shall include filtering on data set (operational, training, exercise, etc.), geographical coverage areas, temporal data, source/ publisher, and classification/ releasability, etc.		-
5.2.2	CSD Export	4.2.2.2		Export of IRM&CM workflow data to NATO CSD IWS	-
5.2.2.1	CSD Export	[FBE-307]	The NATO CSD Export Services shall detect new or updated Geospatial and Features where the change is originating in the I2BE. The service shall then read the Geospatial and Features through the Geospatial and Features Service OData REST API, transform the data into a format that is compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update Geospatial and Features in the NATO CSD IWS.		-

5.2.2.2	CSD Export	[FBE-308]	The NATO CSD Export Services shall detect new or updated ISR organization data where the change is originating in the I2BE. The service shall then read the ISR organization data through the ISR Organization Service OData REST API, transform the data into a format that is compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update ISR organization data in the NATO CSD IWS.	-
5.2.2.3	CSD Export	[FBE-309]	The NATO CSD Export Services shall detect new or updated IRM data where the change is originating in the I2BE. The service shall then read the IRM data through the IRM Service OData REST API, transform the data into a format that is compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update IRM data in the NATO CSD IWS.	-
5.2.2.4	CSD Export	[FBE-310]	The NATO CSD Export Services shall detect new or updated CRM data where the change is originating in the I2BE. The service shall then read the CRM data through the CRM Service OData REST API, transform the data into a format that is compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update CRM data in the NATO CSD IWS.	-
5.2.2.5	CSD Export	[FBE-311]	The NATO CSD Export Services shall detect new or updated COM data where the change is originating in the I2BE. The service shall then read the COM data through the COM Service OData REST API, transform the data into a format that is compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update COM data in the NATO CSD IWS.	-
5.3	**APP11-D Reports Export**	**4.2.3**	**APP11-D Reports Export Service**	**-**
5.3.1	*APP11-D Reports Export*	*4.2.3.1*	*Auto-generate AIRINTREP messages*	*-*
5.3.1.1	APP11-D Reports Export	[FBE-312]	The APP11-D Report Export Services shall detect updates to airfield BSOs (i.e. BSOs of type 'Place') and then subsequently interrogate the airfield BSO (through the I2BE OData REST API) to check the airfields status reports to see if there is any change to the Aircraft Equipment Lines. If there are changes to the Aircraft Equipment Lines then a message in [APP11D-AIRINTREP] XML format shall be automatically generated from the airfield BSO data and published/ sent on the SOA & IdM Platform.	-
5.4	**Emulated IFS1 WS**	**4.2.4**	**Emulated INTEL-FS Spiral 1 Web Services**	**-**
5.4.1	*Emulated IFS1 WS*	*4.2.4.1*	*INTEL-FS Increment 1 SOAP Web Services*	*-*
5.4.1.1	Emulated IFS1 WS	[FBE-313]	The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy I_INTEL-FS_SYSTEM_SERVICE (see table below) in accordance with [IFS1-ICD] as a façade for accessing the I2BE.	-
5.4.1.1	Emulated IFS1 WS	[FBE-314]	The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy I_INTEL-FS_DOMAINVALUE_SERVICE (see table below) in accordance with [IFS1-ICD] as a facade for accessing the I2BE.	-
5.4.1.1	Emulated IFS1 WS	[FBE-315]	The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy I_INTEL-FS_ENTITY_SERVICE (see table below) in accordance with [IFS1-ICD] as a facade for accessing the I2BE.	-
5.4.1.1	Emulated IFS1 WS	[FBE-316]	The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy I_INTEL-FS_ORBAT_SERVICE (see table below) in accordance with [IFS1-ICD] as a facade for accessing the I2BE.	-
5.4.1.1	Emulated IFS1 WS	[FBE-317]	The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy I_INTEL-FS_QUERY_SERVICE (see table below) in accordance with [IFS1-ICD] as a facade for accessing the I2BE.	-

**IFB-CO-14873-INTELFS2
Amendment 6**

**Intelligence Functional Services (INTEL-FS) - Spiral 2
and BMD functions in INTEL-FS**

BOOK II

**PART II
CONTRACT SPECIAL PROVISIONS**

Introduction

The Contract Special Provisions for the User Applications (UA) contract and the Back-end Data Management and Integration (BE) contract will be almost identical.

There are some sections in this document that contain a note to *"delete whichever does not apply".* For example, in Section 4, Scope:

4.1 The purpose of this contract is to upgrade the current Intelligence Functional Services (INTEL-FS) User Applications / Back-end Data Management capabilities [delete whichever does not apply]. All of the technical details and requirements of this project are explained in Part IV – Statement of Work, and its annexes, the System Requirements Specification and User Stories.

This simply means that either the reference to "User Applications" or "Back-end Data Management" will be removed prior to contract award, and the remaining content of that section will remain unchanged.

Bidders shall not make any changes to these Contract Special Provisions as part of their bid.

Table of Contents

1 ALTERATIONS, MODIFICATIONS AND DELETIONS OF THE NCIA CONTRACT GENERAL PROVISIONS

1.1 Article 2 "Order of Precedence" modifies Clause 1 "Order of Precedence" of the Contract General Provisions.

1.2 Article 3 "Interpretations, Definitions and Acronyms" supplements Clause 2 "Definitions of Terms and Acronyms" of the Contract General Provisions.

1.3 Article 5 "Contract Type and Consideration" replaces Clause 7 "Firm Fixed Price Contract" of the Contract General Provisions.

1.4 Article 9 "Acceptance Procedures – Agile Development" augments Clause 21 "Inspection and Acceptance of Work" and Clause 22 "Inspection and Acceptance of Documentation" of the Contract General Provisions.

1.5 Article 10 "Final Systems Acceptance" augments Clause 21 "Inspection and Acceptance of Work" and Clause 22 "Inspection and Acceptance of Documentation" of the Contract General Provisions.

1.6 Article 11 "Termination for Default" augments Clause 39 "Termination for Default" of the Contract General Provisions.

1.7 Article 12 "Termination for Convenience of the Purchaser" delimits Clause 40 "Termination for Convenience of the Purchaser" of the Contract General Provisions.

1.8 Article 13 "Liquidated Damages" replaces Clause 38 "Liquidated Damages" of the Contract General Provisions.

1.9 Article 15 "Participating Countries" augments Clause 9 "Participating Countries" of the Contract General Provisions.

1.10 Article 16 "Security" augments Clause 11 "Security" of the Contract General Provisions.

1.11 Article 17 "Intellectual Property" augments Clause 30 "Intellectual Property" of the Contract General Provisions.

1.12 Article 19 "Systems Warranty" augments Clause 27 "Warranty of Work (Exclusive of Software)" and Clause 30 "Software Warranty" of the Contract General Provisions.

1.13 Article 21 "Purchaser Furnished Items" augments Clause 13 "Purchaser Furnished Property and Services" of the Contract General Provisions.

1.14 Article 23 "Pricing of Changes, Modifications, Follow-on Contracts and Claims" augments Clause 19 "Pricing of Changes, Amendments and Claims" of the Contract General Provisions.

1.15 Article 24 "Acceptance of Design Documentation" augments Clause 22 "Inspection and Acceptance of Documentation" of the Contract General Provisions.

1.16 Article 26 "Place and Terms of Delivery" replaces sub-Clause 20.1 of Clause 20 "Notice of Shipment and Delivery" of the Contract General Provisions.

1.17 Article 29 "Purchaser Right to Contract with Third Parties in Case of Contractor Default" supplements Clause 39 "Termination for Default" of the Contract General Provisions.

2 ORDER OF PRECEDENCE

2.1 Clause 1 of the Contract General Provisions is modified to read as follows;

"In the event of any inconsistency in language, terms or conditions of the various parts of this Contract, precedence will be given in the following order:

2.1.1 The signature page

2.1.2 Part I – Schedule of Supplies and Services

2.1.3 Part II – Contract Special Provisions

2.1.4 Part III – Contract General Provisions

2.1.5 Part IV – Statement of Work

2.1.6 Part IV – Statement of Work Annex A, System Requirements Specification

2.1.7 Part IV – Statement of Work Annex B, User Stories *(UA contract only)*

2.1.8 Part IV – Statement of Work Annex B, Information Model *(BE contract only)*

2.1.9 Part V – Abbreviations and Acronyms

2.1.10 Any sections of the Contractor's proposal (Technical or Price Volumes) in response to IFB-CO-14873-INTELFS2, dated [date to be inserted at contract award] and any clarifications thereto, specifically incorporated by reference.

3 INTERPRETATIONS, DEFINITIONS AND ACRONYMS

3.1 This Article supplements Clause 2 (Definitions of Terms and Acronyms) of the NATO Communications and Information Agency (NCI Agency) Contract General Provisions.

3.2 As used throughout this Contract, the following terms shall have the meanings specified below unless otherwise specified in the Contract:

3.2.1 **"Application"**: the working software products that will be delivered by the Contractor on the User Applications (UA) contract.

3.2.2 **"Activity"**: the periods in which the Services on the Back-end (BE) contract are organized in the SSS. The BE contract has two activities.

3.2.3 **"BE"**: the abbreviation for the Back-end, Data Management contract.

3.2.4 **"CLIN"**: Contract Line Item Number, as shown in the Schedule of Supplies and Services (SSS). For example, 1.0, 2.0, etc.

3.2.5 **"Compliance"**: strict conformity to the requirements and standards of the Prospective Contract.

3.2.6 **"Contractor"**: the awardee which shall be responsible for the fulfilment of the requirements established in the Prospective Contract.

3.2.7 **"Days"**: calendar days.

3.2.8 **"Deliverables"**: the items, features or services to be delivered by the Contractor at a Milestone Date or at any other stage during the performance of this Contract as listed in Part I (Contract Schedules) and as more particularly described in the Statement of Work (SOW), the System Requirements Specification (SRS), the Technical Solution or any other relevant Contract document.

3.2.9 **"EDC"**: Effective Date of Contract.

3.2.10 **"FSA"**: Final Systems Acceptance.

3.2.11 **"Increment"**: is expected to be, on average, about three months in duration. At the end of each Increment, acceptance testing will be performed on any requirements that have been completed. The planning on prioritization of requirements will be managed per Increment.

3.2.12 **"Initial Acceptance"**: this is granted for an Application/Service when all of the Must-have Requirements for that Application/Service, as noted in the SSS, have been delivered and accepted.

3.2.13 **"MoSCoW Prioritization"**: the Agile method of prioritizing specific contract requirements per Increment. Please note the terms "Must have", "Should have" and "Could have" refer to the priority of a requirement for a specific Increment; these terms do not mean that any requirements listed in the SSS are optional.

3.2.14 **"NATO Participating Country"**: any of the 29 NATO nations that have undertaken to share the cost of the project, namely, (in alphabetical order): Albania, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Iceland, Italy, Latvia, Lithuania, Luxembourg, Montenegro, The Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Turkey, The United Kingdom and The United States of America.

3.2.15 **"Phase"**: the periods in which the Applications on the UA contract are organized in the SSS. The UA contract has three phases.

3.2.16 **"Purchaser"**: the current NCI Agency or its legal successor.

3.2.17 **"SPI"**: the Schedule Performance Index, measured at the end of each Increment as the value of the Requirements delivered divided by the value of the Requirements planned for that Increment.

3.2.18 **"SSS"**: the Schedule of Supplies and Services.

3.2.19 **"Service"**: working software products that will be delivered by the Contractor on the Back End Data Management contract.

3.2.20 **"SubCLIN"**: Sub Contract Line Item Number that falls under a CLIN. These are listed in the SSS, for example, 1.2, 1.3, 1.4, etc. for the Applications/Services; and 1.2.1.1 or 1.4.1.3 for the Requirements.

3.2.21 **"UA"**: the abbreviation for the Front-end, User Applications contract.

4   SCOPE

4.1   The purpose of this contract is to upgrade the current Intelligence Functional Services (INTEL-FS) User Applications / Back-end Data Management capabilities *[delete whichever does not apply]*. All of the technical details and requirements of this project are explained in Part IV – Statement of Work (SOW), and its annexes, the System Requirements Specification, the User Stories, and the Information Model.

4.2   This contract will be managed using elements of the Agile methodology. The following paragraphs provide a high-level overview, which is then further explained in the SOW and its annexes.

4.3   The technical work to be performed under this contract is organized into **Applications** (for the User Application contract) or **Services** (for the Back End Data Management contract). Each Application/Service is then broken down into specific **Requirements**.

4.3.1   The Schedule of Supplies and Services (SSS) lists all of the Applications/Services at the CLIN X.1 level. For example CLINs 1.1, 2.1, 2.2, 3.6, etc. are all considered Applications/Services.

4.3.2   The SSS lists all of the Requirements at the CLIN X.1.2.3 level. For example, CLIN 1.1.1.1, CLIN 2.1.4.1, CLIN 3.6.2.1, etc. are all considered individual Requirements.

4.4   Within each Application/Service, the Requirements are assigned a **priority**: Must-have, Should-have or Could-have. The **Must-have** requirements collectively represent the minimum set of deliverables that will provide a working Application. All of the Must-have requirements must be completed before the Initial Acceptance will be granted by the Purchaser for that Application. If the Must-have requirements have not been completed by the end of the Increment, the Increment will be extended by additional Sprints until the Increment has been completed. The SSS notes which Requirements must be delivered for the Initial Acceptance to be granted in the column "Required for Initial Acceptance."

4.5   Applications/Services may contain **Should-have** and/or **Could-have** requirements. It is important to note that these are not "optional" requirements. While they are not required to be completed for the Initial Acceptance of the Application/Service, all of these requirements are an important part of the contract scope and required to be delivered.

4.6   Quarterly Increments: The delivery of the requirements and Applications/ Services will be spread over **Increments**, which are expected to be, on average, three months in duration. Acceptance testing will be performed at the end of each Increment for any requirement completed during that Increment, as explained further in Section 8.

4.7   Monthly Sprints: Each Increment is typically comprised of three **Sprints**.

4.8   This contract includes two Incentive payments for early and complete delivery, as explained in Section 6.

5   CONTRACT TYPE AND CONSIDERATION

5.1   This Article replaces Clause 7 of the Contract General Provisions.

5.2   This is a Fixed Price Incentive Fee contract.

5.3   The Schedule of Supplies and Services (SSS) of this Contract, organized into Contract Line Items (CLINs), lists all services and/or deliverables, their priority, and their fixed price.

5.4   Included in the prices shown in the SSS are all costs for activities not specifically listed on the SSS, but that are considered necessary by the Contractor to execute the Statement of Work, included but not limited to:

- All travel, per diem and accommodation costs;

- All executive management, administrative or other support effort;

- All facility or other overhead costs;

- All other direct costs.

5.5   In addition to the prices shown in the SSS, the contract includes an incentive fee as further explained in Section 6.

6   INCENTIVE FEE

6.1   The Contract allows for additional payments to recognize early delivery of <u>all</u> requirements of an Application/Service. This incentive is in addition to the normal payment following acceptance of each Application/Service and its Requirements.

6.2   The maximum amount of any earned incentive shall be 5% of the value of that Application/Service as specified in SSS Section 2, Payments.

6.3   There are two Incentive Milestones dates:

6.3.1   For the Front-end (UA) contract, the first incentive milestone will be EDC+18 Months for all deliverables listed under CLIN 1 and CLIN 2 of that contract.

6.3.2   For the Back-end (BE) contract, the first incentive milestone will be EDC+12 months for all back-end services listed under CLIN 1 of that contract.

6.3.3   The second Incentive Milestone will be four weeks prior to the respective FSA, as defined in Section 10.

6.4   The incentives will be applied as follows:

6.4.1   Step 1: For any incentive to be earned, <u>all</u> Applications/Services must have passed the Initial Acceptance – that is, <u>all</u> of the Must-have Requirements for <u>all</u> of the Applications/Services have been accepted. If there are any Must-have Requirements that have not been accepted, thereby preventing the Initial Acceptance of any Application/Service, no incentive will be paid.

6.4.2   Step 2: If all of the Applications/Services have passed the Initial Acceptance in Step 1 above, then for any Application/Service which has had all requirements (Must-have, Should-have <u>and</u> Could-have) accepted by the Incentive Milestone date, the incentive will be calculated as 5% of the total price of those Applications/Services.   If one or more Should-have or Could-have requirements have not yet been accepted for a particular Application/Service, the Contractor will not earn the incentive for that Application/Service.

6.4.3   The Purchaser's determination of this Incentive Fee is not subject to the Disputes clause.

7   INVOICING AND PAYMENT

7.1   This Clause augments Clause 25 of the Contract General Provisions.

7.2   No payment shall be made with respect to Requirements that have not been accepted, and/or incorrectly submitted invoices.

7.3   Each invoice shall correspond to the successful completion of an Application/Service or Requirement, shall contain evidence of the acceptance of that Application/Service or Requirement, and shall reference the appropriate sub-CLIN.

7.4   The accumulated invoices for any CLIN cannot exceed the value of that CLIN as stated in the SSS.

7.5   Payment Schedule:

7.5.1   Upon the successful achievement of the Initial Acceptance for each Application/Service – that is, all of the Must-have Requirements have been accepted – the Contractor may submit the first invoice for that Application/Service, in accordance with Part I, Schedule of Supplies and Services, Section 2, *Payment Schedule*. The Requirements that must be accepted for the Initial Acceptance are identified in the SSS, in the column "Required for Initial Acceptance".

7.5.2   The Contractor may also invoice the value of any accepted Should-have and Could-Have Requirements for Applications/Services that have already passed the Initial Acceptance. Payment for Should-have and Could-have Requirements will not be made until all of the Must-have Requirements have been accepted for that Application/Service.

7.5.3   The amount of the invoices – both following the Initial Acceptance for each Application/Service and the acceptance of subsequent Requirements – will equal 90% of the value of the accepted Requirements. The remaining 10% will be paid during the one-year warranty period following FSA.

7.5.4   The total amount of the warranty payment will be 10% of the total value of the accepted Requirements. It will be paid in four quarterly payments of 25% of the total warranty amount upon approval of a quarterly status report.

7.6   As explained in Section 6, the Contractor can earn an incentive fee for timely and complete delivery. Following notification by the Purchaser of the amount of the incentive earned, the Contractor may submit an invoice for this incentive. The earned incentive, if any, will be fully paid at the time it is earned; no amount will be withheld to be paid during the warranty.

8   OPTIONS

8.1   The contract includes options for annual maintenance for up to five years following FSA, which are available for unilateral exercise by the Purchaser at any time and in any combination from Effective Date of Contract until two months before the end of the contract. The total value of these optional CLINs is not included in the initial contract value stated on the signature page of the Contract.

8.2   These optional CLINs are 5.1 – 5.5 for the Front-end (UA) contract; and 6.1 – 6.5 for the Back-end (BE) contract. *[delete whichever does not apply]*

8.3   The Purchaser's liabilities and obligations under this Contract at the time of its signature, and unless a formal Contract Amendment is issued in accordance with the terms of this Clause and Clause 16 (Changes) of the Contract General Provisions, are limited in scope and amount to performance and deliverables associated to the base contract as described in the SSS and SOW.

8.4   The Contractor understands that there are no obligations under this Contract for the Purchaser to exercise any of the Options and that the Purchaser bears no liability should it decide not to exercise them (either totally or partially).

8.5   Further, the Purchaser reserves the right to contract with another company (or the same), to perform the tasks described in the Options of the current Contract through a new Contract with other conditions.

8.6   Any optional CLINs may be exercised unilaterally by the Purchaser, and confirmed by written amendment to the Contract which will establish the payment terms.

8.7   The exercised optional CLINs will be paid in four quarterly payments of 25% of the CLIN amount upon approval of a quarterly status report. The exercised options can be invoiced following successful delivery and acceptance.

8.8   The delivery dates for the options will be specified in the amendment, and Acceptance of the items delivered under this Contract will be made according to Clause 21 - "Inspection and Acceptance of Work" and Clause 22 – "Inspection and Acceptance of Documentation" of the Contract General Provisions and the Statement of Work.

9 ACCEPTANCE PROCEDURES – AGILE DEVELOPMENT

9.1 "Acceptance" is the action by which the Purchaser formally acknowledges that the Contractor has fully demonstrated that the Increment releases are "complete" in accordance with the criteria and definitions in Section 2 and Section 3 of the Statement of Work, and that Contract Deliverables are complete or have been performed according to the requirements set forth.

9.2 Contract payment milestones, as designated in the Schedule of Supplies and Services, shall only be considered as complete and eligible for payment when all milestone entry and exit criteria, and any works or events as defined in this contract as associated and underlying the payment milestone has been formally delivered in the Increment release package (as defined in the SOW) and acknowledged as completed by the Purchaser. Payment milestones shall only be considered as confirmed and fully achieved when the Purchaser has advised the Contractor formally in writing that all conditions necessary for milestone completion (as defined in the Delivery Acceptance Report in the SOW) have been successfully met. All documents and data shall be prepared by the Contractor and approved by the Purchaser.

9.3 Purchaser review and acceptance procedures specific to contract documentation to be submitted by the Contractor are as described in Section 2.5.4.8 of the Statement of Work, "Deliverable Acceptance Report".

10 FINAL SYSTEMS ACCEPTANCE (FSA)

10.1 This Clause modifies Clauses 21 and 22 of the Contract General Provisions.

10.2 The final contracted Increment for the Front-End UA contract shall end at EDC+32 months. The final contracted Increment for the Back-end BE contract shall end at EDC+36 months.

10.3 Within two weeks after the Deliverable Acceptance Review (as defined in SOW 2.4.5.2.6) for the final contracted Increment, for any Requirements not yet completed the Purchaser shall inform the Contractor whether:

10.3.1 These Requirements will be removed from the contract, with a 10% penalty assessed as explained in paragraph 13.4, or;

10.3.2 The contract will be extended with one or more Increments, with liquidated damages assessed as described in paragraph 13.3, to allow the Contractor to complete specific Requirements.

10.4 After the final contracted Increment has been accepted by the Purchaser, the Contractor shall request FSA in writing to the Purchaser, supported by an FSA Report, which shall document:

10.4.1 The completion status of all Requirements listed in the SSS;

10.4.2 All outstanding defects recorded through the Contractor's Defect Management Process as per SOW 2.4.5.2.2.2, with a correction action plan for addressing these defects under Warranty.

10.5 Within 3 weeks of the receipt of a request for FSA, the Purchaser will schedule FSA meeting.

10.6 The FSA meeting will be chaired by the Purchaser with the objective to verify that all contract Requirements (except warranty) have been met and that the Purchaser may grant the FSA.

10.7 The Contractor shall prepare a written report of the FSA meeting in the form of meeting minutes that shall be reviewed and signed by the representatives of the Contractor and Purchaser respectively.

11 TERMINATION FOR DEFAULT

11.1 This Article augments Clause 39 of the Contract General Provisions.

11.2 Beginning at the end of the second Increment, the Purchaser will monitor the Contractor's Schedule Performance Index (SPI). The SPI is calculated by dividing the value of the Requirements delivered by the value of the Requirements planned according to the baseline delivery schedule. The baseline delivery schedule, initially proposed by the Contractor in its bid, is specifically included in the contract in Part I, *Schedule of* Supplies and Services, Section 3, *Project Schedule*. This baseline delivery schedule may be updated upon the agreement of both parties at the start of each Work Package. The values are based on the prices listed for each Requirement in the SSS.

11.3 The SPI will be used to mathematically measure the "failure to make progress as to endanger performance", as stated in Clause 39.1.2 of the General Contract Provisions. It does not obviate the other basis upon which the Termination for Default clause may be invoked. If the SPI falls below 0.70, the Purchaser will consider that the Contractor is "failing to make progress as to endanger performance."

12 TERMINATION FOR CONVENIENCE OF THE PURCHASER

12.1 This Article delimits Clause 40 of the Contract General Provisions.

12.2 Notwithstanding the provisions of the Termination for Convenience clause in the Contract General Provisions, the maximum liability of the Purchaser in the event the Purchaser terminates the Contract pursuant to this Clause will not exceed the value of that amount already paid under the contract to the point of termination, the outstanding unpaid invoices for deliveries accepted and the next two planned Increments following the current one. For example, if the Purchaser terminates the contract for convenience in Increment 5, the maximum liability of the Purchaser will equal the value of Increments 6 and 7. The value of the Increment is calculated based on the values of the Application/Services and Requirements, as stated in the SSS, scheduled for those two Increments.

12.3 This does not imply the Contractor is automatically due the value of the next two Increments following a Termination for Convenience; this simply limits the liability of the Purchaser in this situation.

13   LIQUIDATED DAMAGES

13.1   This Article replaces Clause 38 of the Contract General Provisions.

13.2   If the Contractor fails to obtain acceptance of the delivered Requirements prior to the completion of Phase 1 and/or prior to FSA, the actual damage to the Purchaser for the delay or non-delivery will be difficult or impossible to determine. Therefore, in lieu of actual damages the Contractor shall pay to the Purchaser liquidated damages as explained below.

13.3   For any Requirement listed in the SSS that has not been accepted at two designated points: 1) Four weeks after the Incentive Milestone date; and 2) FSA; the Purchaser may asses liquidated damages in the amount of one-tenth of one per cent (0.1%) of the value of that sub-CLIN as set forth in the SSS per day of delinquent delivery/performance.

- For example, if a Requirement has not been accepted by one of the two designated points (as described above) which has a stated value of €10,000 in the SSS, the Purchaser could allow the Contractor to complete work on this Requirement. If this Requirement was accepted 60 days after Phase 1 and/or FSA, the liquidated damages would be calculated as: €10,000 x 0.1% x 60 days = €600. Following Acceptance, the payment due to the Contractor for that Requirement would then be €10,000 – €600 = €9,400.

13.4   Alternatively, at FSA, the Purchase may declare that Requirement permanently "non-delivered" and asses liquidated damages of 10% of the value of that Requirement. This Requirement would then no longer be required and would no longer be eligible for Acceptance.

- For example, for a Requirement that was not accepted at FSA, which has a stated value of €10,000 in the SSS, the Contractor would be obligated to pay to the Purchaser €1,000 and that Requirement would no longer be eligible for acceptance and payment.

13.5   In addition, the Purchaser may terminate this Contract in whole or in part, as provided in paragraph 39.1 of Clause 39 – "Termination for Default" of the Contract General Provisions and in that event the Contractor shall be liable to pay the excess costs provided in paragraph 39.5.

13.6   The Contractor shall not be charged with liquidated damages when the delay arises out of causes beyond the control and without the fault or negligence of the Contractor as defined in paragraph 39.6 of Clause 39 – "Termination for Default" of the Contract General Provisions. In such event, subject to the Disputes and Arbitration Clause, the Purchaser shall ascertain the facts and extent of the delay and shall extend the time for performance of the Contract when in his judgement the findings of fact justify an extension.

13.7   The amount of Liquidated Damages and/or Penalty due by the Contractor shall be recovered by the Purchaser in the following order of priority:

13.7.1   By deducting such damages from the amounts due to the Contractor against the Contractor's invoices.

13.7.2   By proceeding against any surety, such as a performance guarantee.

13.7.3   By reclaiming such damages through appropriate legal remedies.

13.8   Liquidated damages shall be payable to the Purchaser from the first day of delinquency and shall accrue at the rate specified in Clause 13.3 up to 20% of the value of each line item individually and an aggregate sum of all delinquent items not to exceed 15% of the value of the total Contract. These liquidated damages shall accrue automatically and without any further notice being required.

13.9   The rights and remedies of the Purchaser under this clause are in addition to any other rights and remedies provided by law or under this Contract.

14   CONTRACT ADMINISTRATION

14.1   The Purchaser is the NATO Communications and Information Agency (NCI Agency). The Purchaser is the Point of Contact for all Contractual and Technical issues. The Contractor shall accept Contract modifications only in writing from the Purchaser's Contracting Authority

14.2   Formal letters and communications shall be sent by email, or delivered in person, by registered mail, courier or other delivery service, to the official points of contact quoted in this Contract.

14.3   Informal notices and informal communication may be exchanged by any other means, including telephone.

14.4   All notices and communication shall be effective upon receipt.

14.5   Official Points of Contact are:

Purchaser	
Contractual Issues	**Technical Issues**
NCI Agency	NCI Agency
Boulevard Léopold III	Oude Waalsdorperweg 6
B-1110 Brussels, Belgium	2597 AK The Hague, The Netherlands
Name	*Name*
Phone	*Phone*
Email	*Email*
Contractor	
Contractual Issues	**Technical Issues**
Company	*Company*
Address	*Address*
Address	*Address*
Name	*Name*
Phone	*Phone*
Email	*Email*

15   PARTICIPATING COUNTRIES

15.1   This Article augments Clause 9 of the Contract General Provisions.

15.2   The Contractor may issue sub-contracts to firms and purchase from qualified vendors in any of the following 29 NATO participating nations: Albania, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Iceland, Italy, Latvia, Lithuania, Luxembourg, Montenegro, The Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Turkey, The United Kingdom and The United States of America. None of the work, including project design, labour and services, shall be performed other than by firms from and within participating countries as per NATO policy.

15.3   The Contractor shall notify in writing to the Purchaser immediately upon being informed of any change in the nationality of its Sub-contractor(s) which would prevent the Contractor from further complying with Clause 15.2 above. Upon receipt of this information from the Contractor, the Purchaser may, within three months from this notification, require the Contractor to find an alternate subcontractor, complying with the requirements set out in Clause 15.2 above.

15.4   Unless authorised by NATO Policy, no material or items of equipment down to and including identifiable sub-assemblies delivered under this Contract shall be manufactured or assembled by a firm other than from and within a participating country.

15.5   The Intellectual Property Rights to all designed documentation and system operating software shall reside in NATO member countries, and no license fee, or royalty charges shall be paid by the Contractor to firms, individuals or governments other than within the NATO member community.

16 SECURITY

16.1 This Article augments Clause 11 of the Contract General Provisions.

16.2 The Contractor is responsible, in accordance with NATO and National Security regulations, for the proper handling, storage and control of any classified documents and information as may be furnished to the Contractor in relation to the performance of this contract. As such, the Contractor's premises shall be able to handle information up to NATO Restricted.

16.3 The security classification of this contract and its annexes is "NATO UNCLASSIFIED". However, the Contractor's technical personnel working on the Contract will need to access NATO SECRET data and therefore shall hold a valid NATO SECRET security clearance for the duration of the Contract. This access to NATO SECRET data shall occur only at NATO premises and never at the Contractor's own premises.

16.4 Contractor's personnel visiting or working at Purchaser's facilities in connection with this Contract shall hold a NATO SECRET security clearance valid for the duration of the Contract. This requirement applies to all subcontracts issued by the Contractor for the effort under this prime Contract.

16.5 It is the responsibility of the Contractor to ensure that its personnel obtain the required security clearances and transmit this information to the sites to be visited in adequate time that the site may perform the appropriate administration.

16.6 The Contractor is advised that the personnel security process may be lengthy. The Purchaser bears no responsibility for the failure of the Contractor to secure the required clearances for its personnel within the necessary time.

16.7 Failure of the Contractor to obtain proper security clearances to have access to any NATO sites, and any attendant delay in the project which results from this access refusal, is not the basis for excusable delay under the terms of the contract concerning default. The Contractor bears full responsibility and liability under the contract for delays arising from the failure of the Contractor to adhere to the security requirements.

16.8 If during the performance of the Contract, Contractor's personnel need to be escorted because of non-availability of the security clearance required by the Site, the Contractor shall pay to the Purchaser a compensatory fee of 800 Euro per day of escort.

16.9 In the absence of valid security clearances for the Contractor's personnel at contract signature, the Purchaser reserves the right to terminate the Contract for "Default".

16.10 Reserved.

17   INTELLECTUAL PROPERTY

17.1   This Clause supplements Clause 30 (Intellectual Property) of the Contract General Provisions.

17.2   All Foreground IPR is the property of the Purchaser. Consequently, no statement shall be made restricting the rights of the Purchaser. All Foreground IPR are immediately and exclusively transferred and assigned to the Purchaser as from their coming into existence or, as the case may be, as from the conclusion of this Contract for rights already in existence at the time of execution of this Contract.

17.3   Any use by the Purchaser of Contractor Background IPR for the purpose of carrying out work pursuant to the Contract shall, subject to any obligation on the part of the Contractor to make payments to any third party in respect of IPR which is licensed from such third party, be free of any charge to Purchaser. The Contractor hereby grants to the Purchaser a non-exclusive, royalty-free and irrevocable licence throughout NATO, NATO operations (including out of area operations) and/or among NATO member nations to use and authorise others to use any Contractor Background IPR for the purpose of exploiting or otherwise using the Foreground IPR for any purpose.

17.4   The Purchaser retains the right to redeploy the Software provided under the Contract within NATO for NATO purposes, and/or among NATO Nations for NATO purposes.

17.5   This licence shall also allow the Purchaser and its member nations to use and authorise others to use the software for further adaptation, integration, modifications and future procurements.

17.6   The Contractor intends to use the Background IPR stated in Contract Special Provisions - Annexes B and C hereto for the purpose of carrying out work pursuant to this Contract.

17.7   The Contractor warrants, undertakes, and represents that any derivative product created under this Contract from the stated Background IPR shall be considered as Foreground IPR and, therefore, shall be governed by the terms and conditions specified in Clause 30.3 (Foreground IPR) of the Contract General Provisions.

17.8   In addition, regarding the Contractor's Background IPR, the Purchaser shall have the right to further re-transfer this software (source code excluded) and associated documentation necessary and/or useful for use and integration, to companies eligible for other NATO procurements, subject to an appropriate license agreement. There shall be no additional charges or fees associated with this license agreement beyond the Firm Fixed Price of this contract.

17.9 Any use of Contractor and Third Party Background IPR as stated in Annexes B and C, and unless specifically applicable to COTS items, is not limited to the number of users or the number of licenses required by the Contract for use of the system. With the exception of COTS items, the Purchaser reserves the right to use or authorise NATO members to use the Background IPR as stated in Annexes B and C for any number of users and number of licenses as required, at no additional cost to the Purchaser.

17.10 All Software, except COTS, delivered under this Contract shall not be marked with corporate logos, proprietary information or contain warnings limiting the rights to use or reproduction nor shall those markings be included in the operating and/or maintenance manuals or instructions accompanying such software.

18   KEY PERSONNEL

18.1   The individuals listed in ANNEX B are considered to be key to the performance of this contract and may not be replaced by the Contractor with substitute personnel without the prior written approval of the Purchaser.

18.2   In such cases where the services of the Key Personnel are lost to the Contractor beyond the reasonable control of the Contractor, the Contractor must nominate a substitute(s) of equivalent or higher qualification and experience within 15 working days of the date at which the Contractor has knowledge of the loss of service of such key personnel. The replacement personnel shall be in place within 7 days of Purchaser approval.

18.3   If the Contractor is unable to nominate and/or replace the lost personnel within the timeframe mentioned in 18.2 above, the Purchaser may conclude that the loss of the Key Personnel endangers progress under the Contract to the extent that the Purchaser may resort to the Clause 39 – "Termination for Default" of the Contract General Provisions for redress of the situation.

18.4   The Purchaser shall approve the dedicated personnel, as well as the replacement personnel. The Purchaser has the right to refuse any proposed substitution as not meeting the qualifications and request the Contractor to offer another qualified individual in lieu thereof.

18.5   The Purchaser reserves the right to reject a Contractor's staff member after acceptance of a Contractor's staff member on the basis of his/her CV if the individual is not providing the required level of support. The Purchaser will inform the Contractor in writing in case such a decision is taken and the Contractor shall propose and make another staff member available within three working days after the written notification.

18.6   A Contractor's staff member assigned to this Contract shall remain working on the Contract for as long as required by the terms of the Contract. However, in the event where the Contractor has no control over the individual's non-availability (e.g., resignation, sickness, incapacity, etc.), the Contractor shall notify the Purchaser of a change of key personnel within working 3 days of the date of knowledge of the prospective vacancy and offer a substitute with equivalent qualifications.

18.7   Key Personnel are not necessarily required to work full-time in that position. Therefore, it is possible for an individual to fill more than one Key Personnel role at the same time, assuming the person is qualified to perform both roles.

19   SYSTEMS WARRANTY

19.1   This Article augments Clauses 27 and 31 of the Contract General Provisions.

19.2   Following FSA, the Contractor shall provide a one-year warranty for the supplies and services delivered under this Contract in accordance with Part IV - Statement of Work, Section 2.3.7, *Warranty Requirements*, and Clauses 27 and 31 of the Contract General Provisions.

19.3   In the event of any inconsistency in language, terms or conditions with regards to warranty, the terms or conditions stipulated in Part IV - Statement of Work, Section 2.3.7 shall have precedence over Clauses 27 and 31 of the Contract General Provisions.

20   SOFTWARE WARRANTY

20.1   The Clause augments Clause 31 of the Contract General Provisions.

20.2   For each Software delivered under this Contract, the Contractor warranties stated in paragraph 31.1 of the Contract General Provisions shall extend to all defects discovered within twelve (12) months from Final System Acceptance declared in writing by the Purchaser's Contracting Authority.

21   PURCHASER FURNISHED ITEMS

21.1   This Clause supplements Clause 13 (Purchaser Furnished Property and Services) of the General Contract Provisions.

21.2   The Purchaser will provide the Contractor with the property and services for the performance of the Contract as specified in Section 1.5 of the SOW.

21.3   As specified in Section 2.4.1 of the SOW, the Contractor shall develop software in the NATO Software Factory (NSF). The Purchaser will provide the Contractor with a set of user accounts in the NSF.

22 SOFTWARE LICENSES

22.1 Any software licenses purchased on behalf of or provided to the Purchaser by the Contractor shall be perpetual licenses. In the event a perpetual license model is not available for a particular software product, the Contractor shall request written approval from the Purchaser in advance.

22.2 Any software licenses the Contractor purchases on behalf of the Purchaser, and/or transfers or provides to the Contractor shall provide the same usage rights as required by Article 17. The Contractor shall ensure that any software licenses that will ultimately need to be assigned to the Purchaser can be done so at no additional cost.

22.3 The Purchaser reserves the right to exclude from the awarded Contract the purchase of software licenses which the Purchaser may procure through centralized Contracts. In this case, the contract terms, schedule and prices will be modified accordingly, and the software licenses will be provided to the Contractor in the form of "Purchaser Furnished Items".

23 PRICING OF CHANGES, MODIFICATIONS, FOLLOW-ON CONTRACTS AND CLAIMS

23.1 This Article augments Clause 19 of the Contract General Provisions.

23.2 The Purchaser may at any time, by written order designated or indicated to be a change order, and without notice to the sureties, if any, make changes within the scope of any Contract or Task Order, in accordance with Clause 16 (Changes) of the Contract General Provisions.

23.3 Changes, modifications, follow-on Contracts of any nature, and claims shall be priced in accordance with Clause 19 (Pricing of Changes, Amendments and Claims) of the Contract General Provisions, and with the "Purchaser's Pricing Principles" as set out in the Annex to the Contract General Provisions.

23.4 Contractor price quotations for Contract changes or modifications shall be provided at no cost to the Purchaser and shall have a minimum validity period of six (6) months from submission.

23.5 The pricing information contained in the cost breakdown sheets submitted with the Bidding sheets, as part of the Contractor's proposal, and especially the forward labour rates provided, will constitute the basis for any future negotiations related to possible future amendments to this Contract.

24   ACCEPTANCE OF DESIGN DOCUMENTATION

24.1   This Article augments Clause 22 of the Contract General Provisions.

24.2   The acceptance by the Purchaser of the Contractor's design documentation required by this Contract signifies that the documents delivered appear logical and consistent. The acceptance does not constitute an endorsement or approval of the design by the Purchaser and does not relieve the Contractor of the obligation to meet the performance requirements of this contract in the event that the design eventually proves to be non-compliant at the testing.

25   INDEMNITY

25.1   The Contractor will indemnify and hold harmless NATO, its servants or agents, against any liability, loss or damage arising out of or in connection of the Supplies and Services under this Contract.

25.2   The parties will indemnify each other against claims made against the other by their own personnel, and their sub-Contractors (including their personal representatives) in respect of personal injury or death of such personnel or loss or destruction of or damage to the property of such personnel.

25.3   NATO will give the Contractor immediate notice of the making of any claim or the bringing of any action to which the provisions of this Article may be relevant and will consult with the Contractor over the handling of any such claim and conduct of any such action and will not without prior consultation and without the consent of the Contractor settle or compromise any such claim or action.

25.4   In the event of an accident resulting in loss, damage, injury or death arising from negligence or wilful intent of an agent, officer or employee of NATO for which the risk has been assumed by the Contractor, the cause of the accidents will be investigated jointly by the Parties and the extent to which NATO will be liable to recompense the Contractor will be determined together.

26   PLACE AND TERMS OF DELIVERY

26.1   This Article replaces Clause 20.1 of the Contract General Provisions.

26.2   All deliverables under this Contract shall be delivered DDP ("Delivered Duty Paid") as defined by the INCOTERMS published by the International Chamber of Commerce (Publication No. 560) to the places and at such times as stipulated in the Schedule of Supplies and Services. The Contractor shall note that the Purchaser is exempt from customs duties and Value Added Tax as per Clause 26 – "Taxes and Duties" of the Contract General Conditions.

27   SUPPLEMENTAL AGREEMENT(S), DOCUMENTS AND PERMISSIONS

27.1   The Contractor has submitted all relevant draft supplemental agreement(s), documents and permissions prior to contract award, the execution of which by the Purchaser is/are required by national law or regulation. If any supplemental agreements, documents and permissions are introduced after contract award, and it is determined that the Contractor failed to disclose the requirement for the execution of such agreement from the Purchaser prior to contract signature, the Purchaser may terminate this contract for default in accordance with Clause 29 – "Termination for Default" of the Contract General Conditions.

27.2   Supplemental agreement(s), documents and permissions, the execution of which by the Purchaser is/are required by national law or regulation and that have been identified by the Contractor prior to the signature of this contract, but have not yet been finalised and issued by the appropriate governmental authority, are subject to review by the Purchaser. If such supplemental agreement(s), documents and permissions are contrary to cardinal conditions of the signed contract between the Parties, and the Purchaser and the appropriate governmental authority cannot reach a mutual satisfactory resolution of the contradictions, the Purchaser reserves the right to terminate this contract and the Parties agree that in such case the Parties mutually release each other from claim for damages and costs of any kind, and any payments received by the Contractor from the Purchaser will be refunded to the Purchaser by the Contractor.

28   COMPREHENSION OF CONTRACT AND SPECIFICATIONS

28.1   The Contractor warrants that he has read, understood and agreed to each and all terms, clauses, specifications (including drawings) and conditions specified in the Contract and that this signature of the Contract is an acceptance, without reservations, of the said Contract terms within their normal and common meaning.

28.2   The specifications set forth the performance requirements for the Contractor's proposed work as called for under this Contract. Accordingly, notwithstanding any conflict or inconsistency which hereafter may be found between achievement of the aforesaid performance requirements and adherence to the Contractor's proposed design for the work, the Contractor hereby warrants that the work to be delivered will meet or exceed the performance requirements of the said specifications.

28.3   The Contractor hereby acknowledges that he has no right to assert against the Purchaser, its officers, agents or employees, any claims or demands with respect to the aforesaid specifications as are in effect on the date of award of this Contract:

- based upon impossibility of performance, defective, inaccurate, impracticable, insufficient or invalid specifications, implied warranties of suitability of such specifications, or;

- otherwise derived from the aforesaid specifications, and hereby waives any claims or demands so based or derived as might otherwise arise.

28.4   Notwithstanding the "Changes" Clause or any other Clause of the Contract, the Contractor hereby agrees that no changes to the aforesaid specifications which may be necessary to permit achievement of the performance requirements specified herein for the Contractor's proposed work shall entitle the Contractor either to any increase in the fixed price as set forth in this Contract or to any extension of the delivery times for the work beyond the period of performance in the Schedule of Supplies and Services.

29 PURCHASER RIGHT TO CONTRACT WITH THIRD PARTIES IN CASE OF CONTRACTOR DEFAULT

29.1 This Clause supplements Clause 39 (Termination for Default) of the Contract General Provisions.

29.2 In the event that the Contractor fails to deliver or make progress on the provision of any components of this project in accordance with the milestones and delivery dates stipulated in the SSS and SOW, and is notified by the Purchaser in writing that the Contractor is in a state of default in accordance with Clause 39 of the Contract General Provisions (Termination for Default), the Purchaser reserves the right to enter directly into contracts with any third party, including commercial entities, and Contractor's Subcontractors for provision of the Contract Work Package.

29.3 The provisions of this Article are in addition to and in no way limit the rights of the Purchaser contained in other applicable clauses of this Contract, including but not limited to, Clause 21 (Inspection and Acceptance of Work) and Clause 39 (Termination for Default) of the Contract General Provisions.

30 EXPORT AGREEMENT AND LICENSE

30.1 It is the Contractor's responsibility to ensure compliance with all relevant or necessary national export provisions in executing the work under this contract. Copies of the documentation will be supplied to the Purchaser on request.

31 INDEPENDENT CONTRACTOR

31.1 The Personnel provided by the Contractor are at all times employees of the Contractor and not the Purchaser. In no case shall Contractor personnel act on behalf of or as an agent for NATO or any of its bodies. In no way shall the Contractor personnel claim directly or indirectly to represent NATO in an official capacity or claim themselves to be NATO employees.

31.2 The Purchaser shall not be responsible for securing work permits, lodging, leases nor tax declarations, driving permits, etc., with national or local authorities. Consultants employed under this Contract are not eligible for any diplomatic privileges or NATO employee benefits.

32 FORCE MAJEURE

32.1 If the performance of this Contract, or any obligation hereunder is prevented, restricted or interfered with by reason of fire, flood, earthquake, explosion or other casualty or accident, strikes or labour disputes, war or other violence, including acts of terrorism, any law, order, proclamation, regulation, ordinance, demand or requirement of any governmental agency, or any other act, event or condition whatsoever beyond the reasonable control of the affected Party, the Party so affected, upon giving prompt notice to the other Party, shall be excused from such performance to the extent of such prevention, restriction or interference, provided, however, that the Party so affected shall take all reasonable steps to avoid or remove such cause of non-performance and shall resume performance hereunder with dispatch whenever such causes are removed.

ANNEX A. RESPONSIBILITY OF THE CONTRACTOR TO INFORM EMPLOYEES OF WORK ENVIRONMENT

A.1.   The Contractor shall inform his employees under this Contract of the terms of the Contract and the conditions of the working environment.

A.2.   Specifically, personnel shall be made aware of all risks associated with the performance under this Contract, the conditions of site in which the performance is to take place and living conditions while performing within the boundaries of the Contract. The selection of adequate personnel shall remain sole responsibility of the Contractor.

ANNEX B. KEY PERSONNEL

a. The following Key Personnel shall be subject to the stipulations contained in Clause 18 (Key Personnel) of the Contract Special Provisions for the period of designation indicated below:

Position	SOW Reference	Labour Category	Name	Designation Period
Project Manager	2.1.2	*[To be inserted prior to Contract award]*	*[To be inserted prior to Contract award]*	EDC through End of Contract
Quality Assurance Manager	2.1.2	*[To be inserted prior to Contract award]*	*[To be inserted prior to Contract award]*	EDC through End of Contract
Configuration Manager	2.1.2	*[To be inserted prior to Contract award]*	*[To be inserted prior to Contract award]*	EDC through End of Contract
Technical Lead	3.1	*[To be inserted prior to Contract award]*	*[To be inserted prior to Contract award]*	EDC through End of Contract
Scrum Master	3.1	*[To be inserted prior to Contract award]*	*[To be inserted prior to Contract award]*	EDC through End of Contract
Software Architect *(applies only to the Back-end contract)*	3.1	*[To be inserted prior to Contract award]*	*[To be inserted prior to Contract award]*	EDC through End of Contract
Test Director	3.1	*[To be inserted prior to Contract award]*	*[To be inserted prior to Contract award]*	EDC through End of Contract
Lead SW Developer 1	3.1	*[To be inserted prior to Contract award]*	*[To be inserted prior to Contract award]*	EDC through End of Contract
Lead SW Developer 2	3.1	*[To be inserted prior to Contract award]*	*[To be inserted prior to Contract award]*	EDC through End of Contract

ANNEX C. CONTRACTOR BACKGROUND IPR

a. The Contractor Background IPR specified in the table below will be used for the purpose of carrying out work pursuant to the Contract.

Item	Description / IP Ownership	Indicate if COTS[1]

b. The Contractor represents that it has and will continue to have, for the duration of this Contract, all necessary rights in and to the IPR specified above necessary to meet the Contractor's obligations under the Contract.

c. The Contractor Background IPR stated above complies with the terms specified in Clause 17 of the Contract Special Provisions and shall be licensed to the Purchaser according to the terms and conditions specified therein and in Clause 30 of the Contract General Provisions.

ANNEX D. SUBCONTRACTOR AND THIRD PARTY IPR

a. The Subcontractor and Third Party Background IPR specified in the table below will be used for the purpose of carrying out work pursuant to the Contract.

Item	Description / IP Ownership	Indicate if COTS[1]

b. The Contractor represents that it has and will continue to have, for the duration of this Contract, all necessary rights in and to the IPR specified above necessary to meet the Contractor's obligations under the Contract.

c. The Subcontractor and Third Party Background IPR stated above complies with the terms specified in Clause 17 of the Contract Special Provisions and shall be licensed to the Purchaser according to the terms and conditions specified therein and in Clause 30 of the Contract General Provisions.

NATO Communications and Information Agency
Agence OTAN d'information et de communication

INTEL-FS SPIRAL 2 - USER APPLICATIONS (I2UA)
BOOK II - PART IV - SOW

STATEMENT OF WORK (SOW)

Version 1.3

10/03/2021

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Document Revision History

Date	Version	Changes
21 Dec 2020	1.0	IFB package release version
29 Jan 2021	1.1	IFB Amendment 1: Minor typographical fixes
16 Feb 2021	1.2	IFB Amendment 3: Clarifications on IV&V and UAT
10 Mar 2021	1.3	IFB Amendment 6: Added REST API to the list of PFI and provided clarifications for the Warranty)

1 Introduction

1.1 Background

[1] The Intelligence Functional Services (INTEL-FS) will provide an information management capability that will enable the Commands to execute the Intelligence Support function effectively and efficiently, and to provide comprehensive and relevant intelligence in a timely and responsive manner.

[2] Delivery of the functionalities of INTEL-FS is planned to be done in spirals (where each spiral could consist of multiple increments). The first spiral (INTEL-FS Spiral 1) was delivered in 2016. INTEL-FS Spiral 2 capability will be procured as two separate systems:
    (1) As a set of backend services; and
    (2) As web-browser based collection of user applications.

[3] This SOW is for the procurement of the web-browser based user applications hereafter referred to as INTEL-FS2 UA, or I2UA.

[4] The backend services will be procured through a different contract. The procurement of the backend services is described in a separate SOW.

1.2 Purpose

[5] The purpose of the present contract is to procure a new NATO-owned INTEL-FS User Applications capability (I2UA) for deployment to the NATO Command Structure (NCS) operational network.

[6] The I2UA will replace the current user interface part of INTEL-FS Spiral 1.

[7] The I2UA system requirements is defined in the Annex A to this SOW.

1.3 Scope of Work

[8] The project will be executed in accordance with the principles from the Dynamic System Development Method (DSDM):
    (1) Focus on the business need;
    (2) Deliver on time;
    (3) Collaborate;
    (4) Never compromise quality;
    (5) Build incrementally from firm foundations;
    (6) Develop iteratively;
    (7) Communicate continuously and clearly;
    (8) Demonstrate control.

[9] As shown in Figure 1-1, the main work will be organized in three work packages (WP 1.1, WP1.2, and WP1.3), and in addition an optional work package (WP 1.4) is defined for the eventuality of the Contractor, post the warranty period, is providing 3rd and 4th level software maintenance and support.

Figure 1-1   Work Packages, Increments, and Sprints
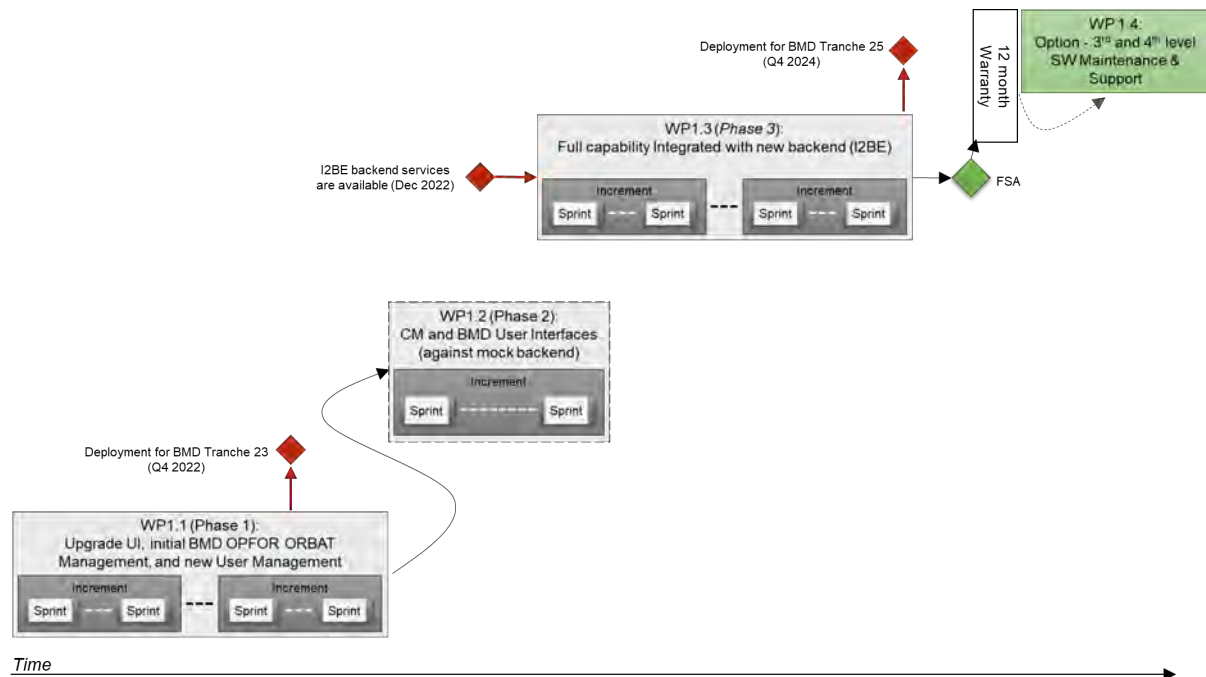
[10]   The main work package is subdivided into a set of increments, where each increment will deliver a tangible and payable deliverable. Each increment is again divided into multiple sprints.

[11]   The first work package (WP1.1) will start with the current INTEL-FS Spiral 1 and upgrade its user interfaces (UI) and it will also add some new UI functionality (in particular functionality for Ballistic Missile Defence (BMD) Order of Battle (ORBAT) management). For this work the Contractor will have to implement its UI functionality accessing the existing INTEL-FS Spiral 1 backend through an abstraction layer. To support the BMD ORBAT functionality the Contractor will have to implement some interim backend logic (it is interim, because it eventually will be replaced by the new I2BE backend services). Included in the work in WP 1.1 is also implementation of new functionality for managing users and their privileges while adapting to the new Bi-Strategic Command Automated Information System (B-SC AIS) identity management (IdM) platform.

[12]   The second work package (WP1.2) is introduced as a mitigation in case the new backend services (provided through a separate contract) is not ready after phase 1 is completed. In the period, waiting for the new I2BE services and the new I2BE application programming interface (API) to become ready, the Contractor will implement new user interfaces. This new UI will be implemented against mock backends (the Contractor will be responsible for establishing such mock backends).

[13]   The third work package (WP 1.3) will continue to evolve the new UI functionalities (started in WP 1.2) while integrating against the new I2BE API. The work also include upgrading all the functionality implemented in WP 1.1 to use the new I2BE API instead of accessing INTEL-FS Spiral 1 through an abstraction layer.

[14]   The Contractor will deliver training material for the usage of the user interfaces. This training material will be used to train a selected group of "students" during the sessions of testing the applications non-functional Learnability requirement.

[15]   The delivered SW at the end of each increment will have to have a quality at the level of being ready for deployment to production. The deployment of new software

modules will be led by the Purchaser with support from the Contractor. There might be multiple deployments to production of incrementally delivered functionality; e.g. deployment of new functionality including the BMD order of battle (ORBAT functionality in support of the BMD program tranche 23 before the end of the year 2022, deployments in support of the BMD tranche 25, and a final deployment prior to final system acceptance (FSA).

[16]   A fourth and optional work package (WP 1.4) is defined for the eventuality of the Contractor, post the warranty period, is providing software (SW) maintenance support (3rd level support).

[17]   The Contractor is expected to apply the Scrum agile process framework for managing the implementation work and to apply Behaviour Driven Development (BDD) methodology.

[18]   The Contractor will have to deliver all supplies and services as specified in this SOW and as stated in the Schedule of Supplies and Services (SSS) for all categories of the project.

[19]   The deliverables of the work is defined in the Schedule of Services and Supplies (SSS) where each deliverable will have by contract line item number (CLIN), a cost, and an expected delivery time information. The CLIN delivery times in the SSS is defined through the increment number when the deliverable is expected.

1.4   Purchaser's Responsibilities

[20]   The following services and items will be provided by the Purchaser for the performance of the Contract.
(1)   Access to Subject Matter Experts (SME) and required NATO documentation during project execution;
(2)   Provide purchaser furnished items (PFI) as per section 1.5 of this SOW;
(3)   Coordinating access to NATO sites the Contractor will have to visit.

[21]   The Purchaser's Project Manager (PM) will act as the Purchaser's representative and will be the primary interface between the Contractor and Purchaser after the Effective Date of Contract (EDC).

[22]   The Purchaser's Project Manager will be supported by specialists in certain areas (e.g. the project Technical Lead) who may, from time to time, be delegated to act on the Project Manager's behalf in their area of expertise.

[23]   Neither the Project Manager, nor any other NATO personnel may make changes to the terms and conditions of the Contract, but may only provide the Purchaser's interpretation of technical matters. All changes to the Contract will be made through the Purchaser's contracting office only.

[24]   The Purchaser will provide the Contractor with available technical descriptions of external NATO interfaces if such descriptions are required for the work.

[25]   The Purchaser will make available to the Contractor the facilities necessary to test and demonstrate the delivered software's interoperability with required external NATO interfaces.

1.5   Purchaser Furnished Items (PFI)

[26]   The Purchaser will provide access to reference test environment and integration testbed facilities for the required testing activities under this contract at the Purchaser's facility (either The Hague-Netherlands or Mons-Belgium).

[27]   The Purchaser will equip the Contractor with one NATO RΞSTRICTED (NR) laptop to be used for sharing of NR material.

[28]   The Purchaser will provide the Contractor with a set of user accounts on the NATO Software Factory (NSF), see section 2.4.1.

[29]   The Purchaser will provide the Contractor with the Service Oriented Architecture (SOA) and Identity Management (IdM) Platform, see [SOA-IdM].

[30]   The Purchaser will provide the Contractor with a reference test environment for system integration testing (this will be provided within the NSF).

[31]   The Purchaser will provide the Contractor with the current INTEL-FS Spiral 1 software.

[31a]   The purchaser will provide the Contractor with an initial version of the OData REST API for accessing INTEL-FS entities. This API will be created by a forward transformation from the INTEL-FS Spiral 2 information model (see [INTEL-FS2-InformationModel]).

[32]   The Purchaser will provide the Contractor with C4ISR Visualization Component (VC), see SRS for additional details.

[33]   The Purchaser will provide the Contractor with a software library for the video player component, see SRS for additional details.

1.6   Conventions

[34]   Requirements in the SOW are formulated using the form "shall". Context information supporting the requirements definition is provided using the form "will".

[35]   "Shall" statements are contractually binding; "Will" statements are non-mandatory, or they imply intent on the part of the Purchaser.

[36]   Mandatory requirements in the SOW are preceded by a unique heading number, consisting of a prefix, followed by a number.

[37]   Informational or context information not conveying any requirement on the Contractor is preceded by a number heading in brackets, [xx], without prefix letters.

[38]   The term "the Purchaser" means the NCI Agency or its authorised representatives.

[39]   Whenever requirements are stated herein to "include" a group of items, parameters, or other considerations, "include" means "include but not limited to".

[40]   Whenever reference is made to a section or paragraph, the reference includes all subordinate and referenced paragraphs.

[41]   The convention to be used for dates appearing in free text (e.g. quoting dates of meetings) is day-month-year and not month-day-year.

1.7   Structure

[42]   This SOW is structured as follows:
- Chapter 1: Introduction of the project;
- Chapter 2: Specification of general requirements for the SOW where those requirements are of a general nature (i.e. applicable to most NATO software acquisition projects);
- Chapter 3: Specification of project specific SOW requirements that are of a character that have been specially identified for this project.

1.8   Applicable documents

[43]   Applicable documents provide details not explicitly set out through this SOW. They shall be considered by the Contractor as requirements associated with this SOW.

Table 1-1   Applicable documents

[ACMP-2009-SRD-41]	Examples of CM Plan Requirements, Edition A, Version 1, March 2017, NATO Standardization Office (NSO)
[AQAP-2110]	NATO Quality Assurance Requirements for Design, Development and Production, Edition D Version 1, JUNE 2016, NATO Standardization Office (NSO)
[INTEL-FS2-Special-Provisions]	CO-14873-INTELFS2, INTEL-FS SPIRAL 2 – CONTRACT SPECIAL PROVISIONS – Book II, Part III, NCI Agency
[INTEL-FS2-General-Provisions]	CO-14873-INTELFS2, INTEL-FS SPIRAL 2 – CONTRACT GENERAL PROVISIONS – Book II, Part III, NCI Agency
[NCIA AI TECH 06.03.01, 2016]	NATO Communications and Information Agency - Agency Instruction 06.03.01, "Identification of Software Assets", 2016.

1.9   Reference documents

[44]   Reference documents are documents providing contextual information that is relevant to this project. They shall be used by the Contractor to support his activity.

Table 1-2   Reference documents

[ADMP-1]	Guidance for Developing Dependability Requirements, Edition A, Version 1, 14 August 2014, NATO non-classified
[ADMP-2]	Guidance for Dependability In-Service, Edition A, Version 1, August 2014, NATO non-classified
[AIA/ASD SX000i, 2016]	International guide for the use of the S-Series Integrated Logistic Support (ILS) specifications (issue 1.1)
[ALP-10]	NATO Guidance on Integrated Logistics Support for Multinational Armament Programs
[ASD S3000L]	International Procedure Specification for Logistics Support Analysis (LSA), 2011
[C-M(2002)49-G]	Enclosure "G" to C-M(2002)49: Classified Project and Industrial Security, Amdt 12, Sep 2015
[DOORS]	IBM® Engineering Requirements Management DOORS, https://www.ibm.com/support/knowledgecenter/en/SSYQBZ_9.7.0/com.ibm.doors.requirements.doc/topics/c_welcome.html
[INTEL-FS2-InformationModel]	CO-14873-INTELFS2, INTEL-FS SPIRAL 2 – Information Model Book II - Part V, NCI Agency
[Jira]	Atlassian Jira, https://www.atlassian.com/software/jira
[MIL-HDBK-338B]	Electronic Reliability Design Handbook, US Department of Defense, 1 October 1998
[MIL-HDBK-470A]	Designing and Developing Maintainable Products and Systems, Volume 1, US Department of Defense, 4 August 1997
[MIL-STD-1388-1A]	Logistics Support Analysis, 11 April 1983
[MIL-STD-1388-2B]	Logistics Support Analysis Records, 28 March 1991
[MIL-STD-1629A]	Procedures for Performing A Failure Mode, Effects and Criticality Analysis (FMECA), 24 November 1980
[SOA-IdM]	CO-14176-SOA-IDM Service Oriented Architecture (SOA) and Identity Management (IdM) Platform – Wave 1, System Design Specification (SDS) and Interface Control Document (ICD), NCI Agency
[SonarQube]	SonarQube, https://www.sonarqube.org/

2   General Requirements

[45]   This section defines requirements that generally could be applied to acquisition of any software application for the NATO Bi-SC AIS.

2.1   Project Management Requirements

[46]   The goal of the Contractor's project management will be to guide the project through a controlled, well-managed, visible set of activities to achieve the desired results and, wherever possible, to eliminate problems and to ensure that those problems that do occur are identified early, assessed accurately, and resolved quickly in partnership with the Purchaser.

2.1.1   Project Management Office

[SOWG-1]   The Contractor shall establish and maintain a Project Management Office (PMO) to perform and manage all efforts necessary to discharge all his responsibilities under this Contract.

[SOWG-2]   The Contractor shall provide all necessary manpower and resources to conduct and support the management and administration of operations in order to meet the objectives of the project, including taking all reasonable steps to ensure continuity of personnel assigned to work on this project.

[SOWG-3]   The Contractor shall use PRINCE2 or a similar and internationally recognized Project Management standard for the direction, governance and management activities for the entire project.

[SOWG-4]   The personnel identified below shall be considered as Key Personnel in accordance with the Special Provisions of this Contract.
(1)   Project Manager;
(2)   Quality Assurance Manager;
(3)   Configuration Manager;
(4)   Technical Team (see section 3).

[SOWG-5]   Location of work: Unless otherwise specified by the Work Package or approved by the Purchaser, the main effort for this Project shall be carried out in the Contractor's premises.

[SOWG-6]   The Contractor's team shall be located together to enable agile execution of the work (e.g. conducting daily stand-up meetings).

2.1.1.1   Project Manager

[SOWG-7]   The Contractor shall designate a Project Manager (PM), who shall direct and co-ordinate the activities of the Contractor's project team.

[SOWG-8]   The Contractor's Project Manager shall be prepared at all times to present and discuss the status of Contract activities with the Purchaser's Project Manager, Contracting Officer, or Technical Lead.

[SOWG-9]   The Contractor`s Project Manager shall meet the following qualifications:
(1)   Have a master's degree in management, engineering, or business administration;
(2)   Have a formal certification through Project Management Institute or equivalent source, PRINCE 2 certified or equivalent;

(3)   Have seven years of experience in managing projects similar to this project in technical and financial scope;
(4)   Have a NATO SΞCRET clearance.

2.1.1.2 Quality Assurance Manager

[SOWG-10]   The Contractor shall designate a Quality Assurance Manager; who shall be responsible for all Quality Assurance Manager for activities under this Contract.

[SOWG-11]   The Quality Assurance Manager shall report to a separate manager within the Contractor's organisation at a level equivalent to or higher than the Project Manager.

[SOWG-12]   The Contractor's Quality Assurance Manager shall meet the following qualifications:
(1)   Have a bachelor's, or higher, degree in Computer Science, or related/ equivalent studies;
(2)   Have worked at least four years with quality control methods and tools;
(3)   Have worked at least four years with supporting system development and test projects;
(4)   Have a NATO SΞCRET clearance.

2.1.1.3 Configuration Manager

[SOWG-13]   The Contractor shall designate a Configuration Manager, who shall be responsible for all configuration activities conducted under this Contract.

[SOWG-14]   The Contractor's Configuration Manager shall meet the following qualifications:
(1)   3 years' experience as Configuration Manager in Projects of a similar nature, both in terms of the products to be delivered and the level of technicality;
(2)   Have a NATO SΞCRET clearance.

2.1.1.4 Other Key Roles

[47]   The required qualifications for other key roles in the Contractor's project team are defined in section 3 (Project-Specific Requirements)

2.1.2   Project Management

[SOWG-15]   The Contractor shall establish and maintain a Project Management Plan (PMP) as defined in section 2.5.2.1.

[SOWG-16]   The Contractor shall provide the initial baseline version of the PMP at the kick-off meeting and maintain it throughout the period of performance of the Contract.

[SOWG-17]   After approval by the Purchaser, the final version of the PMP shall be the official document against which the Contractor is expected to conduct the performance of the Contract.

[SOWG-18]   The approval of the PMP by the Purchaser signifies only that the Purchaser agrees to the Contractor's approach in meeting the requirements. This approval in no way relieves the Contractor from its responsibilities to meet the requirements stated in the Contract. The requirements of the Contract

supersede any statement in the PMP in case of any conflict, ambiguity or omission.

[SOWG-19]   The Contractor shall ensure that the Purchaser always have access to the latest version of the PMP, and that the PMP remains current throughout the duration of the Project to reflect the actual state of the Contractor's organisation and efforts.

2.1.3   Risk Management

[SOWG-20]   The Contractor shall establish a risk management process and perform risk management throughout the period of performance of this Contract.

[SOWG-21]   The Contractor shall document, update and maintain status of all risks in the Risk Register (see section 2.5.2.2).

[SOWG-22]   The Contractor shall update and maintain the Risk Register throughout the period of performance of the Contract.

2.1.4   Issue Management

[SOWG-23]   The Contractor shall establish and maintain a process for identifying, tracking, reviewing, reporting and resolving all project issues.

[SOWG-24]   The Contractor shall develop and maintain an Issue Register (see section 2.5.2.3) where all project issues are recorded and tracked regardless of their status.

[SOWG-25]   The Contractor shall use the Issue Register to track reported bugs in software previously delivered by the Contractor under this Contract.

[SOWG-26]   The Contractor shall update and maintain the Issue Register throughout the period of performance of the Contract.

[SOWG-27]   The Contractor shall ensure that the Purchaser always have access to the latest version of the Issue Register.

2.1.5   Configuration Management

[SOWG-28]   The Contractor shall be responsible for all necessary Configuration Management activities throughout the duration of the Contract.

[SOWG-29]   The Contractor shall establish and maintain a Configuration Management Plan (CMP) in compliance with section 2.5.2.4 that describes how the Contractor will implement Configuration Management within the project.

[SOWG-30]   All Contractor and Purchaser activities and milestones related to CM shall be identified and included in the Delivery Plans schedules (see section 2.5.3.1).

[SOWG-31]   The Contractor shall be responsible for the Configuration Status Accounting (CSA) and reporting for all CIs.

[SOWG-32]   Upon request from the Purchaser, the Contractor shall support configuration audits to demonstrate that the actual status of all CIs matches the state of CIs as registered in the CSA reports; this support shall include:
(1)   Providing the required baseline documentation;
(2)   Answering questions from the Purchaser's Auditor;
(3)   Summarizing the audit results in a Configuration Audit Report and providing this report the Purchaser's approval.

[SOWG-33]   The Contractor shall ensure that the Configuration Baselines and CIs are persistently stored, maintained and managed in the Configuration Management Database CMDB.

[SOWG-34]   The Contractor shall keep the CMDB consistent and updated throughout the duration of the project.

[SOWG-35]   The Contractor shall before FSA conduct a handover of a fully populated CMDB instance (including the full history of all changes to the CIs) to the Purchaser.

[SOWG-36]   The Contractor shall solve any deficiencies found during the Configuration Management Audits within the agreed timeframe and update the baseline accordingly.

2.1.5.1 Configuration Management (CM) Database (CMDB) and CM Tools

[SOWG-37]   The Contractor shall establish and maintain a CMDB that persists the Configuration Items (CIs) attributes, (inter-) relationships/ dependencies, and Configuration Baselines.

[SOWG-38]   The CMDB and CM Tools shall to the maximum extent possible integrate with, or use, the Azure DevOps tools provided within the NSF.

[SOWG-39]   The CMDB and CM Tools shall to the maximum extent possible support DevOps practices and integrate with tools used for automated deployment to production where such deployment scripts also are managed as CIs.

[SOWG-40]   Each CI in the CMDB shall be assigned a unique identifier.

[SOWG-41]   The CIs in the CMDB shall be organized around working and executable software units (e.g. applications or executable services).

[SOWG-42]   The top-level CIs in the CMDB shall be broken down into a tree/ hierarchy of its parts and sub-parts consisting of deliverables, the relevant documentation of these deliverables, all dependent third party components and libraries and respective documentation.

[SOWG-43]   The CMDB shall have support for tracing higher and subordinate CIs using CI identifiers or other CI attributes.

[SOWG-44]   It shall be possible from the CMDB, at any time, to generate Configuration Status Reports for any specified baseline where the report provides a full history on all CIs in the baseline including information on changes, deviations/ waivers, releases, etc.

[SOWG-45]   The CMDB/ CM Tools shall support generation of Configuration Status Accounting (CSA) Reports in two different formats:
(1)   Readable document format (either in PDF or Microsoft Word format);
(2)   XML format in accordance with a Contractor proposed XML schema.

[SOWG-46]   A baseline in the CMDB shall:
(1)   Be defined by version controlled artefacts that all resides in the proper repositories in the NSF;
(2)   Include (off-the-shelf) software and (off-the-self) software license(s) where all software license(s) shall be registered with the NCI Agency as the end-user;
(3)   Include all (supporting) documentation, e.g. off-the-shelf OEM manuals, operations and maintenance support documentation, training

documentation, quality assurance documentation, security documentation, configuration management documentation, and warranty documentation.

[SOWG-47]   The CMDB shall implement support for baselining of Configuration Items (CIs) into the Functional Baseline (FBL), Allocated Baseline (ABL), and Product Baseline (PBL).

[SOWG-48]   It shall be possible from the CMDB and CM Tools to generate a package (as one or several electronic files) with all the artefacts included in a PBL release.

[SOWG-49]   The Contractor's PBL version numbering strategy shall be compliant with [NCIA AI TECH 06.03.01, 2015].

[SOWG-50]   The Contractor shall not use any names that can be associated with the Contractor (e.g. company name) on any of the developed software artefacts (i.e. file names, class names, XML namespaces, etc.)

[SOWG-51]   The CM Tools using the CMDB shall have support for comparison of baselines and precisely identify the changes to the individual items from one baseline to the other (including versions of third-party software components and libraries).

2.1.5.2   Engineering Change Proposals (ECP)

[48]   The ECPs can be categorized by type and class as defined in Table 2-1

Table 2-1   ECP type and class

Type	Class	Definition
NP (New Product)	I	The development of a new capability in order to implement functionalities to meet new requirements.
PE (Product Enhancement)	I	The addition or modification of functionalities to existing capabilities to meet changing requirements (change in the fit-for-purpose).
PC (Product Correction)	I or II	The correction of existing capabilities in order to maintain their functionalities to meet existing requirements (change in the fit-for-use).
DC (Documentation Change)	II	The correction or improvement of documentation. This type of ECP does not affect any other configuration item type.

[SOWG-52]   The Contractor shall prepare and process the ECP for engineering, design, or development changes.

[SOWG-53]   The Contractor shall use the configuration control procedures specified in the CMP for the preparation and processing of ECPs.

[SOWG-54]   The Contractor shall use the ECP format as defined in the CMP when submitting ECPs.

[SOWG-55]   The Contractor shall in the ECP:
(1)   Include a unique ECP reference number;
(2)   Describe the rationale for the change;
(3)   Describe the nature of the change (Deletion, Modification, or Addition);

(4) Describe what impact the change will have on the delivered capability's cost, schedule, scope, and/or performance (this description shall include any trade-offs that shall be considered);

(5) Identify the SOW and SRS section(s) affected;

(6) Include, or reference, an updated Solution Decision Document (SDD), see section 2.5.3.2, that records the analysis and options considered for the proposed change;

(7) Propose a Priority and a Schedule for the change;

(8) Propose a Classification for the change (as either Class I or Class II ECPs as defined in Table 2-1).

[SOWG-56]   Class I ECPs shall have to be mutually agreed upon by the Contractor and Purchaser.

[SOWG-57]   The Contractor shall submit all Class II ECPs to the Purchaser for review and classification concurrence before starting implementation of the change.

[SOWG-58]   The Contractor shall, after the Purchaser's approval of the ECP, update the SDD with a reference to the Purchaser-approved ECP.

[SOWG-59]   Where a change affects more than one document, or affects documents previously approved and delivered, the Contractor shall update and properly reflect the change in all baseline documents affected by that change.

[SOWG-60]   The Contractor shall place all submitted ECPs under configuration control.

2.1.5.3 Requesting Deviations/ Waivers

[49]   A Request for Deviation (RFD) is defined as "planned departure" from a specific requirement where "departure" defined as the "inability of a product to meet one of its functional performance or technical requirements".

[50]   A Request for Waiver (RFW) is defined as "unplanned departure" from a specific requirement.

[SOWG-61]   If required, the Contractor shall submit RFDs/ RFWs for Purchaser's approval.

[SOWG-62]   The Contractor shall be aware that permanent departures from contractual requirements shall be accomplished by ECP action rather than by RFD.

[SOWG-63]   The Contractor shall use the RFD/ RFW format as defined in the CMP when submitting RFDs/ RFWs.

[SOWG-64]   The Contractor shall in the RFD/ RFW:
(1) Include a unique reference number;
(2) Identify the requirement that cannot be fully met (to include references to the affected CLIN in the SSS and the requirement(s) in the SRS);
(3) Describe what impact the departure will have on cost, schedule, ILS, scope, and/or performance;
(4) Description of the deviation/ waiver;
(5) Justify the departure from the specific requirement.

[SOWG-65]   The Contractor shall place all submitted RFDs/ RFWs under configuration control.

2.1.5.4 Deficiency Reporting

[SOWG-66]   The Contractor shall establish and maintain a process for reporting, tracking, and resolving deficiencies.

[SOWG-67]   The Contractor shall use Deficiency Reports (DRs) to document problems during the design, configuration, implementation, or operation of the system.

[SOWG-68]   The Contractor shall close out DRs after the identified problem is resolved.

[SOWG-69]   The Contractor shall place all DRs under configuration control.

2.1.6 Security Aspects

[51]   Security aspects relevant to the Contractor's work are defined in the Contract Special Provisions (see [INTEL-FS2-Special-Provisions]) document and in the Contract General Provisions document (see [INTEL-FS2-General-Provisions]). This section identifies additional security oriented requirements related to the execution of the Contractor's work.

[SOWG-70]   The Contractor shall ensure that all software implementation activities in the NSF is kept at NATO UNCLASSIFIED level.

2.2 Quality Assurance (QA) Requirements

[SOWG-71]   The Contractor shall comply with the requirements as defined [AQAP-2110].

[SOWG-72]   The Contractor shall provide a Quality Plan (QP) as defined by [AQAP-2110] to the Purchaser.

[SOWG-73]   The Contractor shall manage the QP as a living document subject to revision/update, as required.

2.2.1 Audits

[52]   The Purchaser reserves the right to perform Reviews and Quality audits at any of the Contractor (or Sub-Contractor(s)) facilities.

[53]   Audit activities at Sub-supplier's facilities do not relieve the Contractor and Subcontractors from any contractual quality responsibilities.

[SOWG-74]   The Contractor shall fully support the Purchaser in performing Reviews and Quality audits at any of the Contractor (or Sub-Contractor(s)) facilities activities and in particular:
(1)   Host inspection visits by Purchaser's auditors;
(2)   Make himself available for answering questions and furnishing information related to the project;
(3)   Allow the Purchaser's auditors to inspect and monitor the Contractor's processes applicable to this project.

[SOWG-75]   The Contractor shall transfer to the Purchaser's auditors all information deemed necessary to perform the activities, on his own initiative or on request by Purchaser's auditors.

2.3   Integrated Logistics Support (ILS) Requirements

2.3.1   General

[SOWG-76]   [The Contractor activities and milestones related to ILS shall be identified and included in the WP Delivery Plans.

[SOWG-77]   The Contractor shall use the [ALP 10-2016] and [AIA/ASD SX000i, 2016] specification as guidance when establishing and conducting the ILS Process (i.e. Integrated Logistics Support – ILS Process), in accordance with the requirements of the contract.

[SOWG-78]   The Contractor shall use [ADMP-1], [ADMP-2], [MIL-HDBK-338B], [MIL-HDBK-470A], [MIL-STD-1388-1A], [MIL-STD-1388-2B] and [ASD S3000L] as guidance when establishing and conducting the Logistic Support Analysis (LSA) programme, including the Reliability, Availability, Maintainability and Testability (RAMT) programme, in accordance with the requirements of the Contract.

[SOWG-79]   All ILS related deliverables and activities shall be aligned with the incremental delivery approach of the project, and be delivered as required.

2.3.2   Integrated Logistics Support Plan (ILSP)

[SOWG-80]   The Contractor shall provide and maintain an ILSP, tailored to the project and in accordance with the requirements of this section.

[SOWG-81]   The Contractor shall detail in the ILSP how ILS will be designed, managed, procured and provided throughout the system lifetime.

[SOWG-82]   The Contractor shall provide an updated version of the ILSP to the Purchaser for each milestone for Purchaser acceptance, and update it as required to reflect the changes in baselines.

[SOWG-83]   The Contractor shall cover the following sections at minimum including the processes to perform the related activities in ILSP:
(1)   The Contractor's ILS organization, roles, responsibilities and procedures;
(2)   Maintenance Concept (Maintenance Plan, detailed Maintenance Level definitions and tasks);
(3)   Planning of supply support (System Inventory, Codification, Recommended Spare Parts and Consumables list);
(4)   Design Influence:
   (a) RAMT Programme planning, activities, processes;
   (b) Logistics Support Analysis planning, activities and processes;
   (c) Support Case planning, releases and processes.
(5)   Support and Test Equipment Lists;
(6)   Computer Resources (licences, SWDL etc.);
(7)   Manpower and Personnel Requirements;
(8)   Technical Documentation (organization, process, inputs, reviews, release schedule);
(9)   Planning of packaging, handling, storage, and transportation (PHS&T);
(10)   Planning of supply chain security;
(11)   In-Service Support Plan (ISSP).

[SOWG-84]   The Contractor shall provide an In Service Support Plan (ISSP) as an annex to the ILSP and the ISSP shall cover the following topics at minimum with practical instructions:

(1)   The Contractor's Support organization, roles, responsibilities, processes and procedures (until FSA; during warranty and optional support period);

(2)   Description of the system of interest (SOI) in scope of integrated support,

(3)   Description of the integrated support concept, including the maintenance concept, warranty concept, customer support concept, service management & control concept including but not limited to the incident, problem management, release and deployment management, and configuration and change management;

(4)   Description of the parties involved, their responsibilities for the various levels of support (with indication of start and end dates), interfaces, response times and POC details;

(5)   Description and allocation of operation, SM&C and corrective and preventive maintenance tasks required to operate and maintain the system;

(6)   Description of the Sustainability measures (obsolescence management, failure reporting, performance monitoring, reliability and availability assessment and reporting);

(7)   Procedures to follow when any part of the system fails; response times for analyses and resolution by the Contractor;

(8)   Comprehensive lists (as applicable) of all available software licenses (SWDL), support software tools, COTS documentation, technical documentation, training documentation and manuals;

(9)   Description of services during optional Contractor Logistics Support (CLS) period.

[SOWG-85]   The Contractor shall provide the latest ISSP as part of each release and finally before FSA milestone achievement.

2.3.3 Maintenance and support concept

2.3.3.1 Definitions

[54]   <u>Level of Support</u>: Level of support indicates a specific extent of technical assistance in the total range of assistance that is provided by an information technology product to its customer. The Service management is divided in three different level of service, which interface each other, in order to activate the proper level of maintenance in accordance with the event (incident) happened on the system.

[55]   <u>Level of Maintenance</u>: are various echelons at which maintenance tasks are performed on systems and equipment. The levels are distinguished by the relative sophistication of skills, facilities and equipment available at them. Thus, although typically associated with specific organisations and/or geographic locations, in their purest form, the individual maintenance levels denote differences in inherent complexity of maintenance capability.

[56]   <u>First Level Support Process</u>: implements the Incident Management process in accordance with the ISO/IEC 20000 and Information Technology Infrastructure Library (ITIL) framework or equivalent; As part of the Incident Management, the Service Desk receives the issue from the user, puts it into a standard format

(Trouble Ticket (TT)), performs an initial assessment and distributes it to the predefined actors to solve it

[57]   Second Level Support Process: implements the Problem Management process in accordance with the ISO/IEC 20000 and ITIL framework or equivalent. The Problem Management process receives the TT from the Service Desk and performs the following tasks (not limited to):
(1)   (Re-)evaluation of TT category, criticality and priority,
(2)   Identification of the root cause of the issue (e.g. by issue replication testing),
(3)   Identification of workarounds,
(4)   Identification and initial planning of possible short, medium and long-term solutions (e.g. workarounds, patches, or new baseline or CI releases),
(5)   Create Problem Analysis Report and Change Request incl. schedule of implementation, and synchronisation with the Baseline Maintenance process;
(6)   Presentation of the Problem Analysis Report and Change Request to the Change Control Board (CCB) for approval,
(7)   Monitor and Control the approved Change Request during implementation,
(8)   Trigger 3rd Level Support and/or 3rd Level Maintenance process to implement the Change Request, in case the incident cannot be solved at 2nd level;
(9)   Perform the post- Change Request implementation review.

[58]   Third Level Support Process: implements the Deployment and Release Management process in accordance with the ISO/IEC 20000 and ITIL framework or equivalent. The Deployment and Release Management process receives the approved Change Request from the 2nd Level Support and performs the following tasks (not limited to):
a.   Activating Level 3 maintenance when new solutions shall be developed;
b.   Development of the solution (e.g. new CI Fix, Repair, Replacement, Patch, or Release);
c.   Testing of the solution (e.g. Regression testing, issue/deficiency replication testing);
d.   Update of baseline content and status;
e.   Release of the solution (release unit/record);
f.   Delivery and deployment of the solution.

[59]   First Level of Maintenance: It is responsible for the very basic maintenance activities. It is responsible to activate the second level of maintenance when it is needed. It implements the initial preventive Maintenance procedures and any additional Service/Capability and/or site specific procedures that are defined in the corresponding O&M Manual. All 1st Level Maintenance procedures do not require specialised tools and/or specialised personnel.

[60]   Second Level of Maintenance: It is responsible of isolation and resolution of system-level maintenance and management of deficiency reports and repair. It is responsible to activate the third level of maintenance when it is needed. It implements the initial preventive Maintenance procedures and any additional Service/Capability and/or site specific procedures that are defined in the corresponding Manual. All 2nd Level Maintenance procedures do not require specialised tools and/or specialised personnel.

[61]   Third Level of Maintenance: It is responsible of any support that involves a change to the system baseline, such as software patches or new releases. It is responsible of specialised hardware repair, if applicable. Third level maintenance is activated by third level support and can be initiated either to define the solution to a problem (corrective maintenance) or to maintain up to date software configuration (adaptive

maintenance following changes to the underpinning hardware, firmware and software environment) e.g. security patches, operating system upgrades, minor software configuration changes due to operational/interface needs. It implements the initial preventive Maintenance procedures and any additional Service/Capability and/ or site specific procedures that are defined in the corresponding Manual. 3rd Level Maintenance procedures can require specialised tools and/ or Personnel

[62]   Fourth Level of Maintenance: It is the hardware vendor or the software original developer. It is activated from the 3rd level of maintenance only when it is needed.

2.3.3.2 General Requirements

[SOWG-86]   The Contractor shall develop and maintain the Maintenance and Support Concept that defines the maintenance and support environment, constraints, locations, procedures, artefacts, roles and responsibilities (Responsible, Accountable, Consulted and Informed (RACI), organisation and personnel skills to maintain the Delivered baselines.

[SOWG-87]   The Contractor shall design/deliver the system/elements and the Operation/Support/Maintenance documentation, training (when applicable), instructions, and resources (skills, tools/test equipment) in order to allow the Purchaser to fully operate the system, to perform Level 1, Level 2 and Level 3 Maintenance and Support from the first SW release.

[SOWG-88]   Until FSA, the Contractor shall be responsible for the Level 2, Level 3 and Level 4 maintenance and support activities for the releases.

[SOWG-89]   Starting from FSA and until the end of warranty period, all maintenance activities beyond Purchaser capabilities/skills (Level 3 and Level 4 maintenance) required to restore the System from a critical failure shall be carried on by the Contractor by dedicated on-site interventions and/or off-site resolutions.

[SOWG-90]   The Contractor shall ensure the Maintenance and Support Concept refers to the functional and non-functional Requirements of the System.

[SOWG-91]   The Contractor shall define the 2nd and 3rd Level Support process interfaces to the other processes, including the existing NCIA Service Desk (1st Level of Support) and various NATO locations, organisations.

[SOWG-92]   The Contractor shall ensure the process interface definition includes the input and output information, its structure, the communication path (i.e., Points of Contact (POC)), the time constraints for sending and receiving information, and quality criteria to evaluate the integrity of the interface. This shall include the related ITIL Processes to be tailored and detailed for the purposes of Support Concept.

2.3.4 Design Influence

2.3.4.1 Reliability, Availability, and Maintainability (RAM) Requirements

[SOWG-93]   The Contractor shall develop its RAM Programme and perform the analysis based on the RAM metrics and requirements outlined in the SRS.

[SOWG-94]   The Contractor shall ensure the design of the system includes sufficient redundancy and other Reliability, Maintainability, Availability and Testability measures to ensure the RAM requirements in this Contract are achieved and attained at an optimal Total Cost of Ownership (TCO), minimising preventive

maintenance, manpower requirement and usage of special-to-type tools and test equipment.

[SOWG-95]   The RAM analysis shall clearly capture and display the RAM characteristics of each main component, aggregated up to the level of sub-system, and subsequently the entire system. System breakdown in line with the configuration item structure shall be used as reference to perform the analysis.

[SOWG-96]   The RAM analysis shall include the reliability prediction based on the proposed design solution and created Reliability Block Diagrams (RBD), as well as the reliability allocation model to include to trigger the design changes

[SOWG-97]   The RAM analysis shall include Failure Modes, Effects and Criticality Analysis (FMECA) in accordance with [MIL-STD-1629A].

[SOWG-98]   The Contractor shall ensure that the first issue RAM analysis is performed and delivered for each increment, to include all relevant data to demonstrate compliance with the SRS and SOW requirements. Such data shall be documented in the Support Case as outlined below.

2.3.4.2 Logistics Support Analysis (LSA)

[SOWG-99]   The Contractor shall conduct a Logistic Support Analysis (LSA) Process, tailored to support the specific scope of the System operation activities.

[SOWG-100]   The Contractor's LSA analysis shall include, as a minimum:
(1)   Task Analysis for identification of operational tasks, SM&C tasks, administration and maintenance tasks (corrective, preventive, adaptive)
(2)   Planning and execution of the O&M Procedures Verification Test with references to the Master Test Plan.
(3)   Total Cost of Ownership Analysis, which shall include the warranty cost and all the operational costs and all the maintenance cost for all the support and Maintenance levels for at least 5 years after FSA

[SOWG-101]   The Contractor shall ensure that Operation tasks are identified through analysis of the functional and non-functional requirements of the new system taking into account mission scenarios and conditions under which the system will be operated.

[SOWG-102]   The Contractor shall ensure that maintenance tasks are identified using the RAM data and results.

[SOWG-103]   For each task in Task Analysis, the Contractor shall determine the properties and physical resources required to execute the task. For that purpose, each task shall be analysed to identify and capture:
(1)   The support level to be assigned;
(2)   Location/ facility involved;
(3)   Personnel skills required;
(4)   Roles;
(5)   Task duration and frequency, reusing Mean Time Between Failures (MTBF) and Mean Time To Repair (MTTR) data available;

[SOWG-104]   The Contractor shall ensure the data and results of the Task Analysis are used as input to the development of technical publications and the development of training material.

2.3.4.3 Support Case

[SOWG-105]   The Contractor shall develop and maintain the necessary Support Cases in which all LSA and RAM activities shall be documented. The Support Case shall include:

(1)   System description and breakdown down to lowest level of maintenance significant items and in accordance with the CI structure and identifications;

(2)   All COTS equipment datasheets, clearly indicating the reliability and maintainability characteristics which will be used as input for LSA and RAM;

(3)   Availability, Reliability, and Maintainability analysis modelling, calculations and results (complete set of RBDs, FMECA including a list of critical items);

(4)   The complete data set of the Task Analysis, including listings of all operation tasks, administrative tasks, corrective maintenance tasks and preventive maintenance tasks;

(5)   References to deliverable test plans and other relevant testing documentation for RAM requirements verification and validation;

(6)   The results from the O&M Task Procedures Verification Test.

[SOWG-106]   The Contractor's Support Case shall form a body of evidence, providing justification for all data used and sufficient credibility that all LSA and RAM requirements outlined in SOW and SRS have been met by providing credibility to the data used and the results achieved in all calculations and models.

[SOWG-107]   The Contractor shall ensure that the Support Case is delivered before the completion of each increment in accordance with the scope, to include all relevant data to demonstrate compliance with the SRS and SOW requirements.

2.3.5   Training

2.3.5.1 Training Plan

[SOWG-108]   The Contractor shall develop and provide a Training Plan that describes how the Training requirements outlined in this Contract will be met.

[SOWG-109]   The Contractor shall describe in this plan the approach to training, milestones, organization and resource requirements, management structure, interrelationships and other tasks related for training development.

[SOWG-110]   The Contractor shall develop and provide a Training Plan that describes the training documentation for each course including but not limited to the syllabuses, schedules, course prerequisites (both for attendees and physical resources), course descriptions and training materials, method of evaluations (if applicable) and instructors.

[SOWG-111]   The Contractor's Training Plan shall describe the requirement to perform the training in a physical classroom at Purchaser locations, or requirements for performing the training in a virtual classroom as remote training sessions.

[SOWG-112]   The Training Plan shall define training modules and/ or courses required to enable all initially assigned Purchaser personnel to maintain the system at Level 1, 2 and 3, see also [SOWG-229] in section 2.4.5.2.7.

2.3.5.2 Training Material

[SOWG-113]   Each training course material shall be provided for Purchaser review minimum 8 weeks before the start of the training courses.

[SOWG-114]   The Contractor shall generate the following Training Material:
(1)   Training syllabus;
(2)   Student manual;
(3)   Instructor guide and material;
(4)   Learning guide;
(5)   Quick reference card.

[SOWG-115]   The Contractor shall include, in the Training presentation materials, all slides/ information to be presented by the instructor during the course.

2.3.5.3 Training the Purchaser's O&M team

[SOWG-116]   The Contractor shall provide all training modules and courses required to enable Purchaser's O&M personnel to maintain the system at Level 1, 2 and 3.

[SOWG-117]   The training courses shall cover all aspects of the Maintenance and Administration Manual (MAM), see section 2.5.4.4.

[SOWG-118]   The Contractor shall provide all the appropriate training documentation to support the Purchaser O&M personnel to test, operate and maintain the system.

[SOWG-119]   The training of the Purchaser's O&M team shall be conducted one time before each release of new Contractor provided software to production. I.e. the Contractor shall deliver this type of training as many times as the Contractor delivered software is made ready for deployment to production.

[SOWG-120]   The training shall normally take place in person at the Purchaser's premises (in the Netherlands or in Belgium at the discretion of the Purchaser), but a video conference might be acceptable.

2.3.6 Supply Support

2.3.6.1 System Inventory

[SOWG-121]   The Contractor shall provide the Purchaser's ILS POC with a System Inventory in electronic Microsoft Excel format at least 14 (fourteen) calendar days before each software release.

[SOWG-122]   The System Inventory shall include, in separate chapters, all items furnished under this Contract, as follows and as applicable:
(1)   All SW artefacts – i.e. all SW tools, SW test equipment, etc.;
(2)   All Purchaser Furnished Items (PFI);
(3)   All documentation, such as manuals, handbooks and drawings;
(4)   All training materials.

[SOWG-123]   Additionally, the Contractor shall provide a detailed Software Distribution List (SWDL), which shall detail comprehensively all CSCIs and associated software, firmware or feature/performance licenses provided under this Contract. The SWDL shall include, the following data elements:
(1)   CSCI identification number;
(2)   Nomenclature;

(3)   Version number;
(4)   License key (if applicable);
(5)   License renewal date (if applicable);
(6)   Warranty expiration date;
(7)   Date of distribution.

[SOWG-124]   The Contractor shall make sure that all licenses are registered with the NCI Agency as end-user.

2.3.6.2 Physical labelling (if applicable)

[SOWG-125]   In case hardware (CD, USB, memory stick, hard drive etc.) is used to deliver or transfer the software by the Contractor, then this hardware shall be physically labelled with the contract information, CLIN, identification, release date and security classification. The label shall be durable and non-erasable to ensure proper identification is warranted at all times.

2.3.6.3 SW shipment (if applicable)

[63]   Note: As all software should be developed in the NSF, the two following requirements only apply to software developed outside of the NSF.

[SOWG-126]   Unless clearly specified otherwise, the Contractor shall be responsible for the delivery of Installation packages (physical/electronic media) of all SW, firmware and modifications provided under this Contract from Contractor's premises to the respective implementation destination.

[SOWG-127]   14 (fourteen) calendar days before each delivery of supplies, the Contractor shall provide the Purchaser with a Notice of Delivery comprising the following details:
(1)   Shipment Date;
(2)   Purchaser Contract Number;
(3)   CLIN;
(4)   Consignor's and Consignee's name and address;
(5)   Number and type of Installation media and/or Packages/Containers;
(6)   Number of 302 Forms used (if applicable).

2.3.6.4 Customs

[SOWG-128]   The Contractor shall be responsible for customs clearance and/or export licences of all deliveries into their destination countries. It is the Contractor's responsibility to take into account delays at customs. The Contractor shall therefore consider eventual delays and arrange for shipment in time. Under no circumstances can the Purchaser be held responsible for delays incurred, even when utilising Purchaser provided Customs Form 302 (if applicable).

2.3.7 Warranty Requirements

[SOWG-129]   The Contractor shall warrant that all software furnished under this Contract and all installation work performed under this Contract conform to the requirements and is free of any defect in code or workmanship for a period starting at date of Final System Acceptance (FSA) to date of FSA plus one (1) year.

[SOWG-130]   The Contractor shall support the system as part of the project implementation scope from the first site activation until FSA milestone is

successfully completed. During this period, the Contractor shall provide on-site and off-site maintenance and support services as required.

[SOWG-131] The Contractor shall integrate the 3rd Level Maintenance and Support services within its warranty services, to be provided off-site from the Contractor's premises or on-site from the Purchaser premises, as required due to the corrections in SW. If the on-site Level 3 support is requested by the Purchaser for additional technical support or due to the changes in SW environment without any reported SW deficiency, then the Contractor shall provide this on-site support up to 6 times a year without any additional cost to the Purchaser.

[SOWG-132] The Contractor shall provide a specific Customer POC for all warranty and support requests. The Contractor shall detail all the warranty and support requirements in its ISSP including the roles and responsibilities.

[SOWG-133] The Contractor shall ensure that the warranty conditions remain valid even if the software is relocated/ redeployed to an equivalent platform during the warranty period. The "equivalent platform" will have the same amount, or better, computing resources (CPU, memory, and storage capacity), the same operating system, and a version of the Platform as a Service (PaaS) that is the same or backward compatible with the previous version of the PaaS.

[SOWG-134] The Contractor shall fix all software defects as per the Contractor's internal procedures with the highest priority allocated. The Contractor shall provide the workaround within maximum 3 business days and the fixed solution within 20 business days after the Purchaser has provided the failure notification in written. The Contractor shall follow the Configuration and Change Management processes before the release of each fix. For this purpose the Contractor shall identify the changes, propose to the Purchaser, perform the test activities required and perform the Release Management activities.

[SOWG-135] The Contractor shall provide 3rd Level maintenance, when requested by the Purchaser, to define the solution to a problem (corrective maintenance) or to maintain up to date software configuration (adaptive maintenance following Purchaser's changes to the underpinning hardware, firmware and software environment e.g. security patches, operating system upgrades, minor software configuration changes due to operational/interface needs).

[SOWG-136] If the Contractor becomes aware at any time before acceptance by the Purchaser that a defect exists in any Contract deliverables, the Contractor shall coordinate with the Purchaser and promptly correct the defect.

[SOWG-137] During the warranty period, the Contractor shall be responsible for supplying all COTS software upgrades and updates.

[SOWG-138] The availability of COTS software upgrades and updates shall be made known to the Purchaser and, if proposed for introduction by the Contractor (including any corrective action for an identified fault), shall always be subject to Purchaser approval. The Contractor shall support the Purchaser to update the CMDB with information on all changes made to CIs in the warranty period.

[SOWG-139] The Contractor shall provide Technical Assistance, during business hours between 08.30-17.30 CET, to the Purchaser or his representatives during the

warranty period. Technical assistance information details shall be indicated in the ISSP.

[SOWG-140]   The Technical Assistance shall provide on-call support in English for requests that correspond to information demands limited to the perimeter of delivered products, evolution proposals, problem reports, or any information needed by the Purchaser or its representatives, which are not included in the supplied technical documentation. The Contractor shall not be responsible for the correction of defects in Purchaser furnished property, except for defects in installation, unless the Contractor performs, or is obligated to perform, any modifications or other work on such property. In the event described above, the Contractor shall be responsible for correction of defects that result from the modifications or other work.

2.3.7.1 COTS Component Warranty Requirements

[SOWG-141]   The contractor shall warrant the COTS Software components warranty whose duration shall be consistent with the identified Warranty Period.

[SOWG-142]   The Contractor shall coordinate the COTS Software warranty activation with the Purchaser in order to facilitate the system's handover to the Service Provision Authority.

2.3.7.2 Developed Components Warranty Requirements

[SOWG-143]   The Contractor shall be able to extend the warranty for a further period based on Purchaser's request.

[SOWG-144]   The price of the extended warranty shall be consistent with the bid prices, and shall be negotiated at the time of extension.

[SOWG-145]   The Extended warranty shall provide the same coverage as the original warranty and guarantee of the reliability of the Software Component under conditions of ordinary use.

2.4   Work Execution Requirements

2.4.1   NATO Software Factory (NSF)

[64]   The NCI Agency is moving towards a short-cycle capability development approach embracing a high degree of componentization and reuse through services, leading to composite capabilities with a much shorter time to in-service value, cost optimization and transparency. The approach makes use of standardized software engineering processes and common tooling in a test and development cloud DevSecOps Platform (the NSF) shared by NCI Agency, Industry and potentially by Nations.

[65]   The NSF toolchain includes a number of tools that the Contractor can make use of in execution of this work including:
(1)   Azure DevOps
(2)   GitLab
(3)   Jira
(4)   Jenkins
(5)   Nexus
(6)   SonarCube

[SOWG-146]   The Contractor shall, unless otherwise agreed with Purchaser, use the NSF as the platform for all software engineering, implementation work, and testing (including system integration testing).

[SOWG-147]   As the Contractor can only create and maintain engineering artefact at unclassified level on the NSF, the Contractor shall
(1)   On occasions be able to use mock data values (e.g. mock domain values) and/ or data structures to enable work at unclassified level;
(2)   For any module/ component where it is not feasible to do work at unclassified level (using mock data is not feasible), be able to do the work in Contractor's own secure software engineering environment at NATO RΞSTRICTED level.

[SOWG-148]   The Contractor shall when feasible use existing NSF tooling (see list above) for managing the project engineering artefacts. The Contractor may propose additional tooling for managing engineering artefacts on the NSF for Purchaser's approval.

[SOWG-149]   The Contractor shall organize the engineering artefacts in a structured and logical way that will enable the Purchaser to quickly find any artefacts based on context (e.g. work package, increment/ deliverable, etc.) and artefact type.

2.4.2   Meetings – General Requirements

[SOWG-150]   Meetings and phone calls shall be conducted in English.

[SOWG-151]   Unless otherwise specified, at least one week before all meetings required under this Contract, the Contractor shall send an invitation, including:
(1)   Purpose;
(2)   Agenda;
(3)   List of participants;
(4)   Date, hour, place, duration.

[SOWG-152]   The Contractor shall record meeting minutes and provide the minutes to the Purchaser within 3 working days.

[SOWG-153]   The Minutes shall include:
(1)   Date, place, and time of the meeting;
(2)   Purpose of the meeting;
(3)   Name of participants;
(4)   Approval of previous meeting's minutes and all resolutions
(5)   Record of principle points discussed, actions taken, and decisions made;
(6)   Copies of materials distributed at the meeting.

[SOWG-154]   The minutes shall not be used as a mechanism to change the terms, conditions or specifications of the Contract nor as a vehicle to alter the design or configuration of equipment or systems. Such changes shall only be made by agreement, amendment or by authorized mechanisms as set forth in the Contract.

[SOWG-155]   If meeting facilities at a Purchaser location are not available at the specified Purchaser location in the time frame required to support an in-person meeting, the Contractor shall:

(1)   Reschedule the meeting to such time as meeting facilities are available at the Purchaser location, with no further adjustment to schedule or cost; or

(2)   Provide suitable meeting facilities (e.g., hotel meeting facility) for the meeting/review at no additional cost to the Purchaser; or

(3)   Arrange to host the meeting at the Contractor's facility. This facility shall be provided at no additional cost to the Purchaser.

2.4.3   Kick-Off Meeting

[66]   The Purchaser will prior to the Kick-Off Meeting provide the initial MoSCoW prioritization to all the requirements as defined in the SRS. Note: The periodization is used in this contract for scheduling reasons. I.e. at the end of the project all requirements are expected to be fulfilled.

[67]   The MoSCoW priorities for the WP requirements will be updated at regular interval based on the performance and progress of the work delivered by the Contractor.

[68]   The preparation for and the conduct of the Kick-Off meeting is depicted in Figure 2-1.

[SOWG-156]   The Contractor's key personnel shall meet with the Purchaser's Project Manager no later than 1 month after efficient date of contract (EDC). The meeting will normally take place in person at the Purchaser's facility (either The Hague-Netherlands, Brussels-Belgium or Mons-Belgium, at the discretion of the Purchaser), but a video conference might be acceptable.

[SOWG-157]   The Contractor shall one week prior to the meeting submit to the Purchaser:
(1)   The Project Management Plan (see 2.5.2.1);
(2)   The initial WP Delivery Plans for all of the project work packages (see 2.5.3) that as a minimum shall include the work breakdown structure (WBS) and schedules (see section 2.5.3.1);
(3)   The Risk Register (see 2.5.2.2);
(4)   The Issue Register (see 2.5.2.3).

[SOWG-158]   The Contractor shall be prepared to present the Project Management Plan, the initial WP Delivery Plans for all of the project work packages, the Risk Register, and the Issue Register.

[SOWG-159]   The initial WP Delivery Plans shall include:
(1)   A plan to deliver all requirements as defined in the SRS;
(2)   The start and end time of all work packages where the Contractor's schedule shall be in accordance with the Contractor's bid. Note: This initial schedule will be the basis for progress and performance monitoring. The Purchaser may agree to schedule adjustments and re-baselining progress and performance monitoring milestones at WP start-up pending these adjustment are justifiable.

[69]   The Purchaser will review the PMP for concerns (for instance unacceptable replacement of key personnel where the replacement personnel does not have the skill sets compliant with the requirements set forth in this SOW). If there are concerns with the PMP, then the Purchaser will not give the Contractor the permission to proceed.

[70]   The Purchaser will provide feedback to the Contractor on the WBS and schedule.

[71]   The Purchaser will review the Risk Register and the Issue Register for concerns to the execution of the contract. If the registers are properly initialized with acceptable

risks and manageable issues and contains appropriate mitigation/ action plans, the Purchaser will give Contractor permission to proceed.

[SOWG-160]   The Contractor shall verify that the Contractor's key personnel (in particular the SW developers) have access to the NSF.

Figure 2-1   Kick-Off Meeting
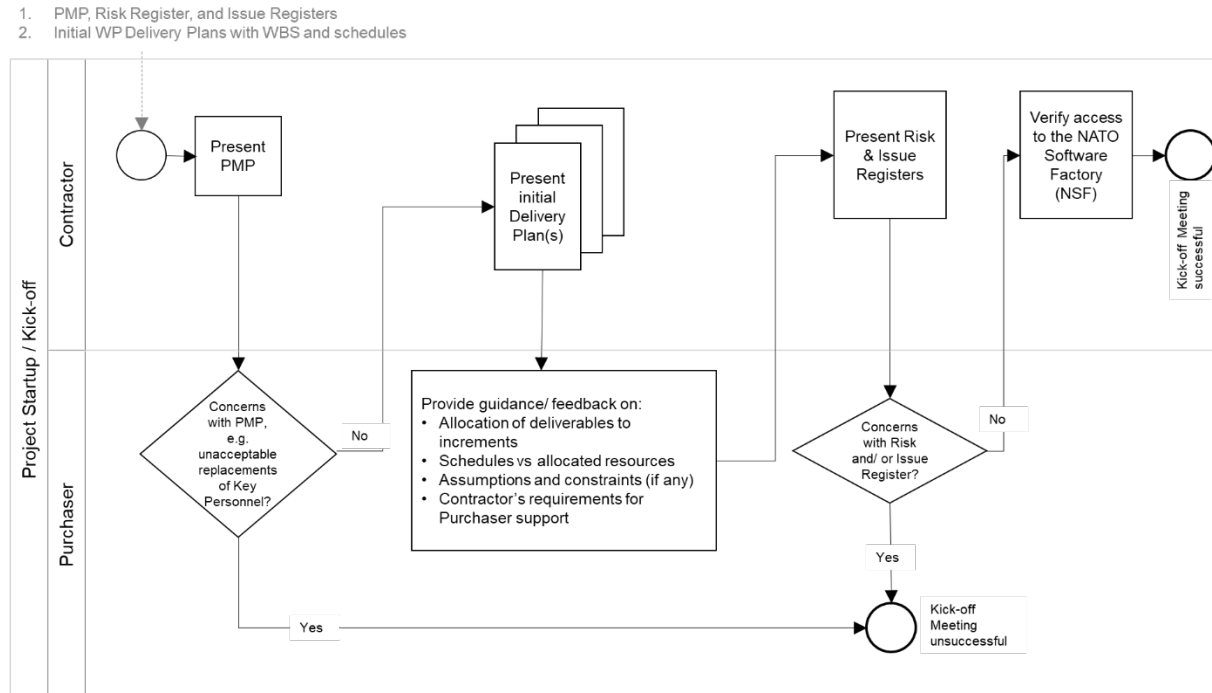
2.4.4   WP Start-up and Execution

2.4.4.1   WP Start-up Meeting

[72]   The preparation for and the conduct of the WP-Start-up Meeting is depicted in Figure 2-2.

[SOWG-161]   The Contractor's key personnel shall meet with the Purchaser's Project Manager. The meeting will normally take place in person at the Purchaser's facility (either The Hague-Netherlands, Brussels-Belgium or Mons-Belgium, at the discretion of the Purchaser), but a video conference might be acceptable.

[SOWG-162]   The Contractor shall submit a refined WP Delivery Plan (see section 2.5.3) and other supporting material to the Purchaser minimum a week prior to the WP Start-up Meeting. This shall include:
(1)   An extract of the CMDB, in the form of a Functional Baseline (FBL), that defines all configuration items of relevance for the WP;
(2)   A work breakdown structure (WBS) defining all increments in time (start and end time) and the deliverables planned for each increment (see section 2.5.3.1);
(3)   An initial Solution Description Document (SDD) (see section 2.5.3.2) which describes the overall solution design that can justify that the WP functional and non-functional requirements will be fulfilled;
(4)   The full Deliverable Requirements Traceability Matrix (DRTM) as defined in section 2.5.3.3. I.e. it shall

        (a) Contain all WP requirements;
        (b) Define delivery status for each requirement (NOT_STARTED);
        (c) Specify initial MoSCoW priority for each requirement.

[SOWG-163] The Contractor shall at the meeting present the refined WP Delivery Plan. The presentation shall be:

    (1) Demonstrating that the WP schedule is realistic and that a team of skilled personnel has been allocated that matches the identified resource requirements;

    (2) Demonstrating that the solution design will address the SRS requirements;

    (3) Demonstrating the initial DRTM;

    (4) Demonstrating that the FBL contains all expected CIs.

[73] The Purchaser will review the Delivery Plan and if agreeing with the plan give Contractor permission to proceed.

[SOWG-164] In case the Contractor choses to adapt the Delivery Plan to accommodate any Purchaser's recommendation and those changes have an impact of any other work packages, then the Contractor shall update all affected Delivery Plans.

Figure 2-2   WP Start-up Meeting

1. WP Delivery Plan
2. Functional baseline (FBL) for WP Configuration Items (CI) extracted from the CMDB
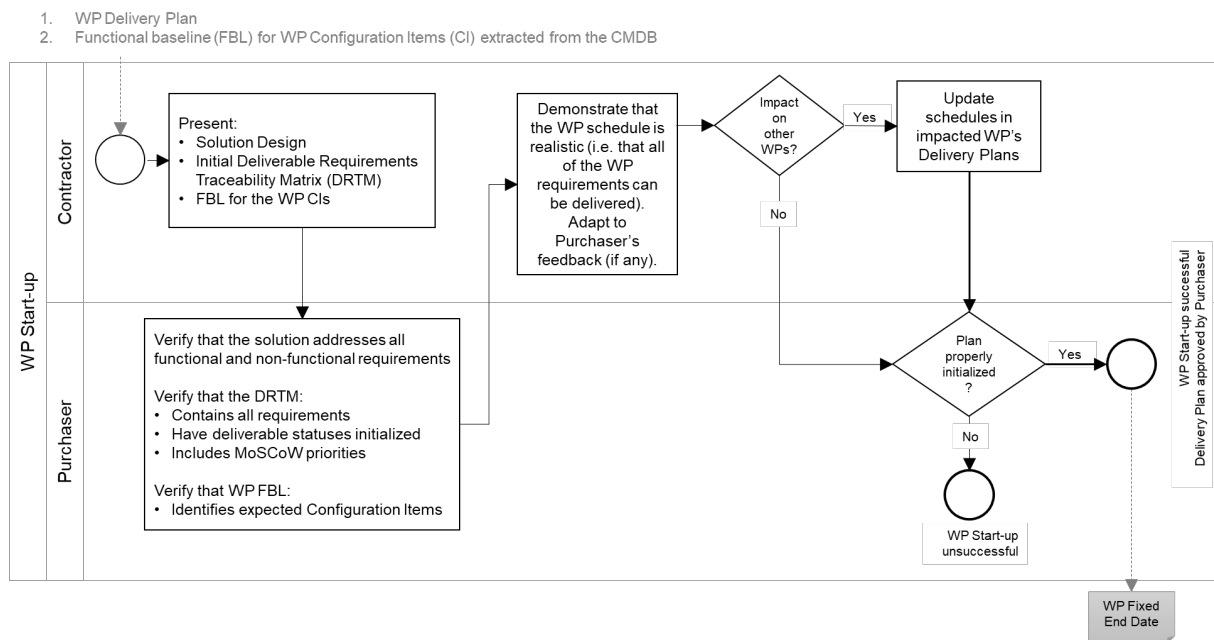
[74] An outcome of the WP Start-up meeting is the identification of a Fixed WP End-date.

2.4.4.2 WP Execution

[75] After a successful WP start-up the project will, as shown in Figure 2-3, run through a set of increments, where each increment will consist of a series of sprints where the duration of a sprint should never exceed 4 weeks.

[76] Each increment will include a delivery acceptance event where the deliverable(s) are scrutinized against the SRS requirements. If the deliverables are not accepted by Purchaser additional work (through added sprints) will have to be performed by the Contractor to reach the acceptance criteria.

[77]   Following a successful delivery acceptance the delivered capability may be released to production.

[SOWG-165]   The Contractor shall be cognisant of the fixed WP End-date and throughout the WP track the progress of implemented deliverables against the fixed WP End-date, and whenever a potential schedule slippage is identified take corrective actions to prevent the schedule slippage.

[78]   At the end of the last planned increment in the WP the Purchaser may, in coordination and agreement with other project stakeholders, decide to extend the WP with one or more additional increment(s) to implement unfulfilled requirements.

[SOWG-166]   The Contractor shall, in case the WP is extended with additional increment(s), update the WP's Delivery Plan, and also update Delivery Plan's for WPs if they are impacted by the extension (e.g. if a subsequent WP cannot start before the WP being extended ends).

[SOWG-167]   The Contractor shall for the additional increment(s) implement remaining requirements in an order defined by priorities defined by the Purchaser.

Figure 2-3   WP execution
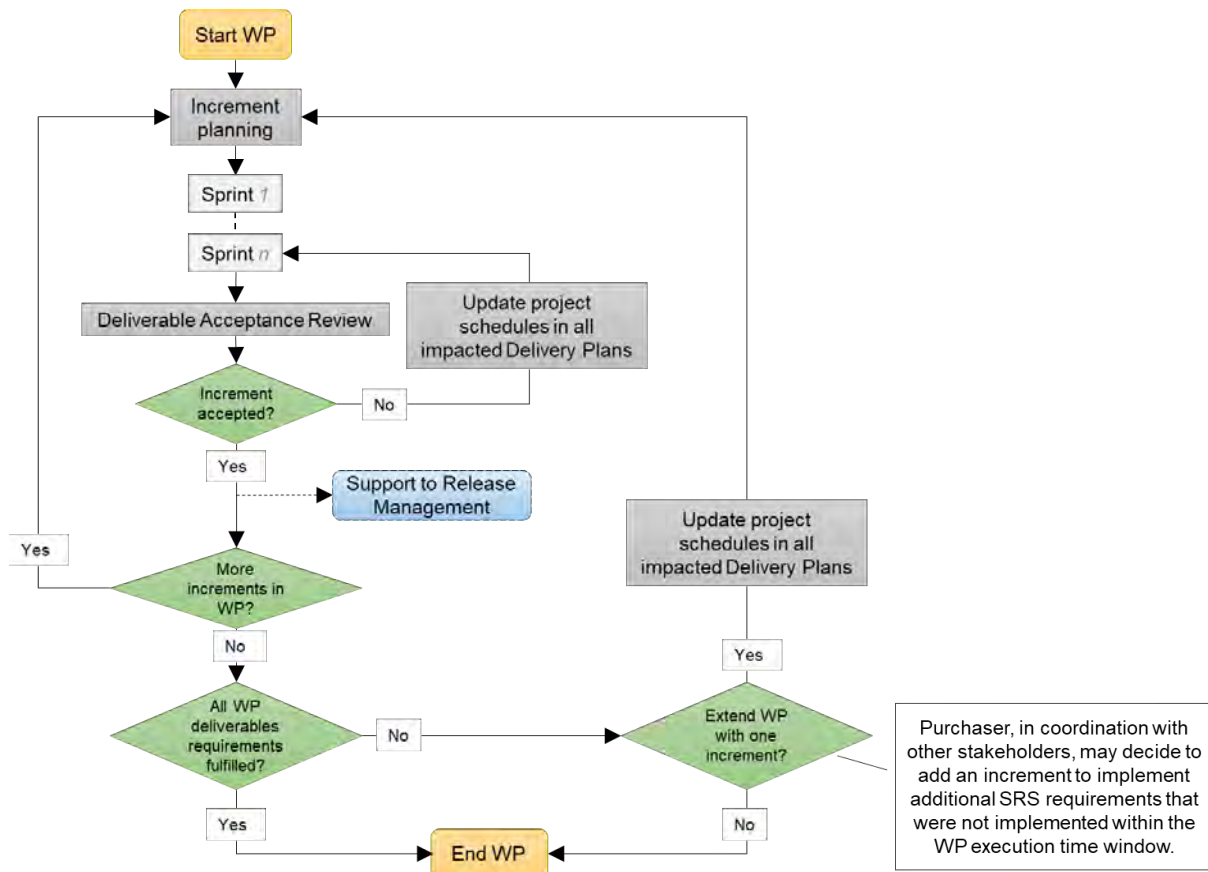
2.4.5   Increment Start-up and Execution

2.4.5.1   Increment Start-up Meeting

[79]   The preparation for and the conduct of the Increment-Start-up Meeting is depicted in Figure 2-4.

[SOWG-168]   The time and duration of each Increment Start-up Meeting shall be in accordance with the schedule established in the Delivery Plan at the WP Start-up meeting.

[SOWG-169]   The Contractor's key personnel shall meet with the Purchaser's Project Manager. The meeting will normally take place in person at the Purchaser's facility (either The Hague-Netherlands, Brussels-Belgium or Mons-Belgium, at the discretion of the Purchaser), but a video conference might be acceptable.

[SOWG-170]   The Contractor shall submit the planning artefacts of the Release Package (see section 2.5.4) and supporting material for the increment to the Purchaser minimum a week prior to the Start-up Meeting. This shall include:
  (1)   A Scope and Requirements Analysis (see section 2.5.4.1). In case the increment deliverable includes any user interface (UI) applications the analysis shall also include UI wireframes[1] for all user interfaces to be implemented;
  (2)   An Integrated Logistics Support (ILS) Plan (see section 2.5.4.2);
  (3)   A Test Plan including test cases and test report templates (see section 2.5.4.3);
  (4)   If applicable, Site Activation Test Plan and Report templates (see section 2.5.4.6);
  (5)   An extract of the CMDB, in the form of an Allocated Baseline (ABL) that is an enrichment of the FBL that now includes information on third-party components and libraries and their licence costs and/ or constraints.

[SOWG-171]   The Contractor shall prior to the meeting provide the Purchaser with the latest version of the Solution Description Document (SDD) with content in accordance with section 2.5.3.2.

[SOWG-172]   The Contractor shall prior to the meeting, with a minimum of one week notice to the Purchaser, state the need for:
  (1)   Prerequisites and required documentation;
  (2)   Purchaser provision of specific subject matter knowledge transfer.

[SOWG-173]   The Contractor shall one week prior to the meeting provide the Contractor with a Schedule Assessment Analysis that:
  (1)   Report on accumulated schedule slippage over previous WP increments (if any) and the estimated impact on the on the WP Fixed End-date.
  (2)   Report on mitigations that will be implemented in the starting increment to reduce the schedule slippage with the goal of delivering the WP in accordance with the WP Delivery Plan schedule.

[80]   The Purchaser will at the meeting review:
  (1)   The Scope and Requirements Analysis. If proposed changes are deemed to resolve inconsistencies or ambiguities, or suggests no-cost improvements, the

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[1] A wireframe is expected to be a low fidelity sketch (sometimes literally a pen and paper sketch) of the UI. The wireframes must convey main features, functions and content of a user interface, without getting into the visual design

Purchaser may approve the proposed changes. Any accepted changes to requirements will be updated in the relevant contractual documents;

    (2)   The Schedule Assessment Analysis.

[81]   The Purchaser will support the Contractor with:

    (1)   Prerequisites (if feasible);

    (2)   Documentation that is relevant to the contract and can be provided by the Purchaser at no cost to Purchaser;

    (3)   Knowledge Transfer (if requested);

    (4)   Guidance on UI Wireframes (if applicable);

    (5)   Guidance on the solution design;

    (6)   Guidance on the presented plans and report templates.

[82]   The Purchaser will agree to start-up of increment pending acceptable ABL, acceptable quality and completeness of plans, test cases, report templates, and increment schedule.

[SOWG-174]   The Contractor shall at the end of the meeting update the Risk Register or Issue Register to reflect the outcome of the Schedule Assessment Analysis.

Figure 2-4   Increment Start-up Meeting

1. Release Plan that includes
   • Scope and Requirements Analysis
   • Initial ILS Plan and Logistics Support Analysis (LSA)
   • Test Plan including test cases & report templates (TP/R)
   • Site Activation and Test Plan & Report templates (SATP/R) (if applicable)
2. Latest version of Solution Description Document (SDD)
3. Allocated baseline (ABL) for Increment Configuration Items (CI) extracted from the CMDB
4. Requirements for Knowledge Transfer, pre-requisites, and documentation
5. Schedule Assessment Analysis
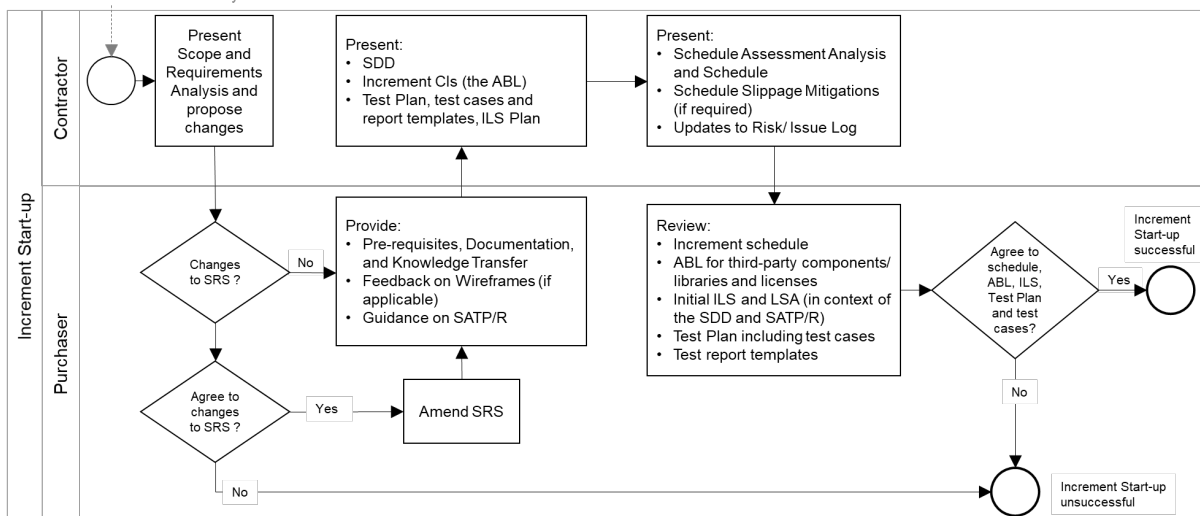
2.4.5.2 Increment Execution

[83]   After a successful Increment Start-up the project will, as shown in Figure 2-5 run through a number of sprints.

[84]   As features become ready (i.e. the Contractor has tested the features and produced the required test reports), the Purchaser will submit those features for Independent Verification & Validation (IV&V). The IV&V will be conducted by the Purchaser, and the Contractor will have to (upon Purchaser's request) support such IV&V activities at no additional cost to the Purchaser. This support includes:

    (1)   Presenting test plans and test cases at Increment start-up meetings;

    (2)   Presenting and reporting on test results at sprint review meetings;

(3) Participating in ad hoc discussions on test results (e.g. in case IV&V identifies potential bugs);

(4) Supporting Purchaser in setting up additional installations on the NSF (the expectation here is that the SW is easily installable and that Purchaser's personnel will be able to do this without contractor support);

(5) Providing answers to question the Change Manager may have to the software submitted into the RFC process.

[85] In case the Contractor is not able to deliver all requirements at Must Have priority before the end of the increment, another sprint is added, and all project schedules are updated.

[86] Once the increment ends with all Must Have requirement fulfilled, a final Delivery Acceptance Review is conducted where the Deliverable Acceptance Report (DAR) (see section 2.5.4.7) will be used to formally record acceptance of the increment's deliverables. In case of the DAR being incomplete, or not providing sufficient proof of a successful delivery, the delivery will not be approved and another sprint added to address the DAR deficiencies.

[87] Following a successful Delivery Acceptance Review, the Increment ends, and the Purchaser may decide to proceed with obtaining approvals for deployment to the production environment. With such an approval, the Purchaser will deploy the Increment's deliverables to the production environment. The Contractor will have to provide support to the Purchaser in the release management activities, see section 2.4.5.2.7.

Figure 2-5 Increment execution
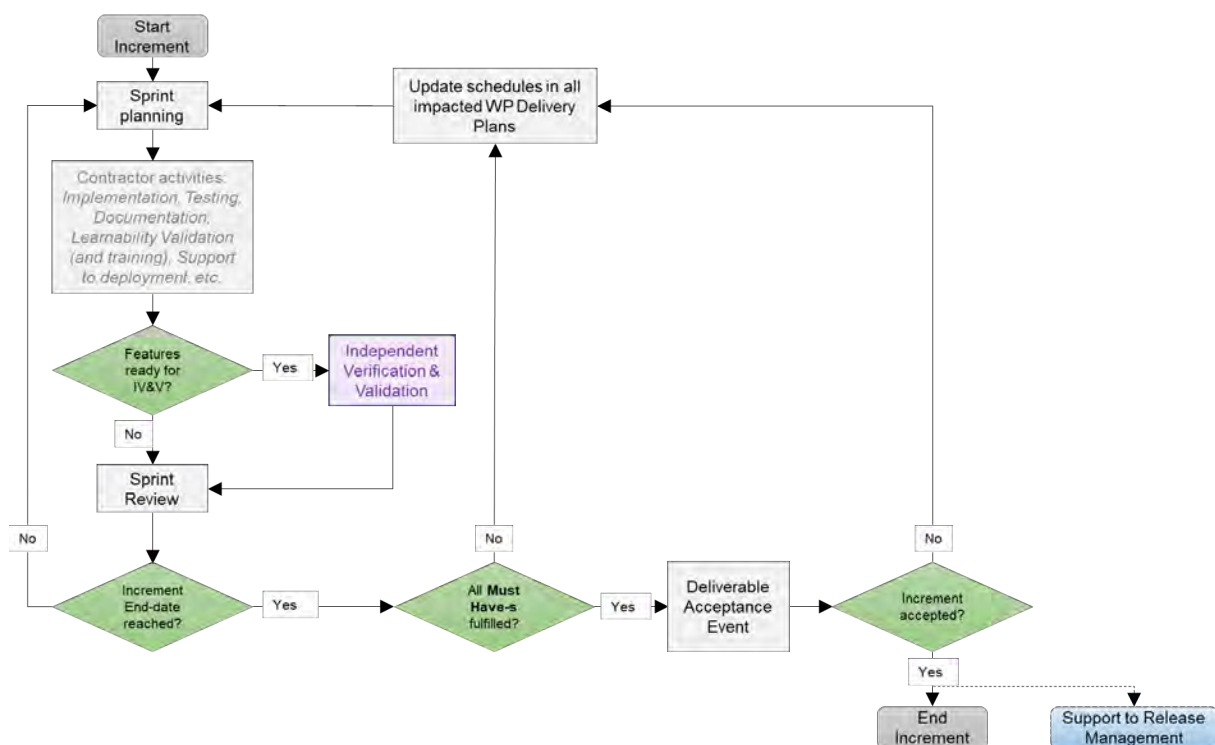
[SOWG-175] The Contractor shall, in case the increment is extended with an additional sprint, update the WP Delivery Plans for all impacted WPs.

2.4.5.2.1   Sprints

[SOWG-176]   The Contractor shall break up the execution of an increment into a sequence sprints where the duration of a sprint is no longer than 4 weeks.

[SOWG-177]   The Contractor shall conduct a Sprint Planning Meeting and a Sprint Review Meeting and invite the Purchaser to take part in these meetings.

[SOWG-178]   The Sprint Planning and Review meetings shall normally take place at the Contractor's premises, but can, upon Contractor's request be conducted at Purchaser's facilities.

[SOWG-179]   The Contractor shall enable the Purchaser to participate remotely in Sprint Planning and Review meetings using video conferencing technology.

2.4.5.2.1.1   Sprint Planning

[SOWG-180]   The Contractor shall after each Sprint Planning Meeting produce a Sprint Work Plan that shall be provided to the Purchaser.

[SOWG-181]   The Sprint Work Plan shall include:
(1)   A list of project implementation tasks (or user stories) with individual priorities;
(2)   Tasks to implement bug-fixes in the case bugs has been discovered in software functionality previously delivered by the Contractor under this contract;
(3)   Updated UI Wireframes (if applicable);
(4)   Recorded request for specific Purchaser support during the sprint (e.g. support to testing, support to assessing User Interfaces, etc.)

[88]   The Purchaser will participate in the Sprint Planning Meeting with Subject Matter Experts to support the Contractor's planning.

2.4.5.2.1.2   Sprint execution

[SOWG-182]   The Contractor shall every day of the Sprint conduct a scrum meeting.

[SOWG-183]   The Contractor shall facilitate participation of the Purchaser in the daily scrum meetings (e.g. by using the Microsoft Teams tool available through the NSF).

[SOWG-184]   The Contractor shall each day of the sprint (typically at the end of the day) commit the implemented software changes to the Git repository in the NSF where the updated software shall pass the CI/ CD build tests.

2.4.5.2.1.3   Sprint Review Meeting

[SOWG-185]   The Contractor shall at the Sprint Review meeting:
(1)   Report the final status of planned tasks, and achievements and progress in the Sprint, to the Purchaser. Note: this report shall include an assessment from the Contractor on the outlook for being able to deliver all the requirements defined for the increment;
(2)   Provide the Purchaser with a new, updated and working, version of the software being developed. I.e. the Contractor shall make sure that the a Sprint always concludes with new working software.

2.4.5.2.2   Contractor's Test Activities

2.4.5.2.2.1   Managing the increment Test Plan, test cases, and test reports

[SOWG-186]   The Contractor shall maintain (i.e. improve and update if required) detailed test cases for how to perform tests that will produce the test report for the deliverable. I.e. there shall be detailed test cases enabling the production of the following reports:
  (1)   Software Quality Metrics Report (SQMR), see 2.5.4.3.4;
  (2)   Source Code Review Report (SCRR), see 2.5.4.3.5;
  (3)   Security Test Report (SecTR), see 2.5.4.3.6;
  (4)   Deliverable Functional and Performance Test Report (DFPTR), see 2.5.4.3.7;
  (5)   System Integration Test Report (SITR), see 2.5.4.3.8;
  (6)   Continuous Delivery Assessment Report (CDAR), see 2.5.4.3.9.

[SOWG-187]   The Contractor shall, when executing automated tests make the output from the tests (i.e. test results) available in the NUnit report XML format.

[SOWG-188]   Test reports shall be uploaded to the Purchaser test reporting tool in the NSF. The report entry in the reporting tool includes shall include an input field reserved for Purchaser's use (to add remarks to the test result).

[89]   Note: The Purchaser is expecting to use Jira tool with a Test Event Management plugin as the test reporting tool.

2.4.5.2.2.2   Defect management process

[SOWG-189]   The Contractor shall record provide a reporting and defect management process to be applied throughout the duration of the Project.

[SOWG-190]   The Contractor shall manage defects in the NSF Jira tool (see [Jira]).

[SOWG-191]   The Contractor shall classify all deficiencies in accordance with the Purchasers' categorization nomenclature for all defects and non-compliances as defined by Table 2-2, Table 2-3, and Table 2-4.

Table 2-2   Definitions for defect categorization

Attribute	Definition
Severity	The severity of a defect is the degree of impact that the failure has on the development or operation of a component, a system or a user function. The severity shall initially be proposed by the tester but shall officially be set in agreement with all the stakeholders. When agreement cannot be reached, the Purchaser's PM will set the severity.
Priority	The priority of a defect defines the order in which defects shall be resolved. The priority of the defect shall initially be proposed by the tester but shall officially be set in agreement with all the stakeholders. When agreement cannot be reached, the Purchase's PM will set the priority.
Category	The type of observation identified during the execution of a test case.

Table 2-3   Classification of defects based on severity

Severity	Definition
Critical	The failure of testing of a requirement. The failure results in the termination of the complete system or one or more component of the system. The failure causes extensive corruption of data. The failed function is unusable and there is no acceptable alternative method to achieve the required results.
Major	A significant failure that causes severely impaired functions but does not prevent operational processing. Applies to conditions under which the complete system or one or more component of the system are partially inoperative, but are still usable by the users. A work around may be available, but it may require manual intervention. Examples: • Absence of expected modules/ object or Unit • Failure of business operational process that affects a large group of users • Complete failure of a module
Moderate	The failure does not result in the termination and all functions are available but causes the system to produce incorrect, incomplete or inconsistent results. When resources are available and budgeted, should be resolved.
Minor	The failure does not result in termination and does not damage the functioning of the system. The desired results can be easily obtained by working around the failure.
Cosmetic	The failure is related to the look and feel of the application, typos in a document or user interfaces (amongst others), and not part of the immediate usability or contractual requirements. The failure does not adversely affect the overall system operation.

Table 2-4   Priorities for defect classification

Priority	Definition
Urgent	The defect shall be resolved as soon as possible. Required to complete independent verification and validation activities.
Medium	The defect shall be resolved in the normal course of development activities. It can wait until a new build or version is created.
Low	The defect is an irritant which should be repaired, but repair can be deferred until after more serious defects have been fixed.

2.4.5.2.2.3   Software Quality Metrics Reporting

[SOWG-192]   The Contractor shall, within the Contractor's continuous integration build pipeline, set up an automated software metrics analysis (e.g. using the NSF SonarQube) which shall provide the required software quality metrics for the Software Quality Metrics Report (SQMR) as defined in section 2.5.4.3.4.

[SOWG-193]   The test coverage reported in the SQMR shall be higher than 80%.

[90]   Note the coverage information can be collected using test runner tools like dotCover (see https://www.jetbrains.com/dotcover) when running unit tests and integration tests etc.

[SOWG-194]   An SQMR shall be produced for the relevant deliverable each time new
software is committed back to the deliverable's software repository.

2.4.5.2.2.4   Source Code Review Reporting

[SOWG-195]   The Contractor shall establish routines for peer review of the developed
software and produce source code review reports (SCRR) as defined in
section 2.5.4.3.5.

2.4.5.2.2.5   Security Tests and Analysis and Reporting

[SOWG-196]   The Contractor shall, within the Contractor's continuous integration build
pipeline, set up automated security test that tests security aspects of the
implemented software in accordance with the OWASP Testing Guide. The
automated security tests shall include:
  (1)   Static Application Security Testing (SAST) (e.g. using the NSF
SonarQube);
  (2)   Dynamic Application Security Testing (DAST) (e.g. using OWASP
ZAP);
  (3)   Dependency checking (i.e. security scanning of third-party libraries);
  (4)   Security-related unit and integration tests.

[SOWG-197]   The Contractor shall during source code reviews shall also consider security
in accordance with the OWASP Code Review Guide.

[SOWG-198]   The Contractor shall document all security test and analysis findings in a
Security Test Report (SecTR), see section 2.5.4.3.6.

2.4.5.2.2.6   Functional and Non-functional Tests and Reporting

[SOWG-199]   The Contractor shall whenever feasible develop automated tests, using a
BDD and/ or Acceptance Test Driven Development (ATDD) methodologies,
which tests functional requirements in the SRS and automatically report the
test results to the Purchaser's test reporting tool. For functional requirements
in the SRS where automated tests are not feasible, the Contractor shall
define manual test cases so that with the combination of automated and
manual tests, all functional requirements in the SRS are tested.

[SOWG-200]   The Contractor shall develop automated and/ or manual tests that tests all
testable non-functional requirements in the SRS.

[SOWG-201]   The Contractor shall whenever feasible, and when it provides test value,
implement unit tests to ensure correct functional and non-functional
behaviour of the delivered software.

[SOWG-202]   The Contractor shall perform regression analysis and conduct regression
testing against dedicated regression test cases and report the results as
regression tests.

[SOWG-203]   The Contractor shall as part of these tests conduct, prepare training material
for the Learnability Tests as defined in section 2.4.5.2.3.

[91]   Note: The training material for the Learnability Test will always have to be
developed. However, the Purchaser may decide from reviewing the training material
that the user interface is intuitive and that the actual Learnability Test event will not
be required.

[SOWG-204]   The Contractor shall, if not deemed unnecessary by the Purchaser (see comment above), conduct a Learnability Test event and document the results from this event (see section 2.4.5.2.3 for details).

[SOWG-205]   The Contractor shall update the DRTM (see section 2.5.3.3) and link the DRTM to the functional and non-functional test results.

[SOWG-206]   The Contractor shall document all function, non-functional, and regression tests in the Deliverable Functional and Performance Test Report (DFPTR), see section 2.5.4.3.7.

2.4.5.2.2.7   System Integration Tests (SIT) and Reporting

[SOWG-207]   The Contractor shall in the Test Plan and test cases for the System Integration Tests identify all external interfaces and develop dedicated test cases for each interface.

[SOWG-208]   The Contractor shall, within the continuous integration build pipeline, set up automated testing of all interfaces that the software implements that can be consumed by external systems. The automated test of such interfaces shall:
   (1)   Be implemented as a test harness using an appropriate test framework (e.g. using the NUnit framework)
   (2)   Test all methods of all services according to documented interface/ service specifications.

[SOWG-209]   The Contractor shall deploy the software to a Purchaser Provided reference environment and verify that the implemented software can consume needed services provided by other Bi-SC AIS systems (e.g. Open Geospatial Consortium (OGC) services provided by the NATO CoreGIS system).

[SOWG-210]   The Contractor shall document all SIT tests results in the System Integration Test Report (SITR), see section 2.5.4.3.8.

2.4.5.2.2.8   Continuous Integration & Continuous Delivery Assessment Report

[SOWG-211]   The Contractor shall, within the continuous integration and continuous delivery (CI/CD) build pipeline, set up automated deployment to a Purchaser provided reference environment and verify that the software functions correctly on a platform running the latest NATO security settings.

[SOWG-212]   For software with a user interface the continuous integration shall include automated tests to verify that users can log on and access the application (e.g. using tools like Selenium Webdriver).

[SOWG-213]   Behavioural aspects of the delivered software shall be tested using behaviour driven development (BDD) testing through usage of Gherkin scenarios with a test runner (e.g. Cucumber).

[SOWG-214]   The Contractor shall report on the tests in the Continuous Delivery Assessment Report (CDAR), see section 2.5.4.3.9.

2.4.5.2.3   Learnability Test

[92]   Any developed software that includes user applications with a graphical user interface will normally have a non-functional requirement on the developed applications Learnability. The purpose of the Learnability requirement is to put a high emphasis on delivering good user experience (UX).

[93]   The Purchaser will select a group of people representing the users that are new to the user application developed by the Contractor. The test will be conducted as follows:

(1)   The Contractor will perform a short training session on the user interfaces for the users;

(2)   The Users will subsequently be given a set of tasks covering most of the user interface's functionality, and will be given a time limit to perform these tasks;

(3)   The result of the users' performance in conducting the selected tasks will be used to assess the Learnability of the user interface.

[94]   The Purchaser will most likely select people that will be responsible for providing training on the new user application as the users for these tests. This means that the Purchaser will use these Learnability Tests as an opportunity to 'Train the Trainers".

[SOWG-215]   The Contractor shall produce training material for any new UI functionality. This training material shall:

(1)   Be in the form of a PowerPoint presentation;

(2)   Be based on screenshots from the application user interface;

(3)   Describe all features of the deliverables user interface.

[SOWG-216]   The Contractor shall develop a Learnability Test to be used for assessing the test-users' performance and efficiency in conducted a representative set of key tasks. The Learnability Test shall:

(1)   Include tasks covering all main features of the user interface;

(2)   Enable a user that is a fast learner to conduct all the test steps in a relatively short time (maximum 10 minutes if feasible);

(3)   Define a time limit for how much time the users will be given to conclude the test. This time limit shall be justifiable (e.g. 1.5 times the time it takes the Contractor to do the tests);

(4)   Be designed such that each user's performance is recorded and can be evaluated (e.g. through recorded screen captures, or expected results entered into the application data set, etc.);

(5)   Be of a binary nature (i.e. pass or fail).

[95]   Note: The Purchaser may from studying the Learnability Training material, and from hands-on experience with the delivered software, decide that it will not be necessary to execute the actual Learnability Test event as described in requirements [SOWG-217] through [SOWG-220] below.

[SOWG-217]   The Learnability Tests shall normally be done in person with the Purchaser's selected user group at the Purchaser's facility (either The Hague-Netherlands, Brussels-Belgium or Mons-Belgium, at the discretion of the Purchaser), but, if feasible, a video conference might be acceptable.

[SOWG-218]   The Contractor shall train the users using the prepared training material (PowerPoint slides) and, if required, perform some limited demonstrations using the application.

[SOWG-219]   The Contractor shall start the test, time the tests, and stop the tests after an agreed end time.

[SOWG-220]   The Contractor shall review the individual test results for all the test users and calculate the following statistics:

(1)   The percentage of users passing each of the tests;

(2)   The percentage of passed tests versus the total number of tests;

    (3)   The percentage of passed tests for 80% of the tests with the highest score (i.e. identify the 20% most difficult tests and remove them from the result set before calculating the statistics).

[96]   The Purchaser will compare the test results and the calculated statistics against the Learnability requirement in the SRS.

2.4.5.2.4   Independent Verification and Validation (IV&V)

[97]   The Purchaser will be conducting IV&V activities that will:
    (1)   Independently repeat tests conducted by Contractor with the aim of recreating the test results reported by the Contractor;
    (2)   Run additional tests. These additional tests may use different data sets, and may include extended system-to-system integration tests;
    (3)   Verify that the software can be installed and maintained as described in the Maintenance and Administration Manual (MAM) see section 2.5.4.4;
    (4)   Verify that the successful site activation can be verified using a Site Activation Test Plan and Report (SATP/R), see 2.5.4.6 (each release will normally be installed at a minimum to one site, the Purchaser production staging environment).

[SOWG-221]   The Contractor shall support the Purchaser in installing the latest version of the software in up to two separate installations after every sprint.

[98]   The installation of the latest software should be so simple that the Purchaser is able to perform the installation without support. The Purchaser will need these installed versions for parallel ongoing IV&V activities.

[SOWG-222]   The Contractor shall, if required, travel to the Purchaser's facility to support such installation.

2.4.5.2.5   UAT

[99]   At the end of each increment the Purchaser will conduct a user acceptance test (UAT) event that will verify that the new features delivered within the increment is able to support operational intelligence processes and is ready for operational use.

[100]   The UAT will be organized by the Purchaser and it will be conducted from the Purchaser's facility using an installation on the Purchaser's production staging environment.

[SOWG-223]   The Contractor shall be physically present at the first UAT event with the right personnel to be able to support the UAT event. For all other UAT events the Contractor shall provide remote support (e.g. through video conferences) to discuss UAT findings.

2.4.5.2.6   Deliverable Acceptance Review

[101]   The Deliverable Acceptance Review serves as an Increment Close-out Meeting.

[102]   The Deliverable Acceptance Review can take place when all Must Have requirements defined for the increment deliverables have been delivered, and there are no recorded defects with a severity above "Minor" (see section 2.4.5.2.2.2).

[SOWG-224]   At the end of each Increment, the Contractor shall by default meet, in person, with the Purchaser's Project Manager and Purchaser's subject matter experts (SME) at the Purchaser's facility (either The Hague-Netherlands, Brussels-Belgium or Mons-Belgium, at the discretion of the Purchaser) for a

Deliverables Acceptance Review. If agreed between Purchaser and Contractor, the meeting could be done as a video-conference meeting.

[SOWG-225]   The Contractor shall one week prior to the Deliverables Acceptance Review provide the Deliverable Acceptance Report (DAR) as defined in section 2.5.4.7.

[SOWG-226]   The Contractor shall at the Deliverables Acceptance Review Meeting present:
(1)   The updated Deliverable Requirements Traceability Matrix (DRTM) (see section 2.5.3.3) that reflect the deliverables and tests produced/ reported in this release;
(2)   A calculation for the total value of the invoice to be submitted for the release. The invoice value shall be calculated as the sum the individual cost value of all successfully delivered requirements in the release.

2.4.5.2.7   Supporting the release to production

[103]   Following a successful Deliverable Acceptance Review the Purchaser may proceed with the release management process to obtain the approval to deploy the implemented capability to the production environment. The result of this approval process will be that the implemented capability is included on the NATO Approved Fielded Product List (AFPL).

[104]   With the implemented capability on the AFPL list, the Purchaser will seek to deploy it onto the production environment.

[SOWG-227]   The Contractor shall support the security testing (penetration tests) of the release management process.

[SOWG-228]   The Contractor shall support the Purchaser in meetings, and other communication, with the Change Advisory Board.

[SOWG-229]   The Contractor shall, prior to deployment to production, provide Administrator training for the Purchaser's O&M support staff, see section 2.3.5.3.

[SOWG-230]   The Contractor shall support the Purchaser in deploying the implemented capability to the production environment.

2.4.6   Final System Acceptance (FSA)

[105]   The FSA requirements are defined in the Contract Special Provisions document, see [INTEL-FS2-Special-Provisions].

2.5   Documentation Requirements

2.5.1   Cross-cutting (General) Document Requirements

[106]   The Purchaser's default software packages for managing projects are:
(1)   Microsoft Office Professional;
(2)   Microsoft Project.

2.5.1.1   Formatting and Naming Conventions

[SOWG-231]   The Contractor shall use filenames for all documentation deliverables in compliance with the following filename convention [NU|NR]_[Contract

number]_[Name of document]_[v0.x|v1.0].[filename extension] and the fields used in the filename convention shall be used as follows:

(1)   [NU|NR] is the classification of the document: NATO Unclassified or NATO Restricted;

(2)   [Contract number] is the official Purchaser contract number;

(3)   [Name of deliverable] is the Contractor proposed, Purchaser agreed designation of the deliverable;

(4)   [v0.x|v1.0] is the version number in the range (v0.1, v0.2, …, v0.9, v0.10, v0.11, …) for drafts not eligible for acceptance and with v1.0 only for the final deliverable;

(5)   [filename extension] is the standard filename extension, but ".zip" may be used to aggregate multiple files.

[SOWG-232]   COTS documents, such as a vendor supplied user manual, shall retain their original filenames and shall hence not be renamed according to the above filename convention.

[SOWG-233]   All documentation produced under this contract shall adhere to the same presentation style (cover pages, approval pages, headers, footers, headings and paragraphs, font types and sizes within headings and paragraphs), irrespective of the source of the document within the Contractor's team, including any subcontractors except COTS equipment documentation.

[SOWG-234]   All documentation (including source code comments) shall be written in UK English.

[SOWG-235]   The first page shall show the document title, project title, contract number as well as version number and issue date, if applicable, and which shall also be shown on each subsequent page bottom. The first page shall also include the classification headers and footers with the highest classification of information contained in the entire document (including annexes and appendices).

[SOWG-236]   Header and Footer Marking shall show the NATO classification, normally —NATO UNCLASSIFIED — or — NATO RESTRICTED —.

[SOWG-237]   Developed documentation shall contain a Table of Contents. It shall be noted that depending on the type of document, a Table of Content might not be required. This shall be agreed between the Purchaser and Contractor beforehand.

[SOWG-238]   All documents shall contain a preface, containing details of related documents and information on how to navigate the document.

[SOWG-239]   All documents produced under this Contract shall use sans-serif fonts (e.g. Arial, Helvetica, Calibri, etc), and obey the following principles:

(1)   Headings shall be numbered and use bold font-types of sizes higher than the body text (the higher the Heading in the document hierarchy, the larger the font-size);

(2)   No document shall use Headings below level 6 (i.e. 1.1.1.2.3.1 Heading Text);

(3)   Body text (under the headings) shall not use fonts smaller than Arial 10 pt (or equivalent size if another font type(s) is (are) selected);

(4)   Any graphic material generated under this Contract, including network diagrams, shall not use font sizes smaller than Arial 8 (or equivalent size if another font type(s) is (are) selected).

[SOWG-240]   Larger font sizes than those specified above shall be selected if the corresponding text or drawing is to be reduced in size when embedded in the document, in order to guarantee that the PDF output keeps the font size as specified.

[SOWG-241]   All documentation developed in Microsoft Word shall be printable if required and therefore the page format shall be A4, printable in loose-leaf form, and possible to be presented bound in stiff backed covers with 4-ringed binders which permit the removal and insertion of individual pages and drawings.

[SOWG-242]   The convention to be used for numbers appearing in textual documents is for a comma to be the thousands separator and a period to be the decimal separator (e.g., 1,365,276.24).

[SOWG-243]   The convention to be used for dates appearing in free text (e.g., quoting dates of meetings) is day-month-year and not month-day-year.

[SOWG-244]   Where documents contain many complex specialized or strongly domain oriented terminologies these shall be defined in a glossary.

2.5.1.2   Distribution

[SOWG-245]   Documentation shall not contain warnings limiting the rights to use or reproduce the document. The Purchaser reserves the right to make additional copies of any documentation provided under this contract for his internal use.

[SOWG-246]   All contractual documentation (e.g., change proposals, invoices, etc.) shall be delivered electronically unless specified otherwise by the Purchaser Contracting Officer.

[SOWG-247]   All electronic copies shall be delivered in a format which is best suited for review and maintenance by the Purchaser. In general the following guidelines shall be used:
(1)   Microsoft Word shall be used for generating text document;
(2)   Microsoft Excel shall be used for tabular or matrix data;
(3)   Microsoft Project shall be used for schedule; and
(4)   Microsoft PowerPoint shall be used for briefings.

[SOWG-248]   The Contractor shall submit documentation, intended for review by the Purchaser in electronic formats compatible guidelines in [SOWG-247].

[SOWG-249]   The Contractor shall submit all final and accepted versions of documentation deliverables in electronic format, as PDF. For non-COTS documentation, the documentation shall also be delivered in an editable Microsoft Office format.

[SOWG-250]   Documentation shall be distributed as follows:
(1)   For all documents unless otherwise instructed: an electronic copy to the Purchaser's Project Manager;
(2)   For contractual documents: an electronic copy to the Purchaser's Contracting Officer and if required and additional hard copy.

2.5.1.3   Review and Updates

[107]   The Purchaser will when reviewing a document provide comments, corrections, and suggested changes to the Contractor within two weeks of receipt, unless specified differently in this Contract

[108]   The Purchaser reserves the right to return without review a document that has significant deficiencies.

[SOWG-251]   All documentation is subject to Purchaser approval.

[SOWG-252]   The Contractor shall not rely on the Purchaser review to fill in deficiencies or obtain missing Purchaser information.

[SOWG-253]   The Contractor shall resubmit the document as a revised draft incorporating the Purchaser's comments within two weeks after receipt, unless specified differently in this SOW.

[SOWG-254]   If there is a change to an already delivered deliverable, then the Contractor shall be responsible for updating all documentation pertaining to the specific deliverable where the deliverable documentation is affected by the change.

2.5.2   Project Management Documentation Package

2.5.2.1   Project Management Plan (PMP)

[SOWG-255]   The PMP shall identify all major Contractor operating units and any Subcontractors involved in the work and a description of the portion of the overall effort or deliverable item for which they are responsible.

[SOWG-256]   The PMP shall cover all aspects of the project implementation, including the Contractor's project management methodology, project control processes, personnel assignments, and external relationships necessary to provide the deliverables as required by this Contract.

[SOWG-257]   The PMP shall be sufficiently detailed to ensure that the Purchaser is able to assess the Contractor plans, capabilities, and ability to satisfactorily implement the entire project in conformance with the requirements as specified in this SOW.

[SOWG-258]   The PMP shall identify key personnel in the project organization, their qualifications, and their responsibilities.

[SOWG-259]   The PMP shall describe the Contractor's, and Subcontractors', approach to security management, including personnel and facility security.

[SOWG-260]   The PMP shall identify Assumptions and Constraints.

[SOWG-261]   The PMP shall describe methodology used for cost and schedule estimation

[SOWG-262]   The PMP shall include a master schedule that defines the project start-up, all major milestones (to include increment start-up and increment end dates), the project durations (in months from the start-up), and the project end-date.

[SOWG-263]   The PMP shall define all expected Purchase involvements and all expected Purchaser Furnished Items (PFI) and associated timelines.

2.5.2.2   Risk Register

[SOWG-264]   The Risk register shall list all project risks, and indicating for each risk the following information (but not limited to):
(1)   Risk identifier: unique code to allow grouping of all information on this risk;
(2)   Description: brief description of the risk;
(3)   Risk category (e.g. management, technical, schedule, quality and cost risks);

(4)   Impact: effect on the project if this risk were to occur;
(5)   Probability: estimate of the likelihood of the risk occurring;
(6)   Risk rating (High, Medium, Low);
(7)   Proximity: how close in time is the risk likely to occur;
(8)   Response strategy: avoidance, mitigation, acceptance, transference
(9)   Response plan(s): what actions have been taken/will be taken to counter this risk;
(10)   Owner: who has been appointed to keep an eye on this risk;
(11)   Author: who submitted the risk;
(12)   Date identified: when was the risk first identified;
(13)   Date of last update: when was the status of this risk last checked;
(14)   Status: e.g. closed, reducing, increasing, no change.

[SOWG-265]   It shall be possible to export the Risk Register to Microsoft Excel.

2.5.2.3 Issue Register

[SOWG-266]   The Issue Register shall comprise the following information (but not limited to):
(1)   Issue Number or Trouble Ticket Number (in case the issue is received through 1st Level Support Service Desk);
(2)   Issue Type (Request for change, Schedule slippage, 2nd Level Support, general issue such as a question or a statement of concern);
(3)   Author;
(4)   Date identified;
(5)   Date of last update;
(6)   Description;
(7)   Criticality;
(8)   Resolution Analysis;
(9)   Status.

[SOWG-267]   It shall be possible to export the Issue Register to Microsoft Excel.

2.5.2.4 Configuration Management Plan (CMP)

[SOWG-268]   The CMP shall in general comply with the requirements of a CMP as defined in [ACMP-2009-SRD-41], and shall be in the format defined by section 2.1 in [ACMP-2009-SRD-41].

[SOWG-269]   Any requirements in the [ACMP-2009-SRD-41] deemed by the Contractor to be not applicable for this contract shall in the CMP be specifically defined as not applicable (N/A) followed by a short justification why the requirement is not applicable.

[109]   Note: Requirements in [ACMP-2009-SRD-41] that are expected to be declared N/A for a SW acquisition contract are found in:
(1)   Paragraph 3.2.1 - Hardware Configuration Item (HWCI) Identification;
(2)   Paragraph 3.7 - Drawing library;
(3)   Paragraph 5.1.3 - Interface Control Working Group (ICWG).

[SOWG-270]   The CMP shall define the CM organisation including the Configuration Manager role and any other supporting CM personnel. Note: CM personnel shall have sufficient knowledge, experience, responsibility, authority, organisational freedom, organisation independence and security clearance to review and evaluate activities, identify problems and initiate or recommend corrective actions.

[SOWG-271]   The CMP shall be tailored to the requirements of the technical solution, specifically addressing how CM shall be achieved in an Agile project.

[SOWG-272]   The CMP shall be maintained as a living document subject to revisions and updates, as required.

[SOWG-273]   The CMP shall be placed under configuration control throughout the period of performance the Contract.

[SOWG-274]   The CMP shall identify and define all top-level configuration items (CI) to be delivered under this Contract and where these top-level CIs are traced to deliverables as defined in the SSS.

[SOWG-275]   The CMP shall define the format for Engineering Change Proposals (ECP) to be used during this Contract.

[SOWG-276]   The CMP shall defined the format for Request for Deviation (RFD)/ Request for Waiver (RFW) to be used during this Contract.

[SOWG-277]   The CMP shall describe how the Configuration Management Database (CMDB) will be implemented.

[SOWG-278]   The CMP shall define the format for the human readable Configuration Status Accounting (CSA) Report.

2.5.3   WP Delivery Plan

[110]   This section identifies documentation artefacts that are specific to the planning and execution of a work package (WP).

[111]   As shown in Figure 2-6 the WP Delivery Plan consists of:
   (1)   A Functional Baseline (FBL) extract from the CMDB;
   (2)   A Work Breakdown Structure (WBS) identifying all WP deliverables and schedule information for when the individual deliverable is planned to be delivered;
   (3)   A Solution Description Document (SDD) describing the solution design, solution decisions, and service specifications for implemented services;
   (4)   A Deliverable Requirements Traceability Matrix (DRTM);
   (5)   A number of Release documentation sets (see section 2.5.4).

Figure 2-6   WP Delivery Plan
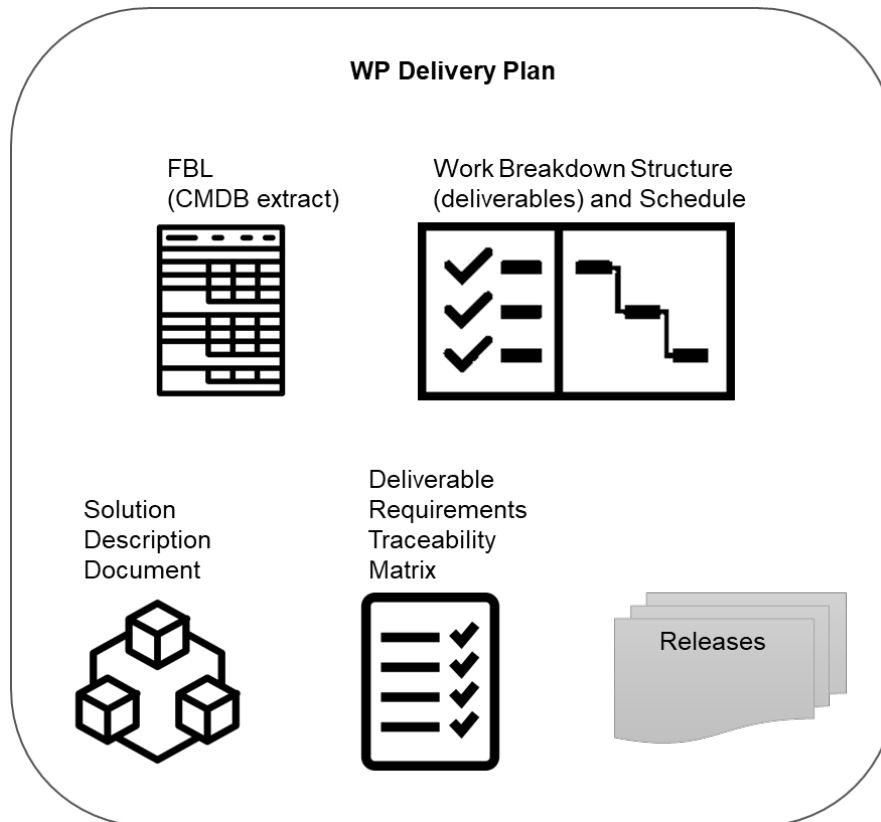
[112]   The requirements defined for a deliverable will each have a Contractor defined cost assigned to it prior to starting an increment and prior to the final prioritization of the deliverable's requirements.

[113]   The requirements defined for a deliverable will be prioritized using the MoSCoW prioritization scheme where the Purchaser prior to starting the increment work, decides the individual priorities of the deliverable's requirements.

[114]   A deliverable will be accepted at the end of an increment pending all of the defined Must Have requirements have been fulfilled, and the deliverable passes all the required tests (see section 2.5.4.7).

[115]   The cost of the implemented deliverable will be calculated as the sum of the individually fulfilled requirements.

2.5.3.1 Work Breakdown Structure (WBS) with Schedule (WBS/ Schedule)

[SOWG-279]   The WBS/ Schedule shall identify each of the deliverables (e.g. applications, services, etc.) using the deliverables identifying code from the CLIN number in the SSS.

[SOWG-280]   The WBS/ Schedule shall group the deliverables by Increment where each Increment is identified by a unique number.

[SOWG-281]   The Level-of-Effort (LOE) in number of person-days shall be defined for each of the deliverables in the WBS/ Schedule.

[SOWG-282]   It shall be possible to view the WBS/ Schedule as a Gantt chart where the start and end time of the increment is depicted. I.e. it shall from this schedule

be possible to identify the time window when a particular deliverable will be delivered.

[SOWG-283]   The WBS/ Schedule shall show all key events within the Work Package. The key events shall include:
    (1)   All Increment Start-up and Increment Review meetings;
    (2)   All Sprint Planning and Review meetings (where the duration of a sprint is expected to be 3 or 4 weeks);
    (3)   All Test Events.

[SOWG-284]   The WBS/ Schedules for each of the Delivery Plans shall be placed under configuration control throughout the period of performance the Contract.

2.5.3.2 Solution Description Document (SDD)

[116]   The purpose of the SDD is to describe solution decisions to a level of detail that the enable the Purchaser to assess the solution's feasibility and ability to fulfil the requirements as defined by the SRS.

[SOWG-285]   The SDD shall include a design that includes:
    (1)   Diagrams identifying key components and services and how they relate to each other;
    (2)   Description of purpose of each of the identified components/ services and a short description of the business logic it will implement;
    (3)   Identification of key technologies and frameworks to be used;
    (4)   Identification of all 3rd party components and/ or libraries to be used and including licensing information on these;
    (5)   Assessment of the proposed solution against the non-functional requirements as defined in the SRS.

[SOWG-286]   The SDD shall record all fundamental solution decisions. Each such decision shall include:
    (1)   An Issue or Problem Statement paragraph/ subsection, that describes the issue/ problem and including motivation for change, and a reference to SRS requirements, if applicable;
    (2)   An Assumption paragraph/ subsection, that provides background information on (external) context, expected future situations, etc.;
    (3)   An Alternatives paragraph/ subsection, that describes the alternatives that have been considered, and their implications. These considerations shall include assessment of the alternative against non-functional requirements (including RAMT), risk of obsolescence, lifecycle costs, licensing constraints, and compute resources requirements (processing power and memory);
    (4)   A Decision and Justification paragraph/ subsection, that identifies the recommended solution and justifies why this is the preferred solution.

[SOWG-287]   The SDD shall identify all COTS and FOSS components and libraries to be included in the solution where this identification shall include Vendor Name, Product Name, SW version, and the full details of the component/ library's lifecycle cost and constraints (license/ subscription fee, licence type, etc.)

[SOWG-288]   The SDD shall include detailed information on all aspects of the Contractor's Continuous Integration (CI) and Continuous Delivery (CD) pipeline. This shall include information on the tooling planned to be used, the approach to automated testing in general, automated integration testing, and automated security testing.

[SOWG-289]   The SDD shall, if required, include an Annex for documenting user interface wireframes or mock-ups.

[SOWG-290]   The SDD shall include annexes that documents implemented server-side services (if any), see section 2.5.3.2.1 below.

[SOWG-291]   The SDDs for each of the Delivery Plans shall be placed under configuration control.

2.5.3.2.1   Service Specifications

[117]   The purpose of a Service Specification is to document the service such that:
   (1)   SW developers implementing functionality that consumes the service have sufficient information to build functionality that can successfully interact with the service;
   (2)   Maintenance of the service is possible as the SW maintenance team will have sufficient information to enable them to understand the inner workings of the service.

[SOWG-292]   Service Specifications shall include machine-readable interface files, in a standardized format/ representation (e.g. OpenAPI for describing RESTful services, Web Services Description Language (WSDL) files for SOAP services, etc.)

[SOWG-293]   Service Specifications shall, when applicable, include documentation of, or reference to, an underlying information model.

[SOWG-294]   Service Specifications shall include documentation of the business logic and business rules implemented by the service.

[SOWG-295]   Service Specification shall include documentation on the service non-functional/ performance characteristics (e.g. response times).

2.5.3.3   Deliverable Requirements Traceability Matrix (DRTM)

[118]   The DRTM will be used to track the progress on all the individual requirements of the WP deliverables as defined in the SRS.

[119]   The Purchaser will provide the contracted requirements as an extract from the Purchaser's requirement management system (see [DOORS]) in a format that can be imported into Jira (see [Jira]).

[SOWG-296]   The DRTM shall be integrated with (or if feasible fully implemented in) the Jira tool (see [Jira]) on the NSF (the Jira tool will be provided as PFI in the NSF).

[SOWG-297]   The DRTM shall record the delivery status for all requirements. The delivery status of a requirement shall be {NOT_STARTED, IN_DEVELOPMENT, COMPLETE}.

[SOWG-298]   The DRTM shall for each requirement record references to the location(s) in the software where the requirement is implemented (e.g. file(s), package(s), classes).

[SOWG-299]   The DRTM shall for each requirement include the verification method based on the SRS. The verification methods are defined in Table 2-5.

Table 2-5   Verification methods

Method	Description
Analysis	The processing of accumulated data obtained from other qualification methods. Examples are reduction, interpretation, or extrapolation of test results; analysing the performance of design by running simulations. This method can be used if a test scenario cannot be created at the Test Environment.
Test	The operation of the software element or component, using instrumentation or other special test equipment to collect data for later analysis. Controlled condition, configurations, and inputs are used in order to observe the response. Results are quantified and analysed. This method can be used where user interaction is involved and when computations with input data are necessary.
Demonstration	The operation of the software element or component, that relies on observable functional operation not requiring the use of instrumentation, special test equipment, or subsequent analysis. This method is used to demonstrate a capability to be provided by the requirement.
Inspection	The visual examination of software code, documentation, etc. This method can be used where testing is not possible (e.g. the maximum number of items used as a limitation inside the code).
Special Case	Any special qualification methods for the software element, such as special tools, techniques, procedures, facilities, and acceptance limits.

[SOWG-300]   The DRTM shall for each requirement, in the COMPLETE state, record a reference to the requirement test result within the Deliverable Functional and Performance Test Report (DFPTR) (see section 2.5.4.3.7).

[SOWG-301]   The DRTM shall include a comments field with the test results records that shall be reserved for the Purchaser's use (the Purchaser will use this comments field to raise comments to the test results).

[SOWG-302]   The DRTM shall for each requirement, in addition to recording the individual test result for the requirement, also include a reference to the Deliverable Acceptance Report (DAR) (see section 2.5.4.7), identifying the requirement was formally accepted by the Purchaser.

[SOWG-303]   The DRTM shall for each requirement record that a requirement has been invoiced by providing a reference number to the invoice where the Contractor requested payment for the requirement.

[SOWG-304]   The DRTM shall for each invoiced requirement record the invoice number and date.

[SOWG-305]   The DRTM shall record the current MoSCoW priorities for all requirements in the work package {M, S, C, W}.

[SOWG-306]   The DRTM shall for each requirement record the date for the last change to the requirement's tracking information.

[SOWG-307]   The Contractor shall be able to provide the DRTM in Excel format to the Purchaser where the information is organized in accordance with the following rules:

(1)   The Excel spreadsheet shall contain the complete DRTM where each attribute of the DRTM is represented by a column, and where each row represents a requirement;

(2)   The Excel spreadsheet shall be sortable by column values;

(3)   It shall be possible to organize the information around the individual deliverables for the work package. I.e. all requirements pertaining to a deliverable can be grouped together in subsequent rows in the matrix.

[SOWG-308]   The DRTM shall be placed under configuration control throughout the period of performance the Contract.

2.5.4 Release Package

[120]   This section identifies documentation artefacts that are specific to the planning and execution of the work required to produce a software release (where the release could be deployed to production). Each WP increment will result in a release; i.e. working software including a set of deliverables.

[121]   As shown in Figure 2-7 the Release Package consists of:

(1)   A Scope and Requirements Analysis (SRA);

(2)   An Integrated Logistics Support (ILS) Plan (ILSP) and a Support Case;

(3)   A Test Plan including test cases and Reports (TP/R);

(4)   A Release Note;

(5)   A Maintenance and Administration Manual;

(6)   A working software component;

(7)   Site Activation Test Plans and Reports (SATP/R);

(8)   A Deliverable Acceptance Report (DAR).

Figure 2-7   Release Package
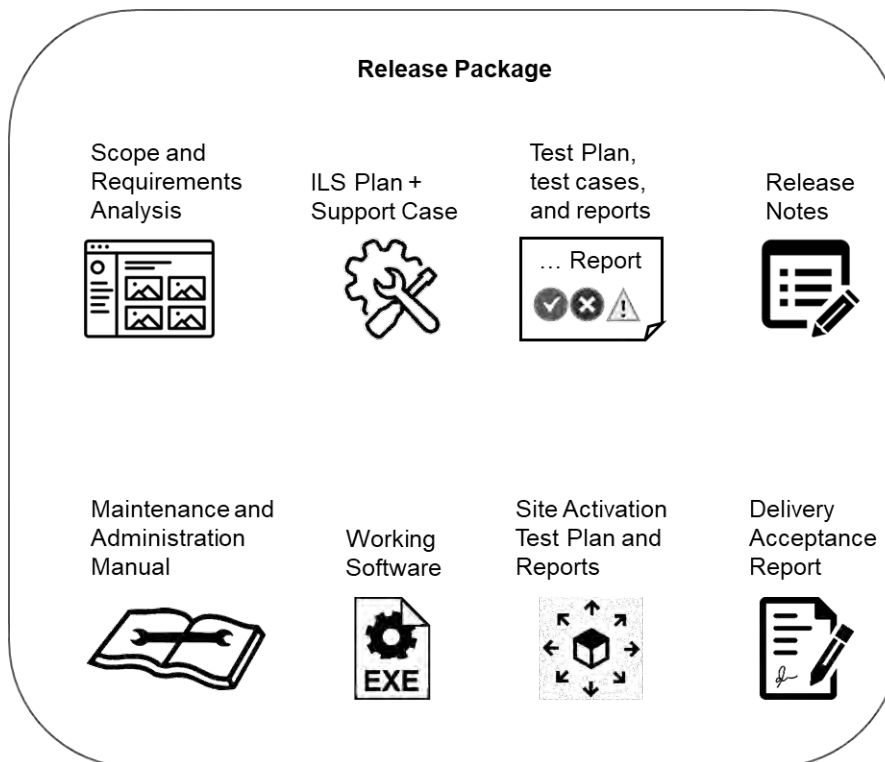
2.5.4.1 Scope and Requirements Analysis (SRA)

[SOWG-309]   The SRA shall include an analysis of all requirements pertaining to the deliverables planned for the next release where this analysis shall:
(1)   Identify potential issues with the requirements for the planned release;
(2)   Propose changes to the requirements definitions to resolve inconsistencies or ambiguities, or to suggest no-cost improvements.

[SOWG-310]   The SRA shall identify any pre-requisites, documentation, and knowledge transfer required for implementation of the Increment's deliverables.

[SOWG-311]   The SRA shall provide UI wireframes (e.g. using Balsamiq Wireframes) or mock-ups for any deliverables in the release that includes user interface (UI) components (the UI wireframes or mock-ups shall also be recorded in the SDD).

[SOWG-312]   The SRA shall identify all documentation artefacts required for the release (to be configuration controlled with the PBL). This list shall include Release Notes, Maintenance and Administration Manual, and Service Specifications (if applicable), etc.

[SOWG-313]   The SRA shall include a general Site Activation Test Plan & Report (SATP/R) that shall defines how the deliverables can be deployed to production, and define the test steps to verify a successful deployment.

[SOWG-314]   Each release shall as a minimum plan for deploying to a staging server on the production environment where the Contractor shall support the Purchaser in the installation and activation at the site.

[SOWG-315]   The SRA and all its individual artefacts shall be placed under configuration control throughout the period of performance the Contract.

2.5.4.2 Integrated Logistic Support Plan (ILSP) and Support Case

[122]   See section 2.3.2 and section 2.3.4.3.

2.5.4.3 Test Plan and Reports (TP/R)

[123]   The purpose of the TP/R is to plan for and record the results of all tests, verification and validation activities for the deliverables of the release.

2.5.4.3.1 General

[SOWG-316]   The TP/R shall be structured in accordance with the deliverable configuration items and the TP/R also shall form configuration items. I.e. the TP/R shall be included in the PBL.

[SOWG-317]   The TP/R shall include:
(1)   Overall Test Plan;
(2)   All test cases for the deliverables planned for the release;
(3)   Software Quality Metrics Report (SQMR);
(4)   Source Code Review Report (SCRR);
(5)   Security Test Report (SecTR);
(6)   Deliverable Functional and Performance Test Report (DFPTR);
(7)   System Integration Test Report (SITR);
(8)   Continuous Delivery Assessment Report (CDAR).

[SOWG-318]   Whenever feasible the test reports shall be automatically generated (e.g. through the NUnit report XML format).

[SOWG-319]   All manually written test reports (in a document format) shall on their front page show how many tests cases that passed, failed or were not run.

2.5.4.3.2 Overall Test Plan

[SOWG-320]   The Overall Test Plan shall describe the Contractor's approach to testing. I.e. how the Contractor will conduct tests that will collect the results to populate the individual reports as defined in section 2.5.4.3.4 through 2.5.4.3.9 below.

[SOWG-321]   The Overall Test Plan shall include templates for all the individual test reports.

2.5.4.3.3 Test cases

[SOWG-322]   The test cases shall document and describe all the test steps that meet or demonstrate Purchaser's requirements with an expected Test Result and pass/fail result.

[SOWG-323]   Whenever feasible, the test cases shall be defined, documented and implemented as executable test code (e.g. as Gherkin scenarios) to enable fully automated tests.

2.5.4.3.4 Software Quality Metrics Report (SQMR)

[SOWG-324]   The SQMR shall be auto-generated from full SonarCube (see [SonarCube]) static code analysis and dependency checking.

[SOWG-325]   The SQMR shall include an analysis on the test coverage achieved.

2.5.4.3.5   Source Code Review Report (SCRR)

[124]   Source code reviews is expected to be produced as a result of peer review of implemented source code. However, tool-based source code analysis (e.g. HP Fortify) could be used instead or in combination to the manual reviews.

[SOWG-326]   The SCRR shall document the source code review findings, and record any action items (or issues) resulting from such reviews, and the latest status of these action items (or issues). The SCRR shall include assessments on:
(1)   Readability of developed code;
(2)   Level of, and quality of, comments embedded in the source code. E.g.:
    (a)   Comments explaining the purpose of a class;
    (b)   Comments explaining what a function does, including descriptions of input parameters and return values;
    (c)   Comments explaining member variables; what the variable means (including unit of measure where appropriate;
    (d)   Comments on type definition explaining what the type represents;
(3)   Compliance with programming style guides and naming conventions;
(4)   Security vulnerability analysis against the Open Web Application Security Project (OWASP) identified vulnerabilities.

2.5.4.3.6   Security Test Report (SecTR)

[SOWG-327]   The SecTR shall record the results of source code analysis of security vulnerabilities, of manual security tests, and of automated security tests.

[SOWG-328]   The SecTR shall describe any security measures that aim to mitigate security issues identified in the SecTR.

2.5.4.3.7   Deliverable Functional and Performance Test Report (DFPTR)

[SOWG-329]   The DFPTR shall report the results of tests that verifies that the deliverable's functional and non-functional requirements (as defined in the SRS) are fulfilled.

[SOWG-330]   The DFPTR shall include test results from a test environment mimicking the actual production environment. This means:
(1)   Test results from the PBL release executing in a reference environment with all the same security constraints, compute resources, etc.;
(2)   Test results from using real operational data in the same volume, size, and quality (or "flaws") as in the production environment.

[SOWG-331]   The DFPTR shall include references to the SRS requirements being tested.

[SOWG-332]   Each individual test record in the DFPTR shall include a unique identifier, a date for when the test was recorded, and an identification of the PBL being tested.

[SOWG-333]   The DFPTR shall include regression testing as required and specifically report on, and record, the results of regression tests performed.

[SOWG-334]   In case a feature has been discontinued and no regression tests has been performed for this feature, this shall be explicitly called out and recorded.

[SOWG-335]   The DFPTR shall, in accordance with section 2.4.5.2.2.2, identify and describe defects found during testing.

2.5.4.3.8   System Integration Test Report (SITR)

[125]   The purpose of this report is to record of testing interfaces used for communicating with external applications and services. Such tests could be done through usage of test harnesses executed as part of the build process (Continuous Integration), or by direct test with the external application and services, or by a combination of the two approaches.

[SOWG-336]   The SITR shall be organized around the interfaces implemented in the PBL release.

[SOWG-337]   The SITR shall record results of integration tests for each of the identified interfaces in the PBL release.

2.5.4.3.9   Continuous Delivery Assessment Report (CDAR)

[126]   The purpose of the CDAR is to track the maturity and quality of the Continuous Integration & Continuous Delivery (CI/CD) processes implemented.

[SOWG-338]   The CDAR shall describe in detail setup of the CI/CD pipeline to include details on:
(1)   The steps in the pipeline;
(2)   What tools are being used;
(3)   What tests are being run.

[SOWG-339]   The CDAR shall describe the main or high-level GitHub activities (Git flows, branches, commits, pull-requests, etc.) for the work of implementing the PBL release.

[SOWG-340]   The CDAR shall include identified weaknesses in the current CI/CD setup and proposal for possible improvements to the CI/CD pipeline.

2.5.4.4   Maintenance and Administration Manual (MAM)

[SOWG-341]   The Contractor shall develop, provide and maintain the System Maintenance and Administration Manual.

[SOWG-342]   The Contractor shall detail all Scheduled and Unscheduled maintenance procedures and all Administration procedures in accordance with the Task Analysis.

[SOWG-343]   The Contractor shall test and validate the procedures and resources described in the MAM and in original equipment manufacturer (OEM) manuals.

[SOWG-344]   The Contractor's MAM shall provide product breakdown list (with CIs), functional descriptions and specifications, screenshots from the software with the procedures required for: deployment, installation, configuration and settings, use of LOG files, security procedures, disaster recovery, backup/restore, BIT/condition monitoring, troubleshooting techniques, test remove/ replace.

[SOWG-345]   The MAM shall describe in detail how to install a new baseline, including description on how to recover the old baseline if the new baseline installation must be aborted. If data migration is needed between baseline versions, the MAM shall describe how to migrate data form the previous baseline to the new baseline.

[SOWG-346]   The Contractor's Maintenance Manual shall provide the description for the usage of all third-party applications needed to configure, manage and maintain the system.

[SOWG-347]   The Contractor's Maintenance Manual shall define the in-depth, step-by-step procedure how to perform the 1st, 2nd and 3rd level corrective and preventive maintenance tasks and SM&C tasks.

[SOWG-348]   The MAM shall include troubleshooting guidance with details on how to solve a full range of potential problems or on how to provide workarounds for potential problems.

[SOWG-349]   The Contractor shall ensure that each and every procedure include as a minimum the following information:
(1)   The support level to be assigned;
(2)   Location/facility involved (if the operation is performed remotely, it has to be specified);
(3)   Personnel skills required;
(4)   Task duration and frequency (if applicable), reusing MTBF and MTTR data available;
(5)   Manpower required;
(6)   Tools, test equipment and special tools required (if any);
(7)   The steps needed to perform the procedure.

2.5.4.4.1   OEM Manuals for COTS products

[SOWG-350]   The Contractor shall provide original OEM manuals for all COTS software installed.

[SOWG-351]   The Contractor shall be responsible to keep the COTS OEM manual under configuration control and to assure that all the COTS OEM Manuals will be always coherent with the operational configuration deployed.

2.5.4.5   Release Note

[SOWG-352]   The Release Note shall identify and explain new features provided in the PBL release.

[SOWG-353]   The Release Note shall identify all Configuration Items in the PBL release that has changed since the previous release.

[SOWG-354]   The Release Notes shall, for the deliverables in the release, identify all known issues and limitations, and workarounds for these.

2.5.4.6   Site Activation Test Plan and Report (SATP/R)

[SOWG-355]   The SATP/R shall describe how the deployment of the new PBL release to the site is tested and verified to be successful.

[SOWG-356]   The SATP/R shall include tests that verifies that the PBL release is fully functional at the site which includes:
(1)   Verifying that the users of the PBL release (if any) can correctly access it and its data;
(2)   Verifying that PBL release's interfaces to external systems is properly configured and functional.

2.5.4.7 Deliverable Acceptance Report (DAR)

[127]   The purpose of the DAR is to serve as a record of the Purchaser's formal
          acceptance of a PBL release and through the PBL the SRS requirements it fulfils

[SOWG-357]   The DAR shall include a summary describing the PBL release, a sheet for
             the sign-off of the formal acceptance of the PBL, and then include the
             following reports as annexes:
             (1)   A Configuration Status Report for the PBL;
             (2)   ILSP with the Logistics Support Analysis;
             (3)   Software Quality Metrics Report;
             (4)   Source Code Review Report;
             (5)   Security Test Report;
             (6)   Deliverable Functional and Performance Test Report;
             (7)   System Integration Test Report;
             (8)   Maintenance and Administration Manual;
             (9)   Release Notes;
             (10)   Site Activation Test Plan/ Reports (if applicable).

[SOWG-358]   The Contractor shall provide the DAR in a PDF format.

[128]   The Purchaser will sign off the DAR pending that:
          (1)   All requirements with a Must Have priority for the defined deliverable(s) have
                 been fulfilled;
          (2)   All relevant test reports have been provided and the tests are successful.

[SOWG-359]   The Contractor shall place the Purchaser-approved DAR under configuration
             control.

3   Project-Specific Requirements

3.1   Contractor's Technical Personnel Qualifications

[129]   This section specifies special skills for individuals of the Contractors project team that are deemed required for this project in particular. The skills for generic project management roles are defined in section 2.1.1.

3.1.1   Technical Lead

[SOWG-360]   The Contractor shall designate a Technical Lead for the project; who shall lead the efforts in analysis, design, development, integration, and follow-on enhancement efforts of the Contractor.

[SOWG-361]   The Contractor's Technical Lead shall meet the following qualifications:
    (1)   Have a master's degree in Computer Science, or related/ equivalent studies;
    (2)   Have seven years of experience in leading technical roles in projects similar to this project in technical scope;
    (3)   Have documented expert knowledge and experience in Angular application framework, OData REST API, OWASP, C# and .Net, Web-applications, JavaScript, SQL databases, Graph databases;
    (4)   Have documented knowledge and experience on Elasticsearch and Neo4j (both used with components of the INTEL-FS Spiral 1 software);
    (5)   Have documented knowledge and experience with social network analysis (SNA) and/ or link analysis, and preferably have experience with implementation of SNA Web and/ or link analysis applications (e.g. using the KeyLines software development kit (SDK), GoJS JavaScript/ TypeScript library, etc.)
    (6)   Have a NATO S≡CRET clearance.

3.1.2   Scrum Master

[SOWG-362]   The Contractor shall designate a Scrum Master for the project; who shall manage and assist the SW development team in planning and executing their work so that the expected delivery goals are achieved.

[SOWG-363]   The Contractor's Scrum Master shall meet the following qualifications:
    (1)   Have a bachelor's degree in Computer Science, or related/ equivalent studies;
    (2)   Have five years of experience in leading technical roles in projects similar to this project in technical scope;
    (3)   Have a minimum of two years of experience in the role of a Scrum Master;
    (4)   Have a NATO S≡CRET clearance.

3.1.3   Test Director

[SOWG-364]   The Contractor shall designate a Test Director for all test activities conducted under this Contract; who shall direct the test planning and test implementation/ execution.

[SOWG-365]   The Contractor's Test Director shall meet the following qualifications:
    (1)   Have a bachelor's, or higher, degree in Computer Science, or related/ equivalent studies;

    (2)   Have seven years of experience working on SW intensive projects;
    (3)   Have documented expert knowledge and experience with automating testing and test reporting (e.g. using the NUnit framework, Jasmine, Gherkin test-scenarios, Selenium, etc.) for Azure DevOps;
    (4)   Have documented expert knowledge in automated security testing of Web-applications;
    (5)   Have documented knowledge and experience of Angular application framework, OData REST API, OWASP, JavaScript, and Typescript;
    (6)   Have a NATO SΞCRET clearance.

3.1.4 Software Developers

[SOWG-366]   The Contractor shall designate a team of experienced User Interface Software Developers, who shall implement the INTEL-FS2 UA user interfaces.

[SOWG-367]   The Contractor's User Interface Software Developers shall meet the following qualifications:
    (1)   Have a bachelor's, or higher, degree in Computer Science, or related/ equivalent studies;
    (2)   Have five years of documented expert knowledge and experience with software implementation of user interfaces in Web-Applications in particular in the latest versions of the Angular application framework;
    (3)   Have a UX design certification;
    (4)   Have documented experience of working with OData REST API;
    (5)   Have a NATO SΞCRET clearance.

3.2 Augmentation of SOW General Requirements

3.2.1 Additional requirements for deliverable acceptance

[SOWG-368]   The Contractor shall be able to demonstrate that whenever any UI is auto-generated (e.g. UI for entering IIE attributes) then such auto-generated UI shall be generated from the [INTEL-FS2-InformationModel]. The Contractor shall for auto-generated UI be able to demonstrate that a change in [INTEL-FS2-InformationModel] is automatically processed to update the relevant UI.

[130]   The purpose of the requirement above is to ensure that the UI is not auto-generated from aspects in the source code (as it is in INTEL-FS Spiral 1).

[SOWG-369]   The Contractor shall instrument the delivered software source code with additional logging that provides diagnostics information in case of issues with use of any Purchaser provided software component as PFI (this is of particular importance for issue the usage of the PFI-provide map visualization component (VC)).

[SOWG-370]   The Contractor shall for any requirements that cannot be fulfilled because of supposed issues in the usage of PFI software provide an analysis based on logged diagnostics information proving/ justifying that the root cause of not being able to meet the requirement is a defect in the PFI provided software. This analysis shall also include proof that the Contractor developed is complete and that once the issue in the PFI the requirement will be fulfilled without requiring any changes to the Contractor provided software.

3.2.2   Additional requirements for supporting release to production

[SOWG-371]   The Contractor shall, starting immediately after the first release to production (see 2.4.5.2.7) until the Final System Acceptance (FSA), provide support to ensure that the software running in production fulfils its availability requirements. This support shall, for all releases to production include:

(1)   2nd level support by performing problem analysis to identify the cause of reported issues with the software in production;

(2)   3rd level support by implementing bug fixes to identified issues and to subsequently produce a new PBL Release;

(3)   4th level support by obtaining and including new versions of 3rd party components and libraries when this is required to resolve issues in production.

[SOWG-372]   The Contractor shall, after FSA, in the Warranty period, continue to provide the 3rd level and 4th level support.

3.3   WP1.1 Upgrade UI, initial BMD OPFOR ORBAT Management, and new User Management – Phase 1

3.3.1   Deliverables

[131]   Table 3-1 below show an extract of the SSS for WP 1.1 identifying the high-level CLIN numbers for the deliverables of the WP sorted by Purchaser-expected delivery increment (for further breakdown and details of deliverables, see the SSS spreadsheet).

Table 3-1   WP 1.1 SSS high-level CLIN numbers

CLIN	Description	Delivery at increment number
1.1	User Management Application	1
2.3	Battlespace Object (BSO) Management Application	1
2.2	Products Management Application	2
2.5	Intelligence Situation Application	3
2.7	Search Application	3
2.10	Intelligence Requirements Management (IRM) Application	4
2.8	Analysis Application	5
2.1	Dashboard Application	6
2.9	ISR Organization Management Application	6
2.11	Collection Requirement Management (CRM) Application	6

3.3.2   Additional Requirements for Site Activations

[132]   Installation and activation of a release in the production environment will done by, or lead/ supervised by, the Purchaser with the support of the Contractor.

[SOWG-373]   In addition to the regular support for deployment of every release to the production staging environment the Contractor shall for WP1.1 also provide support for up to 10 installations and site activations on actual servers in production.

[SOWG-374] The Contractor shall, if deemed required to achieve successful activation, provide the key personnel to be present in person at the installation and activation event.

[133] Note: The installation and activation to production is normally executed from Purchaser's facility in Mons-Belgium.

[SOWG-375] The Contractor shall during WP1.1 be responsible for corrective maintenance of software produced by the Contractor.

[SOWG-376] The Contractor shall factor in the cost of the site installation and activation support, and for corrective maintenance of Contractor's developed software, into the cost of the software deliverables as defined in the SSS. I.e. the Contractor shall not expect any additional compensation for this support.

3.4   WP1.2 New user interfaces (using mock backends) – Phase 2

3.4.1   Deliverables

[134] Table 3-2 below show an extract of the SSS for WP 1.2 identifying the high-level CLIN numbers for the deliverables of the WP (for further breakdown and details of deliverables, see the SSS spreadsheet).

Table 3-2   WP 1.2 SSS high-level CLIN numbers and functionalities groupings

CLIN	Description	Delivery at increment number
3.6	BM JIPOE Application (using mock backend)	7
3.10	IRM Application (using mock backend)	7
3.11	CRM Application (using mock backend)	7
3.12	Collection Operations Management (COM) Application (using mock backend)	7

3.4.2   Additional Requirements for Site Activations

[135] Installation and activation of a release in the production environment will done by, or lead/ supervised by, the Purchaser with the support of the Contractor.

[136] In WP1.2 (Phase 2) the Contractor is not expected to deliver any new release to production as the work in this phase is to evolve the user interfaces against mock-backends.

[137] However, in case critical issues are identified in the software the Contractor delivered in WP1.1 requires new releases to production to fix the issue then the Contractor will have to support this.

[SOWG-377] The Contractor shall in Phase 2, when required provide installation and site activation support for any release to production that is required to address issues in the software delivered by the Contractor.

3.5   WP1.3 Full integration with new backend API – Phase 3

3.5.1   Deliverables

[138] Table 3-3 below show an extract of the SSS for WP 1.2 identifying the high-level CLIN numbers for the deliverables of the WP sorted by Purchaser-expected delivery

increment (for further breakdown and details of deliverables, see the SSS spreadsheet).

Table 3-3   WP 1.3 SSS high-level CLIN numbers

CLIN	Description	Delivery at increment number
4.2	Products Management Application (new backend)	8
4.3	Battlespace Object (BSO) Management Application (new backend)	8
4.7	Search Application (new backend)	8
4.8	Analysis Application (new backend)	9
4.9	ISR Organization Management Application (new backend)	9
4.10	IRM Application (new backend)	9
4.11	CRM Application (new backend)	9
4.1	Dashboard Application (new backend)	10
4.6	BM JIPOE Application (new backend)	10
4.5	Intelligence Situation Application (new backend)	10
4.4	Targets Application (new implementation)	11
4.12	COM Application	11

3.5.2   Additional Requirements for Site Activations

[139]   Installation and activation of a release in the production environment will done by, or lead/ supervised by, the Purchaser with the support of the Contractor.

[SOWG-378]   In addition to the regular support for deployment of every release to the production staging environment the Contractor shall for WP1.3 also provide support for up to 15 installations and site activations on actual servers in production.

[SOWG-379]   The Contractor shall, if deemed required to achieve successful activation, provide the key personnel to be present in person at the installation and activation event.

[140]   Note: The installation and activation to production is normally executed from Purchaser's facility in Mons-Belgium.

[SOWG-380]   The Contractor shall also during WP1.3 be responsible for corrective maintenance of software produced by the Contractor.

[SOWG-381]   The Contractor shall factor in the cost of the site installation and activation support, and for corrective maintenance of Contractor's developed software, into the cost of the software deliverables as defined in the SSS. I.e. the Contractor shall not expect any additional compensation for this support.

3.6   WP 1.4 Optional 3rd and 4th Level Maintenance and Support

[141]   This optional Work Package identifies a 3rd and 4th Level Maintenance and Support deliverable (see section 2.3.3.1) that can be exercised within the Contract for delivery after the Warranty period expires.

[SOWG-382]   The Contractor shall provide one year of 3rd Level and 4th Level Maintenance and Support for the I2UA capability where this support includes:
(1)   Support to NCI Agency's 2nd Level Support process with identification of the root cause of the issue (e.g. by issue replication testing);
(2)   Implement the software corrections as identified in (1);
(3)   Test the corrections in accordance with the testing activities as defined in section 2.4.5.2.2;
(4)   Support the IV&V testing in accordance with section 2.4.5.2.4;
(5)   Support the UAT testing in accordance with section 2.4.5.2.5;
(6)   Define a new PBL in the CMDB and create a Release Note in accordance with section 2.5.4.5;
(7)   Support the Deliverable Acceptance Review in accordance with section 2.4.5.2.6;
(8)   Support the Release Management in accordance with section 2.4.5.2.7.

[SOWG-304]   If the Purchaser activates the optional support package, the Contractor shall be fully compliant with section 2.3.7 Warranty Requirements and provide all the services described under aforementioned section without any additional cost.

NATO Communications and Information Agency
Agence OTAN d'information et de communication

INTEL-FS SPIRAL 2 - USER APPLICATIONS (I2UA)
BOOK II - PART IV - SRS

SYSTEM REQUIREMENT SPECIFICATION (SRS)

Version 1.3

10/03/2021

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Document Revision History

Date	Version	Changes
21 Dec 2020	1.0	IFB package release version
29 Jan 2021	1.1	Added a few requirements clarifications on template management and data loss protection
04 Mar 2021	1.2	Added comment to clarify that a XACML PDP service will be provided by the SOA & IdM Platform
10 Mar 2021	1.3	Added information about the JEMM exchange format and removed [FUA-5] (hide/ unhide domain values) from scope of I2UA.

1   Introduction

[1]   This System Requirements Specification (SRS) documents the requirements for the user applications of the Intelligence Functional Services (INTEL-FS) Spiral 2, hereafter referred to as the I2UA.

1.1   Scope

[2]   This SRS specifies Functional and Non-Functional system requirements for the I2UA. In fulfilling the functional and non-functional requirements defined in this SRS, the I2UA will also have to fully support the INTEL-FS Spiral 2 user stories as defined in [INTEL-FS2-UserStories].

[3]   The Functional Requirements of the I2UA specify the functions that will be implemented by this capability in order to deliver the user applications for INTEL-FS Spiral 2.

[4]   The Non-Functional Requirements of the I2UA specify the quality and performance constraints that shall be satisfied in the solution design and implementation.

[5]   The INTEL-FS Spiral 2 user stories (see [INTEL-FS2-UserStories]) specify the tasks that the users of the I2UA will be able to conduct using features implemented by I2UA and supported by the INTEL-FS Spiral 2 backend (I2BE).

[6]   In addition to explicitly specifying new system requirements, legacy user interface (UI) functionality of the INTEL-FS Spiral 1 will be maintained and improved.

1.2   Conventions

[7]   Within this SRS, general functional requirements applicable to most or all user applications are numbered as [GUA-number], application-specific functional requirements are numbered as [FUA-number], non-functional requirements (NFR) are numbered as [NFR-number], while narrative text is numbered as [number].

[8]   Each functional requirements has associated with it a cost attribute. The Contractor will prior to starting the work identify the cost of each single functional requirement. The cost of implementing the general requirements and the cost of obtaining the qualities of the non-functional requirements will have to be incorporated into the implementation cost of the functional requirements. Hence, the general requirements and the non-functional requirements do not have an associated cost attribute.

[9]   The term "including" is throughout this SRS never meant to be limiting - the list that follows is always non-exhaustive.

1.3   Phased approach to delivering user functionality

[10]   The I2UA capability is expected to be delivered in three phases:

(1)   In phase 1 the I2UA Contractor will address the obsolescence of the INTEL-FS Spiral 1 user interface (UI) and replace it with a new and modern UI that will be based on the Angular TypeScript-based open-source front-end web application platform. The new UI will interface with the current INTEL-FS Spiral 1 backend through a RESTful abstraction layer, see Figure 1-1. An initial version of this abstraction layer exists and is included within the INTEL-FS Spiral 1 product baseline. However, the I2UA contractor should expect to have to make some changes to this abstraction layer and also to make some changes to the INTEL-FS Spiral 1 database to enable implementation of the new UI.

(2)   At the time when the Contractor has completed phase 1, the interface for the new backend (to be delivered through a separate contract) may still not be ready for the I2UA Contractor to use. In this case, a phase 2 is inserted where work can continue to evolve the user interfaces for new functionality against a mock backend. In phase 2

the Contractor is responsible to establish mock backends to enable implementation of new user interfaces.

(3)   In phase 3 all of the user interfaces will be integrated with a new (and separately implemented) backend and the REST abstraction layer and the legacy INTEL-FS Spiral 1 backend will be retired.

Figure 1-1 Accessing INTEL-FS Spiral 1 data through an abstraction layer
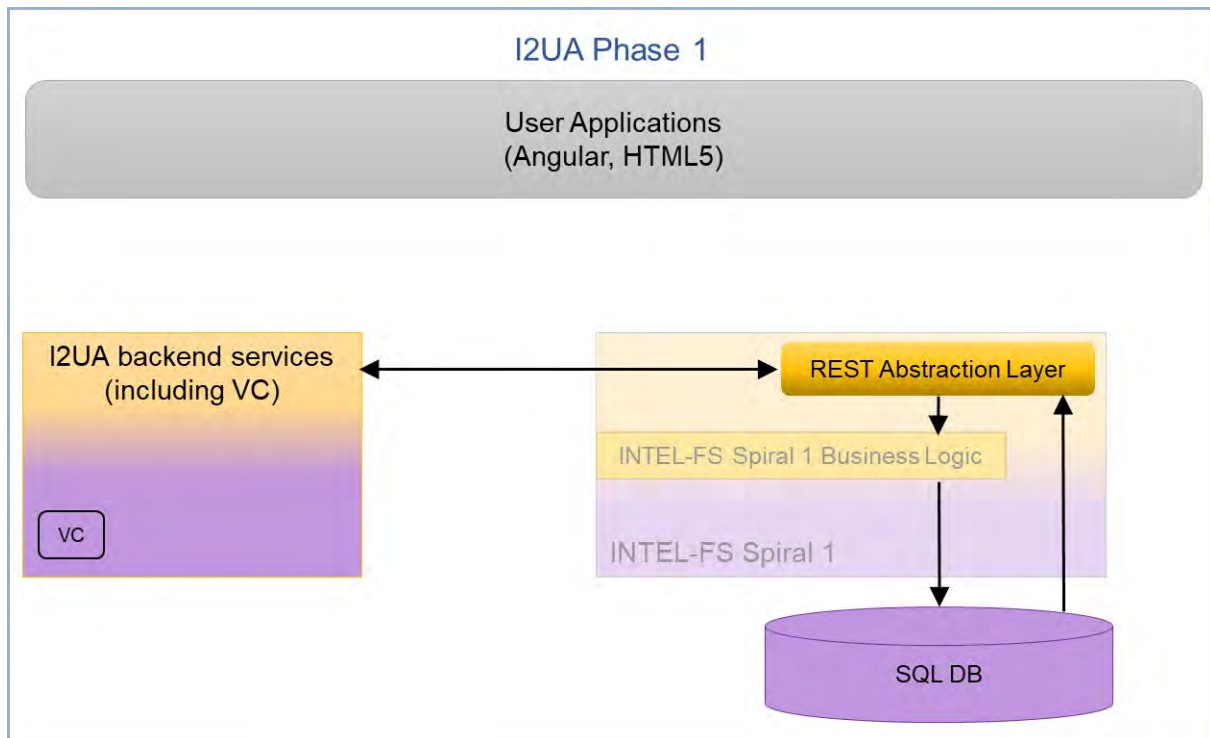
[11]   In the case that initial backend services are available (provided through a different contract) the work described under phase 2 can/ will be merged into phase 3. I.e. the new user interface functionality is implemented directly against the new backend application programming interface (API) instead of against a mock backend.

1.4   Structure

[12]   This SRS is structured as follows:

- Chapter 1: The introduction to this document;
- Chapter 2: Specification of general requirements that generally applies across all deliverables;
- Chapter 3: Specification of the requirements for the user account management application;
- Chapter 4: Specification of the functional requirements for the I2UA;
- Chapter 5: Specification of the Non-functional Requirements for the I2UA.

1.5   Applicable documents

[13]   Applicable documents provide details not explicitly set out through this SRS (other requirements, architecture, standards and specifications). The Contractor shall consider the applicable documents as requirements associated with this SRS.

Table 1-1 Applicable documents (Compliance Requirements)

[INTEL-FS2-	CO-14873-INTELFS2, INTEL-FS SPIRAL 2 - Information Model

InformationModel]	Book II - Part V, NCI Agency
[INTEL-FS2-UserStories]	CO-14873-INTELFS2, INTEL-FS SPIRAL 2 - USER APPLICATIONS (I2UA) BOOK II - PART IV - USER STORY DOCUMENT (USD), NCI Agency

1.6   Reference documents

[14]   Reference documents are documents providing contextual information that is relevant to this project. They shall be used by the Contractor to support his activity.

Table 1-2 Reference documents

[AC/35-D/2004-REV3]	Primary Directive on CIS Security, North Atlantic Council, 15 November 2013 (NATO Unclassified)
[ADatP-4774]	NATO STANDARD ADatP-4774, CONFIDENTIALITY METADATA LABEL SYNTAX, Edition A Version 1, December 2017
[ADatP-4778]	NATO STANDARD ADatP-4778, METADATA BINDING MECHANISM, Edition A Version 1, October 2018
[AEDP-19]	NATO Standard ISR Workflow Architecture, AEDP-19 Edition A Version 1, March 2018
[APP11D-DIR]	APP-11(D)(1)/ J186, DIR (DYNAMIC INTELLIGENCE REPORT), Edition D Version 1, NATO UNCLASSIFIED
[HMI-C4ISR]	Human Machine Interface (HMI) Style Guide for Rich C4ISR Applications, edition 2.0, 30 July 2018, NCI Agency
[NAMIS]	NAMIS Interface Control Document (ICD), version v3.6.16, 22/05/2019, NCI Agency (NATO Unclassified)
[NCOP-ICD]	NCOP INTERFACE CONTROL DOCUMENT, Rev. No. 1.6, 01 MAR 2018, NCI Agency
[OData-4.0]	OData Version 4.0. Part 1: Protocol Plus Errata 03, 02 June 2016, OASIS http://docs.oasis-open.org/odata/odata/v4.0/errata03/os/complete/part1-protocol/odata-v4.0-errata03-os-part1-protocol-complete.html
[OWASP]	Open Web Application Security Project (OWASP), https://www.owasp.org/index.php/Main_Page
[SOA-IdM]	CO-14176-SOA-IDM Service Oriented Architecture (SOA) and Identity Management (IdM) Platform – Wave 1, System Design Specification (SDS) and Interface Control Document (ICD), NCI Agency
[SonarQube]	SonarQube, https://www.sonarqube.org/
[VC-IDC]	TRI-IC-54-2085, Visualisation Component Interface Control Document (VC-ICD), MAR. 30, 2020

1.7   Background – Envisioned Capability

[15]   With the I2UA NATO will acquire a set of user applications for directing intelligence collection, and for analysing and visualizing intelligence data in support of the NATO Intelligence community and the Ballistic Missile Defence (BMD) community.

[16]   The final I2UA capability will:

   (1)   Implemented as a web-application, where the user interface is running in the Angular framework within a web browser.

(2)   Interact with a backend intelligence information platform hereafter referred to as the I2BE.The I2BE will expose a RESTful application programming interface (API) that the I2UA will consume. The backend API will primarily be implemented as a Open Data Protocol (OData) API enabling the I2UA to access the intelligence information entities(IIE) managed in the backend.

(3)   Provide UI support for all of the functionality that is currently in place for INTEL-FS Spiral 1, but ported onto the Angular framework and removing all dependencies on Microsoft Silverlight.

(4)   Augment the UI with support for new functionality like collection management (CM), ballistic missile (BM) opposing force (OPFOR) order of battle (ORBAT) management, BM joint intelligence preparation of the operating environment (JIPOE), etc.

(5)   Re-implement user authentication and authorization functionality to use an attribute-based access control (ABAC) mechanism.

(6)   Manage I2UA user accounts.

[17]   The users of I2UA is managed according to their organizational belonging. This means that each user will be registered as a member of an organizational node (ON).

[18]   The ON concept is used to manage visibility and dissemination of information:

(1)   IIEs created by a user within an ON is initially only visible within the ON;

(2)   The user can through an approval process get the IIE published, and once the IIE has been published it will be retrievable and visible for users at other ONs (pending they have the correct access rights).

[19]   The users of I2UA will have access to several data sources (eventually exposed through the I2BE API) that will contain different data; typically there will be one operational data source and several exercise and training data sources.

[20]   The technical solution of I2UA is envisioned to consist of 14 loosely coupled user applications:

(1)   User Management Application
(2)   Dashboard Application
(3)   Products Management Application
(4)   Battlespace Object (BSO) Management Application
(5)   Targets Application
(6)   Intelligence Situation Application
(7)   BM JIPOE Application
(8)   Search Application
(9)   Analysis Application
(10)   Intelligence, Surveillance and Reconnaissance (ISR) Organization Management Application
(11)   Intelligence Requirements (IR) Management Application
(12)   Request for Information (RFI) Management Application
(13)   Collection Requirement (CR) Management Application
(14)   Collection & Exploitation Planning Application

2   General functional requirements

[21]   This chapter chapter defines a set of general requirements that are generally applicable to all of the I2UA User Applications.

[22]   Note: Costing is broken down according to the I2UA applications and therefore the cost of implementing general requirements is to be incorporated into the cost of each delivered I2UA application.

2.1   General cross-cutting requirements

2.1.1   No loss of legacy functionality

[GUA-1]   The I2UA shall, as it evolves through this project, replace user-facing functionality from INTEL-FS Spiral 1 version 1.5; this shall be based on the principle of no regression (no loss of functionality and no loss of non-functional qualities) unless otherwise agreed with the Purchaser.

Verification: Demonstration

[23]   Note: The existing INTEL-FS Spiral 1 functionality that is to be replaced is included within the requirements of this SRS and within the user stories in [INTEL-FS2-UserStories].

[224]   [INTEL-FS2-InformationModel] implicitly includes the information managed by Spiral 1 because it extends from the principal components of Spiral 1. These principal components include: Battlespace Object (BSO) Management; Reference Data Management; ISR Product-Metadata Management and Intelligence Requirements Management (IRM).

2.1.2 Testability, test automation, continuous integration (CI) and continuous delivery (CD), and quality assurance (QA)

[GUA-501]   The software shall be designed and structured for good testability. This includes usage of patterns such as, for example, decoupling, test data generation and dependency injection to enable unit testing.

Verification: Inspection

[GUA-2]   Test automation, continuous integration (CI), and continuous delivery (CD) shall be implemented for all of I2UA applications and services.

Verification: Demonstration

[GUA-3]   The Continuous Integration shall include automated security tests, automated source code analysis including security vulnerability analysis, and automatic smoke test (build verification test (BVT)).

Verification: Demonstration

[GUA-4]   All applications and services modules shall be accompanied with automated regression tests (e.g. unit tests and external test harnesses).

Verification: Inspection

[GUA-5]   Hardcoding of, or embedding of, resources, configuration settings, or any other non-binary artefacts (URL, DNS, IP addresses, file path, drive letters, etc.) shall NOT be implemented/ used.

Verification: Inspection

2.1.3 Export of information

[GUA-12]   The I2UA shall when exporting any data to a file ensure that highest security classification and the most restricted releasability of the data is captured in the exported file, and that the file name convey the file security classification and releasability. Whenever possible, the classification and releasability markings shall be compliant with [ADatP-4774] and [ADatP-4778]). When exporting to a PDF or Office type file, the content's highest security classification and most restricted releasability shall be inserted in the document header and footer on all pages.

Verification: Demonstration

[GUA-13]   The I2UA shall always require the user to specify/ confirm the highest security classification and most restricted releasability of the file before saving an export file.

Verification: Demonstration

2.1.4 User Interface cross-cutting requirements

2.1.4.1 Language

[GUA-14]   The I2UA shall use "UK English" as the default language. This shall apply to all applications and supporting components, including all user interfaces (e.g.

views, dialogs, help screens, tooltips, etc.), error/notification/warning messages and documentation.

Verification: Demonstration

2.1.4.2   HTML5 implementation

[GUA-15]   The UI shall be implemented in Angular 9 (or newer) and HTML5.

Verification: Demonstration and Inspection

[GUA-16]   The UI shall be implemented in accordance with the recommendations provided in the "Human Machine Interface (HMI) Style Guide for Rich C4ISR Applications" [HMI-C4ISR].

Verification: Demonstration

[GUA-17]   It shall be possible for a user to switch the user interface theme between the dark theme and the light theme UI as defined by [HMI-C4ISR].

Verification: Demonstration

2.1.4.3   Implemented as a set of "Apps" in a web browser

[GUA-18]   The UI shall be organized as a set of applications ("Apps").

Verification: Demonstration

[GUA-19]   The "App" window shall include a classification bar (see [HMI-C4ISR]).

Verification: Demonstration

[GUA-20]   Each App shall include a main menu bar that includes an identification of the App (e.g. an "App logo"), a help function (?), a configuration settings function, and an application selector. Examples for such main menu bars (from Google Apps) are shown in the two figures below.

Verification: Demonstration

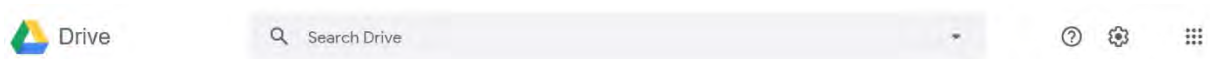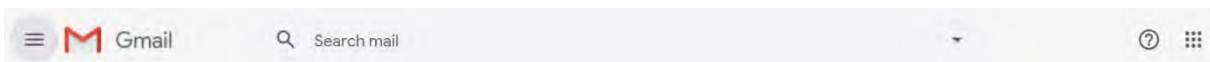Figure 2-1 Example 1 of main menu bar - Google Drive

Figure 2-2 Example 2 of main menu bar - Gmail

[GUA-21]   The UI shall require only an ordinary web browser present on the Approved Fielded Product List (AFPL) at the time of deployment, and shall not require the

installation of additional software, components or plug-ins on the user workstation, except as specifically waived by the Purchaser.

Verification: Demonstration

[GUA-22]   The UI shall run successfully independent of environment regional settings (e.g. decimal symbol, date/time format).

Verification: Demonstration

2.1.4.4   Adapted to user roles and user privileges

[GUA-23]   The UI shall adapt to the individual users roles and privileges (e.g., a user with only read privileges shall not have access to create functionalities, a user with no access to a particular feature within an App shall normally not see/ detect the existence of such a feature, a user with no privilege to access an App shall not even see the App, etc.).

Verification: Demonstration

2.1.4.5   Tooltips, other guidance and user feedback

[GUA-24]   The I2UA shall implement tooltips for all controls, which can benefit from a text description, especially those that do not have a text label. The tooltips shall be configurable (i.e. they can be updated without rebuilding/ recompiling the software). The tooltips shall as a minimum have support for bold font, space between paragraphs, numbered lists, and bullet lists. For more guidance on tooltips, see [HMI-C4ISR].

Verification: Demonstration

[GUA-25]   The I2UA shall display the expected input format on all form fields to the user if the label is not clear enough (e.g. date input format - ddmmyyyy or dd-mm-

yyyy). This shall be done via tooltips, greyed-out example content, additional labels, or some other means.

Verification: Demonstration

[GUA-26]   The I2UA shall notify the user who has initiated an action that processing of the action has started and convey the sense of processing progress (by means of a progress indicator, dialog boxes).

Verification: Demonstration

[GUA-27]   The I2UA control actions shall be simple and direct, whereas potentially destructive control actions shall require extended user attention such that they are not easily acted on (e.g., "are you sure" queries).

Verification: Demonstration

[GUA-28]   The I2UA shall provide an error management capability which is readily distinguishable from other displayed information (e.g. pop-up error dialog window).

Verification: Demonstration

[GUA-29]   The I2UA shall provide the users with meaningful error messages and information about the actions they need to take in order to fix or at least to report the problem.

Verification: Demonstration

[GUA-30]   The I2UA shall include a visual label that at all times inform the user of which data set the user is connected to (i.e. operational data set, training data set, exercise data set, ...)

Verification: Demonstration

[GUA-31]   The I2UA shall only allow a user to be connected to one data set at the time (per session) to prevent data leakage between data sets.

Verification: Demonstration

2.1.4.6   Online help

[GUA-34]   The I2UA shall provide online help functions where the help information is implemented as HTML5 documents and where hyperlinks from the help information to externally provided multimedia files is supported/ possible.

Verification: Demonstration

[GUA-35]   The text for the online help functions shall be managed in updateable server-side files. It shall be possible to edit and update the text for the online help functions without requiring software recompile.

Verification: Demonstration

[GUA-235]   The text for the online help function shall also be made available in the form of a wiki compliant with the Purchaser Knowledge Management tools.

2.1.4.7   Data entry interactions

[GUA-36]   Where the user is entering (or changing) data, the user interface shall detect invalid and missing entries. The invalid or missing entries shall be highlighted or marked so that the user can be quickly identify and correct them. The validation

(and subsequent highlighting) of the value in an entry field shall take place "dynamically" upon moving to the next entry field.

Verification: Demonstration

[GUA-37]   The I2UA shall use predefined dropdown lists based on configured Domain Values in appropriate situations. Open text input fields shall, if possible, be avoided to prevent errors during input.

Verification: Demonstration

[GUA-38]   For all attributes related to geographic co-ordinates, the I2UA shall allow the User to enter geographic co-ordinates using a gazetteer function. The user shall be able to: 1) Select a gazetteer (or optionally use the default gazetteer), and 2) Select a place/area name from the gazetteer.

Verification: Demonstration

[GUA-39]   Whenever it is possible to validate User input values then validation of entered value shall be performed. In particular, data that will be forwarded to the backend shall be validated against the interface specification of which the data will pass through.

Verification: Demonstration

[GUA-40]   In the I2UA, during data entry, the ENTER key shall not trigger form submission. I.e. the user shall specifically click the "submit button" to submit the entered data.

Verification: Demonstration

[GUA-41]   The I2UA shall provide prompts (i.e., allow cancellation or confirmation) when input or changes may be lost due to navigation or logging out.

Verification: Demonstration

[GUA-42]   Any user interface shall support normal Microsoft (MS) Windows Accelerators. These shall include: CTRL+C (Copy), CTRL+X (Cut), CTRL+V (Paste), CTRL+Z (Undo), CTRL+Y (Redo) and DELETE (Delete).

Verification: Demonstration

[GUA-43]   The I2UA shall allow the user to cut, copy and paste [textual or tabulated] data between (to and from) the I2UA applications and Microsoft Office formats.

Verification: Demonstration

[GUA-44]   The I2UA shall be able to undo changes made during data entry by supporting reversing of up to 100 "undoable" changes.

Verification: Demonstration

[GUA-45]   The I2UA shall be tolerant to the delimiters of input format, including Date format (e.g. dd-mm-yyyy could also be entered as ddmmyyyy or d-m-yy without error or picked from a calendar) and Location format (e.g. latitude/longitude could be entered as degrees-minutes-seconds, decimal degrees, etc.)

Verification: Demonstration

[GUA-46]   For all attributes related to geographic coordinates, the I2UA shall allow the user to enter geographic coordinates in a single text field (not requiring the user to copy/paste more than once to input a geographic value). I2UA shall be able

to automatically identify and parse the location formats as listed in the table below.

Verification: Demonstration

Table 2-1 Location formats automatically detected

1	Degrees/Minutes/Seconds
2	Decimal Degrees
3	Degrees and Decimal Minutes
4	Degrees, Minutes and Decimal Seconds
5	Military Grid Reference System (MGRS)
6	Universal Transverse Mercator (UTM)

2.1.4.8   User eXperience (UX)

[GUA-546]   The I2UA shall use dialog windows sparingly (a better solution will normally be to use in-line expansion) and shall be kept simple.

Verification: Demonstration

[GUA-547]   The I2UA dialog windows shall not include multiple steps, and shall not launch other dialog windows.

Verification: Demonstration

[GUA-548]   All I2UA user interfaces shall automatically refresh whenever a user makes a change that has an impact on the information presented in the UI on the screen.

Verification: Demonstration

[GUA-549]   The I2UA shall in all entry fields where dates are provided be flexible and allow other data formats than the one indicted by tooltips or in the field (see [GUA-25]) and automatically detect the date-format entered.

Verification: Demonstration

[GUA-550]   The I2UA shall for all textual entry fields spell-check the entered text, visually highlight spelling errors, and suggest spelling corrections.

Verification: Demonstration

[GUA-551]   The I2UA shall for all multi-select actions support consecutive item selection by selecting first and last item in a list (e.g. by shift-key plus left mouse click) and support adding individual (non-consecutive) items to the multi-selected set (e.g. by control-key plus left mouse click).

Verification: Demonstration

[GUA-552]   The I2UA shall for all panels and dialog windows containing data entry fields support navigation between entry fields using the Tab key (i.e. Tab key to move

cursor to next entry field and Shift-Tab key to move curser to previous entry field)

Verification: Demonstration

2.1.5   Access control

[25]   The I2UA should make use of the SOA & IdM Platform Identity and Access Management (IAM) Components and Services defined in the [SOA-IdM].

[GUA-47]   The I2UA shall implement support for single sign on (SSO).

Verification: Demonstration

[GUA-48]   The I2UA shall implement the authentication/ authorization standards specified by the [SOA-IdM] to include WS-Security/ Security Assertion Markup Language (SAML) and OAuth2/ OpenID Connect (OIDC).

Verification: Demonstration

[GUA-49]   The I2UA shall replace the INTEL-FS Spiral 1 access control mechanism with an implementation of the eXtensible Access Control Markup Language (XACML) version 3 architecture as defined by the Organization for the Advancement of Structured Information Standards (OASIS). The I2UA ABAC implementation shall provide the same (or better) granularity of access control to I2UA resources.

Verification: Demonstration

[26]   Policy attributes for the Subjects will most likely include Identity, Organizational Node (ON), and Role (e.g. Administrator, Intel Creator, Intel Manager, etc.).

[27]   Policy attributes for the Objects will be the IIE at category/type granularity (e.g. Product/Document, Product/Image, Product/ Report, BSO/Person, BSO/Unit, etc.) including confidentiality labels.

[28]   Policy Actions will include Create, Read, Update, Soft Delete, Hard Delete, Approve, Publish, Archive, and other workflow actions.

[29]   Policy Context will include data set (operational data set, training data set, exercise data set, etc.), date-time, etc.

[GUA-50]   The I2UA shall use externally defined and administered XACML policies. E.g. policy decision point (PDP). I.e. using a policy retrieval point (PRP) that uses policies from an external policy store administered by an external policy administration point (PAP).

Verification: Demonstration

[229]   Note: XACML will be implemented within a SOA&IdM Platform's Policy Decision Point (PDP) called by a Policy Enforcement Point (PEP) in the I2UA.

[GUA-51]   An I2UA shall only be accessible for users that have been granted the privilege to access the application; for users that are given access, the application shall

enforce that the access rights are limited to the users assigned privileges (based on claims)

Verification: Demonstration

[GUA-52]   It shall be possible to control access to all functionality (user actions) defined in this SRS with ABAC policies.

Verification: Demonstration

2.1.6   Third-party components

[GUA-54]   Third-party UI component shall be implemented entirely using JavaScript (or TypeScript), HTML, and cascading style sheets (CSS).

Verification: Demonstration

[GUA-55]   Third-party UI component shall be cross-browser compatible, and shall work with any backend and framework (Angular, React, etc.)

Verification: Demonstration

[GUA-56]   Third-party UI component shall have support for changing the visual style using cascading style sheets (CSS).

Verification: Demonstration

[GUA-57]   Purchaser shall approve the choice of any third-party components.

Verification: Inspection

2.1.7   Minimized backend footprint

[GUA-557]   The I2UA, with the exception of the User Management Application, shall not introduce/ implement any backend processing services and shall be fully implemented as a browser-based client application. The only exception from this rule is the User Management Application where server side functionality will be expected and required.

Verification: Inspection

2.1.8   Compliance with non-functional requirements (NFR)

[GUA-558]   The I2UA applications shall comply with the NFRs as defined in chapter 4, when the NFR is relevant for the individual application. In general all NFRs are relevant for all applications, with a few exceptions, like the User Management Application not having the same performance and capacity requirements as the other applications. The Performance Requirements (see section 4.2) and the Interoperability Requirements (see section 4.3.2) will not be applicable before the Phase 3 deliveries.

Verification: Test, Demonstration, Analysis and Inspection

2.2   General UI requirements

2.2.1   Use of panels

[GUA-58]   The User Applications shall consist of a set of panels that enables the user to adapt the user interface to his/ her needs and tasks. Note: Panels are not

windows, and thus that cannot be moved freely; nor can they overlap each other.

Verification: Demonstration

[GUA-60]   It shall be possible to resize a panel by dragging and dropping the panel's border. This means that there can be no gaps or empty spaces between the panels, which keeps the UI manageable.

Verification: Demonstration

2.3   General IIE-oriented requirements

2.3.1   Workflow management requirements

[GUA-63]   It shall be possible to search for and select one or multiple draft application-specific IIEs and request for the selected IIEs to be approved/ published.

Verification: Demonstration

[GUA-64]   It shall be possible to develop draft IIEs that can be saved to enable the user to continue working on the draft IIE across multiple sessions.

Verification: Demonstration

[GUA-65]   It shall be possible to search for, filter, and sort application-specific IIEs awaiting approval, select one or multiple such IIEs, and approve the IIEs, or approve and directly publish the IIEs.

Verification: Demonstration

[GUA-66]   It shall be possible to search for, filter, and sort application-specific IIEs awaiting approval, select one or multiple such IIEs, reject them and add/ attach rejection comments.

Verification: Demonstration

[GUA-67]   It shall be possible to search for application-specific IIEs waiting to be published, select one or multiple such IIEs, and publish the IIEs.

Verification: Demonstration

[GUA-68]   It shall be possible to search, filter, and sort application-specific IIEs where the approval has been rejected, and identify the reason for rejection. It shall then be

possible to update the IIEs and resubmit them for approval, or alternatively leave them in draft status, or delete them.

Verification: Demonstration

2.3.2   IIE data management requirements

[GUA-69]   The applications shall implement user interfaces for managing (create, update, delete) all IIEs that are identified through the user stories and associated acceptance criteria to be of relevance for the particular application.

Verification: Demonstration

[GUA-70]   The applications data entry form for a particular IIE shall enable the user to enter/ update all attributes of the IIE as per definition of the particular IIE in [INTEL-FS2-InformationModel].

Verification: Demonstration

[GUA-570]   The applications data entry form shall support the confidentiality metadata label syntax as defined by [ADatP-4774] for the IIEs in accordance with the IIEs' confidentiality metadata attribute definitions in [INTEL-FS2-InformationModel].

Verification: Demonstration

[GUA-571]   It shall be possible through configuration settings, to define default values for the applications data entry forms for the different IIEs as per definition of the IIE in [INTEL-FS2-InformationModel].

Verification: Demonstration

[GUA-72]   The applications shall validate the entered data in the data entry form against [INTEL-FS2-InformationModel] and ensure that the entered data is valid before submitting the data to the backend API.

Verification: Demonstration

[GUA-73]   The application responsible for managing particular IIE types shall enable an authorized user to search for application-specific IIEs, select one or multiple such IIEs and tag them as soft-deleted.

Verification: Demonstration

[GUA-74]   The application responsible for managing particular IIE types shall enable an authorized user to search for soft-deleted application-specific IIEs, select one or multiple such soft-deleted IIEs and un-delete them.

Verification: Demonstration

[GUA-75]   The application responsible for managing particular IIE types shall enable an authorized user to search for application-specific IIEs, select one or multiple

such IIEs and hard-delete them (i.e. these IIEs will be permanently removed and cannot later be undeleted).

Verification: Demonstration

2.4   General requirements for IIE View/ Entry Panels

[GUA-575]   The IIE View/Entry Panel shall be used for presenting all details of a selected IIE (in read-only mode), and for editing all attributes of an IIE (in edit mode).

Verification: Demonstration

[GUA-576]   It shall be possible to supress all optional attributes and show only the IIE's mandatory attributes in the panel where all the mandatory attributes can be seen and directly accessed without needing to use the scrollbar.

Verification: Demonstration

[GUA-577]   It shall, when working in the IIE View/ Entry Panel in edit mode, be possible to suppress all empty optional attributes. I.e. so that the user in most cases can access the attribute to edit without needing to use the scrollbar.

Verification: Demonstration

[GUA-578]   It shall, when working in the IIE View/ Entry Panel, be possible to manage (create, update, and delete) templates for the relevant IIE type (as supported through the I2BE API).

Verification: Demonstration

[GUA-579]   It shall, when working in the IIE View/ Entry Panel, be possible to create a new IIE from a specific template, and from the default template, and from no template.

Verification: Demonstration

2.5   General requirements for usage of the Table View Component

[GUA-76]   The Table View functionality shall be implemented as a reusable UI component that can be used in many of the I2UA applications.
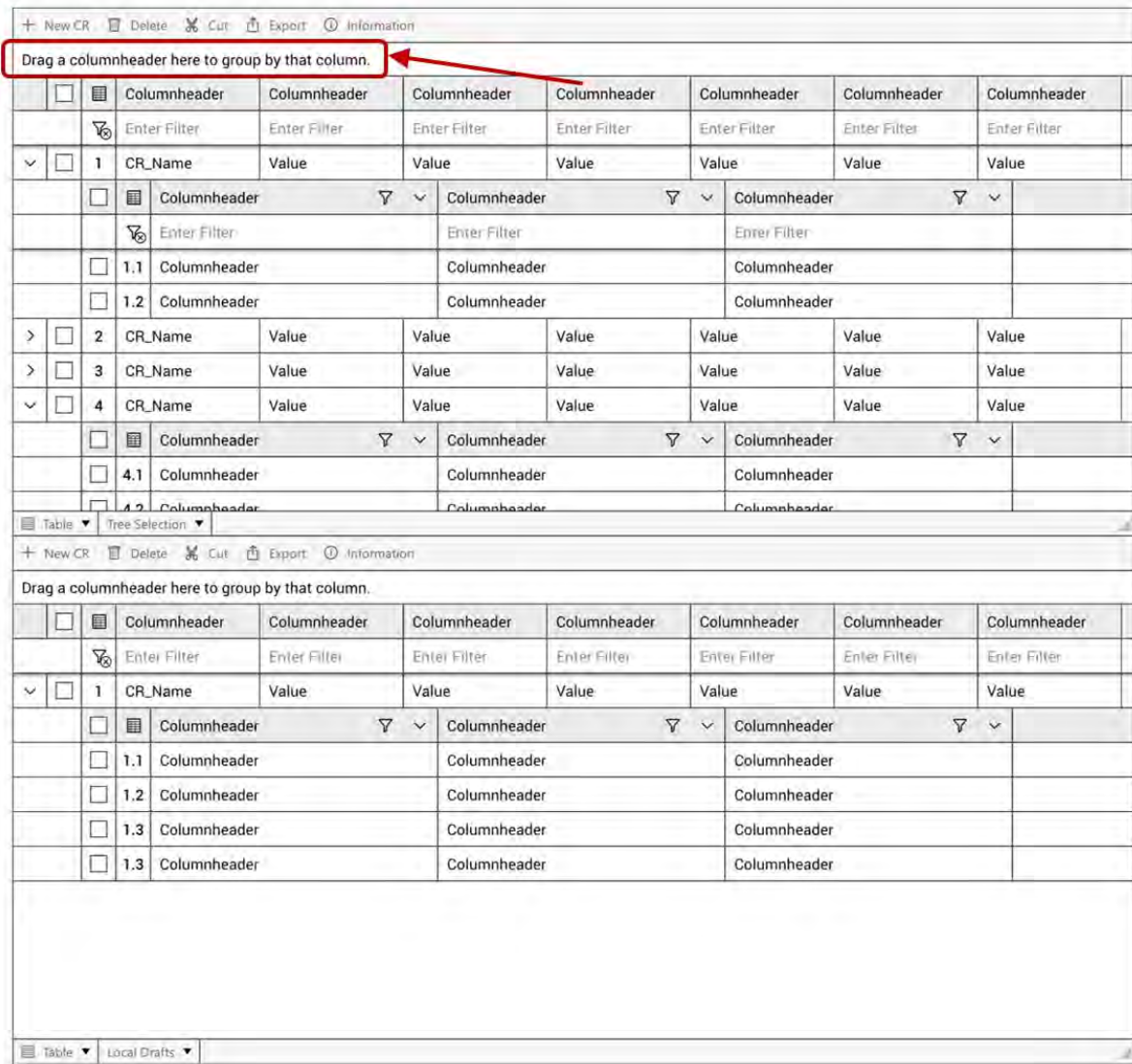
Verification: Demonstration and Inspection

[GUA-77]   It shall be possible to define collapsible groups in the Table View by dragging and dropping an attribute column header to a "Group By field" and to add a second tier group by dragging a second column header to a "Group By field",

see example in the figure below. It shall also be possible to reorder the tiers in the groups and remove a tier from the groups.

Verification: Demonstration

Figure 2-3 Direct-manipulation of table to specify multi-tier groups of rows

[GUA-78]   It shall be possible to sort the Table View by groups and by columns. When the Table View includes groups, the column sorting shall be done within the groups (per group).

Verification: Demonstration

[GUA-79]   It shall be possible to hide/ unhide groups in the Table View.

Verification: Demonstration

[GUA-80]   It shall be possible to hide and unhide columns and rows in the Table View.

Verification: Demonstration

[GUA-81]   It shall from a column (or a row) with numerical values, be possible to select a range of consecutive cells and have the sum of the numerical values in all the selected cells calculated and reported to the screen.

Verification: Demonstration

[GUA-82]   It shall be possible to export the data in the Table View directly to a comma separate file separating the visible (unhidden) columns in the table in the order they have in the table by a comma. Note that hidden columns and rows shall not be exported.

Verification: Demonstration

[GUA-83]   It shall be possible to navigate from cell to cell in the table using the Tab key.

Verification: Demonstration

[GUA-84]   It shall be possible to perform free-text search against the content in the table and have the search hits highlighted in the table.

Verification: Demonstration

[GUA-85]   Default mode for the table cells shall be read-only (i.e. the use cannot change a cells content). The table cells shall only be "editable" in situations where a user (with the appropriate privileges) needs to change the data in the table.

Verification: Demonstration

[GUA-86]   It shall be possible, in edit mode, to change the content of multiple cells in the table in one operation. For instance it shall be possible to select a column in the

table and change the value of all cells in that column to a new value in one operation.

Verification: Demonstration

[GUA-87]   It shall be possible, in edit mode, to drag and drop a row from one group to another group and automatically update the attribute defining the group affiliation for the row that is moved.

Verification: Demonstration

[GUA-88]   It shall be possible, in edit mode, to open up an empty row and enter values in the cells in the new row.

Verification: Demonstration

[GUA-89]   It shall be possible, in edit mode, to copy a row and create a new row with cell values from the copied row.

Verification: Demonstration

[GUA-90]   The Table View shall have support for configurable right-click menus.

Verification: Demonstration

[GUA-91]   The Table View shall include scroll bars for both vertical and horizontal scrolling that appears when the available data exceeds the current viewport.

Verification: Demonstration

[GUA-591]   The Table View shall have support for Freeze Top Row and Freeze First Column (like MS Excel) where the top row or first column stays put when the user scrolls the rest of the table.

Verification: Demonstration

[GUA-92]   It shall be possible to split a Table View in two horizontal views where each view can individually scroll the Table View data set.

Verification: Demonstration

[GUA-93]   It shall be possible to have multiple Table Views active in multiple panels concurrently where each Table View can visualize different data sets.

Verification: Demonstration

[GUA-94]   It shall be possible to present two separate data sets in the Table View side by side for comparison with synchronous scrolling of both data sets.

Verification: Demonstration

2.6   General requirements for usage of the Relationship View Component

[GUA-95]   The Relationship View functionality shall be implemented as a reusable UI component that can be used in many of the I2UA applications.

Verification: Demonstration and Inspection

[GUA-96]   The Relationship View shall have functionality for zooming (in and out), panning and re-centering.

Verification: Demonstration

[GUA-97]　　The Relationship View shall have support for different layout algorithms to include force-directed layout, force-directed with clustering layout, circular layout, hierarchical (organigram) layout, etc.

Verification:　Demonstration

[GUA-98]　　The Relationship View shall support manual changes to the auto-generated layout by dragging nodes around in the Relationship View.

Verification:　Demonstration

[GUA-99]　　The Relationship View shall include functionality for reducing clutter. The de-cluttering function shall include grouping/ combining of nodes by user-selected attributes. The grouped nodes shall depict glyphs informing about the nature of the grouping of nodes. The rendered size of the grouped nodes shall visually be distinguishable based on the number of nodes within the combined node.

Verification:　Demonstration

[GUA-100]　It shall be possible to reduce the information in the Relationship View by selecting nodes matching a certain criteria, and then only show those nodes and any nodes that they are linked to.

Verification:　Demonstration

[GUA-101]　It shall be possible to expand any node with all nodes it is linked to (e.g. by double-clicking, or right-clicking, a node).

Verification:　Demonstration

[GUA-102]　It shall be possible hide/ unhide labels for the IIEs and the relationships within the Relationship View.

Verification:　Demonstration

[GUA-103]　It shall be possible to render nodes in the Relationship View as symbols, or icons, or geometric shapes, or thumbnails.

Verification:　Demonstration

[GUA-104]　It shall be possible to decorate the symbols in Relationship View with country flags and also with fictitious and configurable country flags (when running in exercise mode).

Verification:　Demonstration

[GUA-105]　When using geometric shapes nodes in the Relationships View then it shall be possible, from a palette of different shapes, to select shapes to be used for different node types/ categories using attributes associated with the nodes to categorize them (e.g. using different shapes for male versus female persons).

Verification:　Demonstration

[GUA-106]　When using geometric shapes nodes in the Relationships View then it shall be possible, from a colour palette, to select colours to be used for different node types/ categories using attributes associated with the nodes to categorize them (e.g. using different shapes for male versus female persons.

Verification:　Demonstration

[GUA-107]　When using geometric shapes nodes in the Relationships View then it shall be possible, from a centralities palette, to specify a centrality type and sizing

parameters (minimum and maximum size) to be used for rendering the size of nodes such that the size of the rendered shapes correlates with their centrality values.

Verification: Demonstration

[GUA-108]   It shall be possible to select a node in the Relationship View and for all other nodes compute the similarity rank with the selected node where the similarity rank is visually depicted in the Relationship View.

Verification: Demonstration

[GUA-109]   The Relationship View shall include support for animation that is reflecting changes to the objects within the Relationship View (e.g. visualizing effect of added or removed nodes and or relationships, change in attributes of the nodes or relationships, etc.).

Verification: Demonstration

[GUA-110]   The Relationship View shall have support for configurable right-click menus tailored for individual node types (IIE types) and edges types (links and relationships).

Verification: Demonstration

[GUA-111]   It shall be possible to export the content of the Relationship View as a Portable Network Graphics (PNG) file.

Verification: Demonstration

2.7   General requirements for usage of the Timeline View Component

[GUA-112]   The Timeline View functionality shall be implemented as a reusable UI component that can be used in many of the I2UA applications.

Verification: Demonstration and Inspection

[GUA-113]   The Timeline View shall have functionality for zooming (in and out) and panning along the timeline.

Verification: Demonstration

[GUA-114]   The Timeline View shall have functionality for moving to next or previous event and centre around that event.

Verification: Demonstration

[GUA-115]   The Timeline View horizontal axis shall represent the time dimension where the time representation, and time scale/ resolution, is user configurable.

Verification: Demonstration

[GUA-116]   The Timeline View plot area (canvas) shall have support for callout-boxes and other graphical shapes that can contain formatted text (i.e. font size, type, and colours is dynamically configurable) and pictures combined with text. It shall be

possible to show IIE symbols within the call-out box. The colours of the call-out boxes and the graphical shapes can be dynamically changed.

Verification: Demonstration

[GUA-616]   It shall be possible to minimize the "footprint" of the callout-box in the plot area and/ or only show the IIE symbol.

Verification: Demonstration

[GUA-117]   The Timeline View shall have support for automatic de-cluttering layout. E.g. stacking callout boxes vertically, grouping several overlapping callout boxes that can be expanded by the user.

Verification: Demonstration

[GUA-118]   The Timeline View shall have support for organizing call-out boxes and the graphical shapes in swim lanes.

Verification: Demonstration

[GUA-119]   The Timeline View shall have support for drawing connecting lines between call-out boxes and the graphical shapes.

Verification: Demonstration

2.8   General requirements for usage of the Gantt View Component

[GUA-120]   It shall be possible zoom in and out and pan within the timeline part of the Gantt View.

Verification: Demonstration

[GUA-121]   The timeline part shall have a multi-tier timescale with time-scale groupings supporting years, quarters, months, weeks, and days.

Verification: Demonstration

[GUA-122]   It shall be possible to render summary tasks in the timeline part.

Verification: Demonstration

[GUA-123]   It shall be possible to depict milestones (using milestone symbols) in the timeline part of the Gantt View.

Verification: Demonstration

[GUA-124]   It shall be possible to view more than 20 columns in the data grid part of the Gantt View.

Verification: Demonstration

[GUA-125]   It shall be possible to search for data and to filter out rows in the grid part of the Gant View.

Verification: Demonstration

[GUA-126]   It shall be possible to hide and un-hide columns in the grid part of the Gant View.

Verification: Demonstration

[GUA-127]   It shall be possible to display icons in columns in the data grid part of the Gantt View.
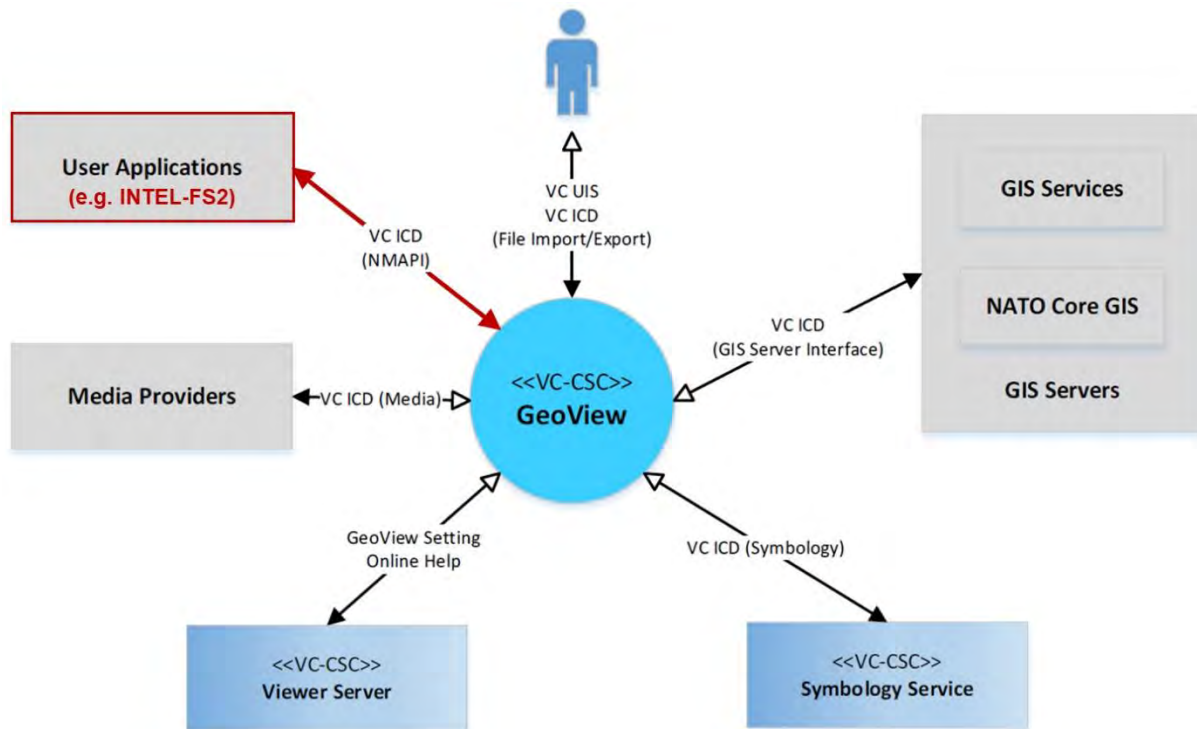
Verification: Demonstration

[GUA-128]   It shall be possible to scroll horizontally and vertically in both the data grid part
and the timeline part of the Gantt View.

Verification: Demonstration

2.9   General requirements for usage of the GeoView and controlling widgets

[32]   I2UA will be using a map component provided as a purchaser furnished item (PFI). This map
component, called GeoView, is provided as an executable container for integration with
INTEL-FS2. As shown in the figure below INTEL-FS2 will integrate with GeoView application
through the NATO Map API (NMAPI), see [VC-ICD]. The NMAPI works by sending and
receiving JSON documents over event channels (HTML5 messaging) in the browser.

Figure 2-4 Integration with GeoView

[GUA-129]   I2UA shall implement the full NMAPI interface as defined in [VC-IDC].

Verification: Demonstration and Inspection

[GUA-130]   Control widgets for controlling the GeoView shall be implemented as reusable
UI components that can be used in many of the I2UA applications.

Verification: Demonstration and Inspection

[GUA-131]   I2UA shall implement listeners to the event channel so that any user defined
actions done in the GeoView is detected by I2UA keeping the state of what is
visualized in GeoView synchronized with information internally in I2UA (e.g. an

overlays hide/ unhide state, the zoom level, changes to the overlay hierarchical structure, etc.)

Verification: Demonstration

[GUA-132]   I2UA shall implement context-oriented right-click menus in GeoView using the nmap.command event channels.

Verification: Demonstration

[GUA-133]   I2UA shall be able to manage geographical areas (as defined in [INTEL-FS2-InformationModel]) from within GeoView. This means it shall be possible to create, update and delete geographical areas from within GeoView and subsequently have these area changes persisted and processed through the approval/ publish workflow. The implementation of this functionality shall fulfil the user story acceptance criteria of [US 32]: As an Authorized User I want to create and update geographic areas so that these can be referenced in multiple use cases within INTEL-FS2 (e.g. Intelligence Requirements Management and Collections Requirements Management).

Verification: Demonstration

[GUA-134]   I2UA shall only use one instance of the GeoView application.

Verification: Demonstration

[33]   Note: the main reason for the constraint of only using one instance of GeoView is that each instance of GeoView will require between 0.5 - 1 GB of memory.

[GUA-135]   I2UA shall have support for concurrently holding data from multiple applications (e.g. Product Management Application and BSO Management Application both being used by a user) and be able to switch the viewable content in the GeoView to match the active application (e.g. switching between the Product Management Application and the BSO Management Application).

Verification: Demonstration

[34]   The I2UA could organize the content of application by hierarchy where the root node in each hierarchy is the I2UA application. To quickly switch from one application to the other the current viewport could be hidden by hiding the overlay at the top level in the current hierarchy and similarly the other applications data can be made visible by un-hiding the other applications top overlay.

[GUA-136]   I2UA shall include control functions for working with GeoView overlays. The control functions identified in the table below shall be supported.

Verification: Demonstration

Table 2-2 Supported GeoView overlay functions from INTEL-FS2

Function	Candidate* NMAPI event channels
I2UA shall be able to create named and hierarchical overlays	map.overlay.create
I2UA shall be able remove an overlay and all features and objects within the overlay	map.overlay.remove
I2UA shall be able to hide an overlay and all features and objects within the overlay	map.overlay.hide
I2UA shall be able to unhide an overlay (and all its content)	map.overlay.show

I2UA shall be able to reorder the sequence of layers (from foreground to background)	map.overlay.update

* It is the Contractors responsibility to identify and implement the appropriate events (HTML5 messaging) in accordance with [VC-ICD] to deliver the functionality defined in the left-hand column. The event channels listed in the right-hand column are suggestions that are believed to be relevant for achieving the required functionality.

[GUA-137] I2UA shall include control functions for rendering GeoView features and objects. The control functions identified in the table below shall be supported.

Verification: Demonstration

Table 2-3 Supported GeoView functions for rendering features from INTEL-FS2

Function	Candidate NMAPI event channels
I2UA shall be able to add or update APP6 (A/ B and D) symbols in GeoView	map.feaure.plot map.feature.plot.batch map.feature.update
I2UA shall be able to annotate APP6 symbols with IIEs workflow status (see PublishedStatusType in [INTEL-FS2-InformationModel]))	map.feaure.plot map.feature.plot.batch map.feature.update
I2UA shall be able to draw icons, pictures, and geometric shapes on GeoView	map.feaure.plot map.feature.plot.batch map.feature.update
I2UA shall be able to render NATO Vector Graphics (NVG) data and Keyhole Markup Language (KML) in overlays	map.feaure.plot map.feature.plot.batch map.feature.update
I2UA shall, when adding or updating geometric shapes in GeoView, implement a colour palette that can be used to select colours for different IIE types and/ or IIE attributes	map.feaure.plot map.feature.plot.batch map.feature.update
I2UA shall, when adding or updating geometric shapes in GeoView, implement palette of different shapes that can be used to select shapes for different IIE types and/ or IIE attributes (e.g. using different shapes for male versus female persons)	map.feaure.plot map.feature.plot.batch map.feature.update
I2UA shall be able to create annotation directly in GeoView	map.feature.edit (and/ or use nmap.object.x channels)
I2UA shall be able to send geometric figures and text annotations to GeoView to be rendered in GeoView	map.feature.draw (and/ or use nmap.object.x channels)
I2UA shall be able to hide/ unhide labels for IIEs and relationships within	nmap.object.x channels
I2UA shall be able to remove features from GeoView	map.feature.unplot map.feature.unplot.batch
I2UA shall be able to hide individual features in GeoView	map.feature.hide
I2UA shall be able to unhide hidden features in GeoView	map.feature.show

[GUA-138]   I2UA shall include control functions for selecting GeoView features. The control functions identified in the table below shall be supported.

Verification: Demonstration

Table 2-4 Supported GeoView functions for features selection

Function	Candidate NMAPI event channels
I2UA shall detect when features are selected in the GeoView and subsequently identify the feature (e.g. as a particular IIE)	map.feature.selected map.feature.selected.batch
I2UA shall detect when features are un-selected in the GeoView and subsequently identify the feature	map.feature.deselected map.feature.deselected.batch
I2UA shall be able to command GeoView to select (and highlight) features	map.feature.selected map.feature.selected.batch
I2UA shall be able to command GeoView to un-select features	map.feature.deselected map.feature.deselected.batch
I2UA shall be able to query GeoView for status information and receive information on which features in the GeoView that is currently selected	map.status.request map.status.selected

[GUA-139]   I2UA shall implement GeoView control functions to support searching and querying. The control functions identified in the table below shall be supported.

Verification: Demonstration

Table 2-5 GeoView functions in support of searching and querying

Function	Candidate NMAPI event channels
A click in GeoView shall be picked up by I2UA such that the selected location can be used for searching or querying (e.g. as a centre point for a circle)	map.view.clicked
The user shall be able to draw an area in GeoView to define a geolocation boundary where this area is received by I2UA and subsequently used in search or query operations	map.view.area.selected

[GUA-140]   I2UA shall include control functions for selecting the GeoView view-port. The control functions identified in the table below shall be supported.

Verification: Demonstration

Table 2-6 Supported GeoView functions for controlling the view-port

Function	Candidate NMAPI event channels
I2UA shall be able to command GeoView to incrementally zoom in and out	map.view.zoom
I2UA shall be able to detect that the zoom level has been changed from within the GeoView	map.view.zoom
I2UA shall be able to command GeoView to re-centre on a particular overlay	map.view.center.overlay
I2UA shall be able to command GeoView to centre and zoom to a	map.view.center.feature

specific feature	
I2UA shall be able to command GeoView to centre on a specific geolocation at a user-defined zoom-level	map.view.center.location map.view.center.bounds

[GUA-141]   The I2UA shall have support for automatically bringing IIEs into the GeoView based on the current viewport when zooming and panning. This "search-by-zooming" shall implement extent management to protect the I2UA and GeoView from having to handle too many search results. Extent management should be implemented by applying a limit for the number of new IIEs to be sent to GeoView, and the IIEs selected for GeoView display should be selected based on time (most recently updated) and other user-configurable filters.

Verification: Demonstration

[GUA-142]   The GeoView shall be configured to, when required, obtain and display a number of different map data types as identified in the table below (pending that these map types are supported by the geographic information system (GIS) server interface and available in the GIS servers).

Verification: Demonstration

Table 2-7 Supported map data types in VC/ GeoView

Map data type
Elevation data
Vegetation data
Hydrology data
Road network data
Railway network data
Telecommunications network data
Multiple gazetteer data sets

[GUA-143]   I2UA shall include functions for exporting files from GeoView and importing files to GeoView. The export and import functions identified in the table below shall be supported.

Verification: Demonstration

Table 2-8 Supported GeoView functions for features selection

File import/ export functionality
I2UA shall be able to import NVG files and display as overlays in GeoView
I2UA shall be able to import KML and zipped KML (KMZ) files and display as overlays in GeoView
I2UA shall be able to export the visual viewport of the GeoView as a Portable Network Graphics (PNG) file.
I2UA shall be able to export the visual viewport of the GeoView as a NVG file.
I2UA shall be able to export the visual viewport of the GeoView as a KML file and as a KMZ file.

[GUA-643]   I2UA shall be able to command decoration of APP-6 symbols in the GeoView with nationality flags, including fictitious and configurable country flags (when running in exercise mode).

Verification: Demonstration

2.10 General requirements for usage of the Chart View Component

[GUA-144]   The Chart View functionality shall be implemented as a reusable UI component that can be used in many of the I2UA applications.

Verification: Demonstration and Inspection

[GUA-145]   The Chart View shall be able to present data sets as pie charts, horizontal and vertical bar charts, stacked bar charts, histograms, scatter charts, line charts, area charts, radar charts, and polar coordinate system charts.

Verification: Demonstration

[GUA-146]   The Chart View shall have support for using multiple (dynamically specified) font types, font sizes, and font colours within a chart.

Verification: Demonstration

[GUA-147]   The Chart View shall have support for multiple (dynamically specified) colours of chart elements.

Verification: Demonstration

3   Functional requirements user account management

[234]   In INTEL-FS Spiral 1 user account management was an integrated function of the application. In INTEL-FS Spiral 2 user account management will be done externally to the INTEL-FS application in a new user account management application that will be based/ built on tooling provided by the SOA & IdM Platform, see [SOA-IdM].

[235]   Of principal relevance for the I2UA are the SOA & IdM Platform Security Platform Identity and Access Management (IAM) Services including:

(1)   Authentication and Authorisation
(2)   Identity Management

3.1   Externalized user account management

3.1.1   User Management Application

[236]   Note: The User Management Application will be required early in phase 1 (see section 4.1).

[237]   The I2UA User Management Application should make use of the SOA & IdM Platform Identity and Access Management (IAM) Components and Services defined in the [SOA-IdM].

3.1.1.1   UI functionalities supporting user stories

[FUA-1]   The User Management Application shall implement functionalities to fulfil the acceptance criteria of [US 1]: As an Authorized User I want to define the policies to be used by the INTEL-FS2 policy decision point (PDP) so users can be given the correct access privileges.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-2]   The User Management Application shall implement functionalities to fulfil the acceptance criteria of [US 2]: As an Authorized User I want to create user accounts so that the new users can get access to INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-3]   The User Management Application shall implement functionalities to fulfil the acceptance criteria of [US 3]: As an Authorized User I want be able to modify user accounts so that I can keep the user accounts and their privileges current.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-4]   The User Management Application shall implement functionalities to fulfil the acceptance criteria of [US 4]: As an Authorized User I want to define default user configuration settings to establish a baseline configuration so that the users will have a baseline to start from, or return to.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-5]   *Removed from scope.*

[FUA-6]   The User Management Application shall implement functionalities to fulfil the acceptance criteria of [US 6]: As an Authorized User I want to be able to send email to users so that I can provide them with information relevant to their

usage of INTEL-FS2 (e.g. planned outages due to maintenance, changes to the user's account settings, etc.)

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-7]   The User Management Application shall implement functionalities to fulfil the acceptance criteria of [US 7]: As an Authorized User I want to be able to manage a set of standard role-based notifications so that users with specific roles can be automatically informed of any change of interest to the role.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

3.1.1.2   Standalone application

[238]   The I2UA User Management Application should make use of the Identity Management Components and Services defined in the [SOA-IdM]. These include all aspects of the identity lifecycle: management, provisioning, workflow (onboarding, etc.), persistence, governance, portal access, etc.

[FUA-10]   The User Management Application shall be implemented as a standalone application, and where this standalone User Management application can also manage user accounts for other applications than INTEL-FS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.1.3   User Accounts administration functionalities

[FUA-12]   The User Management Application shall include a dedicated User Interface allowing users to request user accounts where the requester can select from a number of predefined user role/ type configurations.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-13]   The User Management Application shall have support for redirecting account requests to relevant ONs for processing.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-14]   The User Management Application shall include a notification mechanism that alerts the appropriate user account administrator of pending new user account requests.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-15]   The User Management Application shall upon any change to a user account automatically notify, by email, the user with information on the change to the user account (this includes a welcome email to a user for whom a new user account has just been created). The email shall contain details on the change (i.e. what was changed).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-16]   The User Management Application shall include support for resetting the password for a user with no domain account to enable the user to access INTEL-FS2 again.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-17]   The User Management Application shall manage the user's attributes (including assertions/ claims required for access control) locally to the I2UA application. This means that I2UA shall provide its own application attribute store.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-18]   The User Management Application shall backup its user account database at regular (and configurable) intervals.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-19]   It shall be possible to restore the User Management Application user account database from a backup.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-20]   In case the User Management Application is implemented using a solution based on the Windows operating System, the I2UA user accounts shall be declared in an Active Directory inheriting NATO Group Policy Object (GPO) declared at the network domain level for password policy (e.g. complexity, history, minimum age, maximum age, length).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.1.4   Initial policy definitions

[FUA-21]   The User Management Application shall be populated with an access control policy set that enables user access controls to I2UA that are comparable with the mainstream access privileges currently in use in INTEL-FS Spiral 1 (see also examples in Chapter 3 of [INTEL-FS2-UserStories]).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4   Functional requirements user applications

4.1   Phase 1 – Upgrade UI, initial BMD OPFOR ORBAT Management, and new User Management

[35]   The current INTEL-FS Spiral 1 was implemented using aspect-oriented programming (AOP). As part of the AOP, the UI of the current INTEL-FS Spiral 1 was auto-generated from aspects to the classes in the back-end software. For INTEL-FS Spiral 2 AOP will not be used to auto-generate the UI.

[36]   The main activity in phase 1 is to re-implement and improve the current INTEL-FS UI.

[37]   In addition to the UI upgrade, phase 1 will also bring dedicated functionality for managing the BM opposing order of battle (OPFOR ORBAT) and new analysis functionalities.

[38]   While the INTEL-FS Spiral 1 UI was designed to look like MS Outlook the new INTEL-FS Spiral 2 UI will be designed to look like modern web applications, e.g. something similar to the Google platform with similar UI widgets and look-and-feel across multiple (e.g. Gmail, Google Search, Google Drive, etc.)

4.1.1   Dashboard Application

4.1.1.1   UI functionalities supporting user stories

[FUA-22]   The Dashboard Application shall implement functionalities to fulfil the acceptance criteria of [US 8]: As an Authorized User I want to see, and have dynamically updated, information on the latest updates to IIEs of interest to me on my Dashboard so that I obtain this information without having to manually search for it.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-23]   The Dashboard Application shall implement functionalities to fulfil the acceptance criteria of [US 9]: As an Authorized User I want to see my notifications on my Dashboard so that I can dynamically see updates to these as they are generated.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-24]   The Dashboard Application shall implement functionalities to fulfil the acceptance criteria of [US 10]: As an Authorized User I want to access favourites/ links from my Dashboard so that I can quickly retrieve resources of relevance to my tasking.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-25]   The Dashboard Application shall implement functionalities to fulfil the acceptance criteria of [US 11]: As an Authorized User I want to customize the information to be shown in the Table View for the latest updated IIEs so that the information shown there is of relevance to me.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-27]   The Dashboard Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to

access a help function that can provide me with information on how to use INTEL-FS2.

Verification:　Demonstration (see User Story acceptance criteria)
Est. Cost[€]:　Contractor to provide cost estimate

4.1.1.2　Table Views

[FUA-29]　The Dashboard Application shall by default display the latest-updated-products, the RFI statuses, the CR statuses, and the Notifications in different Table Views using the Table View Component as defined in chapter 2.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

[FUA-30]　It shall, in a Table View, be possible to select one or multiple notifications and flag them (i.e. mark as "to do"), and to mark them as "read" or "unread", and to archive them (and thus hide them), and to delete them.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

4.1.1.3　Relationship View

[FUA-31]　The Dashboard Application shall use the Relationship View Component with all its features as defined in chapter 2.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

[FUA-32]　The Dashboard Application shall be able to display the IIEs (filtered according to the user's preferences) with the latest updates in the Relationship View. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

[FUA-33]　Items selected in Relationship View shall be displayed/ previewed in the Dashboard Application.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

4.1.1.4　GeoView

[FUA-34]　The Dashboard Application shall integrate with and control the GeoView component as described in chapter 2.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

[FUA-35]　The Dashboard Application shall display the IIEs (filtered according to the user's preferences) with the latest updates in the GeoView.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

[FUA-36]　An item selected in GeoView shall be displayed/ previewed in the Dashboard Application.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

4.1.1.5 UI functionalities for managing cross-cutting configuration settings (for all applications)

[41]   The Dashboard Application should be where the user will manage configuration settings that is applicable for many applications.

[FUA-37]   It shall be possible for the user to specify which data source (operational data, exercise data, training data) to use.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-38]   It shall be possible to configure the default user interface customization settings as defined in the table below to be used in the user interfaces across all I2UA applications.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-1 Cross-cutting user interface configurations

Configurable	Supported variants
Date/ time format	YYYY-MM-DD, or DD-MM-YYYY, and time values in 24-hour clock (local or zulu), or AM/PM clock (local or zulu). The user shall be able to see from any time value on the screen which format that is being used (e.g. adding a 'Z' to indicate zulu time)
Coordinate system	Degrees-Minutes-Seconds (DMS) as decimal degrees, DMS as degrees and decimal minutes, DMS as degree, minutes and decimal seconds, MGRS, and UTM
Measure of units	Metres, kilometres, miles, nautical miles, degrees, minutes, seconds

[FUA-39]   Changes to configuration settings shall be persisted for each individual user, and loaded upon the start of each new user session (logon).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.1.6 UI functionalities for managing configuration settings for the Dashboard views

[FUA-40]   It shall be possible to change the default time window for the latest-published-products view (Table View).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-41]   It shall be possible to apply filters to tailor which products to be shown in the latest-published-products view. Supported filters shall include product type, geospatial coverage (location of the reported information), source/ producer of the information, a set of IRs, etc.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.1.7   Messaging with INTEL-FS Backend (I2BE)

[FUA-42]   The I2UA shall implement the service-to-service messaging protocol as supported by the SOA & IdM Platform for communication with the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.2   Products Management Application

4.1.2.1   UI functionalities supporting user stories

[FUA-43]   The Products Management Application shall implement functionalities to fulfil the acceptance criteria of [US 15]: As an Authorized User I want to create/ update products, so that I can share intelligence and information with other users.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-44]   The Products Management Application shall implement functionalities to fulfil the acceptance criteria of [US 16]: As an Authorized User I want to be able to use templates when creating products, so that I can automatically prefill repeatable metadata for products that I create on a regular basis.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-45]   The Products Management Application shall implement functionalities to fulfil the acceptance criteria of [US 17]: As an Authorized User I want to create products with associations to other IIEs of different types and export these so that these products can be used for automated ingestion during training exercises.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[46]   Note: These pre-canned products that will be prepared in advance of an exercise will not be submitted to the backend, the Products and its associated metadata shall be exported to a file in a structured format, see also [FUA-64].

[FUA-47]   The Products Management Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

4.1.2.2   Integrated search and basic actions on search results

[FUA-48]   The Product Management Application shall include an integrated search function allowing the user to identify products that can subsequently be selected for editing and for workflow management.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-49]   From the search results it shall be possible (for an authorized user) to perform the actions as defined in the table below.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-2 Product Management Application integrated search and search results actions

Search result	Supported actions
Any Product	Single and multi-select items and tag them as soft-deleted
Soft-deleted Products	Single and multi-select items and un-delete them
Any Product	Single and multi-select items and hard-delete (purge) them Note: Very few, if any, users shall have this privilege
Products in Draft workflow state	Single and multi-select items and submit approval request for them
Products in a workflow state of awaiting approval	Single and multi-select items and approve them, or approve and directly publish them
Products in a workflow state of awaiting to be published	Single and multi-select items and publish them
Products in a workflow state of having been rejected approval (i.e. still in Draft status)	Select a Product, obtain rejection reason, open the Product for further editing
Any Product	Single and multi-select items and change a metadata attribute for the entire set in one operation (e.g. setting security classification or releasability for the entire set in one operation)

4.1.2.3   Create and/ or update functionalities

[FUA-50]   The Product Management Application shall through submitting the product file (in PDF or MS Word format) to an I2BE metadata extraction service obtain Keywords and Locations from the product file and pre-fill the Keywords and Locations in the product entry forms.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-51]   The Product Management Application shall through submitting imagery and video product files (in STANAG 4545 and STANAG 4609 format) to a I2BE metadata extraction service obtain product metadata values and pre-fill the metadata attributes in the product entry forms.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-53]   The Product Management Application shall be able to use templates to prefill values to selected metadata attributes. As a minimum it shall use default values to prefill the Authority, Classification, and Releasability attributes.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-54]   The Product Management Application shall, when a new product is linked to a RFI, IR, CR, or collection/ exploitation task, provide functionality to set the

status of the linked IIE to completed or fulfilled (as appropriate for the linked IIE type).

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

[FUA-55]　　　The Product Application can create different types of products (as defined by [INTEL-FS2 InformationModel]), and the user shall have the possibility to specify the type of product when activating the create form/ panel.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

4.1.2.4　Application Data Set (ADS)

[FUA-555]　　It shall be possible to perform multiple, consecutive queries to add products to the ADS.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

4.1.2.5　IIE View/ Entry Panel

[FUA-556]　　The Product Management Application shall include an IIE View/ Entry Panel as defined in chapter 2 to display and edit IIEs managed by the application.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

4.1.2.6　Relationship View

[FUA-56]　　　The Product Management Application shall use the Relationship View Component with all its features as defined in chapter 2.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

[FUA-57]　　　The Product Management Application shall be able to display products (identified through the integrated search) in the Relationship View. The user can expand the information in the Relationship View by selecting individual products and view all IIEs (of any type) linked to the selected products.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

[FUA-58]　　　By selecting an item in Relationship View the full detail of the item shall be displayed/ previewed in the Product Management Application (e.g. in a dialog window).

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

4.1.2.7　GeoView

[FUA-59]　　　The Product Management Application shall integrate with and control the GeoView component as described in chapter 2.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

[FUA-60]　　　The Product Management Application shall display products (from the integrated search) in GeoView. In case a product is associated with multiple

locations then all locations shall be indicated on the map while visually depicting that they all belong to the same product (e.g. by using annotation in glyphs).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-61]   The Product Management Application shall be able to use the GeoView to define the geolocation of a new product by selecting a position in GeoView.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.2.8   Export functionalities

[FUA-62]   It shall be possible to search for products, select one or multiple products and export the metadata of selected products to a single XML file, and exports the products icon, symbol, or thumbnail. The resulting file shall include information of the security classification of the exported data, and the file name shall include prefix that informs about the highest classification of the information in the file (e.g. using an (NR) prefix for files with NATO RΞSTRICTED information).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-63]   It shall be possible to transform the exported data resulting from [FUA-62] into humanly readable document using a separate/ external and customizable transformations (e.g. XSLT-FO). The transformations shall use the exported XML file, icons, symbols, and thumbnails and produce a PDF file. The resulting file shall include information of the security classification of the exported data, and the file name shall include prefix that informs about the highest classification of the information in the file (e.g. using an (NR) prefix for files with NATO RΞSTRICTED information).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-64]   In support of exercises (see [FUA-45]), it shall be possible to define a new product entirely on the client side (not submitting the product to the I2BE backend) where this product includes a full set of metadata and a number of attachments. It shall be possible to export this product (metadata and attachments) in to a file in a structured format. The resulting file shall include information of the security classification of the exported data, and the file name shall include prefix that informs about the highest classification of the information in the file (e.g. using an (NR) prefix for files with NATO RΞSTRICTED information).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-65]   For the type of product export files that are used for exchange with the Joint Exercise Management Module (JEMM) system (see [FUA-45]) it shall be possible to manage these outside of the INTEL-FS repository. It shall be possible to load a previously exported product file and edit/ refine it and save it back to the same file, or to save it under another file name. The product file shall be fully compliant with the [InformationModel] and map directly to the product OData API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[248]   Note: The exported files to be exchanged with JEMM will need no, or minimal, additional information beyond the information in the product itself. The JEMM system will not use the information, and the sole purpose of this exchange is for JEMM to push the information back to INTEL-FS through the SOA & Idm Platform integration services (see I2BE SRS requirement [FBE-200]) so that the product can be imported into the INTEL-FS repository.

4.1.3   Battlespace Object (BSO) Management Application

4.1.3.1   UI functionalities supporting user stories

[49]   Note: NCI Agency is already in possession of a software (SW) tool, and its source code, that has implemented functionality in Angular 9 that interfaces with a REST abstraction layer in INTEL-FS Spiral 1 as depicted Figure 1-1. This UI software (that is also compliant with [HMI-C4ISR]) fulfils many of the acceptance criteria of several of the user stories below including [US-18], [US 21], [US 23], [US 24], [US 25], [US 26], and [US 27]. This source code will be available with the INTEL-FS Spiral 1 software.

[FUA-66]   The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 18]: As an Authorized User I want to create or update a BSO or a BSR so that this new intelligence can be used in analysis and shared with other users.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-67]   The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 19]: As an Authorized User I want to manage reporting on IED incidents in order to build a complete picture of adversary IED activities in the area of intelligence interest (AOII) and thereby contribute to the counter-IED (C-IED) mission.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-68]   The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 21]: As an Authorized User I want to use the Relationship View for creating/ updating BSOs and relationships between BSOs and other IIEs as this is a highly efficient way of managing BSOs and their relationships.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-69]   The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 22]: As an Authorized User I want to use the Map View for creating/ relationships between BSOs and other IIEs.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-70]   The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 23]: As an Authorized User I want to have the report to be collated imported into an editable scratch panel and the original and formatted report available in a PDF viewer so that I can start executing the collation work.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-71]   The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 24]: As an Authorized User I want to use the report extracted to a scratch panel as the source for my collation work so that I can efficiently identify BSOs and copy/ paste text into BSRs.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-72]   The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 25]: As an Authorized User I want to be able to compare BSOs to detect if they are duplicates so that I can subsequently merge the BSOs (and their reports) into a single BSO.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-73]   The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 26]: As an Authorized User I want to have my collation tasks organized in a task list so that I can better plan my collation work.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-74]   The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 27]: As an Authorized User I want to manage the collation tasking so that I can plan, prioritize, and track the progress of the collation work.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-75]   The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 28]: As an Authorized User I want to create or update an OPFOR ORBAT in order to model a real world ORBAT so that this can be persisted, used in analysis and shared with other users.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-76]   The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 29]: As an Authorized User I want to inspect the OPFOR ORBAT in order to track changes, understand and analyse the ORBAT.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-78]   The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

4.1.3.2   Integrated search and basic actions on search results

[FUA-80]   The BSO Management Application shall include an integrated search function allowing the user to identify IIEs that can subsequently be selected for BSO

management and for workflow management. I.e. it shall be possible to search for all OPFOR ORBATs, BSO types, IED incidents, products, etc.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-81]   The BSO Management Application shall when displaying a BSO show the latest assessed status information.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-82]   It shall be possible from the integrated search function to use an OPFOR ORBAT as a search criteria and find all IIEs (e.g. BSOs, Products, RFIs and RFI Responses, Collection Requirements, etc.) associated with elements of the ORBAT.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-83]   From the search results it shall be possible (for an authorized user) to perform the actions as defined in the table below.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-3 BSO Management Application integrated search and search results actions

Search result	Supported actions
Any BSO and/ or BSR and BM ORBAT	Single and multi-select items and tag them as soft-deleted
Soft-deleted BSO and/ or BSRs and BM ORBAT	Single and multi-select items and un-delete them
Any BSO and/or BSRs and BM ORBAT	Single and multi-select items and hard-delete (purge) them Note: Very few, if any, users shall have this privilege
BSO/ BSRs and BM ORBATs in Draft workflow state	Single and multi-select items and submit approval request for them
BSO/ BSRs and BM ORBATs in a workflow state of awaiting approval	Single and multi-select items and approve them, or approve and directly publish them
BSO/ BSRs and BM ORBATs in a workflow state of awaiting to be published	Single and multi-select items and publish them
BSO/ BSRs and BM ORBATs in a workflow state of having been rejected approval (i.e. still in Draft status)	Select a rejected BSO/ BSR, obtain rejection reason, open the BSO/ BSR for further editing
Any BSO/ BSR and BM ORBATs	Single and multi-select items and change a metadata attribute for the entire set in one operation (e.g. setting security classification or releasability for the entire set in one operation)

[50]   Note: From within the BSO Management Application the user will also need to be able to search for other IIE types besides BSOs/ BSRs (e.g. IRs, products etc. to be able to be able to fulfil user story acceptance criteria pertinent to this application).

4.1.3.3   Application Data Set (ADS)

[FUA-84]   It shall be possible to perform multiple, consecutive queries to add data to the data set (OPFOR ORBATs, BSOs, IED Incidents, and other IIEs). I.e. the user can chose whether to use the result of the new query to augment or replace the content of the application data set. When a new query is adding to the content of the data set, any duplicate IIEs from the multiple queries shall be resolved. Any change to the data set shall be reflected in all the application views.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-85]   It shall be possible to filter the data set based on IIE types, and attributes of the IIEs and remove/ hide IIEs of "unwanted" types in all views. It shall be possible to filter on OPFOR ORBAT attributes, all BSO types, all attributes of the individual BSO types, and IED Incidents, as defined in [INTEL-FS2-InformationModel].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-86]   It shall be possible to filter the OPFOR ORBAT to a specified level (e.g. only down to Battalion level) remove/ hide ORBAT elements below that level in all views.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-87]   It shall be possible to apply a geographical coverage area filter to filter out information from the application data set, and dynamically update all the views.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-88]   It shall be possible to filter the application data set based on a time window (e.g. using a time slider UI widget) and remove/ hide IIEs outside the of the active time window and dynamically update all the views. It shall be possible to dynamically shrink, expand, and shift the time window in time (backwards and forwards in time).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.3.4   IIE View/ Entry Panel

[FUA-588]   The BSO Management Application shall include an IIE View/ Entry Panel as defined in chapter 2 to display and edit IIEs managed by the application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.3.5   Table Views

[FUA-89]   The BSO Management Application shall use the Table View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-90]   The Table View shall show the maximum set of IIE attributes that are common across all IIEs in the application data set and support editing of the attributes within the table.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-91]   When the data set only contains IIE of one particular data type, then all attributes of that type shall be shown in the table (e.g. if the data set only contains BM TECHINT of a certain equipment type, all parameters of that particular equipment type shall be shown in the Table View).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-92]   It shall, when the Table View is showing IIEs grouped by ORBATs, be possible to copy data from one ORBAT to another and update and save (and subsequently approve and publish) the changed ORBAT.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.3.6   Relationship Views

[FUA-93]   The BSO Management Application shall use the Relationship View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-94]   It shall be possible, from within the BSO Application, to expand the view with additional BSOs by specifying a degree of separation from the original BSO set and request import (note: a degree of separation greater than 2 is probably not practical). The Relationship View shall automatically re-render its layout and display all the BSOs including the newly added ones.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-95]   It shall be possible to select an IIEs in the Relationship View and get all details of the IIE presented within the BSO Management Application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-96]   It shall be possible to animate the change over time of the ORBAT e.g. using a time slider UI widget) in the Relationship View (using a hierarchical layout).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-97]   Items selected in Relationship View shall be displayed/ previewed in the BSO Management Application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.3.7   Timeline Views

[FUA-98]   The BSO Management Application shall use a Timeline View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-99]   It shall be possible to view the entire history of a selected BSO's status reports in a Timeline View that shows when changes occurred. For each change, it shall be possible to identify what was changed. It shall be possible to hide (and unhide) status reports classified as 'contributing' from this history view (reports classified as 'assessed' shall always be shown).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-100]   It shall be possible to view the entire change history for a selected OPFOR ORBAT in a Timeline View that shows all changes in the ORBAT and when the changes occurred. For each change, it shall be possible to identify what was changed.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-101]   An Item selected in Timeline View shall be displayed/ previewed in the BSO Management Application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.3.8   GeoView

[FUA-102]   The BSO Management Application shall integrate with and control the GeoView component as described in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-103]   The BSO Management Application shall display BSOs and Relationships in GeoView.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-104]   The BSO Management Application shall be able to create new, or update, relationships between BSOs from within the GeoView.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-105]   An Item selected in GeoView shall be displayed/ previewed in the BSO Management Application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.3.9   ORBAT View

[FUA-106]   It shall be possible to view the ORBAT with all its information as defined in the [INTEL-FS2-InformationModel] in a human readable document format.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-107]   The BSO Management Application shall in the ORBAT View be able to display the historical changes of the ORBAT over time.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-607]   The BSO Management Application shall be able to export the ORBAT View as a PDF file.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.3.10   Report Collation View

[FUA-608]   It shall be possible from within the Report Collation View (as described by [FUA-71]), at any time, to close down the collation of a report by setting the status of the report collation to Completed, Aborted, NoInformationValue, or ReviewedNotCollated. When setting the collation status to any of these values, the BSO Management Application shall exit from the Report Collation View and return to the Collation Task List (as described by [FUA-73]).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-609]   It shall be possible to sort the list of automatically identified BSOs (from the report) BSO Name and by BSO type.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-610]   It shall be possible to collapse multiple findings of a particular BSO in the report text in the list of identified BSOs, and it shall be possible to expand the collapsed findings for a BSO to see all matches (as text snippets) in the report text.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-611]   It shall be possible to select any of the multiple matches for each of the BSOs in the list of identified BSOs and have that particular text match highlighted in the text in the scrap panel, and to reposition the curser in the scrap panel on the matched text (i.e. center the scrap panel view on the matched text).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.4   Targets Application

[51]   The Targets Application will be implemented in Phase 3.

4.1.5 Intelligence Situation Application

4.1.5.1 UI functionalities supporting user stories

[FUA-108] The Intelligence Situation Application shall implement functionalities to fulfil the acceptance criteria of [US 34]: As an Authorized User I want to create/ load overlays so that I can study the Intelligence Situation.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-109] The Intelligence Situation Application shall implement functionalities to fulfil the acceptance criteria of [US 35]: As an Authorized User I want to expose a named overlay as the Intelligence Situation so that it becomes available at all Organizational Nodes (ON) and can be shared with other applications such as NATO Common Operating Picture (NCOP).

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-111] The Intelligence Situation Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

4.1.5.2 Integrated search and basic actions on search results

[FUA-112] The Intelligence Situation Application shall include an integrated search function allowing the user to identify IIEs where one or many of the identified IIEs can be selected and added to dedicated overlays.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-113] From the search results it shall be possible (for an authorized user) to perform the actions as defined in the table below.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

Table 4-4 Intelligence Situation Application integrated search and search results actions

Search result	Supported actions
Overlays	Single and multi-select items and tag them as soft-deleted
Soft-deleted Overlays	Single and multi-select items and un-delete them
Overlays	Single and multi-select items and hard-delete (purge) them Note: Very few, if any, users shall have this privilege
Overlays in Draft workflow state	Single and multi-select items and submit approval request for them
Overlays in a workflow state of awaiting approval	Single and multi-select items and approve them, or approve and directly publish them
Overlays in a workflow state of awaiting to be published	Single and multi-select items and publish them

Overlays in a workflow state of having been rejected approval (i.e. still in Draft status)	Select a rejected Overlay, obtain rejection reason, open the Overlay for further editing
Overlays	Single and multi-select items and change a metadata attribute for the entire set in one operation (e.g. setting security classification or releasability for the entire set in one operation)
Any IIE	Single and multi-select items and add to an overlay

4.1.5.3   Application Data Set (ADS)

[FUA-114]   The Intelligence Situation Application shall be able to work with multiple overlays concurrently.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-115]   It shall be possible to search for and load an existing overlay into an overlay data set.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-116]   It shall be possible to perform multiple, consecutive queries to add data to an overlay data set. I.e. the user can chose whether to use the result of the new query to augment or replace the content of the application data set. When a new query is adding to the content of the data set, any duplicate IIEs from the multiple queries shall be resolved.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-117]   It shall be possible to filter an overlay data set based on IIE types, and attributes of the IIEs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-118]   It shall be possible from the overlay data set to create, or update, and submit for approval, the new/ changed overlay.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.5.4   IIE View/ Entry Panel

[FUA-618] The Intelligence Situation Application shall include an IIE View/ Entry Panel as defined in chapter 2 to display and edit IIEs managed by the application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.5.5   Table Views

[FUA-119]   The Intelligence Situation Application shall be able to visualize and edit overlays in the Table View Components as defined in chapter 2, and support editing of the overlay attributes within the table.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.5.6   Relationship View

[FUA-120]   The Intelligence Situation Application shall use the Relationship View
Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-121]   The Intelligence Situation Application shall be able to display the IIEs of an
overlay in the Relationship View. The user can expand the information in the
Relationship View by selecting individual IIEs and bring into the view all IIEs (of
any type) linked to the selected IIEs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-122]   Items selected in Relationship View shall be displayed/ previewed in the
Intelligence Situation Application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.5.7   GeoView

[53]   INTEL-FS2 overlays typically consists of IIEs that are organized as a "collection" of geo-
located IIEs. In addition to containing IIESs, overlays can also include annotations.

[FUA-123]   The Intelligence Situation Application shall integrate with and control the
GeoView component as described in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-124]   The Intelligence Situation Application shall be able to create, update, or delete
overlays from within the GeoView where subsequently the overlays changes
are persisted in INTEL-FS2 and processed through the approval workflow
process.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-125]   The Intelligence Situation Application shall be able to visualize its overlay data
set in GeoView and control how the overlays are visualized in GeoView (e.g.
hide/ unhide, hierarchical ordering, remove overlay, etc.)

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-126]   The Intelligence Situation Application shall be able to dynamically update
GeoView's visualization of overlays whenever there is a change to the overlay's
data set (e.g. an IIE is added or removed, the position of an IIE is changed, etc.)

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-127]   It shall be possible to multi-select IIEs in the GeoView and copy or move the
selected IIEs from one overlay to another overlay.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-128]   The Intelligence Situation Application shall be able to obtain graphical
              representation of the recognized maritime picture (RMP) as NVG or KML from
              NCOP (see [NCOP-ICD]), display it in GeoView, and regularly update the RMP
              overlay in GeoView.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-129]   The Intelligence Situation Application shall be able to obtain graphical
              representation of the recognized ground picture (RGP) as NVG from the NCOP
              system (see [NCOP-IDC]), display it in GeoView, and regularly update the RGP
              overlay in GeoView.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-130]   The Intelligence Situation Application shall be able to obtain graphical
              representation of the chemical, biological, radiological and nuclear (CBRN)
              hazard areas (as NVG) from services in the CBRN FS system, display the
              areas in GeoView, and regularly update the hazard areas overlay in GeoView.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-131]   The Intelligence Situation Application shall be able to obtain graphical
              representation of the weather situation through OpenGIS® Web Map Service
              (WMS) Interface provided by the NATO Automated Meteorological Information
              System [NAMIS] and display the data in GeoView, and regularly update this
              overlay in GeoView. If the information is available from NAMIS the application
              shall be able to display: Cloud Cover, Humidity data, Atmospheric Pressure
              data, Precipitation data, Thunderstorm data, Temperature data, and Wind
              Speed data at different altitudes.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.6   BM JIPOE Application

[54]   The BM JIPOE Application will be implemented in Phase 2 and Phase 3.

4.1.7   Search Application

4.1.7.1   UI functionalities supporting user stories

[56]   In Phase 1 the search function will be limited to search over the OData REST API. When
          integrated with the new backend, an additional faceted search/ browsing feature will be
          implemented. The search engine for the faceted search will be implemented in the new
          backend (I2BE).

[FUA-132]   The Search Application shall implement functionalities to fulfil the acceptance
              criteria of [US 48]: As an Authorized User I want to combine free-text search
              with specific metadata search so that I can narrow down the search result set.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-133]   The Search Application shall implement functionalities to fulfil the acceptance criteria of [US 49]: As an Authorized User I want to save the combined search so that this specific combined search can be repeated and subscribed to.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-134]   The Search Application shall implement functionalities to fulfil the acceptance criteria of [US 51]: As an Authorized User I want to preview IIEs and their attachments and related files so that I can precisely identify and select existing data, information and intelligence.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-135]   The Search Application shall implement functionalities to fulfil the acceptance criteria of [US 52]: As an Authorized User I want to export search results to support further analysis of the selected information to be done externally to INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-137]   The Search Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

4.1.7.2   Relationship View

[FUA-138]   The Search Application shall use the Relationship View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-139]   The Search Application shall be able to display the search results in the Relationship View while using some form of extent management or lazy loading to provide the search results to the user within a minimum response time. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.7.3   GeoView

[FUA-140]   The Search Application shall integrate with and control the GeoView component as described in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-141]   The Search Application shall be able to use GeoView to define geo-location constraints to be used in the search criteria.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-142]   The Search Application shall be able to display search results in GeoView as thumbnails or icons while using some form of extent management or lazy loading to provide the search results to the user within a minimum response time.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-143]   An Item selected in GeoView shall be displayed/ previewed in the Search Application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.7.4   Search Results functionalities

[FUA-144]   The search result list shall include icons for each of the IIEs in the list using file type symbols (e.g. standard PDF icon, MS Office icons, etc) and for non-file-type IIEs use APP-6 symbols when applicable (e.g. for BSOs). The icons and symbols shall be decorated with the workflow status of the IIE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-644]   It shall be possible to decorate the APP-6 symbols in the search list with nationality flags, including fictitious and configurable country flags (when running in exercise mode).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-145]   It shall be possible to rearrange the sequence of the columns in the search result list.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-146]   It shall be possible to customize the information being shown in the result list (hide and unhide/add columns.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-147]   The Search Application shall from the result set support selection of single, or multiple, video products and/ or image products and export these for use by Google Earth. I.e. the products (metadata and videos/ images) are exported in the KML file format. The resulting file shall include information of the security classification of the exported data, and the file name shall include prefix that informs about the highest classification of the information in the file (e.g. using an (NR) prefix for files with NATO RΞSTRICTED information).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-148]   The Search Application shall from the result set support selection of single, or multiple BSOs and export those BSOs with their BSRs, and with their relationships to other BSOs (and their BSRs) to a user-specified degree of relationship separation from the selected set of BSOs. The export file shall be in

XML format and shall preserve all relationships between all BSOs exported format.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[57]   Note the purpose of the requirement above is to export BSO data for network analysis. It should be possible to transform the resulting XML file into a format that can be imported by Off-the-shelf external network analysis tools (e.g. the i2 Analyst Notebook (ANB)).

4.1.7.5   Report Reader

[FUA-150]   The Search Application shall implement a dedicated Report Reader Component that can load a result document attachment in PDF format and thus enable the user to read the entire document.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-151]   The Report Reader Component shall be implemented such that it can be reused by other I2UA applications.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-152]   The Previewing Report Reader shall support text search within the previewed document.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-153]   The Previewing Report Reader shall support identification of existing BSOs in the text (an example of a Report Reader with BSO identification is shown in the figure below. For BSOs that already exist as objects in the INTEL-FS repository, and that are found in the text, the user can use the automatically created list (to the right in the example Report Reader) to navigate to that entity.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Figure 4-1 Report Reader

[FUA-154]　　It shall be possible to extend the Report Reader with a Relationship View in another Panel. The Relationship View shall be implemented using, or including,

the Relationship View Component with all its features as defined in chapter 2. The Relationship View shall show the BSOs found in the report and include relationships between these (if any), as shown in the figure below.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Figure 4-2 Report Reader extended with Relationship View of BSOs in the report
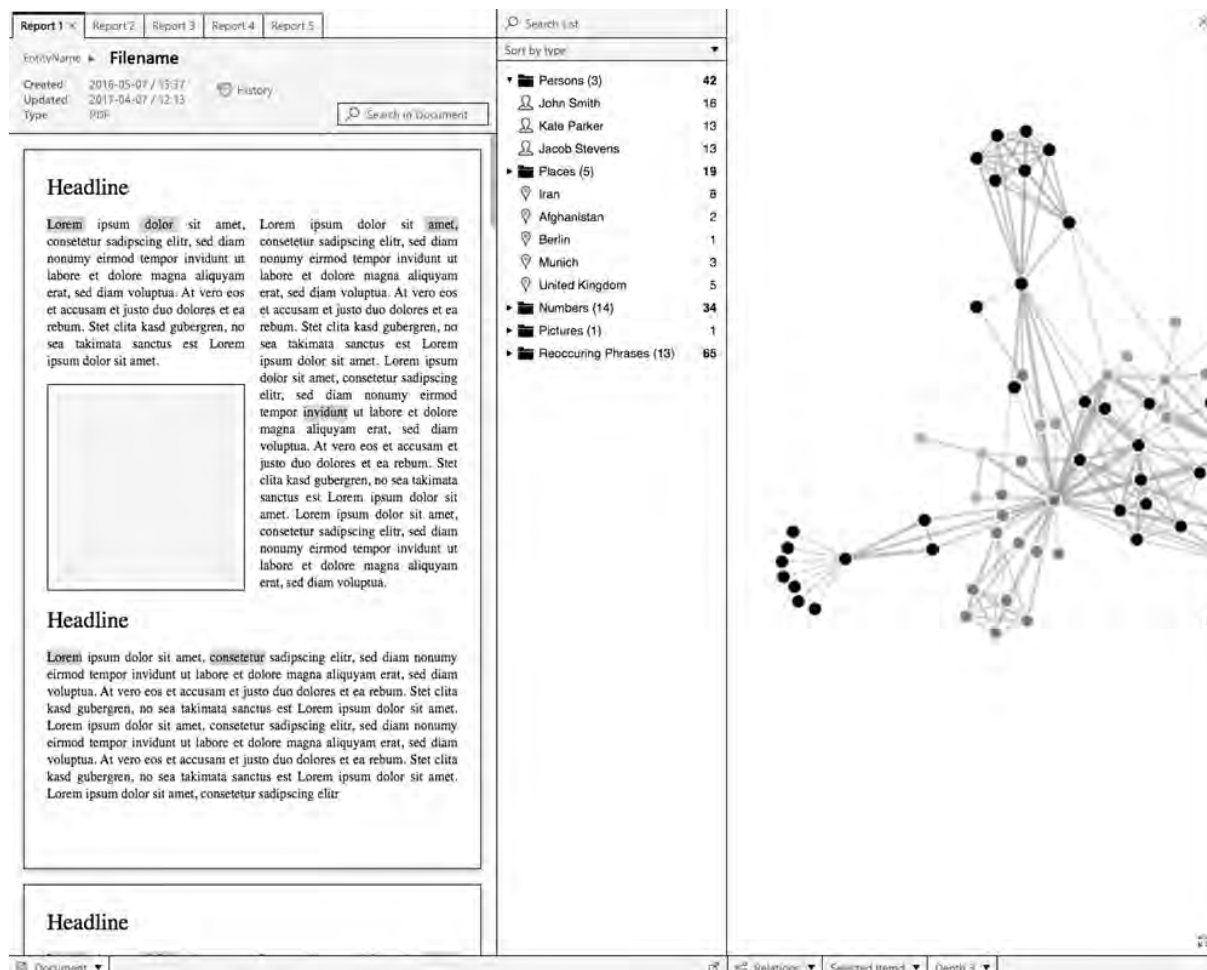
4.1.7.6   Saved searches and search history functionalities

[FUA-155]   The Search Application can export and import saved searches allowing users to share defined searches without using the global/ published search mechanism (i.e. the saved searches stays private to the individual users).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-156]   It shall be possible to manage (rename or delete) saved searches.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-157]   The user shall be able to access his search history to be able to redo a search.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.8 Analysis Application

4.1.8.1 UI functionalities supporting user stories

[FUA-158]   The Analysis Application shall implement functionalities to fulfil the acceptance criteria of [US 53]: As an Authorized User I want to be able to build advanced queries so that I can perform analysis to obtain answers to intelligence questions.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-159]   The Analysis Application shall implement functionalities to fulfil the acceptance criteria of [US 54]: As an Authorized User I want to save the results of a query-based analysis so that I can revisit the results at a later time, repeat the analysis, and share the analysis.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-160]   The Analysis Application shall implement functionalities to fulfil the acceptance criteria of [US 55]: As an Authorized User I want to perform additional link analysis in ANB on the query-based analysis data set so that I exploit the full functionality of ANB to enhance my analysis.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-161]   The Analysis Application shall implement functionalities to fulfil the acceptance criteria of [US 56]: As an Authorized User I want to have tool support to find connection path between entities so that I can investigate if a connection between the entities exist.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-162]   The Analysis Application shall implement functionalities to fulfil the acceptance criteria of [US 57]: As an Authorized User I want to perform pattern of life analysis on events so that I can understand historical activity.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-164]   The Analysis Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

4.1.8.2 Application Data Set (ADS)

[FUA-166]   It shall be possible to perform multiple, consecutive queries to add data to the set of IIEs to Analysis Data Set (ADS). I.e. the user can chose whether to use the result of the new query to augment the ADS or to replace the ADS with the new query result. When a new query is adding to the ADS, any duplicate IIEs

from the multiple queries shall be resolved. Any change to the ADS shall be reflected in all ADS views.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-167]   In case of BSO data in the ADS, it shall be possible to expand the ADS by adding linked BSOs to a user-selected degree of separation from the original BSO set and dynamically update all ADS Views.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-168]   It shall be possible to filter the ADS based on IIE types and remove/ hide IIEs of "unwanted" types and dynamically update all ADS View.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-169]   It shall be possible to filter the ADS based on relationship types and remove/ hide relationships of "unwanted" types and dynamically update all ADS View.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-170]   It shall be possible to filter the ADS based on a Degree Centrality and remove/ hide IIEs falling outside a Degree Centrality window (defined by a lower and an upper and lower limit) and dynamically update all ADS View.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-171]   It shall be possible to select individual IIEs from either of the Table View, GeoView, Relationship View, or Timeline View and remove/ hide such IIEs from the ADS and dynamically update all ADS views.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-172]   It shall be possible to apply a geographical coverage area filter to filter out information from the ADS and dynamically update all ADS views.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-173]   It shall be possible to filter the ADS based on a time window (e.g. using a time slider UI widget) and remove/ hide IIEs falling outside the of the active time window and dynamically update all ADS views. It shall be possible to dynamically shrink, expand, and shift the time window in time (backwards and forwards in time).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-174]   It shall be possible to apply temporal interval filters. Supported interval filters shall include: filtering out information for specific months of the year in the Gregorian and/ or in the Islamic calendar, and filtering out information from specific weekdays.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.8.3   Table Views

[FUA-175]   It shall be possible view all common metadata attributes for ADS IIEs in a Table
View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-176]   The Analysis Application shall support in-place editing of single fields in the
Table View (to correct data mistakes that is preventing or hampering the
analysis). It shall be possible to handle the edit as local to the analysis, and it
shall also be possible (for an authorized user) to commit the edit back to the
INTEL-FS repository.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-676]   It shall be possible to calculate centrality values for the data in the ADS and
have the centrality values presented in a Table View for all the ADS items
where a centrality value can be calculated. The table shall include centrality
values for Degree Centralities, Betweenness Centrality, and Closeness
Centralities, where the table can be sorted on any of the centrality types and on
IIE/ BSO name.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-677]   It shall be possible to select any IIE in the table showing centrality values and
have the Relationship View centre on this IIE, and highlight the selected IIE in
the Relationship View.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.8.4   Relationship Views

[FUA-177]   The Analysis Application shall be able to render the entire ADS and the
relationships between the ADS IIEs in a Relationship View using the
Relationship View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-178]   Items selected in Relationship View shall be displayed/ previewed in the
Analysis Application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.8.5   Timeline Views

[FUA-179]   The Analysis Application shall use a Timeline View Component with all its
features as defined in chapter 2.
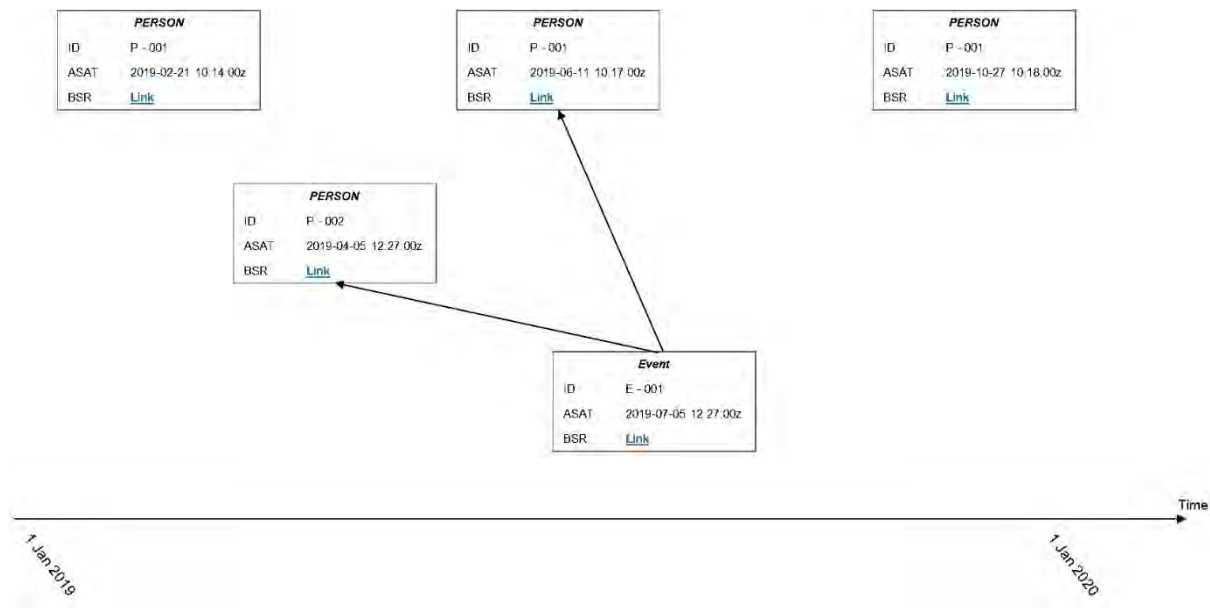
Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-180]   The Analysis Application shall plot the temporal updates to the IIEs in the ADS.
The plot shall include relationships between the objects (e.g. see example in the
figure below where relationships drawn between an event and two persons).
Normally the BSOs shall be placed on the timeline according to the relevant

status report ASAT time. However, for some BSO types it shall be possible to select the time value to use for the "placing" of the BSO on the timeline; this include for event BSOs the option of selecting between ASAT time and the event start time for placing the event.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Figure 4-3 Example Timeline View

[FUA-680]   It shall be possible from within the Timeline View to suppress/ remove IIEs from the view. It shall be possible to select a single or multiple BSOs and remove all updates for the BSO (or BSOs) in the view.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.8.6   GeoView

[FUA-181]   It shall be possible to render the entire ADS and the relationships between the ADS IIEs in GeoView defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-182]   The Analysis Application shall be able to display all its data (in the ADS) in GeoView.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-183]   It shall be possible to enable and disable a "dynamic update mode" in the Analysis Application where in enabled mode the Analysis Application dynamically updates GeoView whenever there is an update to any of the entities in the ADS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-184]   An Item selected in GeoView shall be displayed/ previewed in the Analysis
             Application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.8.7   Animation

[FUA-185]   It shall be possible to dynamically animate the visualization of the ADS in the
             GeoView and in the Relationship View and in the Timeline View by dragging a
             time "handle" in the time slider tool.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-685]   During animation, the BSO location on the GeoView shall be the location of the
             last location update in the status reports. It shall be possible to specify if only
             'assessed' reports will be used to update BSO locations or if location from
             'contributing' status reports will also be used.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate
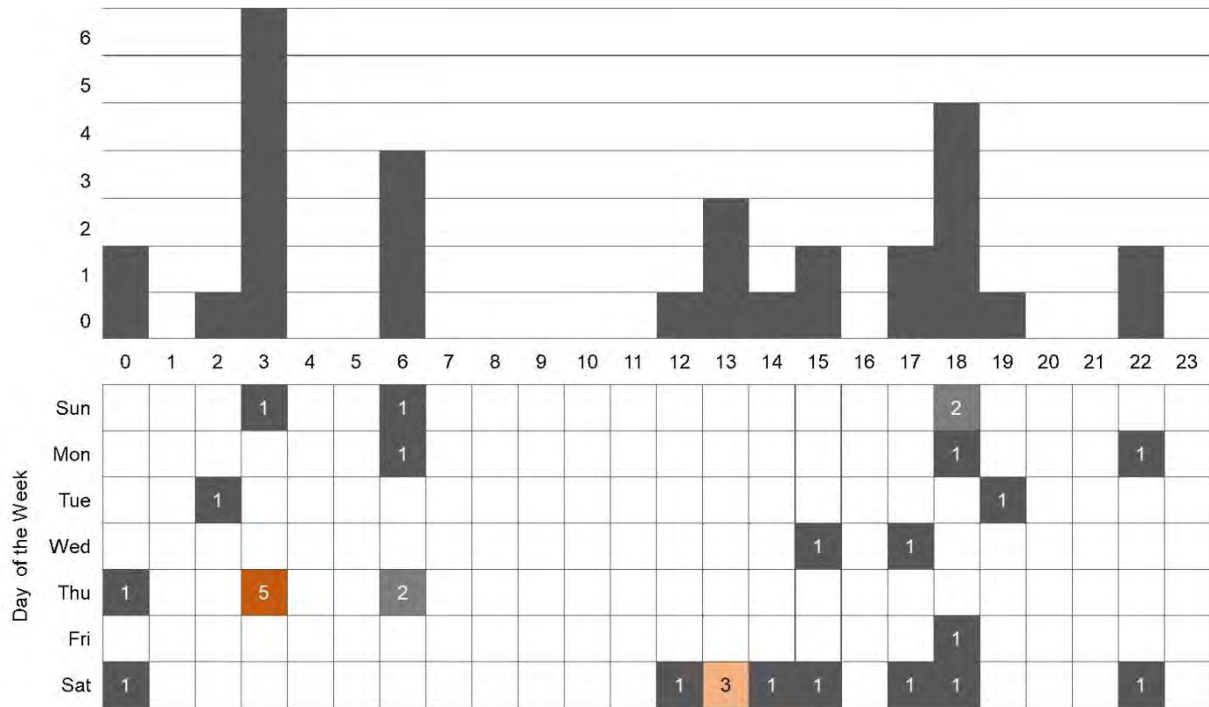
4.1.8.8   Pattern of life (PoL) analysis functionalities

[FUA-186]   It shall be possible to render/ plot temporal information in a Histogram vs
             Timeline View as shown in example in the figure below.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Figure 4-4 Event histogram combined with day of week and time of day
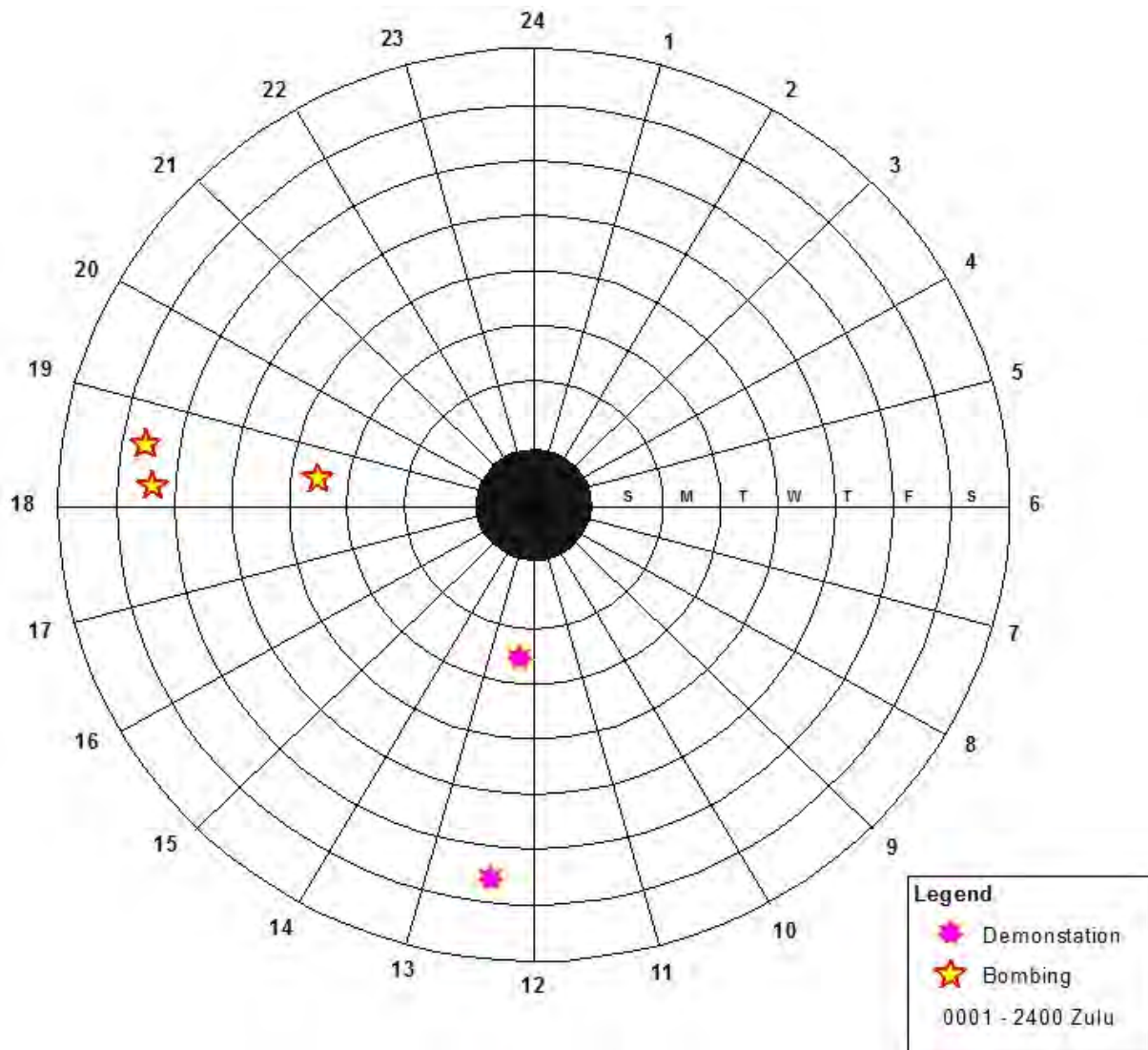

[FUA-187]   It shall be possible to render/ plot temporal information in a Polar Coordinate System View as shown in example in the figure below.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Figure 4-5 Individual events plotted in a Polar Coordinate System View with day-of-week on the radial axis and time-of-day on the circumference

[FUA-188]   It shall be possible to plot any type/ category of data in the Polar Coordinate System View both with and without visually distinguishing between the types/ categories (in the figure above the types are visually distinguishable). When distinguishing types/ categories it shall be able to visually distinguish up to 10 different types/ categories of in the diagram.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-189]   It shall be possible from the temporal information to calculate statistics (occurrences by type or other classifier) that is shown in a Radar Plot View as shown in example in the figure below.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Figure 4-6 Events plotted in a Radar Chart View with number of occurrences on the radial axis, month of the year on the circumference, and the different plots representing different categories of events
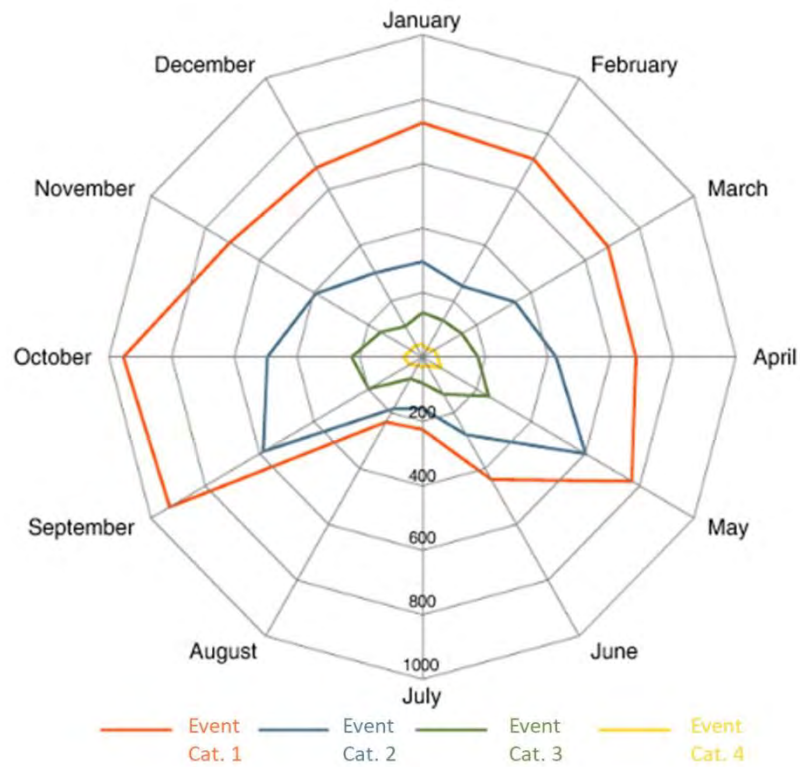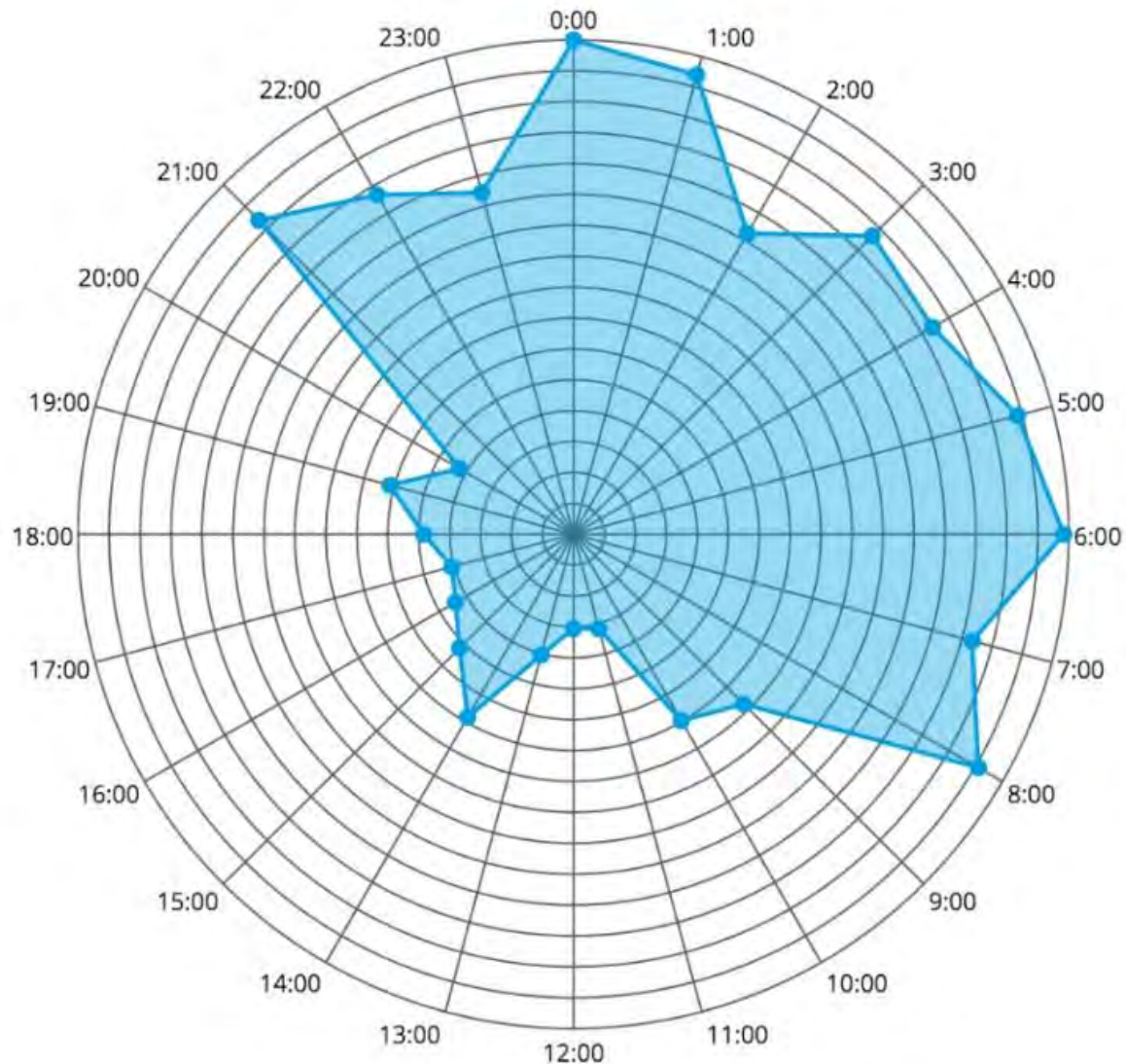

Figure 4-7 Another example of Radar Chart Visualisation of Temporal Data; this time with time-of-day on the circumference

[FUA-190]   The three Pattern of Life Views (Histogram, Polar Coordinate System, and Radar Chart) shall have support for using different date-time types and intervals to include hours of the day, days of the week (Sunday through Saturday), days of the year, and months of the year in both Gregorian and Islamic calendar. In particular the Polar Coordinate System shall include the five different radial/circumference coordinate pairs as defined in the table below.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-5 Supported radial/circumference coordinate pairs for the Polar Coordinate System diagram

	Radial Value	Angular Value
1	Weekday as Sunday through to Saturday	24-hour time of day with decimal precision
2	Weekday as Sunday through to Saturday	Day of the year in Gregorian calendar as 1 January through to 31 December. Note: The diagram shall indicate the month of the year.
3	Weekday as Sunday through to Saturday	Day of the year in Islamic calendar. Note: The diagram shall indicate the month of the year

		(Muḥarram through Dhū al-Ḥijjah
4	Month of the year in Gregorian calendar as 12 discrete values representing January through December	24-hour time of day with decimal precision
5	Month of the year in Islamic calendar as 12 discrete values representing Muḥarram through Dhū al-Ḥijjah	24-hour time of day with decimal precision

[FUA-191]   It shall be possible to toggle between the supported date-time types when viewing the temporal data in any of the three pattern of life diagrams (histogram, polar coordinate, and radar chart).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-192]   It shall be possible to compute frequency-based heat maps from temporal information (events) and have the heat-map visualized in GeoView.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-193]   It shall be possible to compute and display a concentration-based heat-map based on the geo-locations of the IIEs in the ADS and have the heat-map visualized in GeoView.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.8.9   Save and export functionalities

[FUA-194]   When saving an Analysis it shall be possible to save the visual layout of the Relationship View including manual adjustments and recreate the layout when re-loading the Analysis.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-195]   It shall be possible to save the ADS as a set of queries and filter operations such that the Analysis Application is able to recreate the ADS (by re-running the queries and filter operations).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9   ISR Organization Management Application

[60]   In Phase 1 the ISR Organization Management Application is expected to interface directly with the STANAG 4559/AEDP-19 services, see [AEDP-19]. For that reason the normal submit for approval, approve, and publish INTEL-FS workflow is not expected in Phase 1. This will be implemented in Phase 3 when the new I2BE API is available.

[61]   When the I2BE API becomes available the ISR Organization entities will be managed as BSOs through the BSO Management Services of the I2BE API

4.1.9.1   UI functionalities supporting user stories

[FUA-196]   The ISR Organization Management Application shall implement functionalities to fulfil the acceptance criteria of [US 58]: As an Authorized User I want to

create, update, and delete an operation and/ or a named collection so it can be used as mechanism for INTEL-FS2 to support multiple ongoing operations.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-197]   The ISR Organization Management Application shall implement functionalities to fulfil the acceptance criteria of [US 59]: As an Authorized User I want to create, update and delete ISR units and/or ISR systems so that the ISR unit/ ISR system can be tasked appropriately.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-198]   The ISR Organization Management Application shall implement functionalities to fulfil the acceptance criteria of [US 61]: As an Authorize User I want to create/ update an ISR ORBAT so Collection Requirements (CR) and collection and exploitation tasks can be distributed to the appropriate ISR units and ISR systems.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-199]   The ISR Organization Management Application shall implement functionalities to fulfil the acceptance criteria of [US 62]: As an Authorized User I want to view the details of the ISR ORBAT for my situational awareness.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-201]   The ISR Organization Management Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.2   Integrated search and basic actions on search results

[FUA-202]   The ISR Organization Management Application shall include an integrated search function allowing the user to identify Operational Activities, ISR ORBATs, Units, and ISR Systems can subsequently be selected for inspection and editing.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-203]   From the search results it shall be possible (for an authorized user) to perform the actions as defined in the table below.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-6 ISR Organization Management Application integrated search and search results actions

Search result	Supported actions
Operational Activities, ISR ORBATs, Units, and ISR Systems	Single and multi-select items and tag them as soft-deleted

Soft-deleted Operational Activities, ISR ORBATs, Units, and ISR Systems	Single and multi-select items and un-delete them
Operational Activities, ISR ORBATs, Units, and ISR Systems	Single and multi-select items and hard-delete (purge) them Note: Very few, if any, users shall have this privilege
Operational Activities, ISR ORBATs, Units, and ISR Systems in Draft workflow state	Single and multi-select items and submit approval request for them
Operational Activities, ISR ORBATs, Units, and ISR Systems in a workflow state of awaiting approval	Single and multi-select items and approve them, or approve and directly publish them
Operational Activities, ISR ORBATs, Units, and ISR Systems in a workflow state of awaiting to be published	Single and multi-select items and publish them
Operational Activities, ISR ORBATs, Units, and ISR Systems in a workflow state of having been rejected approval (i.e. still in Draft status)	Select a rejected entity, obtain rejection reason, open the entity for further editing
Operational Activities, ISR ORBATs, Units, and ISR Systems	Single and multi-select items and change a metadata attribute for the entire set in one operation (e.g. setting security classification or releasability for the entire set in one operation)

4.1.9.3   Application Data Set (ADS)

[FUA-704]   It shall be possible to filter the ADS on attributes of the IIEs in the ADS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-705]   It shall be possible to apply a geographical coverage area filter to filter out information from the ADSs, and dynamically update all the views of the ADS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.4   IIE View/ Entry Panel

[FUA-706]   The ISR Organization Application shall include an IIE View/ Entry Panel as defined in chapter 2 to display and edit IIEs managed by the application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.5   Table Views

[FUA-204]   The ISR Organization Management Application shall use the Table View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-205]   It shall be possible to view ISR Systems in a Table View where each row represents an ISR System, and the systems attribute values are shown across

multiple columns in the table. The Unit that the ISR System is assigned to shall be included as one of the column attributes.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-206]   It shall be possible to view Units in a Table View where each row represents a Unit, and the Unit attribute values are shown across multiple columns in the table.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-707]   It shall be possible to select an ISR ORBAT and populate the Table View with all ISR Units in the ISR ORBAT, and by selecting an ISR ORBAT populate the Table View with all ISR Systems in the ISR ORBAT.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-207]   It shall be possible from a Table View of Units to create/ add new Units and to edit, in-place in the Table, existing Units.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-208]   It shall be possible from a Table View of ISR Systems to create/ add new ISR Systems and to edit, in-place in the Table, existing ISR Systems.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-209]   It shall be possible from a Table View of ISR Systems to reassign ISR Systems from one Unit to another by dragging and dropping ISR Systems from one Unit group to another Unit group.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.6   Relationship Views

[FUA-210]   The ISR Organization Management Application shall use the Relationship View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-211]   It shall be possible from a Hierarchy (organigram) layout of the ISR ORBAT in the Relationship View to move a Unit's position in the command hierarchy by dragging and dropping a Unit (and its subordinate Units) with the ISR ORBAT hierarchy.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-212]   Items selected in Relationship View shall be displayed/ previewed in the ISR Organization Management Application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.7 GeoView

[FUA-213] The ISR Organization Management Application shall integrate with and control the GeoView component as described in chapter 2.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-214] The ISR Organization Management Application shall be able to display Units and ISR Systems the GeoView.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-215] An item selected in GeoView shall be displayed/ previewed in the ISR Organization Management Application.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.1.10 Intelligence Requirements (IR) Management (IRM) Application

4.1.10.1 UI functionalities supporting user stories

[FUA-216] The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 64]: As an Authorized User I want to be able to create and update PIRs, SIRs, EEIs, and Indicators to guide/ direct the intelligence collection process.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-217] The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 65]: As an Authorized User I want to track the status of PIRs, SIRs, EEIs and indicators so I can understand whether they are being addressed or not.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-218] The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 66]: As an Authorized User I want to create/ update an Intelligence Collection Plan (ICP) so I can capture all related PIRs, SIRs, EEIs, and indicators relevant to an operation.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-219] The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 67]: As an Authorized User I want to create/ update an RFI so that I can formulate a question to be answered by a higher, lower, adjacent command, or by a nation to address my intelligence gap.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-220] The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 69]: As an Authorized User I want to forward a RFI that cannot be

answered within my own organization to a different organization so that the RFI can be answered.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-221]   The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 70]: As an Authorized User I want to update the status of an RFI to control the workflow of the RFI (e.g. to cancel RFIs that will no longer provide any value).

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-222]   The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 71]: As an Authorized User I want to be able to view the status of the RFIs to check that the RFIs are being actioned.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-223]   The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 72]: As an Authorized User I want to create/ update a response to the RFI so the RFI originator can receive the relevant intelligence to answer the intelligence gap.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-224]   The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 73]: As an Authorized User I want to transform RFI to a readable format (PDF) so that the RFI can be shared with users not having access to INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-225]   The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

4.1.10.2   Integrated search and basic actions on search results

[FUA-226]   The IRM Application shall include an integrated search function that supports searching for ICPs, PIRs, SIRs, EEIs, Indicators, RFIs, RFI responses, NAIs, Products, BSOs and Targets in different workflow states (see NATO::JISR::Metadata::PublishedStatusType in [INTEL-FS2-InformationModel]). It shall be possible to add all search results to the ADS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-227]   From the search results it shall be possible (for an authorized user) to perform the actions as defined in the table below.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-7 IR Management Application integrated search and search results actions

Search result	Supported actions
PIRs, SIRs, EEIs, Indicators, RFIs, and RFI Responses	Single and multi-select items and tag them as soft-deleted
PIRs, SIRs, EEIs, Indicators, RFIs, and RFI Responses	Single and multi-select items and un-delete them
PIRs, SIRs, EEIs, Indicators, RFIs, and RFI Responses	Single and multi-select items and hard-delete (purge) them
PIRs, SIRs, EEIs, Indicators, RFIs, and RFI Responses in 'Draft' workflow state	Single and multi-select items and submit approval request for them
PIRs, SIRs, EEIs, Indicators, RFIs, and RFI Responses in a workflow state of awaiting approval	Single and multi-select items and approve them, or approve and directly publish them
PIRs, SIRs, EEIs, Indicators, RFIs, and RFI Responses in a workflow state of awaiting to be published	Single and multi-select items and publish them
PIRs, SIRs, EEIs, Indicators, RFIs, and RFI Responses in a workflow state of having been rejected approval (i.e. still in Draft status)	Select a rejected entity, obtain rejection reason, open the entity for further editing
PIRs, SIRs, EEIs, Indicators, RFIs, and RFI Responses	Single and multi-select items and change a metadata attribute for the entire set in one operation (e.g. setting security classification or releasability for the entire set in one operation)

4.1.10.3   Application Data Set (ADS)

[FUA-228]   It shall be possible to filter the ADS on attributes of the IIEs in the ADS, including constraining the ADS to a specific operation or named collection, to a specific ICP, originator of the data, status values of IRs and RFIs, etc. and dynamically update all the views of the ADS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-229]   It shall be possible to apply a geographical coverage area filter to filter out information from the ADSs, and dynamically update all the views of the ADS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-230]   It shall be possible to filter the ADS based on a time window (e.g. using a time slider UI widget) and remove/ hide IIEs falling outside the of the active time window (e.g. using Last Report Date and latest time information is of value (LTIOV) attributes, BSO ASAT times, product modification times, etc.) and dynamically update all the views of the ADS. It shall be possible to dynamically shrink, expand, and shift the time window in time (backwards and forwards in time).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-231]   It shall be possible to save search + filter settings as named user-specific filters for the IRM Application to be able to recreate the ADS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.10.4 IIE View/ Entry Panel

[FUA-731]   The IRM Management Application shall include an IIE View/ Entry Panel as defined in chapter 2 to display and edit IIEs managed by the application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.10.5 Table Views

[FUA-232]   The IRM Application shall use the Table View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-233]   It shall be possible to view a set of IRs in a Table View where each row represents an IR, and the IR attribute values are shown across multiple columns in the table. The operation or named collection, the ICP, the indicator (in case a IR is linked to more than one indicator then the indicator shall be delimited within the same column, etc. shall all be included as column attributes.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-234]   It shall be possible to select between a set of standard and predefined layouts of the Table View (the purpose of this is to allow the user to quickly organize the Table View for the task at hand; e.g. there might be a particular layout for the export to comma-separated values (CSV) files, etc.)

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-235]   It shall be possible to edit (including deleting) IRs directly in a Table View.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-236]   It shall be possible to view a set of Indicators in an (Indicator) Table View where each row represents an Indicator and the Indicator attribute values are shown across multiple columns in the table. The IR that the Indicator is linked to, and all other IIEs of different types that the Indicator is linked to shall all be included as column attributes.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-237]   It shall be possible to select the IIEs the Indicator is linked to within the Table View and have all the details of the IIE presented previewed in a dialog window.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-238]   It shall be possible to view a set of RFIs in a Table View where each row represents an RFI, and the RFI attribute values are shown across multiple

columns in the table. The IR that the RFI is linked to shall be included as one of the column attributes. RFI responses shall also be reported on in each row.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-239]   It shall be possible display the RFI responses grouped by RFIs in a Table View.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-240]   It shall be possible to export the content of the Table View to a file in XML format.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.10.6   Relationships View

[FUA-241]   The IRM Application shall use the Relationship View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-242]   The IRM Application shall be able to display an ICP with its PIRs, SIRs, EEIs and indicators in the Relationship View. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-243]   The IRM Application shall be able to display RFIs, RFI responses and EEIs in the Relationship View. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-244]   It shall be possible to use Degree Centrality filtering to filter out all RFIs with more than a specified number of RFI responses (e.g. to show only unanswered RFIs in the Relationship View), and to filter out RFIs with less than a specified number of RFI responses.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-245]   Items selected in Relationship View shall be displayed/ previewed in the IRM Application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.10.7   Gantt Views

[FUA-246]   The IRM Application Gant View shall be implemented using, or including, the Gant View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-247]   It shall be possible to visualize the selected set of IRs in a Gantt View grouped by IR hierarchy (PIR/SIR/EEI) where also linked Indicators at all levels in the IR hierarchy is visualized.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-747]   It shall be possible to delete an IR in an IR hierarchy and have also all child IRs of the IR deleted (e.g. by deleting a PIR, all SIRs linked to that PIR shall be deleted, and all EEIs linked to these SIRs are also deleted), pending that the child IRs are not linked to any other superior IRs (e.g. EEIs can be typically reused in different SIRs that may be subordinate to different PIRs).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-248]   It shall be possible to visualize the selected set of IRs in the Gantt View grouped by multiple ICPs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-249]   It shall be possible when visualizing the selected IRs in the Gantt View to also present information on the IRs' associated BSOs and Targets.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-250]   It shall be possible within the timeline part of the Gantt View to display IR time-based attributes (e.g. Latest Report Time and LTIOV as milestone symbols).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-251]   The Gantt View shall show the RFIs (and RFI responses) grouped by IRs (when the RFI is linked to an IR) and where the IR hierarchy (PIR/SIR/EEI) is also shown/depicted. RFIs with no IR association shall be grouped under a "no IR" group. RFI responses shall be grouped under their respective RFIs in the Gantt View.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-252]   It shall be possible within the timeline part of the Gantt View to display status value changes as annotated events/ milestones.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.10.8   GeoView

[FUA-253]   The IRM Application shall integrate with and control the GeoView component as described in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-254]   The IRM Application shall be able to show PIRs, SIRs, EEI, indicators, and RFIs in GeoView where status values of the IRs and RFIs can be used to select how they are rendered (options to include symbols vs shapes and colour coding).

E.g. using colours based on the RFIs status values (SUBMITTED, RESUBMITTED, FULFILLED or STOPPED)

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-255] The IRM Application shall display geographical areas of interests, BSOs, Targets, and Products linked to IRs and/ or RFIs in GeoView.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-256] Items selected in GeoView shall be displayed/ previewed in the IRM Application.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.1.10.9 Chart Views (statistical analysis)

[FUA-257] The IRM Application Chart View shall use the Chart View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-258] From the set of RFIs identified through search and filtering operations it shall be possible to plot Number of RFIs (in the set) by Status values, and by Organization, as bar charts and pie charts.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-259] From the set of RFIs identified through search and filtering operations it shall be possible to plot Number of RFI Responses (in the set) by Status, and by Organization, as bar charts and pie charts.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-260] It shall be possible to turn developed charts into named templates to be reused again and again to reproduce statistical diagrams with the same layout for other sets of RFIs.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.1.10.10 Document View

[FUA-261] The IRM Application Document View shall be able to collect all information about an RFI (including all ForAction information and RFI responses) and present the information in a readable form. It shall be possible to export this RFI document view to a PDF file.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.1.11 Collection Requirement (CR) Management (CRM) Application

[66] In Phase 1 the CRM Application is expected to interface directly with the STANAG 4559/AEDP-19 services. For that reason the normal submit for approval, approve, and

publish INTEL-FS workflow is not expected in Phase 1. This will be implemented in Phase 3 when the new I2BE API is available.

[67]   Phase 1 will only deliver interim CR functionality based on the INTEL-FS Spiral 1 ISR Synch Mechanism, and fulfilment of User Stories will first be achieved in Phase 2 and Phase 3.

4.1.11.1 Basic CR functionalities using STANAG 4559 services

[FUA-283]   The CRM Application shall enable the user to create ISR Requests (i.e. a CR with addressee information) and submit these to the STANAG 4559/AEDP-19 workflow services.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-284]   The CRM Application shall enable the user to link ISR Requests to resulting exploitation products using the STANAG 4559/AEDP-19 workflow services.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-285]   The CRM Application shall enable the user to view the status of ISR Requests using the STANAG 4559/AEDP-19 workflow services.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.12 Collection Operations Management (COM) Application

[69]   The COM Application will be implemented in Phase 2 and Phase 3.

4.2 Phase 2 – New user interfaces

[70]   In anticipation that the I2BE backend services are not available at a time that when the Contractor has completed Phase 1, the work Phase 2 will continue evolving the INTEL-FS2 User Interfaces by implementing new UI functionality against mock backends.

4.2.1 Dashboard Application

[73]   No feature changes for the Dashboard Application is expected in Phase 2.

4.2.2 Product Management Application

[74]   No feature changes for the Product Management Application is expected in Phase 2.

4.2.3 Battlespace Object (BSO) Management Application

[75]   No feature changes for the BSO Management Application is expected in Phase 2.

4.2.4 Targets Application (new implementation)

[76]   The Targets Application will be implemented in Phase 3.

4.2.5 Intelligence Situation Application

[77]   No feature changes for the Intelligence Situation Application is expected in Phase 2.

4.2.6 BM JIPOE Application (using mock backend)

[78]   The BM JIPOE Application will include all the functionality of the Intelligence Situation Application, and the BMF JIPOE functionality may be implemented as an integrated part of

the Intelligence Situation Application or as a separate application that includes all of the features from the Intelligence Situation Application.

[79]   The initial BM JIPOE Application user interface functionality will be implemented against mock backend as it is assumed that the I2BE API is not ready at the start-up of this work.

4.2.6.1   UI functionalities supporting user stories

[FUA-286]   The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 42]: As an Authorized User I want to create/ update a multi-criteria decision analysis (MCDA) comparison framework so that I can rank the different OPFOR COAs (e.g. as most likely and most dangerous).

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

4.2.6.2   Dynamic Intelligence Report (DIR) editor and message publisher

[80]   From [APP11D-DIR]: The DIR (Dynamic Intelligence Report) is used for the dissemination of TBM (Theatre Ballistic Missile) threat data updates.

[FUA-288]   The BM JIPOE Application shall provide a tool or editor that enable the user to create Dynamic Intelligence Reports with the information content as specified in [APP11D-DIR]. The DIR, as an [APP11D-DIR] XML message, shall be posted onto the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.2.7   Search Application

[81]   No feature changes for the Search Application is expected in Phase 2.

4.2.8   Analysis Application

[82]   No feature changes for the Analysis Application is expected in Phase 2.

4.2.9   ISR Organization Management Application

[83]   No feature changes for the ISR Organization Management Application is expected in Phase 2.

4.2.10   IRM Application (using mock backend)

[84]   The IRM Application's user interface functionality will in Phase 2 be augmented by using a mock backend.

4.2.10.1   UI functionalities supporting user stories

[FUA-291]   The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 68]: As an Authorized User I want to attach an effect/ task verb to the RFI so that I can specify what is required from the tasked unit and subsequently support the MOE analysis post completion.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

4.2.10.2 GeoView (enhanced)

[FUA-292]　　When using geometric shapes in the GeoView then it shall be possible, from a palette of different shapes, to select shapes to be used for RFIs with different effects/ tasks verb.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

4.2.10.3 Chart Views (enhanced)

[FUA-293]　　From the set of RFIs identified through search and filtering operations it shall in the Chart View be possible to plot Number of RFIs (in the set) by Status values, and by effect/ task verb, by degree of effectiveness, etc. as bar charts and pie charts.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

4.2.11 CRM Application (using mock backend)

[86]　　　The purpose of augmenting the CRM Application's user interface functionality in Phase 2 against a mock backend is to focus on (and gain more time to) developing good user experience (UX) for the more elaborate and complex features of the CR Management Application. Implementation of the full UI functionality for the CR Management Application will be done in Phase 3.

4.2.11.1 UI functionalities supporting user stories

[FUA-294]　　The CRM Application shall implement functionalities to fulfil the acceptance criteria of [US 74]: As an Authorized User I want to create a prioritization scheme so all CRs can be ordered in terms of priority ranking based on a prescribed criteria and weighting.

Verification:　Demonstration (see User Story acceptance criteria)
Est. Cost[€]:　Contractor to provide cost estimate

[FUA-295]　　The CRM Application shall implement functionalities to fulfil the acceptance criteria of [US 75]: As an Authorized User I want to create a CR so it can be prioritised and assigned for collection and exploitation.

Verification:　Demonstration (see User Story acceptance criteria)
Est. Cost[€]:　Contractor to provide cost estimate

4.2.11.2 IIE View/ Entry Panel

[FUA-297]　　The CRM Application shall implement data entry forms (using the IIE View/ Entry Panel as defined in chapter 2) that enables the user to enter/ update all attributes of a CR and related CR workflow information (For Action, For Information, etc.) as defined by [INTEL-FS2-InformationModel].

Verification:　Demonstration (see User Story acceptance criteria)
Est. Cost[€]:　Contractor to provide cost estimate

4.2.12 COM Application (using mock backend)

[87]　　　The initial COM Application user interface functionality will be implemented against mock backend as it is assumed that the I2BE API is not ready at the start-up of this work.

4.2.12.1 UI functionalities supporting user stories

[FUA-298] The COM Application shall implement functionalities to fulfil the acceptance criteria of [US 82]: As an Authorized User I want to create/ update a collection or exploitation task so the ISR systems under my command receives clear tasking.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

4.2.12.2 IIE View/ Entry Panel

[FUA-300] The COM Application shall implement data entry forms (using the IIE View/ Entry Panel as defined in chapter 2) that enables the user to enter/ update all attributes of a Collection and Exploitation Plan (CXP) as defined by [INTEL-FS2-InformationModel].

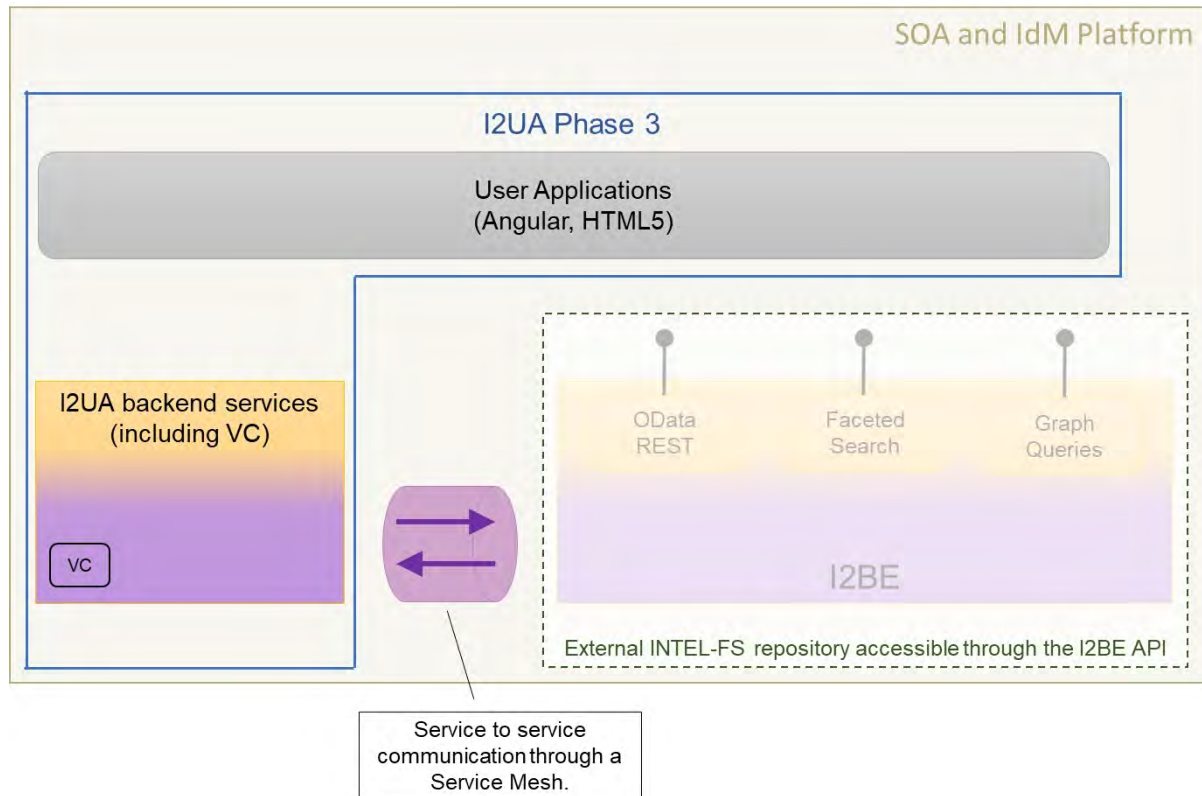Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

4.3 Phase 3 – Full integration with new backend API

[88] In phase 3, the I2UA will stop using the legacy INTEL-FS Spiral 1 data repository and switch over to accessing an externally provided intelligence repository. The new, and externally provided data repository, will be accessible through an application programming interface (API), see figure below. The externally provided data repository is referred to as INTEL-FS2 Backend (I2BE).

[89] The I2UA and I2BE will be hosted on the same SOA and IdM platform and whenever the I2UA backend needs to communicate with the I2BE this will be done through a Service Mesh capability provided by the SOA & IdM Platform (see [SOA-IdM]).

Figure 4-8 Phase 3 - I2UA integrated with external repository over I2BE API

[90]   The I2BE API will, as shown in in the figure above, include services for faceted search and graph queries I addition to a OData REST interface to all IIEs.

4.3.1 Dashboard Application (new backend)

4.3.1.1   UI functionalities supporting user stories

[FUA-301]   The Dashboard Application shall implement functionalities to fulfil the acceptance criteria of [US 12]: As an Authorized User I want to configure INTEL-FS2 so that I receive e-mail notifications (in my normal email tool; i.e. Microsoft Outlook) when new data that I am interested in is entered to INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-302]   The Dashboard Application shall implement functionalities to fulfil the acceptance criteria of [US 14]: As an Authorized User I want to configure INTEL-FS2 so that I receive notifications to my Dashboard Application when new data that I am interested in is entered to INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

4.3.1.2   UI integrated with new backend (no regression)

[FUA-303]   The I2UA with Dashboard Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented

functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.1.3   Messaging with I2BE

[93]   The I2BE System Administrator will at times publish notification message (e.g. for planned outages). The I2BE Services may also submit notification messages of interest to the I2UA

[FUA-304]   The I2UA with Dashboard Application shall implement Service Mesh service-to-service messaging with the I2BE. I.e. I2UA server-side services shall be able to send and receive messages from the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-305]   The I2UA shall when receiving such notification messages from the I2BE push the notifications (when relevant) to the appropriate users so that the messages appear in their application user interface the messages (e.g. using WebSocket) and appear on the Dashboard.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-306]   The I2UA shall place a visual indication of a received notification in all of I2UA user applications (not only in the Dashboard Application), and make the details of the notification available on the Dashboard Application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-307]   It shall be possible to create and/or update (i.e. subscribe to) notifications from saved and named searches and queries such that any new results from such searches or queries will be sent as a notification to the user. It shall also be possible to remove/ delete previously defined notification subscriptions.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-308]   It shall be possible to associate notifications with user-defined categories so that the notifications in its Table View can be grouped by the categories, and collapse/ expand notification categories to control what is being displayed on the screen.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.2   Products Management Application (new backend)

4.3.2.1   UI integrated with new backend (no regression)

[FUA-309]   The I2UA with Products Management Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.2.2   Video Player

[95]   To play videos the I2UA will consume a video conditioning service hosted by the I2BE that will synchronously stream the video and the video metadata in different channels

[96]   Web-client source code that implements the video player can be provided as PFI to the Contractor

[FUA-310]   The Products Management Application shall be able to play STANAG 4609 videos and support playing, pausing, timeline scrubbing forward and backward in the video to position the video at a new start point for the video playback.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-311]   The Products Management Application shall when playing STANAG 4609 videos display, and dynamically update, metadata received in the video stream. The metadata that shall be displayed and dynamically updated shall as a minimum include (if included in the video stream) the metadata listed in the table below.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-8 Video metadata to be displayed

1	Security classification of the video
2	Sensor platform identification
3	Latest timestamp received
4	Latest geographical coordinates for the video footprint
5	Latest geographical position of the sensor platform

[FUA-312]   The Products Management Application shall when playing STANAG 4609 videos synchronously display the video frame footprint (ground coverage area) and the video sensor platform in GeoView dynamically updating the footprint and sensor position.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.3   Battlespace Object (BSO) Management Application (new backend)

4.3.3.1   UI functionalities supporting user stories

[FUA-313]   The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 20]: As an Authorized User I want to be able to link to EOB data and associated electronic warfare derived TECHINT so that a complete understanding across all components of an opposing force (OPFOR) ORBAT can be obtained.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

4.3.3.2   UI integrated with new backend (no regression)

[FUA-314]   The I2UA with BSO Management Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented

functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.3.3   UI extended with support for BM BSO extensions

[FUA-315]   All user interfaces of the BSO Management Application shall be updated/ enhanced so support management of BSOs and BSRs on all BM-related BSOs and BSRs as defined [INTEL-FS2-InformationModel] (e.g. BM equipment, BM equipment types (BM TECHINT), BM historical firing events (HFE), BM units, BM locations, etc.)

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-316]   It shall be possible to link BM ORBAT holdings with BM TECHINT data as in accordance with [INTEL-FS2-InformationModel].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-317]   Relevant user interfaces of the BSO Management Application shall be updated/ enhanced so support viewing of BSOs and BSRs on all electronic order of battle (EOB) related BSOs and BSRs as defined [INTEL-FS2-InformationModel].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.3.4   EOB equipment and EOB-associated equipment types functionalities

[FUA-318]   The BSO Management Application integrated search function shall be enhanced to support searching for EOB equipment and EOB-associated equipment types.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-319]   The BSO Management Application filtering functionality shall be enhanced to support filtering on an attributes of EOB equipment and EOB-associated equipment types as defined in [INTEL-FS2-InformationModel].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.4   Targets Application

[97]   The different target lists are created and maintained by the NJTS system, and are dynamically made available to the I2UA through the new INTEL-FS2 (I2BE) backend through the I2BE API

4.3.4.1   UI functionalities supporting user stories

[FUA-320]   The Targets Application shall implement functionalities to fulfil the acceptance criteria of [US 30]: As an Authorized User I want to view targets from various types of target lists superimposed on a map so that I improve my situational awareness of BSOs relevant to me.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-321]   The Targets Application shall implement functionalities to fulfil the acceptance criteria of [US 31]: As an Authorized User I want to view targeting attributes of the individual targets/ BSOs from the various target lists so that I improve my situational awareness of targets/ BSOs relevant to me.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-322]   The Targets Application shall implement functionalities to fulfil the acceptance criteria of [US 32]: As an Authorized User I want to improve and enhance information on targets/ BSOs so that I can provide support to targeting.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-324]   The Targets Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

4.3.4.2   Integrated search and basic actions on search results

[FUA-326]   The Targets Application shall include an integrated search function allowing the user to identify target lists that can subsequently be viewed.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-327]   The integrated search function shall be able to find information associated with targets in the target list like BSOs, battle damage assessment (BDA) reports, collection requirements (CR), and ISR Systems tasked to the linked CR.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-328]   From the search results it shall be possible (for an authorized user) to perform the actions as defined in the table below.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-9 Targets Application integrated search and search results actions

Search result	Supported actions
BSOs	Single and multi-select items and add to, or remove from, a Candidate Target List or a No-strike List

4.3.4.3   Application Data Set (ADS) management functionalities

[FUA-329]   It shall be possible to filter the set of targets to be viewed on specific target lists, Basic Encyclopaedia (BE) Number, target identifier, etc. and hide filtered-out targets (and target lists), and dynamically update the information/ content in the different target views.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.4.4   IIE View/ Entry Panel

[FUA-829] The Targets Application shall include an IIE View/ Entry Panel as defined in chapter 2 to display and edit IIEs managed by the application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.4.5   Table Views

[FUA-330]   The Targets Application shall use the Table View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-331]   It shall be possible to view a set of targets in a Table View where each row represents a target, and the target attribute values are shown across multiple columns in the table. The Target List that the target is linked to shall be included as a column attribute.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.4.6   Relationships View

[FUA-332]   The Targets Application shall use the Relationship View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-333]   The Targets Application shall have functionality for selecting a particular target list and have all targets on that list displayed in a Relationship View. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-334]   The Targets Application shall have functionality for selecting a No-strike List and have all BSOs on that list displayed in a Relationship View. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-335]   The Targets Application shall have functionality for selecting a Candidate Target List and have all BSOs on that list displayed in a Relationship View. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-336]   Items selected in Relationship View shall be displayed/ previewed in the Targets Application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.4.7 GeoView

[FUA-337] The Targets Application shall integrate with and control the GeoView component as described in chapter 2.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-338] The Targets Application shall have functionality for selecting a particular target list and have all targets on that list displayed and highlighted in GeoView.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-339] The Targets Application shall have functionality for selecting a No-strike List and have all BSOs on that list displayed and highlighted in GeoView.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-340] The Targets Application shall have functionality for selecting a Candidate Target List and have all BSOs on that list displayed and highlighted in GeoView.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-341] Items selected in GeoView shall be displayed/ previewed in the Targets Application.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.3.5 Intelligence Situation Application (new backend)

4.3.5.1 UI integrated with new backend (no regression)

[FUA-342] The I2UA with Intelligence Situation Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.3.6 BM JIPOE Application (new backend)

4.3.6.1 UI functionalities supporting user stories

[FUA-343] The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 36]: As an Authorized User I want to create/ update areas, so that I can confine/ focus my operating environment (OE) analysis.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-344] The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 37]: As an Authorized User I want to create/ update a

named collection for the OE, so that I can establish a grouping of the information for the collaborative JIPOE process.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-345]   The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 38]: As an Authorized User I want to organize information items in overlays to support multiple analyses of the OE.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-346]   The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 39]: As an Authorized User I want to exploit a multitude of overlays so that I can evaluate the OE.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-347]   The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 40]: As an Authorized User I want to create/ update actors (e.g. Nations of Concern), so that I can include actor analysis into the JIPOE process.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-348]   The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 41]: As an Authorized User I want to view the actor information in different views to support my analysis of the actor.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-349]   The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 43]: As an Authorized User I want to be able to create/ update and define OPFOR BM COAs so that these can subsequently be used for OPFOR BM COA comparisons and OPFOR BM COA rankings.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-350]   The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 44]: As an Authorized User I want to be able to compare OPFOR BM COAs so these can be ranked in importance (e.g. most likely OPFOR BM COA and most dangerous OPFOR BM COA).

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-351]   The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 45]: As an Authorized User I want to assess OPFOR BM COA predictions against actual observations to subsequently improve my OPFOR BM COA predictions.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-352]   The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 46]: As an Authorized User I want to use new

information that can be extracted from HFEs to update my understanding of the opposing BM force.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-353]   The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 47]: As an Authorized User I want to fill my intelligence gaps to support the BM JIPOE process.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-355]   The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

4.3.6.2   UI integrated with new backend (no regression)

[FUA-356]   The I2UA with the BM JIPOE Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.6.3   Create and/ or update functionalities

[FUA-358]   The BM JIPOE Application shall when creating BSRs always link these to a COA.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[99]   Note: By creating BSRs in the context of COAs these status report are to be considered predictions and not real observations.

4.3.6.4   Integrated search and basic actions on search results

[FUA-359]   The BM JIPOE Application shall include an integrated search function allowing the user to identify Operation Environment Evaluations (OE), Actors Evaluations, Courses of Action (COA), Areas at Risk (AAR), all BSO types, products, PIRs, SIRs, EEIs, RFIs, CR, BM OPFOR Comparison Records, etc.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-360]   From the search results it shall be possible (for an authorized user) to perform the actions as defined in the table below.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-10 BM JIPOE Application integrated search and search results actions

Search result	Supported actions

area of intelligence interest (AOII), area of interest (AOI), area of intelligence responsibility (AOIR), BM OPFOR ORBAT, BM operation areas (BMOA), named area of interest (NAI), indicators, CRs, named collections, overlays, actors, threat analysis, OPFOR COA assessment criteria, OPFOR BM COA, asset lists, BSRs, BM OPFOR Comparison Records	Single and multi-select items and tag them as soft-deleted
IIEs managed within the application	Single and multi-select items and un-delete them
IIEs managed within the application	Single and multi-select items and hard-delete (purge) them Note: Very few, if any, users shall have this privilege
IIEs managed within the application in Draft workflow state	Single and multi-select items and submit approval request for them
IIEs managed within the application in a workflow state of awaiting approval	Single and multi-select items and approve them, or approve and directly publish them
IIEs managed within the application in a workflow state of awaiting to be published	Single and multi-select items and publish them
IIEs managed within the application in a workflow state of having been rejected approval (i.e. still in Draft status)	Select a rejected entity, obtain rejection reason, open the entity for further editing
IIEs managed within the application	Single and multi-select items and change a metadata attribute for the entire set in one operation (e.g. setting security classification or releasability for the entire set in one operation)

4.3.6.5   Application Data Set (ADS)

[FUA-361]   It shall be possible to perform multiple, consecutive queries to add data to the ADS. I.e. the user can chose whether to use the result of the new query to augment or replace the content of the application data set. When a new query is adding to the content of the data set, any duplicate IIEs from the multiple queries shall be resolved. Any change to the data set shall be reflected in all the application views.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-362]   It shall be possible search for an actor and expand all the information that is linked to the actor and add the actor and its linked information added to a BM JIPOE data set.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-363]   It shall be possible to search for all HFEs associated with a particular BMOA (or with multiple BMOAs) and add to a BM JIPOE data set.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-364]   It shall be possible to apply a geographical coverage area filter to filter out information from the BM JIPOE data set, and dynamically update the data set views.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-365]   It shall be possible to filter the BM JIPOE data set based on the linkage to a set of user-specified nodes and update the data set views. E.g. the user can select some BMOAs and reduce the data set to IIEs that is linked to the selected BMOAs, the user can select some assets and reduce the data set to IIEs linked to those assets, the user can select Areas of Intelligence Interest (AII) and Areas of Intelligence Responsibility (AIR) and reduce the data set to IIEs linked to those AIIs and AIRs, etc.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-366]   It shall be possible to filter the BM JIPOE data set based on IIE types, IIE attributes and associations to other IIEs (i.e. using graph-oriented queries) and remove/ hide "unwanted" IIEs and dynamically update the data set views.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-367]   It shall be possible to filter the BM JIPOE data set based on a time window (e.g. using a time slider UI widget) and remove/ hide IIEs falling outside the of the active time window and dynamically update the data set views. It shall be possible to dynamically shrink, expand, and shift the time window in time (backwards and forwards in time).

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-368]   The BM JIPOE Application shall be able to define data sets for multi-criteria decision analysis (MCDA) comparisons.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.3.6.6   Application-supported assessments

[FUA-867]   The BM JIPOE Application shall be able to calculate associations between an OPFOR BM HFE and BMOAs by comparing the smallest reported Estimated Launch Point error ellipse, the reported or correlated BM Type and the correlated Trajectory Type with BMOAs, expected BM Types and expected Trajectory Types.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-868]   The BM JIPOE Application shall calculate associations between an OPFOR BM HFEs and Assets based on the smallest reported Predicted Impact Point error ellipse and Asset areas or locations.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-369]   The BM JIPOE Application shall be able to calculate a total score for BM OPFOR targeting likelihood for each military and non-military asset type, and store the score values for the assets.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.6.7   IIE View/ Entry Panel

[FUA-869]   The BM JIPOE Application shall include an IIE View/ Entry Panel as defined in chapter 2 to display and edit IIEs managed by the application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.6.8   Table Views

[FUA-370]   The BM JIPOE Application shall use the Table View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-371]   It shall be possible view and edit all common metadata attributes for IIEs in the ADS in a Table View.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-372]   It shall be possible load Asset Lists into a Table View.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-872]   It shall be possible to load AARs into a Table View.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-873]   It shall be possible to load a BM OPFOR COA Comparison Record into a Table View.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-373]   It shall be possible to compare, the observed operational tempo for a BMOA with the expected operational tempo in a Table View.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-374]   It shall be possible to present threats to assets in a Table View where each row represent an asset, and each column identify a threat (i.e. a red BSO) to that asset.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.6.9   Relationship Views

[FUA-375]   The BM JIPOE Application shall be able to render the entire BM JIPOE Data set in a Relationship View where this view is implemented using the Relationship View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-376]   Items selected in Relationship View shall be displayed/ previewed in the BM JIPOE Application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.6.10   GeoView

[FUA-377]   The BM JIPOE Application shall integrate with and control the GeoView component as described in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-378]   The BM JIPOE Application shall be able to visualize the entire ADS including all parts of the COAs (e.g. AARs, BMOAs, etc.) in GeoView.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-379]   The BM JIPOE Application shall be able to identify HFEs that are not associated with any BMOAs and highlight these in GeoView.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-380]   The BM JIPOE Application shall be able to identify HFEs that have a different BM type to what is expected for the associated BMOA and highlight these in GeoView.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-880]   The BM JIPOE Application shall highlight OPFOR BM HFEs which have a different Trajectory Type to what is expected for the BM Type when they are displayed.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-881]   The BM JIPOE Application shall display all OPFOR BM HFEs in the ADS in the GeoView highlighting events which do not associate with at least one asset type in the expected OPFOR BM Targeting Strategy.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-381]   The BM JIPOE Application shall be able to draw multiple parameterized range rings for BSOs (launchers) in the BM JIPOE data set (pulling the parameters for the rings from BSO TECHINT).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-382]   The BM JIPOE Application shall be able to load asset lists from files and display the assets in GeoView.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-383]   It shall be possible to select one or many of the geo-referenced entities in the BM JIPOE data set in the GeoView and calculate the intersection with all defined range rings in the INTEL-FS data set using the I2BE API, and subsequently render such range rings in the GeoView (i.e. to visualize threats) and present the intersection calculations in a Table View (see [FUA-374]).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-883]   It shall be possible to create an overlay from the launcher positions and identified threatened assets from the intersect calculation above (see [FUA-383]), and it shall be possible to update this overlay with the result of re-calculation of the threat (e.g. to reflect the consequences of movement of launchers and/ or assets).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-884]   It shall be possible to visualize a BM OPFOR COA Comparison Record in GeoView. This visualization shall include the BMOAs, assets, and HFEs associated with the BM OPFOR COA Comparison Record.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.6.11   Terrain and mobility analysis visualization

[100]   The development of Ballistic Missile Operating areas (BMOA) is a key aspect of OPFOR BM COA development. In areas where there are major terrain features, such as large lakes, mountain ranges etc., such features may constrain/ refine the BMOAs.

[101]   Mobility Analysis is a variant of the Terrain Analysis and will most likely involves similar calculations, but taking into account the relocation speed of the vehicle. The difference is that while the Terrain Analysis focus on where a BM Unit can travel (typically within a BMOA), the focus of the Mobility Analysis is to detect how far a BM unit can travel as a function of time. An example of a visualization of a Terrain and Mobility Analysis is shown in the figure below.

Figure 4-9 Example of Terrain and Mobility Analysis Visualization
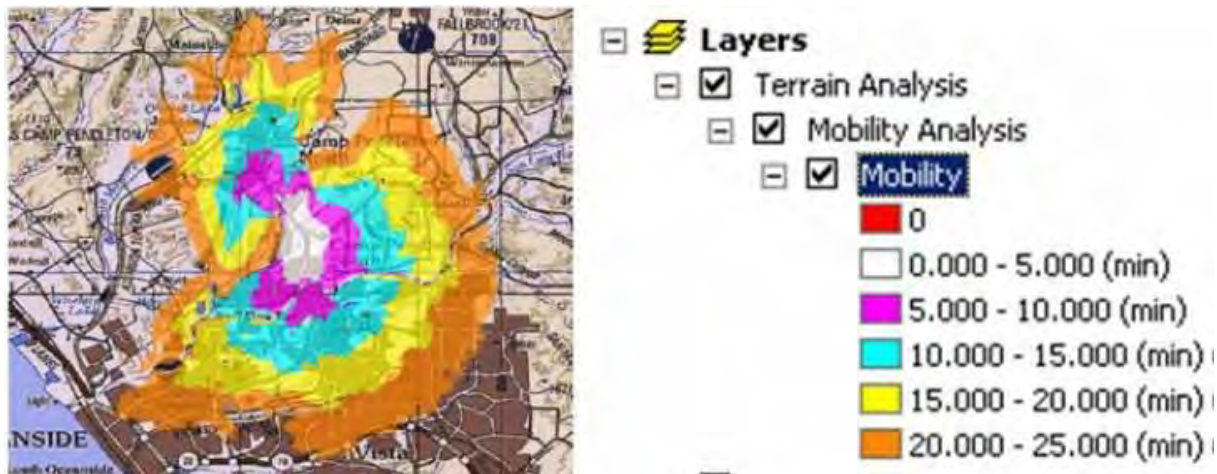
[FUA-384]   The BM JIPOE Application shall through the I2BE Terrain Analysis API obtain one or several overlays that depicts where BM Units can reach and operate from. The I2BE Terrain Analysis API will be implemented as an Open Geospatial Consortium (OGC) Web Processing Service (WPS) and is expected to require the input parameters as defined in the table below. The BM JIPOE Application shall be able to provide all the parameters when calling the backend Terrain Analysis service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-11 Expected parameters for the I2BE Terrain Analysis API

Input Parameter	Remarks
Coverage area	Geographical area defined by a BMOA to constrain the analysis
Vehicle weights, heights, and widths	Maximum vehicle weights, heights, and widths from BM TECHINT to be matched against road network constraints (e.g. bridges, tunnels, small roads, etc.)
Vehicle turning radius	
Vehicle off-road ability/ Land use	This should include information on type of terrain where the vehicles can go off-road (e.g. sand, snow, wetland, etc.)
Maximum off-road distance	E.g. measured in kilometers
Slope limitations (degrees)	Maximum slope the vehicles can travel from BM TECHINT to be matched against road network data and terrain elevation data (in case the vehicles can go off-road)

[FUA-385]   The BM JIPOE Application shall through the I2BE Mobility Analysis API that obtain one or several overlays that depicts how far the BM Units can reach for a set of time intervals The I2BE Mobility Analysis API will be implemented as an OGC Web Processing Service (WPS) and is expected to require the input parameters as defined in the table below. The BM JIPOE Application shall be

able to provide all the parameters when calling the backend Mobility Analysis
service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-12 Parameters for Mobility Analysis function

Input Parameter	Remarks
Start position	Geographical location from which the BM Unit will start the movement
Time increments	In unit and extent (e.g. in 5 hour increments)
Vehicle relocation speed on roads	Average/ expected road speed of vehicle from BM TECHINT
Vehicle relocation speed off roads	Average/ expected off-road speed
Vehicle weights, heights, and widths	Maximum vehicle weights, heights, and widths from BM TECHINT to be matched against road network constraints (e.g. bridges, tunnels, small roads, etc.)
Vehicle turning radius	
Vehicle off-road ability/ Land use	This should include information on type of terrain where the vehicles can go off-road (e.g. sand, snow, wetland, etc.)
Maximum off-road distance	E.g. measured in kilometers
Slope limitations (degrees)	Maximum slope the vehicles can travel from BM TECHINT to be matched against road network data and terrain elevation data (in case the vehicles can go off-road)

4.3.6.12 Chart Views (statistical analysis)

[FUA-386]   The BM JIPOE Application Chart View shall use the Chart View Component
with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-387]   The BM JIPOE Application Chart View shall display summary graph of filtered
HFE in the application data set.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-388]   The BM JIPOE Application shall be able to display HFEs in the application data
set as bar chart against time.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-389]   The BM JIPOE Application shall calculate the average number of BM launches
per 24 hours for each BMOA and present in an appropriate Chart View (e.g.
using bar charts).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-889]   The BM JIPOE Application shall calculate the average salvo size for each
               BMOA in the ADS using the specified Salvo Time-out.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-890]   The BM JIPOE Application shall calculate the average salvo duration for each
               BMOA in the ADS using the specified Salvo Time-out.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-891]   The BM JIPOE Application shall from the Chart View launch/ salvo calculations
               store the calculated BM Operational Tempo for each BMOA in the ADS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.6.13   Multi-Criteria Decision Analysis (MCDA) View

[FUA-892]   The BM JIPOE Application shall implement a MCDA View where the MCDA
               criteria sets can be defined, updated, and saved.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-893]   The MCDA View shall have support for showing both the MCDA criteria and all
               OPFOR BM COAs to be analysed in a panel, and shall enable the user to make
               changes to the MCDA criteria and directly see the results on the ranking of the
               OPFOR BM COAs in the different ratings (most dangerous, most likely).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-894]   It shall be possible for the user to override the automatically calculated rankings
               from the MCDA criteria (most dangerous, most likely) and manually set rankings
               of the OPFORM BM COAs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-895]   It shall be possible to store the final MCDA rankings (automatically generated
               and/ or manually adjusted) of OPFOR BM COAs through the I2BE API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.6.14   OPFOR BM COA (Observed vs Expected) Comparison View

[FUA-896]   The BM JIPOE Application shall implement a view tailored for comparing
               observed versus expected OPFOR BM COA where information from BSO
               status reports are compared with the expected/ predicted OPFOR BM COA
               activities, and where the comparison results can be organized, annotated, and
               stored (and retrieved) through the I2BE API (i.e. BM OPFOR Comparison
               Records can be created, updated, and deleted). Annotations can be made both
               at the individual comparisons, and as a summary annotation on the Comparison
               Record (i.e. as an overall compliance assessment/ summary of all the
               comparisons in the record).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-897]   The OPFOR BM COA Comparison View shall for each BMOAs within the OPFOR BM COA calculate the observed operational tempo and visualize a comparison with the expected operational tempo for the BMOA, and it shall be possible to annotate and store the comparison result (differences) as part of a comparison record (see [InformationModel]) linked to the OPFOR BM COA.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-898]   The OPFOR BM COA Comparison View shall for each BMOAs within the OPFOR BM COA retrieve observed BM types and visualize a comparison with the expected BM types for the BMOA, and it shall be possible to annotate and store the comparison result (differences) as part of a comparison record linked to the OPFOR BM COA.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-899]   The OPFOR BM COA Comparison View shall for each BMOAs within the OPFOR BM COA retrieve observed BM trajectory types and visualize a comparison with the expected BM trajectory types for the BMOA, and it shall be possible to annotate and store the comparison result (differences) as part of a comparison record linked to the OPFOR BM COA.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-900]   The OPFOR BM COA Comparison View shall for each OPFOR BM Force within the OPFOR BM COA retrieve new intelligence (new BSO status reports) on the OPFOR BM Force available warhead types and visualize a comparison with the expected warhead types for the OPFOR BM Force, and it shall be possible to annotate and store the comparison result (differences) as part of a comparison record linked to the OPFOR BM COA.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-901]   The OPFOR BM COA Comparison View shall for each OPFOR BM Force within the OPFOR BM COA retrieve observed warhead types employed by an OPFOR BM Force and visualize a comparison with the expected warhead types for the OPFOR BM Force, and it shall be possible to annotate and store the comparison result (differences) as part of a comparison record linked to the OPFOR BM COA.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-902]   It shall be possible from within the OPFOR BM COA Comparison View to associate a set of OPFOR BM HFEs (within the ADS) with an OPFOR BM COA Comparison Record.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-903]   The OPFOR BM COA Comparison View shall for each OPFOR BM Targeting Strategy associated with the OPFOR BM COA compare the expected BM targeting strategy against observed activity, and it shall be possible to annotate

and store the comparison result (differences) as part of a comparison record linked to the OPFOR BM COA.

[FUA-904]　The OPFOR BM Comparison View shall be able to display a time-sorted list of OPFOR BM COA Comparison Records based on the period of validity for each expected OPFOR BM COA.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

4.3.6.15　Document Views

[FUA-390]　It shall be possible to view the operating environment evaluation in a customizable and human readable document format and to save/ export this document as a PDF file.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

[FUA-391]　It shall be possible to view the actor analysis in a customizable and human readable document format and to save/ export this document as a PDF file.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

[FUA-392]　It shall be possible to view the BM OPFOR COA in a customizable and human readable document format and to save/ export this document as a PDF file.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

4.3.6.16　Animation

[FUA-393]　It shall be possible to dynamically animate the visualization of the ADS in GeoView by dragging a time "handle" in the time slider tool.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

4.3.7　Search Application (new backend)

4.3.7.1　UI functionalities supporting user stories

[103]　Note: The search engine for the faceted search will be implemented in the new backend (I2BE)

[FUA-394]　The Search Application shall implement functionalities to fulfil the acceptance criteria of [US 50]: As an Authorized User I want to be able to look for information using faceted search techniques so that I can narrow down search results by applying multiple filters based on faceted classification of the items.

Verification:　Demonstration (see User Story acceptance criteria)
Est. Cost[€]:　Contractor to provide cost estimate

4.3.7.2　UI integrated with new backend (no regression)

[FUA-395]　The I2UA with Search Application shall be fully integrated with new I2BE backend. There shall be no regression from previously implemented functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API. This includes verifying that the combined search can search also against the

new IIE types introduced in this phase, and that the faceted search also has support for previewing and exporting of search results.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.7.3   Search results functionalities

[FUA-396]   The Search Application shall by default filter out BSRs that are linked to COAs (i.e. these COA-linked BSRs shall normally not be included in the result set). The user shall be able to override this default filtering so that COA-linked BSRs are also reported in the result set, but in this case these BSRs shall be visually distinguishable from the normal BSRs (to alert the user that these are not real observations).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-397]   The Search Application shall be able to use the I2BE provided search clustering functionality (exposed through the I2BE search API) to present search results grouped into categories.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.8   Analysis Application (new backend)

4.3.8.1   UI functionalities supporting user stories

[FUA-398]   The Analysis Application shall implement functionalities to fulfil the acceptance criteria of [US 49]: As an Authorized User I want to have tool support to find connection path between entities so that I can investigate if a connection between the entities exist.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

4.3.8.2   UI integrated with new backend (no regression)

[FUA-399]   The I2UA with Analysis Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.8.3   Advanced graph query builder

[FUA-400]   The Analysis Application shall be augmented with a visual graph query builder that takes full advantage of the graph query support in the I2BE API and the relational nature of the [INTEL-FS2-InformationModel].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-401]　　The Analysis Application shall transform geographical area constraints defined using INTEL-FS2 geographical areas (e.g. NAI, BMOA, etc.) into a geospatial representation supported by the query language exposed through the I2BE API.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

4.3.8.4　Centralities analysis

[FUA-402]　　Within the Analysis Data Set (ADS) it shall be possible to select IIE types and relationship types suitable for centrality calculations, select centrality types, and calculate the centralities for the selected IIEs and relationships. Note: Degree, Closeness, Betweenness, and Eigenvector Centrality calculations will be supported by the I2BE API.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

[FUA-403]　　It shall, when using geometric shapes nodes in the Relationship View, and in the GeoView, be possible, from a centralities palette, to specify a centrality type and sizing parameters (minimum and maximum size) to be used for rendering the size of IIEs (nodes) such the size of the rendered shapes correlates with their centrality values.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

[FUA-404]　　It shall be possible to view the results of the centrality calculations in a table with the different centrality types reported in different columns and where the table rows represents the IIEs. The Centrality Table shall be sortable (ascending and descending) for each one of the centrality columns.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

[FUA-405]　　It shall be possible to select an IIE from the Centrality Table and have that IIE highlighted in the ADS views.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

4.3.9　ISR Organization Management Application (new backend)

4.3.9.1　UI functionalities supporting user stories

[FUA-406]　　The ISR Organization Management Application shall implement functionalities to fulfil the acceptance criteria of [US-63]: As an Authorized User I want to have the operation, ISR ORBAT, ISR units, and ISR systems approved and published so that this information becomes known/ available at all ONs.

Verification:　Demonstration (see User Story acceptance criteria)
Est. Cost[€]:　Contractor to provide cost estimate

4.3.9.2　UI integrated with new backend (no regression)

[FUA-407]　　The ISR Organization Management Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

This means that the usage of the STANAG 4559 services as implemented in Phase 1 shall be stopped. Instead the ISR Organization Management Application shall consume the new I2BE OData REST API for accessing ISR ORBATs, Units, ISR Systems, etc.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.10 IRM Application (new backend)

4.3.10.1 UI integrated with new backend (no regression)

[FUA-409]   The I2UA with IRM Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.11 CRM Application (new backend)

4.3.11.1 UI functionalities supporting user stories

[FUA-410]   The CRM Application shall implement functionalities fulfil [US 76]: As an Authorized User I want to update the status of a CR to control the workflow of the CR.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-411]   The CRM Application shall implement functionalities fulfil [US 77]: As an Authorized User I want to track the status of CRs as they go through the tasking, collection, processing, exploitation, and dissemination (TCPED) process so I can understand whether they will be supported or not.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-412]   The CRM Application shall implement functionalities fulfil [US 78]: As an Authorized User I want to process CRs into actions so that they ultimately result in collection activities.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-413]   The CRM Application shall implement functionalities fulfil [US 79]: As an Authorized User I want to be able to export a set of CRs, a CRL and a CTL so this information can be used outside of INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-417]   The CRM Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

4.3.11.2   UI integrated with new backend (no regression)

[FUA-418]   The I2UA with the CRM Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.11.3   Integrated search and basic actions on search results

[FUA-420]   The CRM Application shall include an integrated search function allowing the user to identify Intelligence Requirements (IR), BSOs that can subsequently be used for creating CRs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-421]   The CRM Application's integrated search function shall support searching for and identifying Operational Activities, CRLs, CTLs, NAIs, Products and BSOs etc. so that the CRs can be linked to IIEs of such types.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-422]   The CRM Application's integrated search function shall support searching for CRs (including draft CRs) to be viewed in Table View, GeoView, and Gantt View. Searching for specific CRs based on CR serial number shall be supported.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-423]   From the search results it shall be possible (for an authorized user) to perform the actions as defined in the table below.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-13 CRM Application integrated search and search results actions

Search result	Supported actions
CRs	Single and multi-select items and tag them as soft-deleted
Soft-deleted CRs	Single and multi-select items and un-delete them
CRs	Single and multi-select items and hard-delete (purge) them Note: Very few, if any, users shall have this privilege
CRs in Draft workflow state	Single and multi-select items and submit approval request for them
CRs in a workflow state of awaiting approval	Single and multi-select items and approve them, or approve and directly publish them
CRs in a workflow state of awaiting to be published	Single and multi-select items and publish them
CRs in a workflow state of having been rejected approval (i.e. still in Draft status)	Select a rejected entity, obtain rejection reason, open the entity for further editing

CRs	Single and multi-select items and change a metadata attribute for the entire set in one operation (e.g. setting security classification or releasability for the entire set in one operation)

4.3.11.4   Application Data Set (ADS)

[FUA-424]   It shall be possible to filter the set of CRs on specific CRLs and CTLs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-425]   It shall be possible to filter the set of CRs on operation or named collection, IRs, Originator, actionees (For Action), CR Status, Priority, Basic Encyclopaedia (BE) Number, Target ID, Category code, degree of effectiveness, etc. and hide filtered-out CRs, and dynamically update all the CR views.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-426]   It shall be possible to apply a geographical coverage area filter to filter out information from the set of CRs, and dynamically update all the CR views.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-427]   It shall be possible to filter the set of CRs based on a time window (e.g. using a time slider UI widget) and remove/ hide CRs falling outside the of the active time window (using Last Report Date and LTIOV attributes) and dynamically update all the CR views. It shall be possible to dynamically shrink, expand, and shift the time window in time (backwards and forwards in time).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-428]   It shall be possible to save search + filter settings as named user-specific filters for the CR Management Application to be able to recreate the set of CRs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.11.5   Table Views

[FUA-429]   The CRM Application shall use the Table View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-430]   It shall be possible to view a set of CRs in a Table View where each row represents a CR, and the CR attribute values are shown across multiple columns in the table. The operation or named collection, the Unit (in case a CR is assigned to more than one Unit then the Units shall be delimited within the same column), the IR, the CR priority, the CR Status, etc. shall all be included as column attributes.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-431]   It shall be possible to select between a set of standard and predefined layouts of the Table View (the purpose of this is to allow the user to quickly organize the

Table View for the task at hand; e.g. there might be a particular layout for the export to CSV files, etc.)

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-432]   It shall be possible to edit CRs in the Table View. The editing functionality shall include the possibility of dragging one or many CRs from one group to another group (e.g. to reassign CRs from one Unit to another Unit).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-433]   It shall be possible to export the set of CRs as a "bag of CRs", as a CRL, and as a CTL, in an XML format.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.11.6   Relationship View

[FUA-434]   The CRM Application shall use the Relationship View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-435]   The CRM Application shall be able to display CRs, PIRs, SIRs, EEIs, collection and exploitation tasks, and products in the Relationship View. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-436]   Items selected in Relationship View shall be displayed/ previewed in the CR Management Application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.11.7   Gantt Views

[FUA-437]   The CRM Application Gant View shall be implemented using, or including, the Gant View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-438]   It shall be possible to visualize the selected set of CRs grouped by IRs (when the CR is linked to an IR) and where the IR hierarchy (PIR/SIR/EEI) is also shown/ depicted. CRs with no IR association shall be grouped under a "no IR" group.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-439]   It shall be possible to visualize the selected set of CRs grouped by CRLs and CTLs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-440]   It shall be possible when visualizing the selected CRs to display information on the CRs' associated BSOs and Targets, and assigned Units (in particular status updates from multiple Units on the same CR in case a CR is allocated to multiple Units).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-441]   It shall be possible within the timeline part of the Gantt View to display CR time-based attributes (Latest Report Time and Latest Time of Information Value) as milestones/ events.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-442]   It shall be possible within the timeline part of the Gantt View to display status value changes as annotated events/ milestones.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.11.8   GeoView

[FUA-443]   The CRM Application shall integrate with and control the GeoView component as described in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-444]   The CRM Application shall be able to show CRs and associated geographical areas in GeoView where status values, and effects/ tasks verb, of the CRs can be used to select how the CRs are rendered (options to include symbols vs shapes and colour coding).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-445]   The CRM Application shall, for CRs in the CR set with multiple locations in it, command GeoView to depict a link between the CR with all its locations.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-446]   The CRM Application shall show BSOs and Targets linked to CRs in the selected CR set in GeoView.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-447]   Items selected in GeoView shall be displayed/ previewed in the CR Management Application.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.11.9   Chart Views (statistical analysis)

[FUA-448]   The CRM Application Chart View shall use the Chart View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-449]   From the set of CRs identified through search and filtering operations it shall be possible to plot Number of CRs (in the set) by Status values, by effects/ tasks verb, by degree of effectiveness, degree of effectiveness vs ad hoc and dynamic tasking, CR status vs CR Priority, by Organization etc. as bar charts and pie charts.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-450]   It shall be possible to turn developed charts into named templates to be reused again and again to reproduce statistical diagrams with the same layout for other sets of CRs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.12 COM Application

4.3.12.1 UI functionalities supporting user stories

[FUA-451]   The COM Application shall implement functionalities to fulfil the acceptance criteria of [US 83]: As an Authorized User I want to update the status of tasks to control the workflow of the tasks.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-452]   The COM Application shall implement functionalities to fulfil the acceptance criteria of [US 84]: As an Authorized User I want to track the status of tasks so I can understand whether they will be supported or not.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-453]   The COM Application shall implement functionalities to fulfil the acceptance criteria of [US 85]: As an Authorized User I want to create and manage several CXPs to support a CM battle rhythm so that individual collection and exploitation tasks can be viewed in accordance with the defined CXPs.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-454]   The COM Application shall implement functionalities to fulfil the acceptance criteria of [US 86]: As an Authorized User I want to be able to export a set of tasks and CXPs so this information can be used outside of INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-455]   The COM Application shall implement functionalities to fulfil the acceptance criteria of [US 87]: As an Authorized User I want to manage finalized CXPs to provide clear tasking of ISR Systems.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-457]   The COM Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]:   Contractor to provide cost estimate

4.3.12.2   UI integrated with new backend (no regression)

[FUA-458]   The I2UA with the COM Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.12.3   Integrated search and basic actions on search results

[FUA-459]   The COM Application shall include an integrated search function allowing the user to identify Collection Requirements (CR) that can subsequently be used for creating collection and exploitation tasks.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-460]   The Collection & Exploitation Planning Application's integrated search function shall support searching for and identifying Operational Activities, CTLs, CXPs, NAIs, Products and BSOs etc. so that the tasks can be linked to IIEs of such types.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-461]   The Collection & Exploitation Planning Application's integrated search function shall support searching for tasks (including draft tasks) and CRs to be viewed in Table View, GeoView, and Gantt View. Searching for specific tasks based on task serial number shall be supported.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-462]   From the search results it shall be possible (for an authorized user) to perform the actions as defined in the table below.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-14 COM Application integrated search and search results actions

Search result	Supported actions
Tasks, CXPs	Single and multi-select items and tag them as soft-deleted
Soft-deleted Tasks, CXPs	Single and multi-select items and un-delete them
Tasks, CXPs	Single and multi-select items and hard-delete (purge) them Note: Very few, if any, users shall have this privilege
Tasks, CXPs in Draft workflow state	Single and multi-select items and submit approval request for them
Tasks, CXPs in a workflow state	Single and multi-select items and approve them, or approve

of awaiting approval	and directly publish them
Tasks, CXPs in a workflow state of awaiting to be published	Single and multi-select items and publish them
Tasks, CXPs in a workflow state of having been rejected approval (i.e. still in Draft status)	Select a rejected entity, obtain rejection reason, open the entity for further editing
Tasks, CXPs	Single and multi-select items and change a metadata attribute for the entire set in one operation (e.g. setting security classification or releasability for the entire set in one operation)

4.3.12.4   Application Data Set (ADS)

[FUA-463]   It shall be possible to filter the set of tasks and CRs on specific CTLs and CXPs (by name and creator).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-464]   It shall be possible to filter the set of tasks and CRs on operation or named collection, IRs (in particular EEIs), tasking Unit, ISR System, ISR System operational/ capacity/ processing status, task creation time, task status values, products required, etc. and hide filtered-out tasks, and dynamically update all Views.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-465]   It shall be possible to apply a geographical coverage area filter to filter out information from the set of tasks and CRs, and dynamically update all Views.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-466]   It shall be possible to filter the set of tasks based on a time window (e.g. using a time slider UI widget) and remove/ hide tasks falling outside the of the active time window (using task interval and collection time intervals) and dynamically update all the task views. It shall be possible to dynamically shrink, expand, and shift the time window in time (backwards and forwards in time).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-467]   It shall be possible to save search + filter settings as named user-specific filters for the Collection & Exploitation Planning Application to be able to recreate the set of tasks.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.12.5   Table Views

[108]   The tasks that are managed within the COM Application are based on CRs and access to CRs from within the application will be required.

[109]   The COM Application will need to manage multiple Table Views (for CRs and for Tasks)

[FUA-468]   The COM Application shall use the Table View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-469]   It shall be possible to work with CRs in a Table view, to select one or many CRs in the Table View and generate tasks from them (e.g. by dragging and dropping into the Task Table View). The new tasks shall be added to the task set and those shall how up in another Table View for tasks, in GeoView, and in the Gantt View.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-470]   It shall be possible to view a set of tasks in a Table View where each row represents a task, and the task attribute values are shown across multiple columns in the table. The operation or named collection, the ISR System, the CR, the CXP that the task is linked to, the task timing data, etc. shall all be included as column attributes.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-471]   It shall be possible to edit tasks directly in a Table View.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-472]   It shall be possible edit tasks in the table by dragging one or many tasks from one group to another group (this functionality could be used to reassign tasks from one ISR System to another ISR System).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-473]   It shall be possible to select between a set of standard and predefined layouts of the Table View (the purpose of this is to allow the user to quickly organize the Table View for the task at hand; e.g. there might be a particular layout for the export to CSV files, etc.)

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-474]   It shall be possible to export the set of tasks in a Table View as a "bag of tasks", and/ or as a CXP, in an XML format.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.12.6   Gantt Views

[FUA-475]   The COM Application Gant View shall be implemented using, or including, the Gant View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-476]   It shall be possible to visualize the selected set of tasks grouped by CXPs with ISR Systems as second tier sub-group.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-477]   It shall be possible within the timeline part of the Gantt View to display task time-based attributes (Task Interval and Collection Time Interval).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-478]   It shall be possible within the timeline part of the Gantt View to display status value changes as annotated events/ milestones.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-479]   It shall be possible within the timeline part of the Gantt View to visualize the individual ISR Systems availability, capability, capacity, and operational status (e.g. indicate timeframes where the ISR System is fully tasked and time frames where it has spare capacity).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-480]   It shall be possible to edit tasks directly in the Gant View.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-481]   Using the visual indication of when ISR Systems are overloaded vs having spare capacity (see [FUA-479]) it shall be possible to reallocate tasks by dragging and dropping tasks from one ISR System to another ISR System. The visual indication of availability/ capacity status for the ISR Systems shall be dynamically updated as tasks are reassigned.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.12.7   GeoView

[FUA-482]   The COM Application shall integrate with and control the GeoView component as described in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-483]   The COM Application shall be able to show geographical areas, CRs, and collection and exploitation tasks in GeoView.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-484]   The COM Application shall be able to use different shapes and colours to visually distinguish tasks with different status values GeoView.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-485]   The COM Application shall also be able to use different shapes and colours to visually distinguish tasks based on the required product types (SAR, EO, IR, etc.) in GeoView.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-486]   The COM Application shall be able to obtain graphical representation of the Air Tasking Order (ATO) from the NCOP system (see [NCOP-IDC]) and display the ATO in GeoView.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-487]   It shall be possible to select one or many CRs in the GeoView and generate tasks from them. The new tasks shall be added to the task set and show up in the GeoView, Task Table View, and Gant View.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.3.12.8   Chart Views (statistical analysis)

[FUA-489] The COM Application Chart View shall use the Chart View Component with all its features as defined in chapter 2.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-490]   From the set of tasks identified through search and filtering operations it shall be possible to plot Number of tasks (in the set) by statuses, by Unit, by ISR System, etc. as bar charts and pie charts.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FUA-491]   It shall be possible to turn developed charts into named templates to be reused again and again to reproduce statistical diagrams with the same layout for other sets of tasks.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

5 Non-functional Requirements (NFR)

[110]   NFR quality requirements is defined in accordance with ISO-25010 standard, and definitions in this chapter are based on ISO/IEC 25010:2011(E) - System and software quality models.

[111]   For monitoring of quality characteristics, the definitions in the table below will be used:

Table 5-1 Definitions used for monitoring NFR quality characteristics

Error (or Fault):	A design or source code or hardware flaw or malfunction that causes a Failure of one or more Configuration Items. A mistake made by a person or a faulty Process that affects a CI is also an Error (human Error). For this System, Human Error is generally not taken into consideration in measuring the quality Performance
Fault:	see Error
Failure:	Loss of ability to Operate to Specification, or to deliver the required output. The term Failure may be used when referring to Services, Processes, Activities, or Configuration Items
Critical Failure:	it is a failure that causes an immediate cessation of the ability to perform the required function/service
Incident:	An unplanned interruption to a service or reduction in the quality of a service
Problem:	A cause of one or more Incidents. The cause is not usually known at the time the Incident happens

[112]   Note: The NFRs (as qualities) are not priced separately; the cost of achieving these qualities will have to be costed as part of the I2UA applications' functional requirements [FUA-xx].

5.1 Functional Suitability

[113]   ISO 25010: This characteristic represents the degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions.

[NFR-1]   Location accuracy shall be better than 1 meter (i.e., sub-meter accuracy) for translation of values (UTM, Latitude/Longitudes, others).

Verification: Demonstration and Analysis

5.2 Performance Requirements

[114]   ISO 25010: This characteristic represents the performance relative to the amount of resources used under stated conditions.

5.2.1 Response Times

[115]   ISO 25010: Time Behaviour is the degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements.

[NFR-2]   The time from restarting until all services is restored and fully operational again shall be less than 5 minutes for at least 99.5% of the Operational Time

Verification: Demonstration and Analysis

[NFR-3]   Any search or query operation against a repository containing 1 trillion entities shall return results within 3 seconds for at least 99.5% of the Operational Time

Verification: Demonstration and Analysis

5.2.2 Capacity

[116]   ISO 25010: Capacity. Degree to which the maximum limits of a product or system parameter meet requirements.

[117]   Capacity parameters can include the number of items that can be stored, the number of concurrent users, the communication bandwidth, throughput of transactions, and size of database.

[NFR-4]   The user applications and services shall be able to handle search and/ or query results consisting of a trillion of search hits, without any critical failure for at least 99.5% of its Operational time.

Verification: Analysis

[NFR-5]   The applications and services shall be able to serve 2000 concurrent users/ connections, without any critical failure for at least 99.5% of its Operational time.

Verification: Demonstration and Analysis

5.3 Compatibility

[118]   ISO 25010: Compatibility. Degree to which a product, system or component can exchange information with other products, systems or components, and/or perform its required functions, while sharing the same hardware or software environment.

5.3.1 Co-existence

[119]   ISO 25010: Co-existence. Degree to which a product can perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product.

[NFR-6]   The implemented applications and services shall be capable of operating within the NS and MS WAN environment (including servers, network, services and workstations) in the presence of the latest approved NATO Security Settings (target version to be provided by the Purchaser during the Design Stage), without any critical failure for 99.5% of its operational time.

Verification: Demonstration

5.3.2 Interoperability Requirements

[NFR-7]   The I2UA shall be fully interoperable with the new INTEL-FS Spiral 2 backend (I2BE) through the I2BE's application programming interfaces (API) in 99.5% of the time without any failure. This means that the I2UA shall be able to handle safe (non-breaking) changes to the backend API without any impacts to the existing interoperability with the I2BE (for safe changes see section 5 in [OData-4.0]).

Verification: Test

5.4 Usability/ Learnability

[120]   ISO 25010: Usability: Degree to which a product or system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.

[121]   ISO 25010: Learnability. Degree to which a product or system can be used by specified users to achieve specified goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use.

[122]   In order to measure Learnability, the Contractor will prepare a set of Learnability Tasks tailored for the user functionality to be learned that will be reviewed for approval by Purchaser prior to conducting the learnability verification.

[123]   The Learnability Tasks will be performed by a maximum of 50 Purchaser's designated users, and the learnability verification will be monitored by Purchaser appointed evaluators.

[124]   Each of the Learnability Tasks should individually typically not take more than 10 minutes to be executed and should include usage of the online help/ training modules.

[NFR-8]   A minimum of 80% of all the Learnability Tasks shall be learned by at least 80% of the designated users within the time allocated for the Learnability Tasks (test).

Verification: Demonstration

5.5   Reliability

[125]   ISO 25010: Reliability. Degree to which a system, product or component performs specified functions under specified conditions for a specified period of time.

[126]   MTBF (mean time between failures) is defined as the mean time between two consecutive failures.

[127]   MTBCF (mean time between critical failures) is defined as the mean time between two consecutive CRITICAL failures.

5.5.1   Availability

[128]   ISO 25010: Availability. Degree to which a system, product or component is operational and accessible when required for use.

[129]   Inherent Availability (Intrinsic) assumes ideal support (i.e., unlimited spares, no delays, etc.); only design related Failures are considered.

[130]   Mission Inherent Availability (Intrinsic) assumes ideal support (i.e., unlimited spares, no delays, etc.); only design related CRITICAL Failures are considered

[NFR-9]   The Inherent Availability shall be better than 99.5%

Verification: Analysis (using MTBF data)

[NFR-10]   The Mission Inherent Availability shall be better than 99.97%.

Verification: Analysis (using MTBCF data)

5.5.2   Fault Tolerance and Recoverability

[131]   Fault Tolerance is the property that enables a system to continue operating properly in the event of the failure of some of its components. A fault-tolerant design enables a system to continue its intended operation, possibly at a reduced level, rather than failing completely when some part of the system fails.

[132]   Graceful Degradation is the ability of a computer, machine, electronic system or network to maintain limited functionality even when a portion of it has been destroyed or rendered inoperative (either by a fault or deliberately).

[133]   Based on the principle of gracefully degradation the following recovery time have been defined:

Table 5-2 Recovery Time by Failure Criticality

Failure Type	Recovery Time
Failure	4 hours

Critical Failure	10 minutes

[134] ISO 25010: Fault Tolerance. Degree to which a system, product or component operates as intended despite the presence of hardware or software faults.

[135] ISO 25010: Recoverability. Degree to which, in the Event of an interruption or a Failure, a product or system can recover the data directly affected and re-establish the desired state of the system.

[NFR-11] For 99% of the possible Failures in any service, the service shall be recovered or be replaced by an alternative service, in no more than the amount of Recovery Time defined in the table above, without loss of any previously persisted data.

Verification: Test and Analysis

5.6 Security

[136] ISO 25010: Degree to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization.

[137] ISO 27001 (Information Security): Information security is all about protecting and preserving information. It's all about protecting and preserving the confidentiality, integrity, authenticity, availability, and reliability of information.

[138] Security, within the context of Information Technology (IT), is defined as the capability of the software product to protect information and data so that unauthorised persons or systems cannot read or modify them and such that authorised persons or systems are not denied access to them.

[139] I2UA will operate in the "System High" mode of operation (see [AC/35-D/2004-REV3] for definitions of Security Modes of Operation). That is, all individuals with access to the system are cleared to the highest classification of the information stored, processed or transmitted within the system, but not all individuals with access to the system have a common need to know for the information stored, processed or transmitted within the system.

[NFR-12] The applications and services shall implement relevant security techniques to protect against any security vulnerabilities as identified by Open Web Application Security Project (OWASP), see [OWASP], so that no such security vulnerabilities occurs for 99.5% of its Operational time.

Verification: Test

5.7 Maintainability

[140] ISO 25010: This characteristic represents the degree of effectiveness and efficiency with which a product or system can be modified to improve it, correct it or adapt it to changes in environment, and in requirements.

[141] The MTTR to be considered is the mean time needed to restore services after a failure in the operative condition, excluding administrative and logistics delay times.

[142] The MaxTTR to be considered is the maximum time needed to restore services in the operative condition, excluding administrative and logistics delay times.

Table 5-3 Maintainability by Failure Criticality

Failure Type	MTTR	MaxTTR
Critical Failure	1 hours	4 hours
Failure	2 hours	8 hours

[NFR-13]   On the hypothesis of an operational time of 24/7/365 (24 hours per day, 7 days a week, 365 days per year), the MTTR and MaxTTR shall not exceed the time limits defined in the table above for each single maintenance action for 99.5% of its Operational Time.

Verification: Test and Analysis

[NFR-14]   The applications and services shall be able to isolate any occurring Faults/Errors and provide error diagnostics reports that identifies the Error/Fault for 90% of its Operational Time.

Verification: Analysis and Inspection

[NFR-15]   The developed source code shall exhibit a Technical Debt Ratio (TDR) lower than 5% when calculated using [SonarQube] in its default setting for TDR calculations.

Verification: Inspection

[NFR-16]   Automated regression tests and Continuous Integration shall ensure that for 99% of the times the applications and services are modified, and a release candidate produced, the change does not adversely affected existing functionalities/ features.

Verification: Demonstration and Inspection

5.8   Portability, Installability, and Replaceability

[143]   ISO 25010: Portability. Degree of effectiveness and efficiency with which a system, product or component can be transferred from one hardware, software or other operational or usage environment to another.

[144]   ISO 25010: Installability. Degree of effectiveness and efficiency with which a product or system can be successfully installed and/or uninstalled in a specified environment.

[145]   ISO 25010: Replaceability. Degree to which a product can replace another specified software product for the same purpose in the same environment.

[NFR-17]   It shall be possible to run fully automated installation and/ or uninstallation of the applications and services for 99.5% of the times.

Verification: Demonstration

[NFR-18]   It shall be possible to install replace a previous release with a new release in a fully automated way without loss of any user data and configuration settings in 99.5% of the times.

Verification: Demonstration

NATO Communications and Information Agency
Agence OTAN d'information et de communication

INTEL-FS SPIRAL 2 - BACKEND SERVICES (I2BE)
BOOK II - PART IV - SRS

SYSTEM REQUIREMENT SPECIFICATION (SRS)

Version 1.2

10/03/2021

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Document Revision History

Date	Version	Changes
21 Dec 2020	1.0	IFB package release version
29 Jan 2021	1.1	IFB Amendment 1: Clarified PaaS and IaaS in relation to SOA & IdM Platform and ITM, and a few other minor corrections (template management requirement and data loss requirement)
10 Mar 2021	1.2	IFB Amendment 6: Clarifying that the SysAdm tool will fulfil user story [US 5]

1   Introduction

[1]   This System Requirements Specification (SRS) documents the system requirements for the backend services of the Intelligence Functional Services (INTEL-FS) Spiral 2, hereafter referred to as the I2BE.

1.1   Scope

[2]   This SRS specifies Functional and Non-Functional system requirements for the I2BE. In fulfilling the functional and non-functional requirements defined in this SRS, the I2BE will also have to enable the INTEL-FS Spiral 2 user stories as defined in [INTEL-FS2-UserStories].

[3]   The Functional Requirements of the I2BE specify the functions that will be implemented by this capability in order to deliver the services that the user applications of INTEL-FS Spiral 2 will consume. Note: the user applications of INTEL-FS Spiral 2, hereafter referred to as I2UA, will be delivered under a separate contract.

[4]   The Non-Functional Requirements of the I2BE specify the standards, quality, performance, sizing and design constraints that shall be satisfied in the solution design and implementation.

1.2   Conventions

[5]   Within this SRS, general functional requirements applicable to most or all services are numbered as [GBE-number], application-specific functional requirements are numbered as [FBE-number], non-functional requirements are numbered as [NFR-number], while narrative text is numbered as [number].

[6]   Each functional requirement has associated with it a cost attribute. Prior to starting work,the Contractor will identify the cost of each single functional requirement. The Contractor will include the cost of implementing the general requirements and the cost of obtaining the qualities of the non-functional requirements into the implementation cost of the functional requirements. Hence, the general requirements and the non-functional requirements do not have an associated cost attribute.

[7]   The term "including" is, throughout this SRS, never meant to be limiting - the list that follows is always non-exhaustive.

[8]   References to applicable or reference information are in the text identified by an identifier within square brackets (e.g. [SOA-IdM]).

1.3   Structure

[9]   This SRS is structured as follows:
- Chapter 1: The introduction to this document;
- Chapter 2: Specification of general requirements that generally applies across all deliverables;
- Chapter 3: Specification of the functional requirements for the I2BE backend services and System Administration Tools;
- Chapter 4: Specification of the functional requirements for the Integration Services;
- Chapter 5: Specification of the Non-functional Requirements for the I2BE services and the Integration Services.

1.4   Applicable documents

[10]   Applicable documents provide details not explicitly set out through this SRS (other requirements, architecture, standards and specifications). The Contractor shall consider the applicable documents as requirements associated with this SRS.

Table 1-1 Applicable documents (Compliance Requirements)

[INTEL-FS2-IM]	CO-14873-INTELFS2, INTEL-FS SPIRAL 2 – Initial Information Model Book II - Part V, NCI Agency
[INTEL-FS2-UserStories]	CO-14873-INTELFS2, INTEL-FS SPIRAL 2 - USER APPLICATIONS (I2UA) BOOK II - PART IV – USER STORY DOCUMENT (USD), NCI Agency

1.5 Reference documents

[11] Reference documents are documents providing contextual information that is relevant to this project. They shall be used by the Contractor to support his activity.

Table 1-2 Reference documents - miscellaneous

[AC/35-D/2004-REV3]	Primary Directive on CIS Security, North Atlantic Council, 15 November 2013 (NATO Unclassified)
[ADatP-4774]	NATO STANDARD ADatP-4774, CONFIDENTIALITY METADATA LABEL SYNTAX, Edition A Version 1, December 2017
[ADatP-4778]	NATO STANDARD ADatP-4778, METADATA BINDING MECHANISM, Edition A Version 1, October 2018
[AEDP-17]	NATO Standard ISR Library Interface, AEDP-17 Edition A Version 1, March 2018
[AEDP-19]	NATO Standard ISR Workflow Architecture, AEDP-19 Edition A Version 1, March 2018
[AI 06.02.08]	Agency Instruction Instr Tech 06.02.08, Service interface profile for publish-subscribe services, 04-Feb-2015, NCI Agency, (NATO Unclassified)
[AI 06.02.10]	Agency Instruction Instr Tech 06.02.10, Service interface profile for a publish/subscribe notification consumer, 04-Feb-2015, NCI Agency, (NATO Unclassified)
[AI 06.02.11]	Agency Instruction Instr Tech 06.02.11, Service interface profile for a notification cache service, 04-Feb-2015, NCI Agency, (NATO Unclassified)
[AirC2IS ICD]	AIRC2IS_SDS_ANNEX_04_ICD , AIR COMMAND AND CONTROL INFORMATION SERVICES (AIRC2IS) INCREMENT 1 (INC1) BASELINE 4 (BL4) - INTERFACE CONTROL DOCUMENT (ICD), version 6.0, 4 July 2019
[IFS1-ICD]	F0057 62778135 558, Interface Control Document for the INTEL-FS Project, v1.3, 29 Aug 2016 (NATO UNCLASSIFIED)
[IPIWG]	Intelligence Project Implementation Working Group, IPIWG 4.0 R19 Schema: http://www.nato.int/namespace/ipiwg/4.0#
[MARIX]	Maritime C2 Information Exchange (MARIX) Specification (a RESTful protocol and a model for the exchange of maritime information in support of Maritime Situational Awareness and Command and Control), https://tide.act.nato.int/tidepedia/index.php/Maritime_C2_Information_Exchange_Specification
[NCSD-IPL-SDS]	NATO-CSD CO-14682-CSD, SYSTEM DESIGN SPECIFICATION (SDS) – CIPL, Version 1.1, 4/12/2019
[NCSD-IWS-SDS]	NATO-CSD CO-14682-CSD, SYSTEM DESIGN SPECIFICATION

	(SDS) – CIWS, Version 1.0, 12/11/2019
[NCIA SIP REST 06.02.07, 2015]	NCI AGENCY INSTRUCTION INSTR TECH 06.02.07 SERVICE INTERFACE PROFILE FOR REST MESSAGING, 04 February 2015.
[CEOB-EF]	NATO AEWP-01 DRAFT Common Electronic Order of Battle Exchange Format
[NIRIS-WS-ICD]	NIRIS WEB SERVICES ICD VERSION 1.3.1, May 2020, NCI Agency
[OAS v3.0.1, 2017]	OpenAPI-Specification v3.0.1 https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.1.md, 07 December 2017
[OASIS Odata OAS 1.0, 2016]	Organization for the Advancement of Structured Information Standards (OASIS) OData to OpenAPI Mapping Version 1.0, 15 December 2016
[OData 4]	Organization for the Advancement of Structured Information Standards (OASIS) Open Data Protocol (OData) Version 4.01 (23 April 2020), https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=odata
[OWASP]	Open Web Application Security Project (OWASP), https://www.owasp.org/index.php/Main_Page
[SOA-IdM]	CO-14176-SOA-IDM Service Oriented Architecture (SOA) and Identity Management (IdM) Platform – Wave 1, System Design Specification (SDS) and Interface Control Document (ICD), NCI Agency
[SonarQube]	SonarQube, https://www.sonarqube.org/
[NVG]	TIDE Transformational Baseline Version 4.0, NATO VECTOR GRAPHICS PROTOCOL, version 2.0.2, 22 May 2015

Table 1-3 Reference documents – APP11D

[APP11D-ACO]	APP-11(D)(1)/ F011, ACO (AIRSPACE CONTROL ORDER), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-AEW_MISREP]	APP-11(D)(1)/ F053, AEW_MISREP (AIRBORNE EARLY WARNING MISSION REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-AIRINTREP]	APP-11(D)(1)/ F001, AIRINTREP (AIR INTELLIGENCE REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-ATO]	APP-11(D)(1)/ F058, ATO (AIR TASKING ORDER), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-ASSESSREP]	APP-11(D)(1)/ J002, ASSESSREP (COMMANDERS ASSESSMENT REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-BOMBWARN]	APP-11(D)(1)/ A079, BOMBWARN (BOMB THREAT WARNING), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-CIINTREP]	APP-11(D)(1)/ J112, CIINTREP (COUNTER-INTELLIGENCE AND SECURITY REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-CIINTSUM]	APP-11(D)(1)/ J113, CIINTSUM (COUNTER-INTELLIGENCE AND SECURITY SUMMARY), Edition D Version 1, NATO UNCLASSIFIED

[APP11D-CISUPINTREP]	APP-11(D)(1)/ J115, CISUPINTREP (COUNTER-INTELLIGENCE AND SECURITY SUPPLEMENTARY REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-DIR]	APP-11(D)(1)/ J186, DIR (DYNAMIC INTELLIGENCE REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-ENSITREP]	APP-11(D)(1)/ A026, ENSITREP (ENEMY LAND FORCES SITUATION REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-EVENTREP]	APP-11(D)(1)/ J092, EVENTREP (EVENTS REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-FHOSTILEACT]	APP-11(D)(1)/ J009, FIRST HOSTILE ACT (FIRST HOSTILE ACT REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-INCREP]	APP-11(D)(1)/ A078, INCREP (INCIDENT REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-INCSPOTREP]	APP-11(D)(1)/ J006, INCSPOTREP (INCIDENT SPOT REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-INTREP]	APP-11(D)(1)/ J110, INTREP (INTELLIGENCE REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-INTSUM]	APP-11(D)(1)/ J111, INTSUM (INTELLIGENCE SUMMARY), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-MARINTREP]	APP-11(D)(1)/ J016, MARINTREP (MARITIME INTELLIGENCE REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-MARINTSUM]	APP-11(D)(1)/ J015, MARINTSUM (MARITIME INTELLIGENCE SUMMARY), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-MISREP]	APP-11(D)(1)/ F031, MISREP (MISSION REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-ORBATAIR]	APP-11(D)(1)/ F032, ORBATAIR (ORDER OF BATTLE - AIR FORCES)), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-ORBATLAND]	APP-11(D)(1)/ A032, ORBATLAND (ORDER OF BATTLE - LAND FORCES), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-OWNSITREP]	APP-11(D)(1)/ A031, OWNSITREP (OWN LAND FORCES SITUATION REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-PWINTERREP]	APP-11(D)(1)/ J080, PWINTERREP (PRISONER OF WAR INTERROGATION REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-SUPINTREP]	APP-11(D)(1)/ J114, SUPINTREP (SUPPLEMENTARY INTELLIGENCE REPORT), Edition D Version 1, NATO UNCLASSIFIED

1.6   Background – envisioned capability

[12]   With the I2BE NATO will acquire a set of backend services for managing intelligence data in support of the NATO Intelligence community and the Ballistic Missile Defence (BMD) community.

[13]   The I2BE, as an intelligence information platform, will:

(1)   Provide a complete application programming interface (API) that enables the INTEL-FS Spiral 2 User Applications (I2UA) to provide the users with the functionality defined by [INTEL-FS2-UserStories];

(2)　　Meet all of the performance, scalability, capacity and other quality requirements as defined by the non-functional requirements of this SRS (meet the specified NFRs when accessing the data in a repository of trillions of entities);

(3)　　Provide a complete implementation of [OData 4] as an OData REST API that enables authorized clients to access all the Intelligence Information Entities (IIE) in the I2BE intelligence information platform. The complete set of IIEs can be seen in the Index of Intelligence Information Entities at the front of the [INTEL-FS2-IM];

(4)　　Implement a faceted search against the IIEs hosted in the I2BE that meets the specified response time requirements;

(5)　　Implement a graph-oriented query service against the IIEs in the I2BE that meets the specified NFRs;

(6)　　Be hosted upon, re-use and/ or integrate with the services provided by the Bi-Strategic Command Automated Information System (Bi-SC AIS) Service-Oriented Architecture (SOA) and Identity Management (IdM) Platform (see [SOA-IdM]), hereafter referred to as the SOA & IdM Platform. Note the SOA & IdM will serve INTEL-FS2 as a Platform as a Service (PaaS). and the SOA & Idm Platform PaaS will again be running on top of the NATO Information Technology Modernization (ITM) capability as Infrastructure as a Service (IaaS);

(7)　　Through the SOA Platform Integration Services (see [SOA-IdM]) integrate INTEL-FS2 with the set of external systems defined in the Integration Services section of this SRS;

(8)　　Host a video conditioning service enabling Web-clients to play streaming video in STANAG 4609 format;

(9)　　Replicate IIEs (and their aggregations) asynchronously between multiple installations/ instances of the I2BE, and exchange IIEs between multiple I2BE instances through export and import (where the data can be air-gapped between different networks);

(10)　Provide System Administration tools.

1.7　Initial Information Model

[14]　　The significant part of the Initial Information Model [INTEL-FS2-IM] is based on existing production systems (IRM, CM, BSO, Products, EOB, etc.) that these I2BE services will be replacing.

[15]　　Consistent with the vision of the best practice Domain Driven Design (DDD) it is expected that the model will evolve under implementation as any residual elaboration is realised. It is expected that this evolution will be limited to fine grained adjustment because the bulk of the Spiral 2 effort concerns itself with technology refresh, migration and 're-platforming' (see [18]) of existing back end, full stack capabilities to the SOA & IdM Platform.

[16]　　Further leveraging DDD best practices, the Information Model will form the basis for the 'Ubiquitous Language' – INTEL-FS Spiral 2 'Universe of Discourse'. This domain language shall be the only language present in the application and it shall be reflected in all aspects including: the UX, the API, the business services, the analytic services, storage solutions, schema, events, business intelligence, query parameters, etc.

[17]　　The [INTEL-FS2-IM] shall remain authoritative for those aspects that it specifies; no part of the information model is reproduced here in order to prevent synchronization issues.

1.8　SOA & IdM Platform

[18]　　Of major importance to this back-end service implementation is the SOA & IdM Platform. A part of the work defined in this SRS concerns itself with the re-platforming of existing capabilities that are wrapped up in sub-optimal software architectures; tightly coupled; depend on obsolete technologies and impose high interest payments on the technical debt that they represent. Further, these legacy solutions incur a high total cost of ownership depending, as they do, on their many in-house variants of core services that are now available on/ in the SOA & IdM Platform.

[19]　　Leveraging the services provided by the SOA & IdM Platform frees up resources that can now be focussed solely on the services at the top of the stack - the Joint Intelligence Surveillance

and Reconnaissance (JISR) COI-specific business services that compose the I2BE intelligence information platform specified herein.

2 General Backend Requirements

[20] This section defines a set of general requirements that are applicable to all of the I2BE services.

[21] Within this SRS, the I2BE services specifications will, when applicable, make references to these generic requirements.

[22] Costing is broken down according to the I2BE functional services and therefore the cost of implementing general requirements is to be incorporated into the cost of each delivered I2BE functional service.

2.1 General cross-cutting requirements

2.1.1 Auto-generating from the information model

[GBE-1] The I2BE API specifications shall, whenever feasible, be auto-generated as OData REST APIs from the information model as documented by [INTEL-FS2-IM].
Verification: Demonstration and Inspection

[GBE-2] The Information Model shall be maintained, on a service-by-service basis, throughout this contract.
Verification: Inspection

[GBE-3] Any deviation from these General Requirements shall require the approval of the purchaser prior to implementation.
Verification: Demonstration and Inspection

[GBE-4] The data access layer (DAL) shall be auto-generated from the information model as defined by [INTEL-FS2-IM].
Verification: Demonstration and Inspection

[GBE-5] All date-times shall clearly identify time values as Zulu and the date/time format shall be in accordance with ISO 8601.
Verification: Demonstration

[23] Note: The two requirements above separate the design of the API from the implementation of the API; both are deliverables,

2.1.2 Integrating into the SOA & IdM Platform

[24] The SOA & IdM Platform general requirements span all phases of the service lifecycle –a key service provided by the SOA & IdM Platform is Service Lifecycle Automation.

[25] Some high level treatment of the SOA & IdM Platform will necessarily be included here; for detailed, authoritative specification see [SOA-IdM].

[26] The SOA & IdM Platform provides services to three client/ consumer hosting models. These include:

(1) Non-Native Hosted Services: This is the preferred model for I2BE functional and Phase II services providing, as it does, maximum flexibility in the choice of underlying software and runtime whilst granting complete access to SOA & IdM Platform services (see below). Non-Native base images are provided to create runtime implementations that follow standard NATO technology stacks including: .Net Core Framework; Java Web Application Server; generic Web Application Server, etc.
(2) Native Hosted Services: These services leverage a pre-canned 'base runtime' and include extensions to support integration, mediation, edge and common business services. The edge, mediation and integration runtimes are the preferred model for the I2BE integration services.

(3)   Externally hosted services and applications: these include some or more of legacy/ heritage systems; other systems that, for whatever reason, are not hosted on the SOA & IdM Platform; external integration partners and/ or federated systems that are not a part of the NATO IT estate; etc. INTEL-FS Spiral 2 will integrate with such systems external to the SOA & IdM Platform (see the set of Integration Services specified herein) via the Native Hosted Service implementation model and the appropriate SOA & IdM Platform services.

[27]   The standard unit of software - deployable to the SOA & IdM Platform- is the container image. Container image lifecycles are managed by the SOA & IdM Platform Container Image Registry. Container images encapsulate all service dependencies except for service runtime parameterisation. Management of runtime parameterisation is solely the concern of the SOA & IdM Platform Configuration Server.

[28]   Various pre-canned, curated, container base images are available from the SOA & IdM Platform with which JISR COI-specific services are to be developed.

[29]   This SRS does not prescribe tooling related to the development phase of the build pipeline (e.g. the integrated development environment (IDE), test framework/ runner, continuous integration, build automation, etc.) The result of the development phase of the pipeline will go into staging where various pipeline stages mandated by the SOA & IdM Platform are applied. For example, the SOA & IdM Platform will apply security scanners to release candidate container images prior to these images being accepted in to the Container Image Registry.

[30]   The SOA & IdM Platform will provide 'Platform Services' in support of Domain Specific Services such as the I2BE Phase I, Phase II and Integration Services specified herein.

[31]   SOA & IdM Platform services include:
- Observability service: logging, metrics, audit, traces, customizable dashboards, alert management and notification rules, etc.
- Security services: Identity Management, Authentication, Single Sign On (SSO), Authorisation, Authoring (Policies, etc.), Credential Management, etc.
- Integration Services are based on the established Enterprise Integration Patterns (EIP) and include: Transport Normalisation, Encoding/ Decoding, Message composition/ aggregation/ de-aggregation etc., Message Routing, Publish and Subscribe, Mediation, etc.
- Platform Management Services manage, configure and operate the SOA & IdM Platform, its tenants and the services hosted on it.
- Message Oriented Middleware Services are provided by several of the SOA & IdM Platform's foundational components including the Message Bus, Message Broker, Notification Broker, Notification Cache and Message Queue. Together, these components provide a number of services including asynchronous messaging, message queues, publish and subscribe, message streaming, brokerage etc.; these in support of both SOA & IdM Platform hosted service-to-service communications and SOA & IdM Platform hosted service-to-external service communications.
- Service Lifecycle Management: lifecycle automation, container registry, service configuration management, etc.

2.1.2.1   General SOA & IdM Platform Requirements

[GBE-6]   All I2BE services (taken to mean the full set of Phase I, Phase II and integration services specified herein) shall be hosted upon the SOA & IdM Platform, and re-use and/ or integrate with the SOA & IdM Platform services.
Verification: Inspection

[GBE-7]   All I2BE functional and integration service implementations shall derive from the SOA & IdM Platform provided, pre-canned service base images.
Verification: Inspection

[GBE-8]   I2BE service implementations deriving from the SOA & IdM Platform provided, pre-
               canned service base images that include externally sourced dependencies must
               demonstrate complete image supply chain provenance for those dependencies.
Verification: Inspection

[GBE-9]   All supporting service implementations that cannot derive from the SOA & IdM
               Platform provided, pre-canned service base images must demonstrate total base
               image and dependency supply chain provenance.
Verification: Inspection

[GBE-10]   For all I2BE services, the build pipeline shall result in self-contained (all
               dependencies are included with the exception of runtime parameterisation) base
               images that target the SOA & IdM Platform Container Image Registry and are
               compatible with the SOA & IdM Platform Application Runtimes, see [SOA-IdM].
Verification: Inspection

[GBE-11]   All I2BE services shall use the SOA & IdM Platform Configuration Server for the
               complete lifecycle management of their runtime parameterisation, see [SOA-IdM].
Verification: Inspection

[GBE-12]   All I2BE services shall conform to the SOA & IdM Hosted Services Implementation
               Contract, see [SOA-IdM].
Verification: Inspection

[GBE-13]   I2BE Functional and Phase II service implementations shall target the Non-Native
               Hosted implementation model and shall derive from one of the SOA & IdM
               Platform provided, NATO standard technology stack, base images.
Verification: Inspection

[GBE-14]   I2BE Integration service implementations shall target the Native Hosted
               implementation model combined with the pre-canned Base Integration, Edge,
               Mediation and Integration Runtimes provided by the SOA & IdM Platform, see
               [SOA-IdM].
Verification: Inspection

[GBE-15]   For those services and interfaces that are required, all I2BE Services shall conform
               to the respective standard and version specified in the Applicable Standards of the
               SOA & IdM Platform Interface Control Document (ICD) included in [SOA-IdM].
Verification: Inspection

[GBE-16]   I2BE Services shall not implement or duplicate service, capability or functionality
               that is available from/ in the SOA & IdM Platform services.
Verification: Inspection

[GBE-17]   I2BE service isolation: all aspects of an individual I2BE service runtime lifecycle
               (deploy, start, stop, update, retire, etc.) shall be functionally and non-functionally
               isolated from any of the other I2BE services.
Verification: Demonstration

[GBE-18]   I2BE services shall work consistently with the quality of service characteristics
               facilitated by the SOA & IdM Platform including observability, elasticity/ scale-out,
               resilience, etc.
Verification: Demonstration

2.1.2.2   Eventing

[32]   SOA & IdM Platform Messaging Services include two types of eventing services:

- SOA & IdM Platform Message Bus/ Broker –a highly scalable, fault-tolerant, distributed publish and subscribe messaging capability (realized via Apache Kafka)
- WS-Notification is realized as a wrapper over the SOA & IdM Platform Message Bus/ Broker. WS-Notification is an implementation of the 'NotificationBroker' and 'SubscriptionManager' interfaces of the OASIS WS-Notification standard referenced by the [SOA-IdM] in support of the NATO SIPs (also see [SOA-IdM]).

[GBE-19]   Where I2BE services are required to fire events they shall do so using both event mechanisms supported by the SOA & IdM Platform (unless explicitly stated otherwise).

Verification: Demonstration

2.1.2.3   Security

[33]   Collectively, the security services provided by the SOA & IdM Platform are referred to as Identity and Access Management (IAM) and in the [SOA-IdM] cover four broad areas:

- Authentication and Authorisation
- Identity Management
- Service and Application (delegated) Authentication
- Attribute Based Access Control.

[34]   The security technologies, implementations and standards used with the SOA & IdM Platform include OAuth2, Open ID Connect (OIDC), WS-Security, SAML, XACML, etc.

[35]   SOA & IdM Platform service security features cover both RESTful and SOAP based services.

2.1.2.3.1   Identity Management

[GBE-20]   All I2BE services shall make use of the full lifecycle, identity management services provided by the SOA & IdM Platform.

Verification: Demonstration

2.1.2.3.2   Authentication

[GBE-21]   All I2BE services shall make use of the authentication services provided by the SOA & IdM Platform.

Verification: Demonstration

2.1.2.3.3   Authorization, Access Control

[36]   All I2BE services will require the extra access control decision fidelity enabled by the Attribute Based Access Control (ABAC) features of the SOA & IdM Platform. This fidelity is expressed in terms of the four types of attributes – Subjects, Resources, Actions and Environment:

- Policy attributes for the Subjects will include Identity, Organizational Node (ON), and Role (e.g. Administrator, Intel Creator, Intel Manager, etc.).
- Policy attributes for the Resources will be the IIE at category/ type granularity (e.g. ISR Product/Document, ISR Product/Image, ISR Product/ Report, BSO/ Person, BSO/ Unit, IR/PIR, IR/SIR, etc.), workflow state, confidentiality labels, etc.
- Policy Actions will include Create, Read, Update, Soft Delete, Hard Delete, Approve, Publish, and other workflow actions.
- Policy Environment will include data set (operational data repository, training data repository, exercise data repository, etc.), date-time, etc.

[37]   An example of these attributes in policy decision logic might be: J2 Collator in KFOR (Subject)
            Publishing (Action) a classified battlespace event status report (Object type and Object
            property) from within the KFOR J2 Collation Cell at Threat Level X (Context).

[GBE-22]   All I2BE services shall implement access control/ authorisation consistent with the
            security services, technologies and standards provided by the underlying SOA &
            IdM Platform Security Services.

Verification: Demonstration

[GBE-23]   All I2BE services shall leverage the SOA & IdM Platform provided policy-based
            access control services through the implementation of a policy enforcement point
            (PEP) interacting with the SOA & IdM Platform Policy Decision Point (PDP).

Verification: Demonstration

[GBE-24]   The I2BE Policy Enforcement Point shall (via the external SOA & IdM Platform
            provided PDP) use only externally defined and administered XACML policies. E.g.
            using a policy retrieval point (PRP) that uses policies from an external policy store
            administered by an external policy administration point (PAP).

Verification: Demonstration

[GBE-25]   When invoked by other ABAC enabled services, services shall use relayed claims,
            or, in turn, relay claims when calling other ABAC enabled services.

Verification: Demonstration

[GBE-26]   I2BE services shall not hard-code authorisation/ access control logic in any way
            other than through the PEP and PDP components of the ABAC architecture.

Verification: Demonstration and Inspection

2.1.2.4   Observability

[GBE-27]   All I2BE Services shall, by fulfilling the SOA & IdM Platform Implementation
            Contract, make use of the SOA & IdM Platform observability interfaces and
            services to support central management, accessing and analysis of the I2BE logs
            and metrics through the SOA & IdM Platform tooling.

Verification: Demonstration and Inspection

[GBE-28]   At a minimum, all activities/ actions/ queries of all I2BE service consumers
            (persons, integration partners, other services, etc.) shall be logged for auditing
            purposes (i.e. enabling full audit traceability of identifiable client activities/ actions).
            Note this includes all read actions on all IIEs; i.e. identification of which identity
            received the IIE, its version and at what time.

Verification: Inspection

[GBE-29]   Information on any change made to the system, and all occurring faults and errors,
            shall be logged.

Verification: Demonstration and Inspection

[GBE-30]   Change and fault/ error logs shall contain required information in order to provide
            the support staff with interpretable and comprehensive information about the cause
            and nature of the change or fault/ error.

Verification: Demonstration

2.1.3 Testability, test automation, continuous integration (CI) and continuous delivery (CD), and quality assurance (QA)

[GBE-31]   The software shall be designed and structured for good testability. This includes usage of patterns such as, decoupling, test data generation and dependency injection to enable unit testing.

Verification: Inspection

[GBE-32]   Test-automation, Continuous Integration (CI) and Continuous Delivery (CD) processes shall be implemented for all of the services and these process shall feed in to the SOA & IdM Platform pipeline stages for staging, security scanning, container signing, base image registration, etc..

Verification: Demonstration

[GBE-33]   The Continuous Integration process shall include automated security tests, automated source code analysis including code coverage, security vulnerability analysis, and automatic smoke test/ build verification test (BVT).

Verification: Demonstration and Inspection

[GBE-34]   Automated regression tests shall be delivered with all services (including all artefacts required to run the tests e.g. unit tests, test data, data generators, external test harnesses, etc.).

Verification: Inspection

[GBE-35]   Hardcoding of, or embedding of, resources, configuration settings, or any other non-binary artefacts (URL, DNS, IP addresses, file path, drive letters, etc.) shall NOT be implemented/ used. (As already mentioned, all services shall use the SOA & IdM Platform Configuration Server for this type of data.)

Verification: Inspection

2.1.4 API supporting multiple geographic reference systems

[GBE-36]   The I2BE APIs shall support input and output of geospatial data in multiple geographic reference systems. The supported geographic reference systems shall include Universal Transverse Mercator (UTM) grid system, Military Grid Reference System (MGRS), and World Geodetic System 1984 (WGS84) with latitude/ longitude options as degrees, minutes and seconds or degrees, minutes and decimal minutes.

Verification: Demonstration

2.1.5 Supporting multiple data sets

[GBE-37]   The services shall, from a user's perspective, be seen to concurrently support multiple data sets (e.g. an operational data set, a training data set, an exercise data set, etc.) where there is no spill-over of data between the data sets.

Verification: Demonstration and Inspection

[GBE-38]   The services shall whenever an IIE is created, tag the IIE with a label that associates it to the data set to which it belongs (e.g. OPERATIONAL, EXERCISE, TRAINING).

Verification: Demonstration and Inspection

[GBE-39]   The services shall have support for fictitious security markings (e.g. marking an IIE as releasable to a fictitious country code).
Verification: Demonstration and Inspection

[GBE-40]   The services shall, when operating in exercise or training mode, support the usage of fictitious Geospatial and Features and locations/ places (i.e. business validation rules shall accept such fictitious names as long as they are pre-defined in appropriate dictionaries).
Verification: Demonstration and Inspection

[GBE-41]   The services shall, when operating in exercise or training mode, have support for using separate domain value tables (from the operational domain value tables) where the exercise/ training domain value tables can contain fictitious domain values.
Verification: Demonstration and Inspection

[GBE-42]   Data lifecycle management shall be applicable to data sets such that individual data sets can be isolated; exported and imported; archived, backed up and restored; etc.
Verification: Demonstration and Inspection

2.1.6   Confidentiality metadata labelling

[GBE-43]   The services shall implement the confidentiality metadata label specification defined by [ADatP-4774] (this is referenced on the base Entity in the [INTEL-FS2-IM].)
Verification: Inspection

[GBE-243]   The services shall implement the metadata label binding specification defined by [ADatP-4778].
Verification: Inspection

2.1.7   Export of information

[GBE-44]   The services shall when exporting any data – in any way - ensure that highest security classification and the most restricted releasability of the data is captured in the exported data. If the export is file based then the file name shall convey the file security classification and releasability. When exporting to a PDF file, the file security and releasability shall be inserted in the document header and footer on all pages.
Verification: Demonstration

2.1.8   User Interface (UI) cross-cutting requirements

[38]   Note: The I2BE is expected to deliver user-facing application(s) only to support systems administration, operation, configuration, etc.; other (e.g. domain specific, functional) UI implementation is NOT expected.

2.1.8.1   Language

[GBE-45]   Any user interface shall use "UK English" as the default language. This shall apply to all applications and supporting components, including all user interfaces (e.g. views, dialogs, help screens, tooltips, etc.), error/notification/warning messages and documentation.

Verification: Demonstration

2.1.8.2   User feedback

[GBE-46]   Any user interface shall notify the user who has initiated an action that processing of the action has started and convey the sense of processing progress (by means of a progress indicator, dialog boxes).

Verification: Demonstration

[GBE-47]   Any user interface control actions shall be simple and direct, whereas potentially destructive control actions shall require extended user attention such that they are not easily acted on (e.g., "are you sure" queries).

Verification: Demonstration

[GBE-48]   Any user interface shall provide an Error Management capability, which is readily distinguishable from other displayed information (e.g. Pop-up Error Window).

Verification: Demonstration

[GBE-49]   Any user interface shall provide the users with meaningful error messages and information about the actions they need to take in order to fix or at least to report the problem.

Verification: Demonstration

2.1.8.3   Data Entry Interactions

[GBE-50]   Where the user is entering (or changing) data, the user interface shall detect invalid and missing entries. The invalid or missing entries shall be highlighted or marked so that the user can be quickly identify and correct them.

Verification: Demonstration

[GBE-51]   In any user interface, during data entry, the ENTER key shall not trigger form submission. I.e. the user shall specifically click the "submit button" to submit the entered data.

Verification: Demonstration

[GBE-52]   Any user interface shall provide prompts (i.e., allow cancellation or confirmation) when input or changes may be lost due to navigation or logging out.

Verification: Demonstration

2.1.9   Compliance with non-functional requirements (NFR)

[GBE-53]   The I2BE services shall comply with the NFRs as defined in chapter 5, when the NFR is relevant for the individual service. In general, all NFRs are relevant for all services, with a few exceptions, like [NFR-12] that is mostly targeted for the I2BE to I2BE Synchronization Service.

Verification: See individual requirements

2.2   General IIE-Oriented Requirements

2.2.1   IIE data management through OData REST API

[39]   The I2BE will expose the IIEs through an Open Data (OData) Protocol Version 4.01 Representational State Transfer (REST) architectural style Application Programming Interface (API). For information on OData see [OData 4]

[40]   IIEs are the top level "root aggregates" in the Intelligence Information Model.

[GBE-54]   The I2BE API shall implement OData Version 4.01 for all Intelligence Information Entities (including compliance with the [OData 4] URL ABNF).
Verification: Demonstration

[GBE-55]   The I2BE API shall deliver versioned OData APIs.
Verification: Demonstration

[GBE-56]   The services shall return a standard, programming language-agnostic, interface description which allows both humans and computers to discover and understand the capabilities of a service without requiring access to source code, additional documentation, or inspection of network traffic [OAS v3.0.1, 2017]. That means the services shall return the contract specifying the API interface compliant to [OAS 3.0.1, 2017] in both JSON (JavaScript Object Notation) and in YAML (Yet Another Mark-up Language) formats [OASIS Odata OAS 1.0, 2016]
Verification: Demonstration

[GBE-57]   The services shall implement the OData Service Document Requests and Metadata Document Request.
Verification: Demonstration

[GBE-58]   The services shall, for all APIs, (including non OData API) collect statistics on the API usage to log files. The statistics shall include metrics on the API latencies (response times), frequency of use (down to the granularity of the IIE type), the URI requested, the requester, the action, etc.
Verification: Demonstration

[GBE-59]   The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement full entity lifecycle management (create, read,update, delete, etc.)
Verification: Demonstration

[GBE-60]   The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement the full set of query operators and filters appropriate to the types of the IIE properties (numeric, string, datetime, enumeration, etc.)
Verification: Demonstration

[GBE-61]   The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement extent management (paging, top, skip, etc.)
Verification: Demonstration

[GBE-62]   The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement Partial GETs (OData $select)
Verification: Demonstration

[GBE-63]   The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement partial updates (PATCH).
Verification: Demonstration

[GBE-64]   The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement 'navigation properties' for entity relationships.
Verification: Demonstration

[GBE-65]   The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement expansions (OData $expand).
Verification: Demonstration

[GBE-66]   The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], provide optimistic concurrency (ETag).
Verification: Demonstration

[GBE-67]   The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], provide batching of operations (functions and actions)/ queries.
Verification: Demonstration

[GBE-68]   For all update operations, the I2BE services OData API implementation shall enforce the authorisation/ validation rules derived from the [INTEL-FS2-IM], and from the capability being re-platformed. I2BE services shall prevent create and update commands succeeding in case of validation error.
Verification: Demonstration

[GBE-69]   The services shall mark the data being created such that exercise-related and training-related information are distinguishable from operational information (See IntelligenceDatasetType enumeration in the [INTEL-FS2-IM]).
Verification: Demonstration

[GBE-70]   The I2BE services shall whenever an IIE through the OData API is created, updated, or deleted, publish an appropriate IIE event notification Create/ Update/ Delete/ etc. on/ through the SOA & IdM Platform for the IIE.
Verification: Demonstration

[GBE-71]   Through an OData API, the services shall implement soft-deletion of any IIE (i.e. tagging the IIE as deleted).
Verification: Demonstration

[GBE-72]   Through an OData API, the services shall implement un-deletion of any soft-deleted IIE.
Verification: Demonstration

[GBE-73]   Through an OData API, the services shall support hard-deletion of any IIE (i.e. permanently remove the IIE).
Verification: Demonstration

[GBE-74]   The OData API shall for all IIE actions, support individual action on a single IIE as well as applying the action on a list of IIEs (e.g. soft-deleting many IIEs in one operation).
Verification: Demonstration

2.2.2   IIE dissemination workflow management

[GBE-75]   The services shall, through the OData API, implement searching for IIEs, of any IIE type, in any workflow status (see PublishedStatusType in [INTEL-FS2-IM]).
Verification: Demonstration

[GBE-76]   The I2BE services shall, whenever an IIE is subjected to a dissemination workflow choreography-task, publish an appropriate IIE event notification; see the [INTEL-FS2-IM] NATO:JISR:Staff:Dissemination:DisseminationCT enumeration for these (e.g. PostForApproval, Approve, Reject, ApproveAndPublish, Publish).
Verification: Demonstration

[GBE-77]   The services shall, through the OData API, implement operations for changing IIEs workflow state for any IIE type.
Verification: Demonstration

[GBE-78]   The services shall, through the OData API, implement functionality for changing the workflow state for multiple IIEs in one operation (e.g. set all IIEs in a list to an Approved workflow state).
Verification: Demonstration

[GBE-79]   The services shall, through the OData API, implement functionality for attaching comments to the workflow state (e.g. if an IIEs is set to rejected, a reason for the rejection can be attached to the IIE's workflow state).
Verification: Demonstration

[GBE-80]   The services shall, whenever an IIE's PublishedStatusType is set to 'Published' make the IIE available at all organizational nodes (ON).
Verification: Demonstration

3 Functional service requirements (deliverable specific)

3.1 Backend services - Phase 1

[41]   Through the implementation of the requirements defined in the sub-sections below an initial version of the new, 're-platformed' INTEL-FS backend will be established on the SOA & IdM Platform [SOA-IdM]. This new back-end will provide the same backend functionalities as the back-end of INTEL-FS Spiral 1. The main difference from INTEL-FS Spiral 1 is the adaptation to the SOA & IdM Platform, bringing much improved performance and scalability, and some additional functionality like the ORBAT management, the BM-augmented BSO management, and the blue ISR ORBAT management).

3.1.1 IIE to IIE Association Service

[42]   The information to be managed by this service is derived from the NATO::JISR::Relationships class diagram in the [INTEL-FS2-IM].

3.1.1.1 API

[FBE-1]   The IIE to IIE Association Service shall through the OData REST API support all IIE access actions on inter-service IIE relationships (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[43]   Note: IIE to IIE relationships are those associations which cross services. A relationship between a BSO IIE and a Product IIE is one example of an inter-service relationship. Relationships between IIEs within a service are managed by that service. An example of an intra-service relationship would be equipment holdings within the Battlespace service which relate Actors to Materiel.

[FBE-2]   The IIE to IIE Association Service shall implement server-side functionality that enables the I2UA client though service's API to fulfil any acceptance criteria defined in [INTEL-FS2-UserStories] that describes management of associations between IIEs (this includes [US 15], [US 17], [US 18], [US 22], [US 33], [US 36], [US 38], [US 39], [US 40], [US 43], [US 47], [US 48], [US 53], [US 58], [US 61], [US 64], [US 65], [US 67], [US 72], [US 75], [US 76], [US 77], and [US 83]). This means that the IIE to IIE Association Service shall though a REST API enable clients to create and manage (update and delete) associations as defined in [INTEL-FS2-IM].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-3]   The IIE to IIE Association Service shall after a create, update or delete change to an association, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message identifies the changed association, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-4]   The IIE to IIE Association Service API shall have support for creating associations from an IIE to a temporarily non-existing IIE (i.e. an IIE that has not yet been established in the I2BE, but that will be established).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[44]   The reason for the requirement above it to handle situations where IIEs with associations to other IIEs are received before the associated IIE has been created. This could potentially happen if integration services extracting information from an external source where an association is defined, and the associated entity hasn't yet been retrieved and uploaded to the I2BE.

[FBE-5]   The IIE to IIE Association Service API shall have support for creating associations to externally hosted information entities identified by an endpoint identifier (e.g. a URL) to the external entity.
Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-6]   The IIE to IIE Association Service API shall for clients accessing dangling/ incomplete associations inform (indicate to) the client about the dangling endpoint(s).
Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-7]   The IIE to IIE Association Service API shall implement a query function to find, and return to a requesting client, all IIEs that are associated to a specific IIE (as identified in the client request). The returned information shall provide all details on the individual associations.
Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-8]   The IIE to IIE Association Service API shall implement a query function that returns a list of incomplete associations (i.e. containing a dangling endpoint).
Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-9]   The IIE to IIE Association Service API shall implement a function that checks associations to external information endpoints and report on the endpoints that are found not to be reachable.
Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.2 Geospatial and Features Service

[45]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the:
- NATO::JISR::Battlespace::Location package - contains the geometrical/ geospatial primitives over which geospatial queries can be expressed, including: Point, Line, Surface and Volume derived types.
- NATO::JISR::Battlespace::Feature package - contains definitions of higher level battlespace Features whose value is partly defined by underlying geometric/ geospatial primitives – for example: area of intelligence Interest (AOII); named area of interest (NAI); line of bearing (LOB): etc.

[46]   Included here in the geospatial areas service is the requirement for support to general geospatial querying over the OData API consistent with what is included in the [OData 4] specification. This includes the following OData Geo functions: 'geo.distance', 'geo.intersects' and 'geo.length'.

[47]   All IIEs are geospatially referenced (IIE->GeoEntities) and therefore all IIEs can parametrise a geospatial query combined with the aforementioned OData geo operators.

3.1.2.1   API

[FBE-10]   The Geospatial and Features Service shall through the OData REST API support all IIE access actions on Features (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-11]   The Geospatial and Features Service shall implement over the OData REST API support for geospatial querying consistent with the OData specification for geospatial support.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-12]   The Geospatial and Features Service shall implement general geospatial support at the IIE level. For example it should be possible to query for Units that are within a Named Area of Interest.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-13]   Geospatial and Features Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 33] and [US 47] with backend-relevant acceptance criteria for geographic areas as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-14]   The Geospatial and Features Service shall after a create, update or delete change to a geographical feature, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-15]   The Geospatial and Features Service API shall support uploading of one or many attachments to geographical feature.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.3   Intel-FS Spiral 1 Geospatial and Features Migration Service

[48]   The purpose of this service is to migrate Geospatial and Features from INTEL-FS Spiral 1 into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.3.1   Extract, transform, load geographical areas

[FBE-16]   The INTEL-FS Spiral1 Geospatial and Features Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new geographic areas (features). It shall be possible through a configurable filter setting to filter the geographic areas that are extracted from INTEL-FS Spiral1.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-17]   The INTEL-FS Spiral1 Geospatial and Features Migration Service shall transform the extracted geographic areas into a format that is compliant with the OData REST API implemented by the Geospatial and Features Service and load the transformed Geospatial and Features into the I2BE through the Geospatial and Features Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-18]   The INTEL-FS Spiral1 Geospatial and Features Migration Service shall identify associations to other IIEs in the extracted geographic areas and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-19]   Using this ETL process, it shall be possible to migrate all geographic areas, without any data loss, from INTEL-FS Spiral 1 into the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.4   Products Management Service

[49]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::Product package.

3.1.4.1   API

[FBE-20]   The Products Management Service shall through the OData REST API support all IIE access actions on products (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-21]   The Products Management Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 15], [US 16], and [US 17] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-22]   The Products Management Service shall after a create, update or delete change to a product, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-23]   The Products Management Service API shall support uploading of one or many attachments to a product in addition to the product file.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-24]   The Products Management Service shall have support for management (create, read, update, and delete) of templates for creation of products. The template shall contain product metadata, but no product file.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[50]   Note: The templates will be used by clients to prefill product metadata for recurring product types; e.g. daily update briefs

[FBE-25]   The Products Management Service shall upon a client request return a template product metadata set where some text is dynamically set through usage of "tags" where the tags are replaced by actual values, as shown in the example below.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[51]   Example of tags usage: For a DocumentProduct of type INTSUM, a template could use "tags" within the Title and Summary attributes as shown below. In this example %DATE% would be replaced with the current date, %ORGNODEPRODUCER% replaced by the ON the user behind the client request, and %UPLOADER% the name of the actual user.

  •   Title: %DATE% Daily INTSUM for TAAC-N by %ORGNODEPRODUCER%
  •   Summary: This is the Daily INTSUM produced for the TAAC-N AOR for %DATE%. Any follow up questions should be directed to %UPLOADER%

3.1.4.2   Transformation of files to PDF service

[FBE-26]   The Products Management Service shall, upon a client request, convert a client-specified Microsoft Office file (MS Word or PowerPoint) or an image file (in common image formats) to a PDF file, and return the PDF file to the client.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[52]   Note: INTEL-FS Spiral 1 the Aspose API is used for converting to PDF.

3.1.4.3   Automatic metadata extraction from files (support to product creation)

[FBE-27]   The Product Management Service shall, upon a client request, processes document product files (in either PDF or MS Word format) to detect Keywords (mapping terms in the report to Keywords) and Locations, and return the found Keywords and Locations to the client.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-28]   The rules for mapping terms in the report to Keywords shall be dynamically configurable. I.e. it shall be possible to update the mapping rule set and dictionaries, and activate the updates, without restarting the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-29]   The rule set for identifying Keywords and Locations shall be extendable and configurable through configurations (i.e. not requiring SW re-build).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-30]   The Products Management Service shall, upon a client request, extract metadata
              attributes from a client-specified STANAG 4545 image file, map relevant metadata
              to INTEL-FS2 metadata attributes, and return the metadata mapping to the client.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-31]   The Products Management Service shall, upon a client request, extract metadata
              attributes from a client-specified STANAG 4609 video file, map relevant metadata
              to INTEL-FS2 metadata attributes, and return the metadata mapping to the client.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.5   Intel-FS Spiral 1 Products Migration Service

[53]   The purpose of this service is to migrate products from INTEL-FS Spiral 1 into INTEL-FS Spiral
             2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.5.1   Extract, transform, load products

[FBE-32]   The INTEL-FS Spiral1 Products Migration Service shall at regular intervals (where
              the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new
              products. It shall be possible through a configurable filter setting to filter the
              products that are extracted from INTEL-FS Spiral1.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-33]   The INTEL-FS Spiral1 Products Migration Service shall transform the extracted
              products into a format that is compliant with the OData REST API implemented by
              the Products Management Service and load the transformed products into the
              I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-34]   The INTEL-FS Spiral1 Products Migration Service shall identify associations to
              other IIEs in the extracted products and transform those associations into a format
              that is compliant with the OData REST API implemented by the IIE to IIE
              Association Service and load the transformed IIE associations into the I2BE
              through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-35]   Using this ETL process, it shall be possible to migrate all products, without any
              data loss, from INTEL-FS Spiral 1 into the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.6   Collation Tasking Management Service

[54]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the
             NATO::JISR::STAFF::Collation package.

3.1.6.1   API

[FBE-36]   The Collation Tasking Service shall through the OData REST API support all IIE access actions on collation tasking information (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-37]   The Collation Tasking Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 26] and [US 27] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-38]   The Collation Tasking Service shall after a create, update or delete change to a product post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-39]   The Collation Tasking Service shall maintain lists of collation status on document products (i.e. reports) as defined by the collation tasking choreography as defined in [INTEL-FS2-IM].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-40]   The Collation Tasking Service shall enable clients to search for, filter, and retrieve lists of document products (reports) according to their collation status (e.g. to retrieve reports needing collation, reports assigned for collation, etc.). The filtering mechanism shall support filtering on collation status, assigned user, source of product, product creation/ modification time, etc.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-41]   The Collation Tasking Service shall enable clients to specify rules for automatically identifying which ON that will be responsible for collating which products. The rules shall identify the ON responsible for a product collation based on product metadata including Keyword, producer, and title (e.g. using regular expression against the title to look for a certain clue).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-42]   The Collation Tasking Service shall manage collation task assignments (i.e. which user is assigned to collate which product).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.7   Battlespace Object (BSO) Management Service

[55]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Battlespace package and in the NATO::BMD::Battlespace package.

3.1.7.1   API

[FBE-43]   The BSO Management Service shall through the OData REST API support all IIE access actions on BSO/ BSRs (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-44]   The BSO Management Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 18] through [US 25] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-45]   The BSO Management Service shall after a create, update or delete change to a BSO/ BSR, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-46]   The BSO Management Service API shall support uploading of one or many attachments to a BSO and/ or a BSR.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-47]   The BSO Management Service shall, upon a client request, be able to move a BSR from one BSO to another BSO (to rectify situations where a BSR has been created for the wrong BSO).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-48]   The BSO Management Service shall have support for management (create, read, update, and delete) of templates for creation of BSOs and BSRs, and for creation of BSO relationships.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[56]   Note: The templates will be used by clients to prefill BSO/ BSR metadata.

[FBE-49]   The BSO Management Service shall, to support link analysis, manage associations to other IIEs at the BSO level in accordance with [INTEL-FS2-IM] (in addition to tracking associations at status report level).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[57]   The purpose of the requirement above is to facilitate different types of link analysis; e.g. using both BSO data and document products.

3.1.7.2   Merging of BSOs

[FBE-50]   The BSO Management Service shall implement a function in the REST API for merging of two or more BSOs into one consolidated BSO (consolidating BSO

attributes across the different BSOs) and aggregating all BSRs (with attachments) in a chronological order based on the ASAT time.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-51]   The BSO Management Service shall move all associations that involved the original BSOs onto the new merged BSO.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-52]   The BSO Management Service shall for client access requests through the REST API to a de-duplicated BSO (i.e. a BSO that can no longer be used) inform the client that the BSO has been replaced by the new BSO with the identification details of the new merged BSO (e.g. trough throwing an exception).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.7.3   Identification of existing BSOs in document products

[FBE-53]   The BSO Management Service shall maintain dynamically updated dictionaries of existing BSOs of type Persons, Organizations, Units, Events, Places, and Equipment. Note: Dynamically updated means that whenever BSOs are updated the dictionaries are automatically and immediately updated.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-54]   The BSO Management Service shall, upon a client request, extract raw text from the file of a DocumentProduct and match it against dictionaries to identify existing BSOs of type Persons, Organizations, Units, Places, Events, and Equipment using a rule set that as a minimum includes the rules identified in the table below. The processed text shall be returned a marked-up format (e.g. XML) where each of the found BSOs are tagged with BSO identifying information (enabling client applications to display and retrieve information on the identified BSOs). The extracted text, shall to the maximum extent have the same structure of paragraphs as the original document report with clear and distinct separation between the paragraphs. A line-break in the original report shall not result in a new paragraph in the extracted text.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 3-1 Initial rule set for identifying existing BSOs

BSO Type	Identification Rules
Person	•Identify existing persons by Name (Note: The look-up shall be able to handle name abbreviations; e.g. it shall be able to identify "John F. Kennedy" as a person) •Identify existing person by previous Surname •Identify existing persons by Alternate Name (nickname)
Organization	•Identify existing organizations by their Name
Unit	•Identify existing units by their Name
Events	•Identify events from date/time-stamps matching existing event's Start Date

Places	•Identify existing places/ locations by their Name
	•Identify existing places/ locations by their Basic Encyclopedia (BE) number
Equipment	•Identify existing vehicles from licence plate numbers
	•Identify existing aircrafts against tail numbers
	•Identify existing vessels against pennant numbers

[58]   Note: A basic function for identifying and marking BSOs already exists with the INTEL-FS Spiral 1 software. This implementation is using Elasticsearch for identifying BSOs. In Spiral 2 this function will have to be extended to find additional BSO types.

[FBE-55]   The rule set for identifying existing BSOs shall be extendable and configurable through configurations (i.e. not requiring SW re-build).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-56]   The dictionary matching shall implement Fuzzy Search techniques (like Levenshtein, SoundEx, and Metaphone) to be able to identify existing BSOs that are differently spelled in the report texts.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-57]   The dictionary matching shall implement the NEAR search-operator (e.g. this will allow a person to be found even if the raw text introduces a new/ unknown middle name for a person).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.8   ORBAT Management Service

[59]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::ORBAT package.

3.1.8.1   API

[FBE-58]   The ORBAT Management Service shall through the OData REST API support all IIE access actions on ORBATs (for an authorized client) including Basic Intel ORBAT - NATO::JISR::Staff::ORBAT package, Ballistic Missile ORBAT - NATO::JISR::Staff::ORBAT::BMORBAT package, and Electromagnetic ORBAT: NATO::JISR::Staff::ORBAT::EOBORBAT package.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-59]   The ORBAT Management Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 28] and [US 29] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-60]   The ORBAT Management Service API shall support uploading of one or many attachments to an ORBAT.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-61]   The ORBAT Management Service shall after a create, update or delete change to a ORBAT, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.9   Intel-FS Spiral 1 BSO Migration Service

[60]   The purpose of this service is to migrate BSO and BSR data from INTEL-FS Spiral 1 into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.9.1   Extract, transform, load BSO data

[FBE-62]   The INTEL-FS Spiral1 BSO Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new BSO/ BSR data. It shall be possible through a configurable filter setting to filter the BSOs/ BSRs that are extracted from INTEL-FS Spiral1.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-63]   The INTEL-FS Spiral1 BSO Migration Service shall transform the extracted BSO/ BSR data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-64]   The INTEL-FS Spiral1 BSO Migration Service shall identify associations to other IIEs in the extracted BSO/ BSR data and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-65]   The INTEL-FS Spiral1 BSO Migration Service shall through inspection of the extracted BSO/ BSR data identify ORBATs and transform the ORBAT data into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed ORBATs into the I2BE through the ORBAT Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-66]   Using this ETL process, it shall be possible to migrate all BSO data and all ORBAT information, without any data loss, from INTEL-FS Spiral 1 into the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.10 ISR Organization Service

[61]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the
NATO::JISR::Staff::IRMCM::Organisation package.

3.1.10.1 API

[FBE-67]   The ISR Organization Service shall through the OData REST API support all IIE
access actions on ISR organizations (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-68]   The ISR Organization Service shall implement all the server-side functionality (i.e.
anything not user-interface related) to fulfil the user stories [US 58] through [US 61]
and [US 63] with backend-relevant acceptance criteria as defined in [INTEL-FS2-
UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-69]   The ISR Organization Service shall after a create, update or delete change to any
ISR organization data, post an event message to the SOA Platform as a
notification that a change has occurred where the event message carry information
on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.11 Targets Service

[62]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the
NATO::JISR::Staff::Target package.

3.1.11.1 API

[FBE-70]   The Target Service shall through the OData REST API support all IIE access
actions on target data (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-71]   The Target Service shall implement all the server-side functionality (i.e. anything
not user-interface related) to fulfil the user stories [US 30], [US 31] and [US 32]
with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-72]   The Target Service API shall support uploading of one or many attachments to the
target-related IIEs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-73]   The Targets Service shall after a create, update or delete change to target data,
post an event message to the SOA & IdM Platform as a notification that a change

has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-74]   The Targets Service shall manage Candidate No-strike BSOs (as per [INTEL-FS2-InformationMode] NATO::JISR::Staff::Target).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.12 Intel-FS Spiral 1 Target Data Migration Service

[63]   The purpose of this service is to migrate target data from INTEL-FS Spiral 1 into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.12.1 Extract, transform, load target areas

[FBE-75]   The INTEL-FS Spiral1 Target Data Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new target data. It shall be possible through a configurable filter setting to filter the target data that are extracted from INTEL-FS Spiral1.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-76]   The INTEL-FS Spiral1 Target Data Migration Service shall transform the extracted target data into a format that is compliant with the OData REST API implemented by the Target Service and load the transformed target data into the I2BE through the Target Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-77]   The INTEL-FS Spiral1 Target Data Migration Service shall identify associations to other IIEs in the extracted target data and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-78]   Using this ETL process, it shall be possible to migrate all target information, without any data loss, from INTEL-FS Spiral 1 into the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.13 Overlays Service

[64]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Metadata package.

3.1.13.1 API

[FBE-79]   The Overlays Service shall through the OData REST API support all IIE access
                 actions on overlays (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-80]   The Overlays Service shall implement all the server-side functionality (i.e. anything
                 not user-interface related) to fulfil the user stories [US 34] and [US 35] with
                 backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-81]   The Overlays Service shall after a create, update or delete change to an overlay,
                 post an event message to the SOA & IdM Platform as a notification that a change
                 has occurred where the event message carry information on the type of IIE,
                 identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.14 Intel-FS Spiral 1 Overlays Migration Service

[65]   The purpose of this service is to migrate overlays from INTEL-FS Spiral 1 into INTEL-FS Spiral
             2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.14.1 Extract, transform, load overlays

[FBE-82]   The INTEL-FS Spiral1 Overlays Migration Service shall at regular intervals (where
                 the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new
                 overlays. It shall be possible through a configurable filter setting to filter the
                 overlays that are extracted from INTEL-FS Spiral1.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-83]   The INTEL-FS Spiral1 Overlays Migration Service shall transform the extracted
                 overlays into a format that is compliant with the OData REST API implemented by
                 the Overlay Service and load the transformed overlays into the I2BE through the
                 Overlay Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-84]   The INTEL-FS Spiral1 Overlays Migration Service shall identify associations to
                 other IIEs in the extracted overlays and transform those associations into a format
                 that is compliant with the OData REST API implemented by the IIE to IIE
                 Association Service and load the transformed IIE associations into the I2BE
                 through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-85]   Using this ETL process, it shall be possible to migrate all overlays, without any
                 data loss, from INTEL-FS Spiral 1 into the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.15 Intelligence Requirements (IR) Management (IRM) Service

[66]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the
            NATO::JISR::Staff::IRMCM::IRM package.

3.1.15.1 API

[FBE-86]   The IRM Service shall through the OData REST API support all IIE access actions
             on IRM data (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-87]   The IRM Service shall implement all the server-side functionality (i.e. anything not
             user-interface related) to fulfil the user stories [US 47], and [US 64] through [US
             72] with backend-relevant acceptance criteria as defined in [INTEL-FS2-
             UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-88]   The IRM Service shall after a create, update or delete change to IRM data, post an
             event message to the SOA & IdM Platform as a notification that a change has
             occurred where the event message carry information on the type of IIE,
             identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-89]   The IRM Service API shall enable clients to manage a distributed RFI process
             (through the underlying choreography tasking message mechanism) that includes
             starting and stopping a request, forwarding the request to other ONs for action (or
             for information), etc.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.16 Intel-FS Spiral 1 IRM Data Migration Service

[67]   The purpose of this service is to migrate IRM data from INTEL-FS Spiral 1 into INTEL-FS Spiral
            2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.16.1 Extract, transform, load IRM data

[FBE-90]   The INTEL-FS Spiral1 IRM Data Migration Service shall at regular intervals (where
             the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new
             IRM data. It shall be possible through a configurable filter setting to filter the target
             data that are extracted from INTEL-FS Spiral1.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-91]   The INTEL-FS Spiral1 IRM Data Migration Service shall transform the extracted
             IRM data into a format that is compliant with the OData REST API implemented by
             the IRM Service and load the transformed IRM data into the I2BE through the IRM
             Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[68]   Note: The transform will have to map between the INTEL-FS Spiral 1 RFI request-response
            protocol information (including its RFI forwarding mechanism) and the INTEL-FS Spiral 2
            information structures needed for managing the RFI requesting process (i.e. choreography
            tasking message "ledger" as defined by the [INTEL-FS2-IM]).

[FBE-92]   The INTEL-FS Spiral1 IRM Data Migration Service shall identify associations to
            other IIEs in the extracted target data and transform those associations into a
            format that is compliant with the OData REST API implemented by the IIE to IIE
            Association Service and load the transformed IIE associations into the I2BE
            through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-93]   Using this ETL process, it shall be possible to migrate all IRM information (i.e.
            ICPs, indicators, RFIs, and RFI Responses), without any data loss, from INTEL-FS
            Spiral 1 into the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.17 Search Service

3.1.17.1 API

[FBE-94]   The Search Service shall implement all the server-side functionality (i.e. anything
            not user-interface related) to fulfil the user stories [US 8], [US 48], [US 49], and [US
            50] with backend-relevant acceptance criteria as defined in [INTEL-FS2-
            UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-95]   The Search Service shall expose its functionalities though a REST API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-96]   The Search Service shall have support for saving and managing (create, read,
            update, delete, rename) search criteria as named searches. The named searches
            can be private to the client (security principal) or public (available to all users).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-97]   The Search Service shall constrain the search result set to match the policy for the
            particular client's (security principal) privileges (i.e. the client shall never receive
            search results that he/ she is not authorized to access).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.17.2 Searchable data

[FBE-98]   The Search Service shall support searching against all metadata attributes and on
            all IIE types.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-99] The Search Service shall index and support full-text searches against all products files, all IIE attachments of textual type and all IIE metadata including inner objects and BSO status reports and choreography task messages (CTM).
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-100] The Search Service shall support searches against soft-deleted data and IIEs in different workflow state (see PublishedStatusType in [INTEL-FS2-IM]).
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-101] The Search Service shall never return search results for hard-deleted IIEs (this may require search re-indexing whenever an IIE is hard-deleted).
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

3.1.17.3 Search engine

[FBE-102] The Search Service shall support matching against strings as exact matches, and as pattern matches (using wildcards and a "LIKE operator").
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-103] The Search Service shall support fuzzy matches (e.g. using the Levenshtein distance, and/ or the Soundex algorithm, and/ or Metaphone algorithm).
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-104] The Search Service shall support the NEAR (proximity) operator with client specified maximum distance between search tokens.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-105] The Search Service shall support logical operators ('AND', 'OR', 'NOT' including grouping of logical expressions using parenthesis).
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-106] The Search Service shall support numerical equality test, greater than and smaller than tests, and timestamp tests (earlier than, within time window, later than).
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-107] The Search Service shall have support for geospatial searches.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-108] The Search Service shall support geospatial coverage queries with standard geospatial primitives and operators including testing for a point being inside or outside an area (ellipse, rectangle, polygon, etc.)
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-109]   The Search Service shall support client applications in implementing facetted search based on classifications derived from the [INTEL-FS2-IM].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[69]   From https://en.wikipedia.org/wiki/Faceted_search: Faceted search is a technique which involves augmenting traditional search techniques with a faceted navigation system, allowing users to narrow down search results by applying multiple filters based on faceted classification of the items

[FBE-110]   The Search Service shall implement document clustering based on content of attachment and IIE metadata. The Search Engine shall have support for grouping the search results into different categories.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[70]   From https://en.wikipedia.org/wiki/Document_clustering: Document clustering (or text clustering) is the application of cluster analysis to textual documents. It has applications in automatic document organization, topic extraction and fast information retrieval or filtering.

[FBE-111]   The Search Service shall have support for synonym searches using configurable synonym rules (preferably using search-time synonym analysis).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[71]   Synonym analysis can be done at index-time or at search-time. Analysis at index time have performance advantages, but will require re-indexing whenever the synonym rules are changed, and that is why search-time synonym analysis is believed to be the preferred option.

[FBE-112]   The Search Service shall have support for returning search results as metadata and also text-snippets where the search token was found where the search token is tagged (to enable the client application to highlight the token in context of the document fragment it was found).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.18 Named Collections Service

3.1.18.1 API

[FBE-113]   The Named Collections Service shall through the OData REST API enable clients to group IIEs together as named collections where such named collections can be created, updated, and deleted (as required by for instance the user story [US 58]).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-114]   The Named Collections Service shall have support private named collections and shared public collections.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.19 Notification Service

3.1.19.1 API

[FBE-115]   The Notification Service shall implement server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 9], [US 12], and [US 14] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-116]   The Notification Service shall enable clients to register subscriptions in the form of a search criteria with the identification of the subscriber, a subscription channel/ queue on the SOA & IdM Platform, and a subscription identifier/ tag. The Notification Service shall dynamically detect when the search criteria is fulfilled, and send the search result on the specified subscription channel with the subscription identifier/ tag and the subscriber identification.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-117]   The Notification Service shall enable clients to register subscriptions in the form of a search criteria with the identification of the subscriber, an email address, and a subscription identifier/ tag. The Notification Service shall dynamically detect when the search criteria is fulfilled, and send the search result by email to the specified recipient with the subscription identifier/ tag.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-118]   The Notification Service shall enable clients to delete/ de-register subscriptions.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-119]   The Notification Service shall include a broadcast message function enabling (authorized) clients to push broadcast messages to all clients of the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[72]   The broadcast function can be used by the i2BE System Administrator to inform users of planned outages etc.

3.2   Backend services - Phase 2

3.2.1   I2BE to I2BE Synchronization Service

[73]   For availability and resilience reasons, it might be required to run multiple instances of the I2BE deployed to geographically dispersed data centres. In such scenarios, the multiple I2BE instances need to be synchronized so the same information/ content is available in all instances.

[74]   The synchronization may take place over SATCOM links and in these cases the synchronization software needs to be able to handle TCP communication with high latency (long round-trip delay times).

[75]   The synchronization between I2BE instances will also have to have support for air-gapped export/ import (for instance to move data between different network security domains).

3.2.1.1   General synchronization requirements

[FBE-120]   The I2BE to I2BE Synchronization Service shall exchange data between I2BE instances so that each I2BE instance has the same replica.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-121]   It shall be possible, through configuration settings, to filter the type of data to be synchronized between I2BE instances (by IIE type, releasability/ dissemination constraints, location and time of information, etc.) and it shall be possible to constrain product files and attachment files that can be synchronized (typically by defining a maximum file size).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-122]   The I2BE to I2BE Synchronization Service shall implement checks preventing circular replication situations (avoiding using unnecessary bandwidth), and it shall prevent creating duplicate entries in the repositories.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-123]   The I2BE to I2BE Synchronization Service shall log information about data transferred between I2BE instances enabling full audit trail of dissemination of I2BE data.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.1.2   Direct synchronization

[FBE-124]   The I2BE to I2BE Synchronization Service shall support different synchronization configurations including point-to-point, one-to many, many-to-one, many-to-many transfers.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-125]   The synchronization service shall work over high-speed/ low-latency networks as well as over high latency SATCOM links where the latter may need special Transmission Control Protocol (TCP) tuning.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-126]   The I2BE to I2BE Synchronization Service shall be able to handle cases where one of the I2BE instances is offline for a long period of time. The synchronization function shall identify the correct resume-point so that synchronicity can be achieved once the offline I2BE comes online. An example of a paused/ resumed synchronization could be when an I2BE instance is running on a ship with no network connection.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.1.3   Air-gapped synchronization

[FBE-127]   The I2BE to I2BE Synchronization Service shall support air-gapped import/ export through configurable export "drop point" and import "pull point". The exporting I2BE shall in this case keep track of what has previously been exported to the receiving I2BE such that each incremental export only contains previously un-exported data.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-128]   The data that is exchanged through the synchronization shall be wrapped in an "electronic envelope" that contains metadata on the data set to be synchronized. The envelop metadata attributes shall include the highest security classification and the most restrictive releasabilty constraint of the data within the data set.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.2   Presentation-conditioning Service

3.2.2.1   API

[FBE-129]   The Presentation-conditioning Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 51] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-130]   The Presentation-conditioning Service shall implement a function that - upon a client request - extracts the images and the associated metadata from STANAG 4545 files and return to the client the images in a browser-supported format (e.g. JPEG) and all the image metadata (in XML format). This functionality shall be available through a REST API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-131]   The Presentation-conditioning Service shall include (see Note below) a video conditioning service that implements Dynamic Adaptive Streaming over HTTP (DASH), i.e. MPEG-DASH (ISO/IEC 23009-1:2012) for streaming video and STANAG 4609 metadata to web browser client applications.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[76]   Note: The software for this functionality will be provided as Purchaser Furnished Item (PFI) source code and the work will be to include and adapt this PFI to run within the Presentation-conditioning Service. The PFI source code could possible also be used in support of [FBE-31].

3.2.3   Data Analytics Service

3.2.3.1   API

[FBE-132]   The Data Analytics Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 53], [US 54], [US

56] and [US 57] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-133]   The Data Analytics Service shall expose its functionalities though a REST API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-134]   The Data Analytics Service shall support common graph analytic functions by exposing a graph query language (preferably compliant with the emerging Graph Query Language (GQL) standard) through the REST API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-135]   The Data Analytics Service shall have support for saving and managing (create, read, update, delete, rename) graph query criteria as named queries. The named graph queries can be private to the client (security principal) or public (available to all users).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-136]   The Data Analytics Service shall have support for saving and managing (create, read, update, delete, rename) specific analysis and the analysis results in containers file (e.g. zip file). The analysis file shall be able to store the queries and filters applied to the I2BE repository to define and constrain the data set to be used for the analysis, miscellaneous text segments/ reports (e.g. as Microsoft Word file) describing analysis findings, images/ screenshots, and other client requested files (e.g. layout information for analysis views). The analysis files shall be private to the client (security principal).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-137]   The Data Analytics Service shall constrain the graph query result set to match the client's (security principal) privileges (e.g. the client shall never receive a graph query results that he/ she is not authorized for).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.3.2   Data analytics

[FBE-138]   The Data Analytics Service shall have support for synonym searches using configurable synonym rules.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-139]   The Data Analytics Service shall include centrality function, for a specified set of nodes (IIEs), to support calculation of Betweeness Centrality, Closeness Centrality, Degree Centrality, and Eigenvector Centrality.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-140]   The Data Analytics Service shall include a shortest path function that for two nodes (IIEs) calculate the shortest path between them.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-141]   The Data Analytics Service shall include a nodes similarity function that compares a set of nodes based on the nodes they are connected to (i.e. two nodes are considered similar if they share many of the same neighbours).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-142]   The Data Analytics Service shall include a function for generating geo-referenced heat maps in a common format (e.g. in KML). The heat maps generation shall be possible for any IIE type with temporal and spatial attributes. Two types of heat maps shall be supported: frequency-based and concentration-based.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-143]   The Data Analytics Service shall have support for calculating intersections between one or many nodes and one or many Geospatial and Features and report whether nodes are inside or outside the specified areas. Supported area types shall include circles/ ellipse, rectangles, and polygons.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.4   Collection Requirement (CR) Management (CRM) Service

[77]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::IRMCM::CM:CRM package.

3.2.4.1   API

[FBE-144]   The CRM Service shall through the OData REST API support all IIE access actions on CRM data (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-145]   The CRM Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 47], and [US 74] through [US 79] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-146]   The CRM Service shall after a create, update or delete change to CRM data, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-147]   The CRM Service API shall enable clients to manage a distributed CR requesting process (through the underlying choreography tasking message mechanism) that

includes submitting and stopping a request, forwarding the request to other ONs for action (or for information), etc.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.4.2   Priority scheme calculation

[FBE-148]   The CRM Service shall calculate the requirement ranking and scores for a set of CRs based on the chosen prioritization scheme. The ranking and score shall be available for clients through the OData client API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.4.3   Transformation of CRs to NVG

[FBE-149]   The CRM Services shall, upon a client request, transform a set of client specified CRs, transform the set of CRs with all relevant attributes to the [NVG] format and return the transformed data as a [NVG] file to the client.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.5   Collection Operations Management (COM) Service

[78]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::IRMCM::CM:COM package.

3.2.5.1   API

[FBE-150]   The COM Service shall through the OData REST API support all IIE access actions on COM data (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-151]   The COM Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 82] through [US 87] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-152]   The COM Service shall after a create, update or delete change to COM data, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-153]   The COM Service API shall enable clients to manage a distributed COM tasking process (through the underlying choreography tasking message mechanism).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.6   JIPOE Service

[79]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::JIPOE package and in the NATO::BMD::Staff::JIPOE package.

3.2.6.1   API

[FBE-154]   The JIPOE Service shall through the OData REST API support all access actions on JIPOE-type IIEs (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-155]   The JIPOE Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US-36] through [US-46] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-156]   The JIPOE Service shall after a create, update or delete change to any JIPOE-type IIE, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-157]   The JIPOE services shall provide a service for creating and managing (update and delete) named multi-criteria comparison rule sets.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.7   Terrain & Mobility Analysis Service

[80]   Note: Within this section the Terrain & Mobility Analysis Service is, for readability, generally referred to simply as "the Service".

3.2.7.1   Generating terrain & mobility analysis overlays

[FBE-158]   The Terrain & Mobility Analysis Service shall implement a Terrain Analysis function that upon a client request generates one or several overlays that depicts the areas where BM Units can reach and from which BM Units can operate. The service shall use the input parameters as defined in the table below and matching against geographical data calculate the possible operational areas (e.g. by greying out the no-go areas).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 3-2 Parameters provided by client when requesting a Terrain Analysis

Input Parameter	Remarks
Coverage area	Geographical area defined by a BMOA to constrain the analysis
Vehicle weights, heights, and widths	Maximum vehicle weights, heights, and widths from BM TECHINT to be matched against road network constraints (e.g. bridges, tunnels, small roads, etc.)

Vehicle turning radius	
Vehicle off-road ability/ Land use	This should include information on type of terrain where the vehicles can go off-road (e.g. sand, snow, wetland, etc.)
Maximum off-road distance	E.g. measured in kilometers
Slope limitations (degrees)	Maximum slope the vehicles can travel from BM TECHINT to be matched against road network data and terrain elevation data (in case the vehicles can go off-road)

[81]   A Mobility Analysis is a variant of the Terrain Analysis and will most likely involve similar calculations, but taking into account the relocation speed of the vehicle. The difference is that while the Terrain Analysis focus on where a BM Unit can travel (typically within a BMOA), the focus of the Mobility Analysis is to detect how far a BM unit can travel as a function of time.

[FBE-159]   The Service shall implement a Mobility Analysis function that upon a client request generates one or several overlays that depicts how far the BM Units can reach for a set of time intervals (e.g. within 1 hour, within 1 day, within a week etc.) as illustrated in the figure below (in this example the ranges are in minutes). The function shall use the input parameters as defined in the table below and matching against geographical data calculate the mobility ranges. The coloured range areas shall only depict areas that is accessible by the vehicles from the starting position (e.g. if a bridge is not dimensioned to support the vehicles, the mobility analysis shall show that the vehicles cannot cross the bridge).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

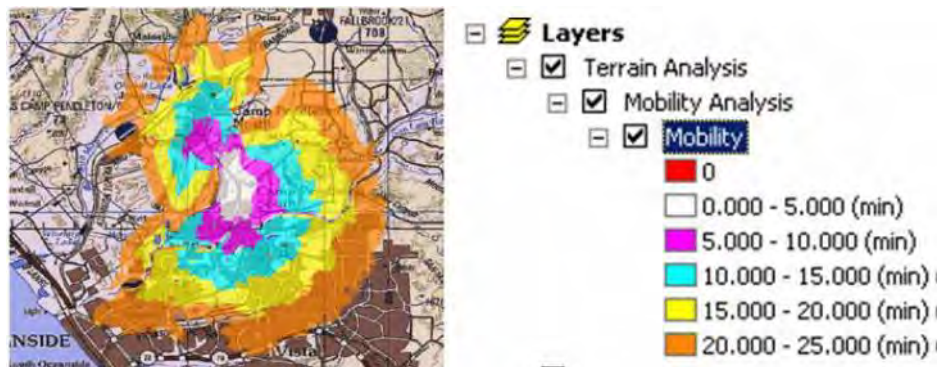Figure 3-1 Terrain and Mobility analysis with ranges

Table 3-3 Parameters provided by client when requesting a Mobility Analysis

Input Parameter	Remarks
Start position	Geographical location from which the BM Unit will start the movement
Time increments	In unit and extent (e.g. in 5 hour increments)
Vehicle relocation speed on roads	Average/ expected road speed of vehicle from BM TECHINT
Vehicle relocation speed off roads	Average/ expected off-road speed
Vehicle weights,	Maximum vehicle weights, heights, and widths from BM TECHINT

heights, and widths	to be matched against road network constraints (e.g. bridges, tunnels, small roads, etc.)
Vehicle off-road ability/ Land use	This should include information on type of terrain where the vehicles can go off-road (e.g. sand, snow, wetland, etc.)
Maximum off-road distance	E.g. measured in kilometers
Slope limitations (degrees)	Maximum slope the vehicles can travel from BM TECHINT to be matched against road network data and terrain elevation data (in case the vehicles can go off-road)

[FBE-160]   The Service shall be implemented as OGC Web Processing Services (WPS).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[82]   Note: The Terrain Analysis WPS and the Mobility Analysis WPS should be implemented for being hosted within the NATO CoreGIS system

[FBE-161]   The JIPOE services shall support collaboration on Courses of Action artefacts prior to these being approved and published.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3   System Administration (SysAdm) tool

[83]   For the operations and maintenance of the I2BE a System Administration (SysAdm) tool will be required.

[84]   The SysAdm tool can include off-the-shelf and/ or customized applications with dedicated user interfaces for the administration tasks, and/ or include a number command line applications/ scripts.

[85]   Note: In the current INTEL-FS Spiral 1, the usage of PowerShell scripts is often the preferred way to efficiently execute system administration/ maintenance tasks.

[GBE-81]   The SysAdm tool shall be using English as language for all user interaction.
Verification: Demonstration

[GBE-82]   The SysAdm tool shall comply with the NFRs as defined in the table below.
Verification: Demonstration

Table 3-4 Applicable NFRs (SysAdm tool)

Qualities	NFRs
Co-existence	[NFR-13]

3.3.1   Configurations and setup management functions

3.3.1.1   Manage data repositories

[FBE-162]   The SysAdm tool shall enable an Authorized Administrator to create many data repositories where each repository is identified by a name (e.g., 'Exercise XYZ')).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-163]   The SysAdm tool shall enable an Authorized Administrator to archive a data
              repository, be able to restore a previously archived data repository (without any
              data loss or data alteration), and be able to delete a data repository.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.1.2   Manage organizational nodes (ON)

[FBE-164]   The SysAdm tool shall enable an Authorized Administrator to create ONs and to
              configure the ON Zulu offset to ensure that timestamps are correctly captured at
              the ON.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[86]   The Zulu Offset will be used as required to compute the correct Zulu time (i.e., Greenwich Mean
              Time) from local time settings and to display the correct local time (as required) computed from
              the Zulu times recorded in the data.

3.3.1.3   Manage report templates

[FBE-165]   The SysAdm tool shall enable an Authorized Administrator to create and update
              report templates to provide users with templates for producing reports.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-166]   The SysAdm tool shall enable an Authorized Administrator to create, update,
              delete, and name global search criteria that will be accessible to users to use for
              their searches.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.1.4   Manage synonym rules

[FBE-167]   The SysAdm tool shall enable an Authorized Administrator to update synonym
              rules used for searching and graph querying.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.1.5   Manage gazetteers

[FBE-168]   The SysAdm tool shall enable an Authorized Administrator to add or delete a
              gazetteer for an ON, and to specify the default gazetteer for the ON.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-169]   The SysAdm tool shall enable an Authorized Administrator to create, edit and
              maintain gazetteer information, including maintaining gazetteer entries (i.e. Place
              Name, Country, Region, Sub-region, Location).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-170]   The SysAdm tool shall enable an Authorized Administrator to import a gazetteer from a file.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-171]   The SysAdm tool shall enable an Authorized Administrator to configure the I2BE to use gazetteer with fictitious nation data sets, including fictitious country names and fictitious country codes.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.2   Domain-values management functions

[87]   Note: The different ONs will have different needs for domain values and hence the domain value set is customized for each ON.

3.3.2.1   Create/ update domain values

[FBE-172]   The SysAdm tool shall enable an Authorized Administrator to centrally manage domain tables and domain values for all ONs. This includes the ability to create new domain values, and configuring which domain values that shall be hidden/ unhidden for individual ONs. Note: The latter part shall ensure that the acceptance criteria of user story [US 5] is fulfilled.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-173]   The SysAdm tool shall enable an Authorized Administrator to view all domain values in table views where the hidden/ unhidden state of each value for each of the ONs are displayed. The Authorized Administrator shall be able to sort and filter these table views, and be able to make changes to one or many values in the table in a single operation.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-174]   The SysAdm tool shall enable an Authorized Administrator or Authorized Reference Data Manager to search for and filter domain values to ease the maintenance work (find and update).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.2.2   Import/ export of domain values

[FBE-175]   The SysAdm tool shall enable an Authorized Administrator to import domain values from files in a structured file format and export domain values to files in structured file formats.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.2.3   Synchronization with Information Model

[FBE-176]   The SysAdm tool shall have support for synchronizing updates to the domain tables and domain values with the Information Model (see [INTEL-FS2-IM]).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.3   Content management functions

3.3.3.1   Import from files

[FBE-177]   The SysAdm tool shall enable an Authorized Administrator to import an ORBAT (e.g. an ISR ORBAT) consisting of Actors and Assets/ Systems with subordination information from a set of comma separated files (CSV), XML or JSON, into a specified data set (Operational Exercise, Training, etc.). The tool shall allow the System Administrator to map columns in the files to the appropriate IIE attribute and automatically extract the BSOs representing Units, the Assets/ Systems, and extract the relationships between the BSOs. Ultimately, the tool shall allow the System Administrator to verify that there is no conflict with the information already in the I2BE data set and subsequently "bulk import" the entire ORBAT and associated Units and Assets/ Systems. In case the validation of the data prior to import finds issue with the data, then the issues shall be identified and reported to the System Administrator to enable corrective actions.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-178]   The SysAdm tool shall enable an Authorized Administrator to import BSO data, including relationships between the BSOs, and all BSRs associated with the BSOs from files in a structured data format into a specified data set (Operational Exercise, Training, etc.) The tool shall allow the System Administrator to map elements in the files to the appropriate IIE attribute and automatically extract the BSOs, their BSRs, and the relationships between the BSOs. Ultimately, the tool shall allow the System Administrator to verify that there is no conflict with the information already in the I2BE data set and subsequently "bulk import" all the BSOs with BSRs and also BSO-BSO relationships. In case the validation of the data prior to import finds issue with the data, then the issues shall be identified and reported to the System Administrator to enable corrective actions.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-179]   The SysAdm tool shall enable an Authorized Administrator to import Products from comma separated files (CSV), XML or JSON, into a specified data set (Operational Exercise, Training, etc.). The tool shall allow the System Administrator to map columns in the files to the appropriate IIE attribute and automatically extract the Product. Ultimately the tool shall allow the System Administrator to verify that there is no conflict with the information already in the I2BE data set and subsequently "bulk import" a potentially large set of Products where also the Product attachments are fetched and pushed into the I2BE data set. In case the validation of the data prior to import finds issue with the data, then the issues shall be identified and reported to the System Administrator to enable corrective actions.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-180]   The SysAdm tool shall include an "undo function" that restores the data repository to the state before the bulk upload was executed (i.e. completely removes all the bulk-uploaded items).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.3.2   Delete and undelete

[FBE-181]   The SysAdm tool shall enable an Authorized Administrator to search and filter for soft-deleted entities, and then multi-select and hard-delete (permanently delete) such soft-deleted entities.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.3.3   Backup & restore

[FBE-182]   The SysAdm tool shall enable an Authorized Administrator to configure automatic backup of the entirety of an I2BE instance. It shall be possible to configure the frequency of and/ or time of day incremental backups and full backups.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-183]   The SysAdm tool shall enable an Authorized Administrator to manually command an incremental backup, and to manually command a full backup.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-184]   The SysAdm tool shall enable an Authorized Administrator to fully restore an I2BE instance from backups.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.4   Diagnostics functions

3.3.4.1   Log files

[FBE-185]   The SysAdm tool shall enable an Authorized Administrator to access log created by all I2BE produced Integration Services. (Note: This is particularly important for the audit trail checks of cross domain exchange between I2BE instances).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-186]   The SysAdm tool shall enable the System Administrator to access and inspect/ analyse log data from all the I2BE services.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-187]   The SysAdm tool shall enable an Authorized Administrator to configure the services logging functions (e.g. logging level, log file sizes, log file retention, etc.)

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-188]   The SysAdm tool shall enable an Authorized Administrator to archive log files from each of the I2BE services and I2BE provided Integration Services.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.4.2   Usage and performance indicators statistics

[FBE-189]   The SysAdm tool shall enable an Authorized Administrator to analyse the usage of the I2BE services OData API by accessing usage statistics; e.g. which part of the API is heavily used, which parts are not used much, usage peaks, average number of activation calls, historical trends, etc. The statistical numbers must be separable by access operations (Create, Read, Update, and Delete) and by ONs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-190]   The SysAdm tool shall enable an Authorized Administrator to analyse the performance of the individual I2BE services. In particular, statistical data measuring the I2BE compliance with the NFR response time requirements shall be available for analysis through the SysAdm tool.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-191]   The SysAdm tool shall enable an Authorized Administrator to specify relevant performance thresholds/ criteria for the services. I.e. thresholds that triggers corrective actions through the Enterprise SMC.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.4.3   Synchronization health check

[FBE-192]   The SysAdm tool shall enable an Authorized Administrator to select any two I2BE instances and perform repository comparisons. It shall be possible check the entire repositories, and it shall be possible with more focussed comparisons limited by IIE type, time window, and other IIE filtering attributes. Any discrepancies in these checks shall be reported by the tool including the option to repair the discrepancy.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.5   Notification function

3.3.5.1   Broadcasting notification messages

[FBE-193]   The SysAdm tool shall enable an Authorized Administrator to write messages (intended to be read by users) and broadcast them using the I2BE Notification Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4 Integration Service Requirements

4.1 Integration services - I2BE destination

[88]   The focus of the deliverables described in this section is to implement a number of dedicated Integration Services for bringing information into I2BE.

4.1.1 Central Card Catalogue (CCC) Import Service

[89]   The CCC is the mechanism by which the BICES nations are sharing intelligence data. Basically the CCC is a File Transfer Protocol (FTP) server that is exchanging library cards in the [IPIWG] format where the library cards are describing the intelligence products.

4.1.1.1 Extract, transform, load products

[FBE-194]   The CCC Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the CCC for new products (i.e. product metadata, product file, and other attachments). It shall be possible through a configurable filter setting to filter the products that are extracted from the CCC.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-195]   The CCC Import Service shall transform the extracted product metadata into a format that is compliant with the OData REST API implemented by the Products Management Service and load the products (i.e. the metadata, the product file, and any attachments) into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-196]   The CCC Import Service shall identify associations the extracted products are part of, collect additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.1.2 Extract, transform, load RFI data

[FBE-197]   The CCC Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the CCC for new RFI data. It shall be possible through a configurable filter setting to filter the RFI data that are extracted from CCC.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-198]   The CCC Import Service shall transform the extracted RFI data into a format that is compliant with the OData REST API implemented by the IRM Service and load the transformed RFI data into the I2BE through the IRM Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-199]   The Import Service shall identify associations the extracted RFI data are part of, collect additional information on these associations, and transform those

associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.2   ETEE Import Service

[90]   In support of exercises the Education Training Exercise and Evaluation (ETEE) will at scripted times in the exercise provide products to be ingested into INTEL-FS. The expected mechanism for INTEL-FS to receive messages with pre-canned (prepared in advance) products will be through the SOA & IdM Platform.

4.1.2.1   Extract, transform, load products from ETEE

[FBE-200]   The ETEE Import Service shall when receiving a ETEE message (dedicated for INTEL-FS), transform (if required) the information in the message into a format that is compliant with the OData REST API implemented by the Products Management Service and load the transformed products into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.3   NATO CSD IPL Import Service

[91]   The NATO CSD ISR Product Library (IPL) will contain product type data of type documents/ reports, images, and video clips. The interfaces to the NATO CSD IPL are defined by [AEDP-17].

4.1.3.1   Extract, transform, load products

[FBE-201]   The NATO CSD IPL Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the NATO CSD IPL for products or product updates that are not already in the I2BE. It shall be possible through a configurable filter setting to filter the products to be extracted from NATO CSD IPL. Note: in this context 'product' means the product metadata, product file, and all attachments (e.g. related files).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-202]   The NATO CSD IPL Import Service shall transform the extracted product metadata into a format that is compliant with the OData REST API implemented by the Products Management Service and load the products (i.e. the metadata, the product file, and any attachments) into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-203]   The NATO CSD IPL Import Service shall identify associations the extracted products are part of, collect additional information on these associations, and transform those associations into a format that is compliant with the OData REST

API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.4   NATO CSD Geospatial and Features Import Service

[92]   The purpose of this service is to import Geospatial and Features from the NATO CSD into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

4.1.4.1   Extract, transform, load geographical areas

[93]   The NATO CSD implements an OData REST API for accessing its entities. This API (called the JIEService) is described in appendix A.2.1.9 in [NCSD-IWS-SDS].

[FBE-204]   The NATO CSD Geospatial and Features Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD Geospatial and Features Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-205]   The NATO CSD Geospatial and Features Import Service shall be able to extract Geospatial and Features from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-206]   The NATO CSD Geospatial and Features Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for changes to geographic areas of interest (GAOI) in the NATO CSD and upon detecting a GAOI changes, extract the Geospatial and Features from the NATO CSD.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-207]   It shall be possible through a configurable filter setting, to filter the geographic areas that shall be extracted from NATO CSD. The service shall be able to detect Geospatial and Features updates originating from the I2BE and not import those (to prevent export-import loops).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-208]   The NATO CSD Geospatial and Features Import Service shall transform the extracted geographic areas into a format that is compliant with the OData REST API implemented by the Geospatial and Features Service and load the transformed Geospatial and Features into the I2BE through the Geospatial and Features Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-209]   The NATO CSD Geospatial and Features Service shall identify associations the extracted geographic areas are part of, extract additional information on these

associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.5   NATO CSD ISR Organizations Import Service

[94]   The purpose of this service is to import ISR organization from the NATO CSD into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

4.1.5.1   Extract, transform, load ISR organizations

[95]   The NATO CSD implements an OData REST API for accessing its entities. This API is described in appendix A.2.1.9 in [NCSD-IWS-SDS].

[FBE-210]   The NATO CSD Organizations Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD Organizations Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-211]   The NATO CSD ISR Organizations Import Service shall be able to extract ISR organization data from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-212]   The NATO CSD ISR Organizations Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for changes to ISR organizations in the NATO CSD and upon detecting ISR organization changes, extract the ISR organization data from the NATO CSD.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-213]   It shall be possible through a configurable filter setting, to filter the ISR organizations that shall be extracted from NATO CSD. The service shall be able to detect ISR organization data updates originating from the I2BE and not import that data (to prevent export-import loops).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-214]   The NATO CSD ISR Organizations Import Service shall transform the extracted ISR organization data (with all its substructures including ORBAT, units, ISR systems, ISR asset status, command relationships, and locations) into a format that is compliant with the OData REST API implemented by the ISR Organizations Service and load the transformed ISR organization data into the I2BE through the ISR Organizations Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-215]   The NATO CSD ISR Organizations Import Service shall identify associations the extracted ISR organization data are part of, extract additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.6   NATO CSD IRM Data Import Service

[96]   The purpose of this service is to import IRM data from the NATO CSD into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

4.1.6.1   Extract, transform, load IRM data

[97]   The NATO CSD implements an OData REST API for accessing its entities. This API is described in appendix A.2.1.9 in [NCSD-IWS-SDS].

[FBE-216]   The NATO CSD IRM Data Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD IRM Data Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-217]   The NATO CSD IRM Import Service shall be able to extract IRM data (ICP, RFIs, RFI choreography tasking information, and products associated with requirements and RFIs) from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-218]   The NATO CSD IRM Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for all types of changes to IRM data in the NATO CSD and upon detecting IRM data changes, extract the IRM data from the NATO CSD.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-219]   It shall be possible through a configurable filter setting, to filter the IRM data that shall be extracted from NATO CSD. The service shall be able to detect IRM data updates originating from the I2BE and not import that data (to prevent export-import loops).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-220]   The NATO CSD IRM Import Service shall transform the extracted IRM data into a format that is compliant with the OData REST API implemented by the IRM Service and load the transformed IRM data into the I2BE through the IRM Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-221]   The NATO CSD IRM Import Service shall identify associations the extracted IRM data are part of, extract additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.7   NATO CSD CRM Data Import Service

4.1.7.1   Extract, transform, load CRM data

[98]   The NATO CSD implements an OData REST API for accessing its entities. This API is described in appendix A.2.1.9 in [NCSD-IWS-SDS].

[FBE-222]   The NATO CSD CRM Data Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD CRM Data Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-223]   The NATO CSD CRM Import Service shall be able to extract CRM data (CRs, ISR Requests, and ISR Request choreography tasking information) from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-224]   The NATO CSD CRM Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for all types of changes to CRM data in the NATO CSD and upon detecting CRM data changes, extract the CRM data from the NATO CSD.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-225]   It shall be possible through a configurable filter setting, to filter the CRM data that shall be extracted from NATO CSD. The service shall be able to detect CRM data updates originating from the I2BE and not import that data (to prevent export-import loops).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-226]   The NATO CSD CRM Import Service shall transform the extracted CRM data into a format that is compliant with the OData REST API implemented by the CRM Service and load the transformed CRM data into the I2BE through the CRM Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-227]   The NATO CSD CRM Import Service shall identify associations the extracted CRM data are part of, extract additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.8   NATO CSD COM Data Import Service

4.1.8.1   Extract, transform, load COM data

[99]   The NATO CSD implements an OData REST API for accessing its entities. This API is described in appendix A.2.1.9 in [NCSD-IWS-SDS].

[FBE-228]   The NATO CSD COM Data Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD COM Data Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-229]   The NATO CSD COM Import Service shall be able to extract COM data (CXPs, collection tasks, exploitation tasks, and the choreography tasking information) from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-230]   The NATO CSD COM Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for all types of changes to COM data in the NATO CSD and upon detecting COM data changes, extract the COM data from the NATO CSD.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-231]   It shall be possible through a configurable filter setting, to filter the COM data that shall be extracted from NATO CSD. The service shall be able to detect COM data updates originating from the I2BE and not import that data (to prevent export-import loops).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-232]   The NATO CSD COM Import Service shall transform the extracted COM data into a format that is compliant with the OData REST API implemented by the COM Service and load the transformed COM data into the I2BE through the COM Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-233]   The NATO CSD COM Import Service shall identify associations the extracted COM data are part of, extract additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9   APP11-D Reports Import Service

4.1.9.1   Extract, transform, load APP11-D reports

[FBE-234]   The APP11-D Reports Import Service shall be able to receive/ obtain the set of ADatP-3 messages in APP11-D XML format defined in the table below as messages from the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-1 ADatP-3 messages (in APP11-D XML format) to be received

Message	Description	XML message format definition
AEW_MISREP	Airborne Early Warning Mission Report	[APP11D-AEW_MISREP]
AIRINTREP	Air Intelligence Report	[APP11D-AIRINTREP]
ASSESSREP	Commanders Assessment Report	[APP11D-ASSESSREP]
BOMBWARN	Bomb Threat Warning	[APP11D-BOMBWARN]
CIINTREP	Counter-Intelligence and Security Report	[APP11D-CIINTREP]
CIINTSUM	Counter-Intelligence and Security Summary	[APP11D-CIINTSUM]
CISUPINTREP	Counter-Intelligence and Security Supplementary Report	[APP11D-CISUPINTREP]
ENSITREP	Enemy Land Forces Situation Report	[APP11D-ENSITREP]
EVENTREP	Events Report	[APP11D-EVENTREP]
FIRST_HOSTILE_ACT	First Hostile Act Report	[APP11D-FHOSTILEACT]
INCREP	Incident Report	[APP11D-INCREP]
INCSPOTREP	Incident Spot Report	[APP11D-INCSPOTREP]
INTREP	Intelligence Report	[APP11D-INTREP]
INTSUM	Intelligence Summary	[APP11D-INTSUM]
MARINTREP	Maritime Intelligence Report	[APP11D-MARINTREP]

MARINTSUM	Maritime Intelligence Summary	[APP11D-MARINTSUM]
MISREP	Mission Report	[APP11D-MISREP]
OWNSITREP	Own Land Forces Situation Report	[APP11D-OWNSITREP]
PWINTERREP	Prisoner of War Interrogation Report	[APP11D-PWINTERREP]
SUPINTREP	Supplementary Intelligence Report	[APP11D-SUPINTREP]

[100]   As INTEL-FS will be one of the first NATO applications that will be hosted on the SOA & IdM Platform there most likely initially will not be any producers of ADatP-3 APP11-D report messages on the SOA & IdM Platform. To enable testing of the APP11-D Reports Import Services, it will be necessary to implement test functions that produces the ADatP-3 messages as defined in the table above.

[101]   For each of the received APP11-D messages the service will transform the message into a readable report in a PDF file. To make these generated report documents intelligible the XML tags in the reports should be used as contextual labels in the report documents, e.g. <CountryCode>USA</CountryCode> in the message should be presented as "Country Code: USA", etc. in the report PDF file.

4.1.9.1.1   AEW_MISREP

[FBE-235]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-AEW_MISREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-236]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-AEW_MISREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.2   AIRINTREP

[FBE-237]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-AIRINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-238]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-AIRINTREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.3   ASSESSREP

[FBE-239]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-ASSESSREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-240]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-ASSESSREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.4   BOMBWARN

[FBE-241]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-BOMBWARN] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-242]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-BOMBWARN] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.5   CIINTREP

[FBE-243]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-CIINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in

the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-244] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-CIINTREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.1.9.1.6   CIINTSUM

[FBE-245] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-CIINTSUM] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-246] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-CIINTSUM] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.1.9.1.7   CISUPINTREP

[FBE-247] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-CISUPINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-248] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-CISUPINTREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.1.9.1.8   DIR

[FBE-249] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-DIR] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant

with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-250]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-DIR] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.9   ENSITREP

[FBE-251]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-ENSITREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-252]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-ENSITREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.10   EVENTREP

[FBE-253]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-EVENTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-254]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-EVENTREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.11   FIRST_HOSTILE_ACT

[FBE-255]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-FHOSTILEACT] message into a readable PDF file, and also map/

transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-256]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-FHOSTILEACT] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.12 INCREP

[FBE-257]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-INCREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-258]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-INCREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.13 INCSPOTREP Transform and Re-publish Integration Service

[FBE-259]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-INCSPOTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-260]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-INCSPOTREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.14 INTREP

[FBE-261]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-INTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-262]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-INTREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.15 INTSUM

[FBE-263]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-INTSUM] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-264]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-INTSUM] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.16 MARINTREP

[FBE-265]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-MARINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-266]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-MARINTREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.17 MARINTSUM

[FBE-267]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-MARINTSUM] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-268]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-MARINTSUM] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.18 MISREP

[FBE-269]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-MISREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-270]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-MISREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.19 OWNSITREP

[FBE-271]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-OWNSITREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently

load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-272]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-OWNSITREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.20   PWINTERREP

[FBE-273]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-PWINTERREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-274]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-PWINTERREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.21   SUPINTREP

[FBE-275]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-SUPINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-276]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-SUPINTREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.10 Air ORBAT Import Service

4.1.10.1 Extract, transform, load ORBATAIR

[FBE-277]   The Air ORBAT Import Service shall when receiving a [APP11D-ORBATAIR] message on the SOA & IdM Platform, transform the message into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed Air ORBAT into the I2BE through the ORBAT Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-278]   To support testing, the Air ORBAT Import Service shall also include a separate test function that fully populates and send [APP11D-ORBATAIR] messages on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.11 Land ORBAT Import Service

4.1.11.1 Extract, transform, load ORBATLAND

[FBE-279]   The Land ORBAT Import Service shall when receiving a [APP11D-ORBATLAND] message on the SOA & IdM Platform, transform the message into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed Land ORBAT into the I2BE through the ORBAT Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-280]   To support testing, the Land ORBAT Import Service shall also include a separate test function that fully populates and send [APP11D-ORBATLAND] messages on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.12 Maritime Task Organization Import Services

[102]   Maritime C2 information is obtained through the Maritime C2 Information Exchange [MARIX] RESTful services.

[103]   Note:
   (1)   The Maritime ORBAT is referred to as Task Organization.
   (2)   INTEL-FS2 will be the authoritative data source for the red ORBAT, but it will also need to import blue ORBAT data originating from C2 systems.

4.1.12.1 Extract, transform, load Maritime Task Organization

[FBE-281]   The Maritime Task Organization Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the [MARIX] services for updates to the maritime task organization. It shall be possible through a configurable filter

setting to filter the maritime task organization data to be extracted through the [MARIX] services.

[FBE-282]   The Maritime Task Organization Import Service shall transform the extracted maritime task organization data into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed maritime task organization data into the I2BE through the ORBAT Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.13 NJTS Import Service

4.1.13.1 Extract, transform, load NJTS target data

[FBE-283]   The NJTS Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the NJTS for new target data (including target lists and target folders with all their content). In the case that NJTS publishes event messages to the SOA & IdM Platform whenever there is a change to its target data, then the NJTS Import Service shall subscribe to the NJTS messages to obtain the target data and/ or to trigger the polling of the target data. It shall be possible through a configurable filter setting to filter the target data to be extracted from NJTS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[104]   The NJTS system does not currently exist. According to NATO acquisition plans, the NJTS system will be delivered in the same timeframe as INTEL-FS Spiral 2. The NJTS interface is currently unspecified, but is expected to be implemented with a RESTful API.

[FBE-284]   The NJTS Import Service shall transform the extracted target data into a format that is compliant with the OData REST API implemented by the Target Service and load the transformed target data into the I2BE through the Target Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-285]   The NJTS Import Service shall identify associations to other IIEs in the extracted target data and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.14 MIDB Import Service

[105]   The Modernized Integrated Database (MIDB) contains different types of battlespace objects that after mediations will be imported into INTEL-FS2.

[106]   Note: The MIDB interface to be used for this integration is not yet defined.

4.1.14.1 Extract, transform, load MIDB Unit and Equipment Holdings data

[FBE-286]   The MIDB Import Service shall at regular intervals (where the interval frequency shall be configurable), or at discrete manually controlled points in time, poll the MIDB for new BSO data of type Units and Equipment Holdings. It shall be possible through a configurable filter setting to filter the BSO data to be extracted from MIDB (filtering options shall include timestamps, and location).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-287]   The MIDB Import Service shall transform the extracted Unit and Equipment Holdings data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.14.2 Extract, transform, load MIDB Places/ Facilities and Equipment Holdings

[FBE-288]   The MIDB Import Service shall at regular intervals (where the interval frequency shall be configurable), or at discrete manually controlled points in time, poll the MIDB for new BSO data of type Places/Facilities and Equipment Holdings. It shall be possible through a configurable filter setting to filter the BSO data that are extracted from MIDB (filtering options shall include timestamps, and location).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-289]   The MIDB Import Service shall transform the extracted Places/Facilities and Equipment Holdings data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.14.3 Extract, transform, load MIDB Events

[FBE-290]   The MIDB Import Service shall at regular intervals (where the interval frequency shall be configurable), or at discrete manually controlled points in time, poll the MIDB for new BSO data of type Event. It shall be possible through a configurable filter setting to filter the BSO data that are extracted from MIDB (filtering options shall include timestamps, and location).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-291]   The MIDB Import Service shall transform the extracted Events data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.14.4 Extract, transform, load MIDB Persons

[FBE-292]   The MIDB Import Service shall at regular intervals (where the interval frequency shall be configurable), or at discrete manually controlled points in time, poll the MIDB for new BSO data of type Person. It shall be possible through a configurable filter setting to filter the BSO data that are extracted from MIDB (filtering options shall include timestamps, and location).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-293]   The MIDB Import Service shall transform the extracted Persons data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.15 Asset Lists Import Service

4.1.15.1 Extract, transform, load asset lists

[FBE-294]   The Asset Lists Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the AirC2IS Asset List Services (see [AirC2IS ICD]) for updates to the asset lists. It shall be possible through a configurable filter setting to filter the asset list data to be extracted from AirC2IS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-295]   The Asset Lists Import Service shall transform the extracted asset list data into a format that is compliant with the OData REST API implemented by the JIPOE Service and load the transformed maritime task organization data into the I2BE through the JIPOE Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.16 Electronic Order of Battle (EOB) Import Service

[107]   EOB and emitter TECHINT data is maintained by the NEDB-NG system. Information from NEDB-NG will be pulled at regular intervals and imported into INTEL-FS2 as encyclopaedic data (i.e. as "read-only" data).

[108]   INTEL-FS will express EOB and emitter TECHINT data as specialised types of BSOs: Installations and facilities are specialisations of BSO places; electromagnetic emitters and platforms are specialisations of BSO equipment; electromagnetic parameters/ technical data (TECHINT) are specialisations of BSO equipment type

4.1.16.1 Extract, transform, load EOB data

[FBE-296]   The EOB Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the NEDB-NG system (see [CEOB-EF]) for new EOB

data. It shall be possible through a configurable filter setting to filter the EOB data that are extracted from NEDB-NG.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-297]   The EOB Import Service shall transform the extracted EOB data into a BSO and BSO status report format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed EOB data into the I2BE through the BSO Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-298]   The INTEL-FS Spiral1 BSO Migration Service shall through inspection of the extracted EOB data construct electronic ORBATs and transform the ORBAT data into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed electronic ORBAT into the I2BE through the ORBAT Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.17 BM Firing Event Import Service

[109]   The Networked Interoperable Real-time Information Services (NIRIS) Web Services enables clients to access tactical data that NIRIS has obtained from tactical data link. Included in the NIRIS Web Services is a RESTful Track Service (see chapter 5 in [NIRIS-WS-ICD]) that provides tracks in JSON format via the HTTP REST protocol. The RESTful Track Service includes a track filtering mechanism implemented in a RESTful Query Language (RSQL).

4.1.17.1 Extract, transform, load NIRIS missile track data

[FBE-299]   The BM Firing Event Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the NIRIS RESTful Track Service for missile launch tracks, missile in-flight tracks, and missile impact tracks. It shall be possible through a configurable filter setting to filter the missile track data to be extracted from NIRIS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-300]   The BM Firing Event Import Service shall combine missile launch track data, missile in-flight track data, and missile impact data, and transform this combined data into a historical firing event format (see NATO::BMD::Battlespace::Action::Event::HFE in the [INTEL-FS2-IM]) that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed missile track data into the I2BE through the BSO Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.2   Integration services – I2BE

[309]   The focus of the deliverables described in this section is to implement a number of dedicated Integration Services for exporting/ sharing information produced within I2BE to external applications and services.

4.2.1   Central Card Catalogue (CCC) Export Service

4.2.1.1   Export of products to CCC

[FBE-301]   The CCC Export Services shall detect new products and updates to existing products, and then read the product information through the Product Management Services OData REST API, transform the product information (that includes embedding product files) to the [IPIWG] format and post the information to the CCC.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-302]   It shall be possible to specify and refine filters for which products to export from I2BE to the CCC. The filtering options shall include filtering on data set (operational, training, exercise, etc.), geographical coverage areas, temporal data, source/ publisher, and classification/ releaseability, etc.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.2.1.2   Export of RFI data to CCC

[FBE-303]   The CCC Export Services shall detect new RFIs and RFI responses, and updates to existing RFI and RFI responses, and then read the RFI and RFI responses information through the IRM Service OData REST API, transform the information (that includes embedding any attachments) to the [IPIWG] format and post the information to the CCC.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-304]   It shall be possible to specify and refine filters for which RFIs and RFI responses to export from I2BE to the CCC. The filtering options shall include filtering on data set (operational, training, exercise, etc.), geographical coverage areas, temporal data, source/ publisher, and classification/ releaseability, etc.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.2.2   NATO CSD Export Service

[110]   The NATO Coalition Shared Data (CSD) contains two components that I2BE will export data to: the ISR Product Library (IPL) , and the ISR Workflow Service (IWS)

[111]   The NATO CSD contains a third component, the ISR Streaming Service. The I2BE will not have any integration points with this service.

4.2.2.1   Export of products to NATO CSD IPL

[FBE-305]   The NATO CSD Export Services shall detect new products and updates to existing products, and then read the product information through the Product Management Service OData REST API, transform the product information (that includes embedding product files and other attachments) into a format that is compliant with

the NATO CSD "IntelFS REST API" (see section 5.2.3.3 and appendix A.2.3 in [NCSD-IPL-SDS]), and upload the product to the NATO CSD IPL.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-306] It shall be possible to specify and refine filters for which products to export from I2BE to the NATO CSD IPL. The filtering options shall include filtering on data set (operational, training, exercise, etc.), geographical coverage areas, temporal data, source/ publisher, and classification/ releaseability, etc.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.2.2.2   Export of IRM&CM workflow data to NATO CSD IWS

4.2.2.2.1   Export of geographical areas

[FBE-307] The NATO CSD Export Services shall detect new or updated Geospatial and Features where the change is originating in the I2BE. The service shall then read the Geospatial and Features through the Geospatial and Features Service OData REST API, transform the data into a format that is compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update Geospatial and Features in the NATO CSD IWS.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.2.2.2.2   Export of ISR organization data

[FBE-308] The NATO CSD Export Services shall detect new or updated ISR organization data where the change is originating in the I2BE. The service shall then read the ISR organization data through the ISR Organization Service OData REST API, transform the data into a format that is compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update ISR organization data in the NATO CSD IWS.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.2.2.2.3   Export of IRM data to NATO CSD IWS

[FBE-309] The NATO CSD Export Services shall detect new or updated IRM data where the change is originating in the I2BE. The service shall then read the IRM data through the IRM Service OData REST API, transform the data into a format that is compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update IRM data in the NATO CSD IWS.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.2.2.2.4   Export of CRM data

[FBE-310] The NATO CSD Export Services shall detect new or updated CRM data where the change is originating in the I2BE. The service shall then read the CRM data through the CRM Service OData REST API, transform the data into a format that is

compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update CRM data in the NATO CSD IWS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.2.2.2.5   Export of COM data

[FBE-311]   The NATO CSD Export Services shall detect new or updated COM data where the change is originating in the I2BE. The service shall then read the COM data through the COM Service OData REST API, transform the data into a format that is compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update COM data in the NATO CSD IWS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.2.3   APP11-D Reports Export Service

4.2.3.1   Auto-generate AIRINTREP messages

[FBE-312]   The APP11-D Report Export Services shall detect updates to airfield BSOs (i.e. BSOs of type 'Place') and then subsequently interrogate the airfield BSO (through the I2BE OData REST API) to check the airfields status reports to see if there is any change to the Aircraft Equipment Lines. If there are changes to the Aircraft Equipment Lines then a message in [APP11D-AIRINTREP] XML format shall be automatically generated from the airfield BSO data and published/ sent on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.2.4   Emulated INTEL-FS Spiral 1 Web Services

[112]   INTEL-FS Spiral 1 implements a number of Read-Only SOAP Web Services that enables external systems (e.g. TOPFAS and NCOP) to access its information.

[113]   Through the implementation of INTEL-FS Spiral 1 WS Emulation Services the I2BE data will be made available through web services that mimics the legacy INTEL-FS Spiral 1 web services

4.2.4.1   INTEL-FS Increment 1 SOAP Web Services

[FBE-313]   The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy I_INTEL-FS_SYSTEM_SERVICE (see table below) in accordance with [IFS1-ICD] as a façade for accessing the I2BE.

Verification: Demonstration, Integration with TOPFAS and NCOP
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-2 I_INTEL-FS_SYSTEM_SERVICE

Purpose	Methods
Enables the caller to access system objects or global values that can be used in the other services	GetAuthorisedOrganisationalNodeLogicalDatabaseCouples
	GetAuthorisedApplicationsTypes
	GetAuthorisedObjectTypes

[FBE-314]   The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy
I_INTEL-FS_DOMAINVALUE_SERVICE (see table below) in accordance with
[IFS1-ICD] as a facade for accessing the I2BE.

Verification: Demonstration, Integration with TOPFAS and NCOP
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-3 I_INTEL-FS_DOMAINVALUE_SERVICE

Purpose	Methods
Enables the caller to access domain values definition and details	GetDomainValueTypes
	GetDomainValues
	GetDomainValueById

[FBE-315]   The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy
I_INTEL-FS_ENTITY_SERVICE (see table below) in accordance with [IFS1-ICD]
as a facade for accessing the I2BE.

Verification: Demonstration, Integration with TOPFAS and NCOP
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-4 I_INTEL-FS_ENTITY_SERVICE

Purpose	Methods
Enables access to Intelligence Information Entities and their relationships.	Read
	GetLocation
	GetAttachments
	GetAttachmentsURL
	GetStatus
	GetAttachment
	GetAttachmentURL

[FBE-316]   The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy
I_INTEL-FS_ORBAT_SERVICE (see table below) in accordance with [IFS1-ICD]
as a facade for accessing the I2BE.

Verification: Demonstration, Integration with TOPFAS and NCOP
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-5 I_INTEL-FS_ORBAT_SERVICE

Purpose	Methods
Enables provision of ORBAT information (i.e., identification, strength, command structure, and disposition of the staff, units, and equipment). Enables the requester to select the 'root' of the organisational hierarchy, the number of levels to be returned, and the type of command relationship (e.g., TACOM, TACON, OPCOM, OPCON, Co-ordinating authority) to be returned	GetSubordinateUnits
	GetSubordinatePersons
	GetSubordinateOrganisations
	GetSuperiorUnits
	GetSuperiorPersons
	GetSuperiorOrganisations

[FBE-317]   The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy
             I_INTEL-FS_QUERY_SERVICE (see table below) in accordance with [IFS1-ICD]
             as a facade for accessing the I2BE.

Verification: Demonstration, Integration with TOPFAS and NCOP
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-6 I_INTEL-FS_QUERY_SERVICE

Purpose	Methods
Enables submission and provision of responses to queries to authorised users or systems. The queries can contain full text and structured constraints.	GetSearchTemplateFromApplication
	GetSearchTemplateFromType
	OpenSearch
	RelationshipSearch
	OwnedObjectSearch
	Query

5 Non-functional Requirements (NFR)

[114] NFR quality requirements is defined in accordance with ISO-25010 standard, and definitions in this section are based on ISO/IEC 25010:2011(E) - System and software quality models.

[115] For monitoring of quality characteristics, the definitions in the table below will be used:

Table 5-1 Definitions used for monitoring NFR quality characteristics

Error (or Fault)	A design or source code or hardware flaw or malfunction that causes a Failure of one or more Configuration Items. A mistake made by a person or a faulty Process that affects a CI is also an Error (human Error). For this System, Human Error is generally not taken into consideration in measuring the quality Performance
Fault:	see Error
Failure:	Loss of ability to Operate to Specification, or to deliver the required output. The term Failure may be used when referring to Services, Processes, Activities, or Configuration Items
Critical Failure:	it is a failure that causes an immediate cessation of the ability to perform the required function/service
Incident:	An unplanned interruption to a service or reduction in the quality of a service
Problem:	A cause of one or more Incidents. The cause is not usually known at the time the Incident happens

5.1 Functional Suitability

[116] ISO 25010: This characteristic represents the degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions.

[NFR-1] Location accuracy shall be better than 1 meter (i.e., sub-meter accuracy) for translation of values (UTM, Latitude/Longitudes, others).

Verification: Demonstration and Analysis

5.2 Performance Requirements

[117] ISO 25010: This characteristic represents the performance relative to the amount of resources used under stated conditions.

5.2.1 Response Times

[118] ISO 25010: Time Behaviour is the degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements.

[NFR-2] The time from restarting until all services is restored and fully operational again shall be less than 5 minutes for at least 99.5% of the Operational Time.

Verification: Demonstration and Analysis

[NFR-3] Simple OData query operations against a repository containing 1 trillion entities shall be able to return results within 5 seconds for at least 99.5% of the Operational Time.

Verification: Demonstration and Analysis

[NFR-4]   For 10 concurrent simple OData query operations against a repository containing 1 trillion entities, each OData query operation shall return results within 10 seconds for at least 99.5% of the Operational Time.

Verification: Demonstration and Analysis

[NFR-5]   Any faceted search operation against a repository containing 1 trillion entities shall be able to return results within 2 seconds for at least 99.5% of the Operational Time.

Verification: Demonstration and Analysis

[NFR-6]   For 10 concurrent faceted search operations against a repository containing 1 trillion entities, with any type of search criteria, each search operation shall return results within 3 seconds for at least 99.5% of the Operational Time.

Verification: Demonstration and Analysis

[NFR-7]   Any graph-oriented query operation against a repository containing 1 million linked entities shall be able to return results within 5 seconds for at least 99.5% of the Operational Time.

Verification: Demonstration and Analysis

[NFR-8]   For 10 concurrent graph-oriented query operations against a repository containing 1 million linked entities, with any type of graph-query criteria, each query operation shall return results within 10 seconds for at least 99.5% of the Operational Time.

Verification: Demonstration and Analysis

5.2.2   Capacity

[119]   ISO 25010: Capacity. Degree to which the maximum limits of a product or system parameter meet requirements.

[120]   Capacity parameters can include the number of items that can be stored, the number of concurrent users, the communication bandwidth, throughput of transactions, and size of database.

[NFR-9]   The services shall be able to a handle trillion IIEs without any critical failure for at least 99.5% of its Operational time.

Verification: Analysis

[NFR-10]   The services shall be able to serve 2000 concurrent users/ connections without any critical failure for at least 99.5% of its Operational time.

Verification: Demonstration and Analysis

[NFR-11]   The services shall be able to receive 2 million new IIEs per day without any critical failure for at least 99.5% of its Operational time.

Verification: Demonstration and Analysis

[NFR-12]   Pending sufficient network bandwidth, replication/ synchronization of 2 million IIEs between I2BE instances per day shall be possible without any critical failure for at least 99.5% of its Operational time.

Verification: Demonstration and Analysis

5.3   Compatibility

[121]   ISO 25010: Compatibility. Degree to which a product, system or component can exchange information with other products, systems or components, and/or perform its required functions, while sharing the same hardware or software environment.

5.3.1   Co-existence

[122]   ISO 25010: Co-existence. Degree to which a product can perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product.

[NFR-13]   The implemented applications and services shall be capable of operating within the NS and MS WAN environment (including servers, network, services and workstations) in the presence of the latest approved NATO Security Settings without any critical failure for 99.5% of its operational time.

Verification: Demonstration

5.3.2   Interoperability Requirements

[NFR-14]   Any new version of the I2BE application programming interfaces (API) exposed to client applications shall be fully backward compatible for a minimum of three releases/ versions, and for a minimum of 1 year in 99.5% of the time. To be fully backward compatible, a version of the API with no breaking changes must be available and functioning.

Verification: Test

5.4   Reliability

[123]   ISO 25010: Reliability. Degree to which a system, product or component performs specified functions under specified conditions for a specified period of time.

[124]   MTBF (Mean time between Failures) is defined as the mean time between two consecutive failures.

[125]   MTBCF (Mean time between critical failures) is defined as the mean time between two consecutive CRITICAL failures.

5.4.1   Availability

[126]   ISO 25010: Availability. Degree to which a system, product or component is operational and accessible when required for use.

[127]   Inherent Availability (Intrinsic) assumes ideal support (i.e., unlimited spares, no delays, etc.); only design related Failures are considered.

[128]   Mission Inherent Availability (Intrinsic) assumes ideal support (i.e., unlimited spares, no delays, etc.); only design related CRITICAL Failures are considered

[NFR-15]   The Inherent Availability shall be better than 99.5%

Verification: Analysis, Using MTBF data

[NFR-16]   The Mission Inherent Availability shall be better than 99.97%.

Verification: Analysis, Using MTBCF data

5.4.2   Fault Tolerance and Recoverability

[129]   Fault Tolerance is the property that enables a system to continue operating properly in the event of the failure of some of its components. A fault-tolerant design enables a system to continue its

intended operation, possibly at a reduced level, rather than failing completely when some part of the system fails.

[130] Graceful Degradation is the ability of a computer, machine, electronic system or network to maintain limited functionality even when a portion of it has been destroyed or rendered inoperative (either by a fault or deliberately).

[131] Based on the principle of gracefully degradation the following recovery time have been defined:

Table 5-2 Recovery Time by Failure Criticality

Failure Type	Recovery Time
Failure	4 hours
Critical Failure	10 minutes

[132] ISO 25010: Fault Tolerance. Degree to which a system, product or component operates as intended despite the presence of hardware or software faults.

[133] ISO 25010: Recoverability. Degree to which, in the Event of an interruption or a Failure, a product or system can recover the data directly affected and re-establish the desired state of the system.

[NFR-17] For 99% of the possible Failures in any service, the service shall be recovered or be replaced by an alternative service, in no more than the amount of Recovery Time defined in the table above, without loss of any previously persisted data.

Verification:　Test and Analysis

5.5　Security

[134] ISO 25010: Degree to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization.

[135] ISO 27001 (Information Security): Information security is all about protecting and preserving information. It's all about protecting and preserving the confidentiality, integrity, authenticity, availability, and reliability of information.

[136] Security, within the context of Information Technology (IT), is defined as the capability of the software product to protect information and data so that unauthorised persons or systems cannot read or modify them and such that authorised persons or systems are not denied access to them.

[137] I2UA will operate in the "System High" mode of operation (see [AC/35-D/2004-REV3] for definitions of Security Modes of Operation). That is, all individuals with access to the system are cleared to the highest classification of the information stored, processed or transmitted within the system, but not all individuals with access to the system have a common need to know for the information stored, processed or transmitted within the system.

[NFR-18] The services shall implement relevant security techniques to protect against any security vulnerabilities as identified by Open Web Application Security Project (OWASP), see [OWASP], so that no such security vulnerabilities occurs for 99.5% of its Operational time.

Verification:　Test

[NFR-19] The services shall implement protection mechanisms against data spillage between the different repositories (Operational, Exercise, Training, etc.) so that for 99.5% of its Operational time no spillage occurs (exempt from this will be operator error by-passing implemented security mechanisms).

Verification:　Test

5.6   Maintainability

[138]   ISO 25010: This characteristic represents the degree of effectiveness and efficiency with which a product or system can be modified to improve it, correct it or adapt it to changes in environment, and in requirements.

[139]   The MTTR to be considered is the mean time needed to restore services after a failure in the operative condition, excluding administrative and logistics delay times.

[140]   The MaxTTR to be considered is the maximum time needed to restore services in the operative condition, excluding administrative and logistics delay times.

Table 5-3 Maintainability by Failure Criticality

Failure Type	MTTR	MaxTTR
Critical Failure	1 hours	4 hours
Failure	2 hours	8 hours

[NFR-20]   On the hypothesis of an operational time of 24/7/365 (24 hours per day, 7 days a week, 365 days per year), the MTTR and MaxTTR shall not exceed the time limits defined in the table above for each single maintenance action for 99.5% of its Operational Time.

Verification: Test and Analysis

[NFR-21]   The applications and services shall be able to isolate any occurring Faults/Errors and provide error diagnostics reports that identifies the Error/Fault for 90% of its Operational Time.

Verification: Analysis and Inspection

[NFR-22]   The developed source code shall exhibit a Technical Debt Ratio (TDR) lower than 5% when calculated using [SonarQube] in its default setting for TDR calculations.

Verification: Inspection

[NFR-23]   Automated regression tests and Continuous Integration shall ensure that for 99% of the times the applications and services are modified, and a release candidate produced, the change does not adversely affected existing functionalities/ features.

Verification: Demonstration and Inspection

[NFR-24]   The OData REST API and the Data Access Layer (DAL) shall be consistent with [INTEL-FS2-IM] 99% of all services releases.

Verification: Demonstration and Inspection

5.7   Portability, Installability, and Replaceability

[141]   ISO 25010: Portability. Degree of effectiveness and efficiency with which a system, product or component can be transferred from one hardware, software or other operational or usage environment to another.

[142]   ISO 25010: Installability. Degree of effectiveness and efficiency with which a product or system can be successfully installed and/or uninstalled in a specified environment.

[143]   ISO 25010: Replaceability. Degree to which a product can replace another specified software product for the same purpose in the same environment.

[NFR-25]   It shall be possible to run fully automated installation and/ or uninstallation of the applications and services for 99.5% of the times.

Verification: Demonstration

[NFR-26]   It shall be possible to install replace a previous release with a new release in a fully automated way without loss of any user data and/ or configuration settings in 99.5% of the times.

Verification: Demonstration

NATO Communications and Information Agency
Agence OTAN d'information et de communication

INTEL-FS SPIRAL 2 - BACKEND SERVICES (I2BE)
BOOK II - PART IV - SRS

SYSTEM REQUIREMENT SPECIFICATION (SRS)

Version 1.2

10/03/2021

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Document Revision History

Date	Version	Changes
21 Dec 2020	1.0	IFB package release version
29 Jan 2021	1.1	IFB Amendment 1: Clarified PaaS and IaaS in relation to SOA & IdM Platform and ITM, and a few other minor corrections (template management requirement and data loss requirement)
10 Mar 2021	1.2	IFB Amendment 6: Clarifying that the SysAdm tool will fulfil user story [US 5]

1   Introduction

[1]   This System Requirements Specification (SRS) documents the system requirements for the backend services of the Intelligence Functional Services (INTEL-FS) Spiral 2, hereafter referred to as the I2BE.

1.1   Scope

[2]   This SRS specifies Functional and Non-Functional system requirements for the I2BE. In fulfilling the functional and non-functional requirements defined in this SRS, the I2BE will also have to enable the INTEL-FS Spiral 2 user stories as defined in [INTEL-FS2-UserStories].

[3]   The Functional Requirements of the I2BE specify the functions that will be implemented by this capability in order to deliver the services that the user applications of INTEL-FS Spiral 2 will consume. Note: the user applications of INTEL-FS Spiral 2, hereafter referred to as I2UA, will be delivered under a separate contract.

[4]   The Non-Functional Requirements of the I2BE specify the standards, quality, performance, sizing and design constraints that shall be satisfied in the solution design and implementation.

1.2   Conventions

[5]   Within this SRS, general functional requirements applicable to most or all services are numbered as [GBE-number], application-specific functional requirements are numbered as [FBE-number], non-functional requirements are numbered as [NFR-number], while narrative text is numbered as [number].

[6]   Each functional requirement has associated with it a cost attribute. Prior to starting work,the Contractor will identify the cost of each single functional requirement. The Contractor will include the cost of implementing the general requirements and the cost of obtaining the qualities of the non-functional requirements into the implementation cost of the functional requirements. Hence, the general requirements and the non-functional requirements do not have an associated cost attribute.

[7]   The term "including" is, throughout this SRS, never meant to be limiting - the list that follows is always non-exhaustive.

[8]   References to applicable or reference information are in the text identified by an identifier within square brackets (e.g. [SOA-IdM]).

1.3   Structure

[9]   This SRS is structured as follows:
- Chapter 1: The introduction to this document;
- Chapter 2: Specification of general requirements that generally applies across all deliverables;
- Chapter 3: Specification of the functional requirements for the I2BE backend services and System Administration Tools;
- Chapter 4: Specification of the functional requirements for the Integration Services;
- Chapter 5: Specification of the Non-functional Requirements for the I2BE services and the Integration Services.

1.4   Applicable documents

[10]   Applicable documents provide details not explicitly set out through this SRS (other requirements, architecture, standards and specifications). The Contractor shall consider the applicable documents as requirements associated with this SRS.

Table 1-1 Applicable documents (Compliance Requirements)

[INTEL-FS2-IM]	CO-14873-INTELFS2, INTEL-FS SPIRAL 2 – Initial Information Model Book II - Part V, NCI Agency
[INTEL-FS2-UserStories]	CO-14873-INTELFS2, INTEL-FS SPIRAL 2 - USER APPLICATIONS (I2UA) BOOK II - PART IV – USER STORY DOCUMENT (USD), NCI Agency

1.5   Reference documents

[11]   Reference documents are documents providing contextual information that is relevant to this project. They shall be used by the Contractor to support his activity.

Table 1-2 Reference documents - miscellaneous

[AC/35-D/2004-REV3]	Primary Directive on CIS Security, North Atlantic Council, 15 November 2013 (NATO Unclassified)
[ADatP-4774]	NATO STANDARD ADatP-4774, CONFIDENTIALITY METADATA LABEL SYNTAX, Edition A Version 1, December 2017
[ADatP-4778]	NATO STANDARD ADatP-4778, METADATA BINDING MECHANISM, Edition A Version 1, October 2018
[AEDP-17]	NATO Standard ISR Library Interface, AEDP-17 Edition A Version 1, March 2018
[AEDP-19]	NATO Standard ISR Workflow Architecture, AEDP-19 Edition A Version 1, March 2018
[AI 06.02.08]	Agency Instruction Instr Tech 06.02.08, Service interface profile for publish-subscribe services, 04-Feb-2015, NCI Agency, (NATO Unclassified)
[AI 06.02.10]	Agency Instruction Instr Tech 06.02.10, Service interface profile for a publish/subscribe notification consumer, 04-Feb-2015, NCI Agency, (NATO Unclassified)
[AI 06.02.11]	Agency Instruction Instr Tech 06.02.11, Service interface profile for a notification cache service, 04-Feb-2015, NCI Agency, (NATO Unclassified)
[AirC2IS ICD]	AIRC2IS_SDS_ANNEX_04_ICD , AIR COMMAND AND CONTROL INFORMATION SERVICES (AIRC2IS) INCREMENT 1 (INC1) BASELINE 4 (BL4) - INTERFACE CONTROL DOCUMENT (ICD), version 6.0, 4 July 2019
[IFS1-ICD]	F0057 62778135 558, Interface Control Document for the INTEL-FS Project, v1.3, 29 Aug 2016 (NATO UNCLASSIFIED)
[IPIWG]	Intelligence Project Implementation Working Group, IPIWG 4.0 R19 Schema: http://www.nato.int/namespace/ipiwg/4.0#
[MARIX]	Maritime C2 Information Exchange (MARIX) Specification (a RESTful protocol and a model for the exchange of maritime information in support of Maritime Situational Awareness and Command and Control), https://tide.act.nato.int/tidepedia/index.php/Maritime_C2_Information_Exchange_Specification
[NCSD-IPL-SDS]	NATO-CSD CO-14682-CSD, SYSTEM DESIGN SPECIFICATION (SDS) – CIPL, Version 1.1, 4/12/2019
[NCSD-IWS-SDS]	NATO-CSD CO-14682-CSD, SYSTEM DESIGN SPECIFICATION

	(SDS) – CIWS, Version 1.0, 12/11/2019
[NCIA SIP REST 06.02.07, 2015]	NCI AGENCY INSTRUCTION INSTR TECH 06.02.07 SERVICE INTERFACE PROFILE FOR REST MESSAGING, 04 February 2015.
[CEOB-EF]	NATO AEWP-01 DRAFT Common Electronic Order of Battle Exchange Format
[NIRIS-WS-ICD]	NIRIS WEB SERVICES ICD VERSION 1.3.1, May 2020, NCI Agency
[OAS v3.0.1, 2017]	OpenAPI-Specification v3.0.1 https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.1.md, 07 December 2017
[OASIS Odata OAS 1.0, 2016]	Organization for the Advancement of Structured Information Standards (OASIS) OData to OpenAPI Mapping Version 1.0, 15 December 2016
[OData 4]	Organization for the Advancement of Structured Information Standards (OASIS) Open Data Protocol (OData) Version 4.01 (23 April 2020), https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=odata
[OWASP]	Open Web Application Security Project (OWASP), https://www.owasp.org/index.php/Main_Page
[SOA-IdM]	CO-14176-SOA-IDM Service Oriented Architecture (SOA) and Identity Management (IdM) Platform – Wave 1, System Design Specification (SDS) and Interface Control Document (ICD), NCI Agency
[SonarQube]	SonarQube, https://www.sonarqube.org/
[NVG]	TIDE Transformational Baseline Version 4.0, NATO VECTOR GRAPHICS PROTOCOL, version 2.0.2, 22 May 2015

Table 1-3 Reference documents – APP11D

[APP11D-ACO]	APP-11(D)(1)/ F011, ACO (AIRSPACE CONTROL ORDER), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-AEW_MISREP]	APP-11(D)(1)/ F053, AEW_MISREP (AIRBORNE EARLY WARNING MISSION REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-AIRINTREP]	APP-11(D)(1)/ F001, AIRINTREP (AIR INTELLIGENCE REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-ATO]	APP-11(D)(1)/ F058, ATO (AIR TASKING ORDER), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-ASSESSREP]	APP-11(D)(1)/ J002, ASSESSREP (COMMANDERS ASSESSMENT REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-BOMBWARN]	APP-11(D)(1)/ A079, BOMBWARN (BOMB THREAT WARNING), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-CIINTREP]	APP-11(D)(1)/ J112, CIINTREP (COUNTER-INTELLIGENCE AND SECURITY REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-CIINTSUM]	APP-11(D)(1)/ J113, CIINTSUM (COUNTER-INTELLIGENCE AND SECURITY SUMMARY), Edition D Version 1, NATO UNCLASSIFIED

[APP11D-CISUPINTREP]	APP-11(D)(1)/ J115, CISUPINTREP (COUNTER-INTELLIGENCE AND SECURITY SUPPLEMENTARY REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-DIR]	APP-11(D)(1)/ J186, DIR (DYNAMIC INTELLIGENCE REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-ENSITREP]	APP-11(D)(1)/ A026, ENSITREP (ENEMY LAND FORCES SITUATION REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-EVENTREP]	APP-11(D)(1)/ J092, EVENTREP (EVENTS REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-FHOSTILEACT]	APP-11(D)(1)/ J009, FIRST HOSTILE ACT (FIRST HOSTILE ACT REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-INCREP]	APP-11(D)(1)/ A078, INCREP (INCIDENT REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-INCSPOTREP]	APP-11(D)(1)/ J006, INCSPOTREP (INCIDENT SPOT REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-INTREP]	APP-11(D)(1)/ J110, INTREP (INTELLIGENCE REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-INTSUM]	APP-11(D)(1)/ J111, INTSUM (INTELLIGENCE SUMMARY), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-MARINTREP]	APP-11(D)(1)/ J016, MARINTREP (MARITIME INTELLIGENCE REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-MARINTSUM]	APP-11(D)(1)/ J015, MARINTSUM (MARITIME INTELLIGENCE SUMMARY), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-MISREP]	APP-11(D)(1)/ F031, MISREP (MISSION REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-ORBATAIR]	APP-11(D)(1)/ F032, ORBATAIR (ORDER OF BATTLE - AIR FORCES)), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-ORBATLAND]	APP-11(D)(1)/ A032, ORBATLAND (ORDER OF BATTLE - LAND FORCES), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-OWNSITREP]	APP-11(D)(1)/ A031, OWNSITREP (OWN LAND FORCES SITUATION REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-PWINTERREP]	APP-11(D)(1)/ J080, PWINTERREP (PRISONER OF WAR INTERROGATION REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-SUPINTREP]	APP-11(D)(1)/ J114, SUPINTREP (SUPPLEMENTARY INTELLIGENCE REPORT), Edition D Version 1, NATO UNCLASSIFIED

1.6 Background – envisioned capability

[12]   With the I2BE NATO will acquire a set of backend services for managing intelligence data in support of the NATO Intelligence community and the Ballistic Missile Defence (BMD) community.

[13]   The I2BE, as an intelligence information platform, will:

(1)   Provide a complete application programming interface (API) that enables the INTEL-FS Spiral 2 User Applications (I2UA) to provide the users with the functionality defined by [INTEL-FS2-UserStories];

(2)   Meet all of the performance, scalability, capacity and other quality requirements as defined by the non-functional requirements of this SRS (meet the specified NFRs when accessing the data in a repository of trillions of entities);

(3)   Provide a complete implementation of [OData 4] as an OData REST API that enables authorized clients to access all the Intelligence Information Entities (IIE) in the I2BE intelligence information platform. The complete set of IIEs can be seen in the Index of Intelligence Information Entities at the front of the [INTEL-FS2-IM];

(4)   Implement a faceted search against the IIEs hosted in the I2BE that meets the specified response time requirements;

(5)   Implement a graph-oriented query service against the IIEs in the I2BE that meets the specified NFRs;

(6)   Be hosted upon, re-use and/ or integrate with the services provided by the Bi-Strategic Command Automated Information System (Bi-SC AIS) Service-Oriented Architecture (SOA) and Identity Management (IdM) Platform (see [SOA-IdM]), hereafter referred to as the SOA & IdM Platform. Note the SOA & IdM will serve INTEL-FS2 as a Platform as a Service (PaaS). and the SOA & Idm Platform PaaS will again be running on top of the NATO Information Technology Modernization (ITM) capability as Infrastructure as a Service (IaaS);

(7)   Through the SOA Platform Integration Services (see [SOA-IdM]) integrate INTEL-FS2 with the set of external systems defined in the Integration Services section of this SRS;

(8)   Host a video conditioning service enabling Web-clients to play streaming video in STANAG 4609 format;

(9)   Replicate IIEs (and their aggregations) asynchronously between multiple installations/ instances of the I2BE, and exchange IIEs between multiple I2BE instances through export and import (where the data can be air-gapped between different networks);

(10)   Provide System Administration tools.

1.7   Initial Information Model

[14]   The significant part of the Initial Information Model [INTEL-FS2-IM] is based on existing production systems (IRM, CM, BSO, Products, EOB, etc.) that these I2BE services will be replacing.

[15]   Consistent with the vision of the best practice Domain Driven Design (DDD) it is expected that the model will evolve under implementation as any residual elaboration is realised. It is expected that this evolution will be limited to fine grained adjustment because the bulk of the Spiral 2 effort concerns itself with technology refresh, migration and 're-platforming' (see [18]) of existing back end, full stack capabilities to the SOA & IdM Platform.

[16]   Further leveraging DDD best practices, the Information Model will form the basis for the 'Ubiquitous Language' – INTEL-FS Spiral 2 'Universe of Discourse'. This domain language shall be the only language present in the application and it shall be reflected in all aspects including: the UX, the API, the business services, the analytic services, storage solutions, schema, events, business intelligence, query parameters, etc.

[17]   The [INTEL-FS2-IM] shall remain authoritative for those aspects that it specifies; no part of the information model is reproduced here in order to prevent synchronization issues.

1.8   SOA & IdM Platform

[18]   Of major importance to this back-end service implementation is the SOA & IdM Platform. A part of the work defined in this SRS concerns itself with the re-platforming of existing capabilities that are wrapped up in sub-optimal software architectures; tightly coupled; depend on obsolete technologies and impose high interest payments on the technical debt that they represent. Further, these legacy solutions incur a high total cost of ownership depending, as they do, on their many in-house variants of core services that are now available on/ in the SOA & IdM Platform.

[19]   Leveraging the services provided by the SOA & IdM Platform frees up resources that can now be focussed solely on the services at the top of the stack - the Joint Intelligence Surveillance

and Reconnaissance (JISR) COI-specific business services that compose the I2BE intelligence information platform specified herein.

2   General Backend Requirements

[20]   This section defines a set of general requirements that are applicable to all of the I2BE services.

[21]   Within this SRS, the I2BE services specifications will, when applicable, make references to these generic requirements.

[22]   Costing is broken down according to the I2BE functional services and therefore the cost of implementing general requirements is to be incorporated into the cost of each delivered I2BE functional service.

2.1   General cross-cutting requirements

2.1.1   Auto-generating from the information model

[GBE-1]   The I2BE API specifications shall, whenever feasible, be auto-generated as OData REST APIs from the information model as documented by [INTEL-FS2-IM].
Verification: Demonstration and Inspection

[GBE-2]   The Information Model shall be maintained, on a service-by-service basis, throughout this contract.
Verification: Inspection

[GBE-3]   Any deviation from these General Requirements shall require the approval of the purchaser prior to implementation.
Verification: Demonstration and Inspection

[GBE-4]   The data access layer (DAL) shall be auto-generated from the information model as defined by [INTEL-FS2-IM].
Verification: Demonstration and Inspection

[GBE-5]   All date-times shall clearly identify time values as Zulu and the date/time format shall be in accordance with ISO 8601.
Verification: Demonstration

[23]   Note: The two requirements above separate the design of the API from the implementation of the API; both are deliverables,

2.1.2   Integrating into the SOA & IdM Platform

[24]   The SOA & IdM Platform general requirements span all phases of the service lifecycle –a key service provided by the SOA & IdM Platform is Service Lifecycle Automation.

[25]   Some high level treatment of the SOA & IdM Platform will necessarily be included here; for detailed, authoritative specification see [SOA-IdM].

[26]   The SOA & IdM Platform provides services to three client/ consumer hosting models. These include:
   (1)   Non-Native Hosted Services: This is the preferred model for I2BE functional and Phase II services providing, as it does, maximum flexibility in the choice of underlying software and runtime whilst granting complete access to SOA & IdM Platform services (see below). Non-Native base images are provided to create runtime implementations that follow standard NATO technology stacks including: .Net Core Framework; Java Web Application Server; generic Web Application Server, etc.
   (2)   Native Hosted Services: These services leverage a pre-canned 'base runtime' and include extensions to support integration, mediation, edge and common business services. The edge, mediation and integration runtimes are the preferred model for the I2BE integration services.

(3)   Externally hosted services and applications: these include some or more of legacy/ heritage systems; other systems that, for whatever reason, are not hosted on the SOA & IdM Platform; external integration partners and/ or federated systems that are not a part of the NATO IT estate; etc. INTEL-FS Spiral 2 will integrate with such systems external to the SOA & IdM Platform (see the set of Integration Services specified herein) via the Native Hosted Service implementation model and the appropriate SOA & IdM Platform services.

[27]   The standard unit of software - deployable to the SOA & IdM Platform- is the container image. Container image lifecycles are managed by the SOA & IdM Platform Container Image Registry. Container images encapsulate all service dependencies except for service runtime parameterisation. Management of runtime parameterisation is solely the concern of the SOA & IdM Platform Configuration Server.

[28]   Various pre-canned, curated, container base images are available from the SOA & IdM Platform with which JISR COI-specific services are to be developed.

[29]   This SRS does not prescribe tooling related to the development phase of the build pipeline (e.g. the integrated development environment (IDE), test framework/ runner, continuous integration, build automation, etc.) The result of the development phase of the pipeline will go into staging where various pipeline stages mandated by the SOA & IdM Platform are applied. For example, the SOA & IdM Platform will apply security scanners to release candidate container images prior to these images being accepted in to the Container Image Registry.

[30]   The SOA & IdM Platform will provide 'Platform Services' in support of Domain Specific Services such as the I2BE Phase I, Phase II and Integration Services specified herein.

[31]   SOA & IdM Platform services include:

- Observability service: logging, metrics, audit, traces, customizable dashboards, alert management and notification rules, etc.
- Security services: Identity Management, Authentication, Single Sign On (SSO), Authorisation, Authoring (Policies, etc.), Credential Management, etc.
- Integration Services are based on the established Enterprise Integration Patterns (EIP) and include: Transport Normalisation, Encoding/ Decoding, Message composition/ aggregation/ de-aggregation etc., Message Routing, Publish and Subscribe, Mediation, etc.
- Platform Management Services manage, configure and operate the SOA & IdM Platform, its tenants and the services hosted on it.
- Message Oriented Middleware Services are provided by several of the SOA & IdM Platform's foundational components including the Message Bus, Message Broker, Notification Broker, Notification Cache and Message Queue. Together, these components provide a number of services including asynchronous messaging, message queues, publish and subscribe, message streaming, brokerage etc.; these in support of both SOA & IdM Platform hosted service-to-service communications and SOA & IdM Platform hosted service-to-external service communications.
- Service Lifecycle Management: lifecycle automation, container registry, service configuration management, etc.

2.1.2.1   General SOA & IdM Platform Requirements

[GBE-6]   All I2BE services (taken to mean the full set of Phase I, Phase II and integration services specified herein) shall be hosted upon the SOA & IdM Platform, and re-use and/ or integrate with the SOA & IdM Platform services.

Verification: Inspection

[GBE-7]   All I2BE functional and integration service implementations shall derive from the SOA & IdM Platform provided, pre-canned service base images.

Verification: Inspection

[GBE-8]   I2BE service implementations deriving from the SOA & IdM Platform provided, pre-canned service base images that include externally sourced dependencies must demonstrate complete image supply chain provenance for those dependencies.

Verification: Inspection

[GBE-9]   All supporting service implementations that cannot derive from the SOA & IdM Platform provided, pre-canned service base images must demonstrate total base image and dependency supply chain provenance.

Verification: Inspection

[GBE-10]   For all I2BE services, the build pipeline shall result in self-contained (all dependencies are included with the exception of runtime parameterisation) base images that target the SOA & IdM Platform Container Image Registry and are compatible with the SOA & IdM Platform Application Runtimes, see [SOA-IdM].

Verification: Inspection

[GBE-11]   All I2BE services shall use the SOA & IdM Platform Configuration Server for the complete lifecycle management of their runtime parameterisation, see [SOA-IdM].

Verification: Inspection

[GBE-12]   All I2BE services shall conform to the SOA & IdM Hosted Services Implementation Contract, see [SOA-IdM].

Verification: Inspection

[GBE-13]   I2BE Functional and Phase II service implementations shall target the Non-Native Hosted implementation model and shall derive from one of the SOA & IdM Platform provided, NATO standard technology stack, base images.

Verification: Inspection

[GBE-14]   I2BE Integration service implementations shall target the Native Hosted implementation model combined with the pre-canned Base Integration, Edge, Mediation and Integration Runtimes provided by the SOA & IdM Platform, see [SOA-IdM].

Verification: Inspection

[GBE-15]   For those services and interfaces that are required, all I2BE Services shall conform to the respective standard and version specified in the Applicable Standards of the SOA & IdM Platform Interface Control Document (ICD) included in [SOA-IdM].

Verification: Inspection

[GBE-16]   I2BE Services shall not implement or duplicate service, capability or functionality that is available from/ in the SOA & IdM Platform services.

Verification: Inspection

[GBE-17]   I2BE service isolation: all aspects of an individual I2BE service runtime lifecycle (deploy, start, stop, update, retire, etc.) shall be functionally and non-functionally isolated from any of the other I2BE services.

Verification: Demonstration

[GBE-18]   I2BE services shall work consistently with the quality of service characteristics facilitated by the SOA & IdM Platform including observability, elasticity/ scale-out, resilience, etc.

Verification: Demonstration

2.1.2.2 Eventing

[32] SOA & IdM Platform Messaging Services include two types of eventing services:

- SOA & IdM Platform Message Bus/ Broker –a highly scalable, fault-tolerant, distributed publish and subscribe messaging capability (realized via Apache Kafka)
- WS-Notification is realized as a wrapper over the SOA & IdM Platform Message Bus/ Broker. WS-Notification is an implementation of the 'NotificationBroker' and 'SubscriptionManager' interfaces of the OASIS WS-Notification standard referenced by the [SOA-IdM] in support of the NATO SIPs (also see [SOA-IdM]).

[GBE-19] Where I2BE services are required to fire events they shall do so using both event mechanisms supported by the SOA & IdM Platform (unless explicitly stated otherwise).

Verification: Demonstration

2.1.2.3 Security

[33] Collectively, the security services provided by the SOA & IdM Platform are referred to as Identity and Access Management (IAM) and in the [SOA-IdM] cover four broad areas:

- Authentication and Authorisation
- Identity Management
- Service and Application (delegated) Authentication
- Attribute Based Access Control.

[34] The security technologies, implementations and standards used with the SOA & IdM Platform include OAuth2, Open ID Connect (OIDC), WS-Security, SAML, XACML, etc.

[35] SOA & IdM Platform service security features cover both RESTful and SOAP based services.

2.1.2.3.1 Identity Management

[GBE-20] All I2BE services shall make use of the full lifecycle, identity management services provided by the SOA & IdM Platform.

Verification: Demonstration

2.1.2.3.2 Authentication

[GBE-21] All I2BE services shall make use of the authentication services provided by the SOA & IdM Platform.

Verification: Demonstration

2.1.2.3.3 Authorization, Access Control

[36] All I2BE services will require the extra access control decision fidelity enabled by the Attribute Based Access Control (ABAC) features of the SOA & IdM Platform. This fidelity is expressed in terms of the four types of attributes – Subjects, Resources, Actions and Environment:

- Policy attributes for the Subjects will include Identity, Organizational Node (ON), and Role (e.g. Administrator, Intel Creator, Intel Manager, etc.).
- Policy attributes for the Resources will be the IIE at category/ type granularity (e.g. ISR Product/Document, ISR Product/Image, ISR Product/ Report, BSO/ Person, BSO/ Unit, IR/PIR, IR/SIR, etc.), workflow state, confidentiality labels, etc.
- Policy Actions will include Create, Read, Update, Soft Delete, Hard Delete, Approve, Publish, and other workflow actions.
- Policy Environment will include data set (operational data repository, training data repository, exercise data repository, etc.), date-time, etc.

[37]   An example of these attributes in policy decision logic might be: J2 Collator in KFOR (Subject) Publishing (Action) a classified battlespace event status report (Object type and Object property) from within the KFOR J2 Collation Cell at Threat Level X (Context).

[GBE-22]   All I2BE services shall implement access control/ authorisation consistent with the security services, technologies and standards provided by the underlying SOA & IdM Platform Security Services.

Verification: Demonstration

[GBE-23]   All I2BE services shall leverage the SOA & IdM Platform provided policy-based access control services through the implementation of a policy enforcement point (PEP) interacting with the SOA & IdM Platform Policy Decision Point (PDP).

Verification: Demonstration

[GBE-24]   The I2BE Policy Enforcement Point shall (via the external SOA & IdM Platform provided PDP) use only externally defined and administered XACML policies. E.g. using a policy retrieval point (PRP) that uses policies from an external policy store administered by an external policy administration point (PAP).

Verification: Demonstration

[GBE-25]   When invoked by other ABAC enabled services, services shall use relayed claims, or, in turn, relay claims when calling other ABAC enabled services.

Verification: Demonstration

[GBE-26]   I2BE services shall not hard-code authorisation/ access control logic in any way other than through the PEP and PDP components of the ABAC architecture.

Verification: Demonstration and Inspection

2.1.2.4   Observability

[GBE-27]   All I2BE Services shall, by fulfilling the SOA & IdM Platform Implementation Contract, make use of the SOA & IdM Platform observability interfaces and services to support central management, accessing and analysis of the I2BE logs and metrics through the SOA & IdM Platform tooling.

Verification: Demonstration and Inspection

[GBE-28]   At a minimum, all activities/ actions/ queries of all I2BE service consumers (persons, integration partners, other services, etc.) shall be logged for auditing purposes (i.e. enabling full audit traceability of identifiable client activities/ actions). Note this includes all read actions on all IIEs; i.e. identification of which identity received the IIE, its version and at what time.

Verification: Inspection

[GBE-29]   Information on any change made to the system, and all occurring faults and errors, shall be logged.

Verification: Demonstration and Inspection

[GBE-30]   Change and fault/ error logs shall contain required information in order to provide the support staff with interpretable and comprehensive information about the cause and nature of the change or fault/ error.

Verification: Demonstration

2.1.3 Testability, test automation, continuous integration (CI) and continuous delivery (CD), and quality assurance (QA)

[GBE-31]   The software shall be designed and structured for good testability. This includes usage of patterns such as, decoupling, test data generation and dependency injection to enable unit testing.

Verification: Inspection

[GBE-32]   Test-automation, Continuous Integration (CI) and Continuous Delivery (CD) processes shall be implemented for all of the services and these process shall feed in to the SOA & IdM Platform pipeline stages for staging, security scanning, container signing, base image registration, etc..

Verification: Demonstration

[GBE-33]   The Continuous Integration process shall include automated security tests, automated source code analysis including code coverage, security vulnerability analysis, and automatic smoke test/ build verification test (BVT).

Verification: Demonstration and Inspection

[GBE-34]   Automated regression tests shall be delivered with all services (including all artefacts required to run the tests e.g. unit tests, test data, data generators, external test harnesses, etc.).

Verification: Inspection

[GBE-35]   Hardcoding of, or embedding of, resources, configuration settings, or any other non-binary artefacts (URL, DNS, IP addresses, file path, drive letters, etc.) shall NOT be implemented/ used. (As already mentioned, all services shall use the SOA & IdM Platform Configuration Server for this type of data.)

Verification: Inspection

2.1.4 API supporting multiple geographic reference systems

[GBE-36]   The I2BE APIs shall support input and output of geospatial data in multiple geographic reference systems. The supported geographic reference systems shall include Universal Transverse Mercator (UTM) grid system, Military Grid Reference System (MGRS), and World Geodetic System 1984 (WGS84) with latitude/ longitude options as degrees, minutes and seconds or degrees, minutes and decimal minutes.

Verification: Demonstration

2.1.5 Supporting multiple data sets

[GBE-37]   The services shall, from a user's perspective, be seen to concurrently support multiple data sets (e.g. an operational data set, a training data set, an exercise data set, etc.) where there is no spill-over of data between the data sets.

Verification: Demonstration and Inspection

[GBE-38]   The services shall whenever an IIE is created, tag the IIE with a label that associates it to the data set to which it belongs (e.g. OPERATIONAL, EXERCISE, TRAINING).

Verification: Demonstration and Inspection

[GBE-39]   The services shall have support for fictitious security markings (e.g. marking an IIE as releasable to a fictitious country code).

Verification: Demonstration and Inspection

[GBE-40]   The services shall, when operating in exercise or training mode, support the usage of fictitious Geospatial and Features and locations/ places (i.e. business validation rules shall accept such fictitious names as long as they are pre-defined in appropriate dictionaries).

Verification: Demonstration and Inspection

[GBE-41]   The services shall, when operating in exercise or training mode, have support for using separate domain value tables (from the operational domain value tables) where the exercise/ training domain value tables can contain fictitious domain values.

Verification: Demonstration and Inspection

[GBE-42]   Data lifecycle management shall be applicable to data sets such that individual data sets can be isolated; exported and imported; archived, backed up and restored; etc.

Verification: Demonstration and Inspection

2.1.6   Confidentiality metadata labelling

[GBE-43]   The services shall implement the confidentiality metadata label specification defined by [ADatP-4774] (this is referenced on the base Entity in the [INTEL-FS2-IM].)

Verification: Inspection

[GBE-243]   The services shall implement the metadata label binding specification defined by [ADatP-4778].

Verification: Inspection

2.1.7   Export of information

[GBE-44]   The services shall when exporting any data – in any way - ensure that highest security classification and the most restricted releasability of the data is captured in the exported data. If the export is file based then the file name shall convey the file security classification and releasability. When exporting to a PDF file, the file security and releasability shall be inserted in the document header and footer on all pages.

Verification: Demonstration

2.1.8   User Interface (UI) cross-cutting requirements

[38]   Note: The I2BE is expected to deliver user-facing application(s) only to support systems administration, operation, configuration, etc.; other (e.g. domain specific, functional) UI implementation is NOT expected.

2.1.8.1   Language

[GBE-45]   Any user interface shall use "UK English" as the default language. This shall apply
              to all applications and supporting components, including all user interfaces (e.g.
              views, dialogs, help screens, tooltips, etc.), error/notification/warning messages
              and documentation.

Verification: Demonstration

2.1.8.2   User feedback

[GBE-46]   Any user interface shall notify the user who has initiated an action that processing
              of the action has started and convey the sense of processing progress (by means
              of a progress indicator, dialog boxes).

Verification: Demonstration

[GBE-47]   Any user interface control actions shall be simple and direct, whereas potentially
              destructive control actions shall require extended user attention such that they are
              not easily acted on (e.g., "are you sure" queries).

Verification: Demonstration

[GBE-48]   Any user interface shall provide an Error Management capability, which is readily
              distinguishable from other displayed information (e.g. Pop-up Error Window).

Verification: Demonstration

[GBE-49]   Any user interface shall provide the users with meaningful error messages and
              information about the actions they need to take in order to fix or at least to report
              the problem.

Verification: Demonstration

2.1.8.3   Data Entry Interactions

[GBE-50]   Where the user is entering (or changing) data, the user interface shall detect
              invalid and missing entries. The invalid or missing entries shall be highlighted or
              marked so that the user can be quickly identify and correct them.

Verification: Demonstration

[GBE-51]   In any user interface, during data entry, the ENTER key shall not trigger form
              submission. I.e. the user shall specifically click the "submit button" to submit the
              entered data.

Verification: Demonstration

[GBE-52]   Any user interface shall provide prompts (i.e., allow cancellation or confirmation)
              when input or changes may be lost due to navigation or logging out.

Verification: Demonstration

2.1.9   Compliance with non-functional requirements (NFR)

[GBE-53]   The I2BE services shall comply with the NFRs as defined in chapter 5, when the
              NFR is relevant for the individual service. In general, all NFRs are relevant for all
              services, with a few exceptions, like [NFR-12] that is mostly targeted for the I2BE
              to I2BE Synchronization Service.

Verification: See individual requirements

2.2 General IIE-Oriented Requirements

2.2.1   IIE data management through OData REST API

[39]   The I2BE will expose the IIEs through an Open Data (OData) Protocol Version 4.01 Representational State Transfer (REST) architectural style Application Programming Interface (API). For information on OData see [OData 4]

[40]   IIEs are the top level "root aggregates" in the Intelligence Information Model.

[GBE-54]   The I2BE API shall implement OData Version 4.01 for all Intelligence Information Entities (including compliance with the [OData 4] URL ABNF).
Verification: Demonstration

[GBE-55]   The I2BE API shall deliver versioned OData APIs.
Verification: Demonstration

[GBE-56]   The services shall return a standard, programming language-agnostic, interface description which allows both humans and computers to discover and understand the capabilities of a service without requiring access to source code, additional documentation, or inspection of network traffic [OAS v3.0.1, 2017]. That means the services shall return the contract specifying the API interface compliant to [OAS 3.0.1, 2017] in both JSON (JavaScript Object Notation) and in YAML (Yet Another Mark-up Language) formats [OASIS Odata OAS 1.0, 2016]
Verification: Demonstration

[GBE-57]   The services shall implement the OData Service Document Requests and Metadata Document Request.
Verification: Demonstration

[GBE-58]   The services shall, for all APIs, (including non OData API) collect statistics on the API usage to log files. The statistics shall include metrics on the API latencies (response times), frequency of use (down to the granularity of the IIE type), the URI requested, the requester, the action, etc.
Verification: Demonstration

[GBE-59]   The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement full entity lifecycle management (create, read,update, delete, etc.)
Verification: Demonstration

[GBE-60]   The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement the full set of query operators and filters appropriate to the types of the IIE properties (numeric, string, datetime, enumeration, etc.)
Verification: Demonstration

[GBE-61]   The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement extent management (paging, top, skip, etc.)
Verification: Demonstration

[GBE-62]   The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement Partial GETs (OData $select)
Verification: Demonstration

[GBE-63]   The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement partial updates (PATCH).
Verification: Demonstration

[GBE-64]   The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement 'navigation properties' for entity relationships.
Verification: Demonstration

[GBE-65]   The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement expansions (OData $expand).
Verification: Demonstration

[GBE-66]   The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], provide optimistic concurrency (ETag).
Verification: Demonstration

[GBE-67]   The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], provide batching of operations (functions and actions)/ queries.
Verification: Demonstration

[GBE-68]   For all update operations, the I2BE services OData API implementation shall enforce the authorisation/ validation rules derived from the [INTEL-FS2-IM], and from the capability being re-platformed. I2BE services shall prevent create and update commands succeeding in case of validation error.
Verification: Demonstration

[GBE-69]   The services shall mark the data being created such that exercise-related and training-related information are distinguishable from operational information (See IntelligenceDatasetType enumeration in the [INTEL-FS2-IM]).
Verification: Demonstration

[GBE-70]   The I2BE services shall whenever an IIE through the OData API is created, updated, or deleted, publish an appropriate IIE event notification Create/ Update/ Delete/ etc. on/ through the SOA & IdM Platform for the IIE.
Verification: Demonstration

[GBE-71]   Through an OData API, the services shall implement soft-deletion of any IIE (i.e. tagging the IIE as deleted).
Verification: Demonstration

[GBE-72]   Through an OData API, the services shall implement un-deletion of any soft-deleted IIE.
Verification: Demonstration

[GBE-73]   Through an OData API, the services shall support hard-deletion of any IIE (i.e. permanently remove the IIE).
Verification: Demonstration

[GBE-74]   The OData API shall for all IIE actions, support individual action on a single IIE as well as applying the action on a list of IIEs (e.g. soft-deleting many IIEs in one operation).
Verification: Demonstration

2.2.2   IIE dissemination workflow management

[GBE-75]   The services shall, through the OData API, implement searching for IIEs, of any IIE type, in any workflow status (see PublishedStatusType in [INTEL-FS2-IM]).

Verification: Demonstration

[GBE-76]   The I2BE services shall, whenever an IIE is subjected to a dissemination workflow choreography-task, publish an appropriate IIE event notification; see the [INTEL-FS2-IM] NATO:JISR:Staff:Dissemination:DisseminationCT enumeration for these (e.g. PostForApproval, Approve, Reject, ApproveAndPublish, Publish).

Verification: Demonstration

[GBE-77]   The services shall, through the OData API, implement operations for changing IIEs workflow state for any IIE type.

Verification: Demonstration

[GBE-78]   The services shall, through the OData API, implement functionality for changing the workflow state for multiple IIEs in one operation (e.g. set all IIEs in a list to an Approved workflow state).

Verification: Demonstration

[GBE-79]   The services shall, through the OData API, implement functionality for attaching comments to the workflow state (e.g. if an IIEs is set to rejected, a reason for the rejection can be attached to the IIE's workflow state).

Verification: Demonstration

[GBE-80]   The services shall, whenever an IIE's PublishedStatusType is set to 'Published' make the IIE available at all organizational nodes (ON).

Verification: Demonstration

3 Functional service requirements (deliverable specific)

3.1 Backend services - Phase 1

[41] Through the implementation of the requirements defined in the sub-sections below an initial version of the new, 're-platformed' INTEL-FS backend will be established on the SOA & IdM Platform [SOA-IdM]. This new back-end will provide the same backend functionalities as the back-end of INTEL-FS Spiral 1. The main difference from INTEL-FS Spiral 1 is the adaptation to the SOA & IdM Platform, bringing much improved performance and scalability, and some additional functionality like the ORBAT management, the BM-augmented BSO management, and the blue ISR ORBAT management).

3.1.1 IIE to IIE Association Service

[42] The information to be managed by this service is derived from the NATO::JISR::Relationships class diagram in the [INTEL-FS2-IM].

3.1.1.1 API

[FBE-1] The IIE to IIE Association Service shall through the OData REST API support all IIE access actions on inter-service IIE relationships (for an authorized client).

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[43] Note: IIE to IIE relationships are those associations which cross services. A relationship between a BSO IIE and a Product IIE is one example of an inter-service relationship. Relationships between IIEs within a service are managed by that service. An example of an intra-service relationship would be equipment holdings within the Battlespace service which relate Actors to Materiel.

[FBE-2] The IIE to IIE Association Service shall implement server-side functionality that enables the I2UA client though service's API to fulfil any acceptance criteria defined in [INTEL-FS2-UserStories] that describes management of associations between IIEs (this includes [US 15], [US 17], [US 18], [US 22], [US 33], [US 36], [US 38], [US 39], [US 40], [US 43], [US 47], [US 48], [US 53], [US 58], [US 61], [US 64], [US 65], [US 67], [US 72], [US 75], [US 76], [US 77], and [US 83]). This means that the IIE to IIE Association Service shall though a REST API enable clients to create and manage (update and delete) associations as defined in [INTEL-FS2-IM].

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-3] The IIE to IIE Association Service shall after a create, update or delete change to an association, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message identifies the changed association, and the type of change.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-4] The IIE to IIE Association Service API shall have support for creating associations from an IIE to a temporarily non-existing IIE (i.e. an IIE that has not yet been established in the I2BE, but that will be established).

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

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[44]   The reason for the requirement above it to handle situations where IIEs with associations to other IIEs are received before the associated IIE has been created. This could potentially happen if integration services extracting information from an external source where an association is defined, and the associated entity hasn't yet been retrieved and uploaded to the I2BE.

[FBE-5]   The IIE to IIE Association Service API shall have support for creating associations to externally hosted information entities identified by an endpoint identifier (e.g. a URL) to the external entity.
Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-6]   The IIE to IIE Association Service API shall for clients accessing dangling/ incomplete associations inform (indicate to) the client about the dangling endpoint(s).
Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-7]   The IIE to IIE Association Service API shall implement a query function to find, and return to a requesting client, all IIEs that are associated to a specific IIE (as identified in the client request). The returned information shall provide all details on the individual associations.
Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-8]   The IIE to IIE Association Service API shall implement a query function that returns a list of incomplete associations (i.e. containing a dangling endpoint).
Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-9]   The IIE to IIE Association Service API shall implement a function that checks associations to external information endpoints and report on the endpoints that are found not to be reachable.
Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.2   Geospatial and Features Service

[45]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the:

- NATO::JISR::Battlespace::Location package - contains the geometrical/ geospatial primitives over which geospatial queries can be expressed, including: Point, Line, Surface and Volume derived types.
- NATO::JISR::Battlespace::Feature package - contains definitions of higher level battlespace Features whose value is partly defined by underlying geometric/ geospatial primitives – for example: area of intelligence Interest (AOII); named area of interest (NAI); line of bearing (LOB): etc.

[46]   Included here in the geospatial areas service is the requirement for support to general geospatial querying over the OData API consistent with what is included in the [OData 4] specification. This includes the following OData Geo functions: 'geo.distance', 'geo.intersects' and 'geo.length'.

[47]   All IIEs are geospatially referenced (IIE->GeoEntities) and therefore all IIEs can parametrise a geospatial query combined with the aforementioned OData geo operators.

3.1.2.1   API

[FBE-10]   The Geospatial and Features Service shall through the OData REST API support all IIE access actions on Features (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-11]   The Geospatial and Features Service shall implement over the OData REST API support for geospatial querying consistent with the OData specification for geospatial support.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-12]   The Geospatial and Features Service shall implement general geospatial support at the IIE level. For example it should be possible to query for Units that are within a Named Area of Interest.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-13]   Geospatial and Features Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 33] and [US 47] with backend-relevant acceptance criteria for geographic areas as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-14]   The Geospatial and Features Service shall after a create, update or delete change to a geographical feature, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-15]   The Geospatial and Features Service API shall support uploading of one or many attachments to geographical feature.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.3   Intel-FS Spiral 1 Geospatial and Features Migration Service

[48]   The purpose of this service is to migrate Geospatial and Features from INTEL-FS Spiral 1 into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.3.1   Extract, transform, load geographical areas

[FBE-16]   The INTEL-FS Spiral1 Geospatial and Features Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new geographic areas (features). It shall be possible through a configurable filter setting to filter the geographic areas that are extracted from INTEL-FS Spiral1.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-17]   The INTEL-FS Spiral1 Geospatial and Features Migration Service shall transform the extracted geographic areas into a format that is compliant with the OData REST API implemented by the Geospatial and Features Service and load the transformed Geospatial and Features into the I2BE through the Geospatial and Features Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-18]   The INTEL-FS Spiral1 Geospatial and Features Migration Service shall identify associations to other IIEs in the extracted geographic areas and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-19]   Using this ETL process, it shall be possible to migrate all geographic areas, without any data loss, from INTEL-FS Spiral 1 into the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.4   Products Management Service

[49]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::Product package.

3.1.4.1   API

[FBE-20]   The Products Management Service shall through the OData REST API support all IIE access actions on products (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-21]   The Products Management Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 15], [US 16], and [US 17] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-22]   The Products Management Service shall after a create, update or delete change to a product, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-23]   The Products Management Service API shall support uploading of one or many attachments to a product in addition to the product file.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-24]   The Products Management Service shall have support for management (create, read, update, and delete) of templates for creation of products. The template shall contain product metadata, but no product file.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[50]   Note: The templates will be used by clients to prefill product metadata for recurring product types; e.g. daily update briefs

[FBE-25]   The Products Management Service shall upon a client request return a template product metadata set where some text is dynamically set through usage of "tags" where the tags are replaced by actual values, as shown in the example below.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[51]   Example of tags usage: For a DocumentProduct of type INTSUM, a template could use "tags" within the Title and Summary attributes as shown below. In this example %DATE% would be replaced with the current date, %ORGNODEPRODUCER% replaced by the ON the user behind the client request, and %UPLOADER% the name of the actual user.

- Title: %DATE% Daily INTSUM for TAAC-N by %ORGNODEPRODUCER%
- Summary: This is the Daily INTSUM produced for the TAAC-N AOR for %DATE%. Any follow up questions should be directed to %UPLOADER%

3.1.4.2   Transformation of files to PDF service

[FBE-26]   The Products Management Service shall, upon a client request, convert a client-specified Microsoft Office file (MS Word or PowerPoint) or an image file (in common image formats) to a PDF file, and return the PDF file to the client.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[52]   Note: INTEL-FS Spiral 1 the Aspose API is used for converting to PDF.

3.1.4.3   Automatic metadata extraction from files (support to product creation)

[FBE-27]   The Product Management Service shall, upon a client request, processes document product files (in either PDF or MS Word format) to detect Keywords (mapping terms in the report to Keywords) and Locations, and return the found Keywords and Locations to the client.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-28]   The rules for mapping terms in the report to Keywords shall be dynamically configurable. I.e. it shall be possible to update the mapping rule set and dictionaries, and activate the updates, without restarting the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-29]   The rule set for identifying Keywords and Locations shall be extendable and configurable through configurations (i.e. not requiring SW re-build).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-30]　　　The Products Management Service shall, upon a client request, extract metadata attributes from a client-specified STANAG 4545 image file, map relevant metadata to INTEL-FS2 metadata attributes, and return the metadata mapping to the client.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

[FBE-31]　　　The Products Management Service shall, upon a client request, extract metadata attributes from a client-specified STANAG 4609 video file, map relevant metadata to INTEL-FS2 metadata attributes, and return the metadata mapping to the client.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

3.1.5　Intel-FS Spiral 1 Products Migration Service

[53]　　　The purpose of this service is to migrate products from INTEL-FS Spiral 1 into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.5.1　Extract, transform, load products

[FBE-32]　　　The INTEL-FS Spiral1 Products Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new products. It shall be possible through a configurable filter setting to filter the products that are extracted from INTEL-FS Spiral1.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

[FBE-33]　　　The INTEL-FS Spiral1 Products Migration Service shall transform the extracted products into a format that is compliant with the OData REST API implemented by the Products Management Service and load the transformed products into the I2BE through the Products Management Service.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

[FBE-34]　　　The INTEL-FS Spiral1 Products Migration Service shall identify associations to other IIEs in the extracted products and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

[FBE-35]　　　Using this ETL process, it shall be possible to migrate all products, without any data loss, from INTEL-FS Spiral 1 into the I2BE.

Verification:　Demonstration
Est. Cost[€]:　Contractor to provide cost estimate

3.1.6　Collation Tasking Management Service

[54]　　　The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::STAFF::Collation package.

3.1.6.1 API

[FBE-36]   The Collation Tasking Service shall through the OData REST API support all IIE access actions on collation tasking information (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-37]   The Collation Tasking Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 26] and [US 27] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-38]   The Collation Tasking Service shall after a create, update or delete change to a product post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-39]   The Collation Tasking Service shall maintain lists of collation status on document products (i.e. reports) as defined by the collation tasking choreography as defined in [INTEL-FS2-IM].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-40]   The Collation Tasking Service shall enable clients to search for, filter, and retrieve lists of document products (reports) according to their collation status (e.g. to retrieve reports needing collation, reports assigned for collation, etc.). The filtering mechanism shall support filtering on collation status, assigned user, source of product, product creation/ modification time, etc.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-41]   The Collation Tasking Service shall enable clients to specify rules for automatically identifying which ON that will be responsible for collating which products. The rules shall identify the ON responsible for a product collation based on product metadata including Keyword, producer, and title (e.g. using regular expression against the title to look for a certain clue).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-42]   The Collation Tasking Service shall manage collation task assignments (i.e. which user is assigned to collate which product).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.7 Battlespace Object (BSO) Management Service

[55]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Battlespace package and in the NATO::BMD::Battlespace package.

3.1.7.1   API

[FBE-43]   The BSO Management Service shall through the OData REST API support all IIE access actions on BSO/ BSRs (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-44]   The BSO Management Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 18] through [US 25] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-45]   The BSO Management Service shall after a create, update or delete change to a BSO/ BSR, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-46]   The BSO Management Service API shall support uploading of one or many attachments to a BSO and/ or a BSR.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-47]   The BSO Management Service shall, upon a client request, be able to move a BSR from one BSO to another BSO (to rectify situations where a BSR has been created for the wrong BSO).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-48]   The BSO Management Service shall have support for management (create, read, update, and delete) of templates for creation of BSOs and BSRs, and for creation of BSO relationships.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[56]   Note: The templates will be used by clients to prefill BSO/ BSR metadata.

[FBE-49]   The BSO Management Service shall, to support link analysis, manage associations to other IIEs at the BSO level in accordance with [INTEL-FS2-IM] (in addition to tracking associations at status report level).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[57]   The purpose of the requirement above is to facilitate different types of link analysis; e.g. using both BSO data and document products.

3.1.7.2   Merging of BSOs

[FBE-50]   The BSO Management Service shall implement a function in the REST API for merging of two or more BSOs into one consolidated BSO (consolidating BSO

attributes across the different BSOs) and aggregating all BSRs (with attachments) in a chronological order based on the ASAT time.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-51]   The BSO Management Service shall move all associations that involved the original BSOs onto the new merged BSO.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-52]   The BSO Management Service shall for client access requests through the REST API to a de-duplicated BSO (i.e. a BSO that can no longer be used) inform the client that the BSO has been replaced by the new BSO with the identification details of the new merged BSO (e.g. trough throwing an exception).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.7.3   Identification of existing BSOs in document products

[FBE-53]   The BSO Management Service shall maintain dynamically updated dictionaries of existing BSOs of type Persons, Organizations, Units, Events, Places, and Equipment. Note: Dynamically updated means that whenever BSOs are updated the dictionaries are automatically and immediately updated.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-54]   The BSO Management Service shall, upon a client request, extract raw text from the file of a DocumentProduct and match it against dictionaries to identify existing BSOs of type Persons, Organizations, Units, Places, Events, and Equipment using a rule set that as a minimum includes the rules identified in the table below. The processed text shall be returned a marked-up format (e.g. XML) where each of the found BSOs are tagged with BSO identifying information (enabling client applications to display and retrieve information on the identified BSOs). The extracted text, shall to the maximum extent have the same structure of paragraphs as the original document report with clear and distinct separation between the paragraphs. A line-break in the original report shall not result in a new paragraph in the extracted text.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 3-1 Initial rule set for identifying existing BSOs

BSO Type	Identification Rules
Person	•Identify existing persons by Name (Note: The look-up shall be able to handle name abbreviations; e.g. it shall be able to identify "John F. Kennedy" as a person) •Identify existing person by previous Surname •Identify existing persons by Alternate Name (nickname)
Organization	•Identify existing organizations by their Name
Unit	•Identify existing units by their Name
Events	•Identify events from date/time-stamps matching existing event's Start Date

Places	•Identify existing places/ locations by their Name
	•Identify existing places/ locations by their Basic Encyclopedia (BE) number
Equipment	•Identify existing vehicles from licence plate numbers
	•Identify existing aircrafts against tail numbers
	•Identify existing vessels against pennant numbers

[58]   Note: A basic function for identifying and marking BSOs already exists with the INTEL-FS Spiral 1 software. This implementation is using Elasticsearch for identifying BSOs. In Spiral 2 this function will have to be extended to find additional BSO types.

[FBE-55]   The rule set for identifying existing BSOs shall be extendable and configurable through configurations (i.e. not requiring SW re-build).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-56]   The dictionary matching shall implement Fuzzy Search techniques (like Levenshtein, SoundEx, and Metaphone) to be able to identify existing BSOs that are differently spelled in the report texts.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-57]   The dictionary matching shall implement the NEAR search-operator (e.g. this will allow a person to be found even if the raw text introduces a new/ unknown middle name for a person).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.8   ORBAT Management Service

[59]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::ORBAT package.

3.1.8.1   API

[FBE-58]   The ORBAT Management Service shall through the OData REST API support all IIE access actions on ORBATs (for an authorized client) including Basic Intel ORBAT - NATO::JISR::Staff::ORBAT package, Ballistic Missile ORBAT - NATO::JISR::Staff::ORBAT::BMORBAT package, and Electromagnetic ORBAT: NATO::JISR::Staff::ORBAT::EOBORBAT package.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-59]   The ORBAT Management Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 28] and [US 29] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-60]   The ORBAT Management Service API shall support uploading of one or many attachments to an ORBAT.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-61]   The ORBAT Management Service shall after a create, update or delete change to a ORBAT, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.9 Intel-FS Spiral 1 BSO Migration Service

[60]   The purpose of this service is to migrate BSO and BSR data from INTEL-FS Spiral 1 into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.9.1 Extract, transform, load BSO data

[FBE-62]   The INTEL-FS Spiral1 BSO Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new BSO/ BSR data. It shall be possible through a configurable filter setting to filter the BSOs/ BSRs that are extracted from INTEL-FS Spiral1.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-63]   The INTEL-FS Spiral1 BSO Migration Service shall transform the extracted BSO/ BSR data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-64]   The INTEL-FS Spiral1 BSO Migration Service shall identify associations to other IIEs in the extracted BSO/ BSR data and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-65]   The INTEL-FS Spiral1 BSO Migration Service shall through inspection of the extracted BSO/ BSR data identify ORBATs and transform the ORBAT data into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed ORBATs into the I2BE through the ORBAT Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-66]   Using this ETL process, it shall be possible to migrate all BSO data and all ORBAT information, without any data loss, from INTEL-FS Spiral 1 into the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.10 ISR Organization Service

[61]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::IRMCM::Organisation package.

3.1.10.1 API

[FBE-67]   The ISR Organization Service shall through the OData REST API support all IIE access actions on ISR organizations (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-68]   The ISR Organization Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 58] through [US 61] and [US 63] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-69]   The ISR Organization Service shall after a create, update or delete change to any ISR organization data, post an event message to the SOA Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.11 Targets Service

[62]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::Target package.

3.1.11.1 API

[FBE-70]   The Target Service shall through the OData REST API support all IIE access actions on target data (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-71]   The Target Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 30], [US 31] and [US 32] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-72]   The Target Service API shall support uploading of one or many attachments to the target-related IIEs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-73]   The Targets Service shall after a create, update or delete change to target data, post an event message to the SOA & IdM Platform as a notification that a change

has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-74]   The Targets Service shall manage Candidate No-strike BSOs (as per [INTEL-FS2-InformationMode] NATO::JISR::Staff::Target).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.12 Intel-FS Spiral 1 Target Data Migration Service

[63]   The purpose of this service is to migrate target data from INTEL-FS Spiral 1 into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.12.1 Extract, transform, load target areas

[FBE-75]   The INTEL-FS Spiral1 Target Data Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new target data. It shall be possible through a configurable filter setting to filter the target data that are extracted from INTEL-FS Spiral1.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-76]   The INTEL-FS Spiral1 Target Data Migration Service shall transform the extracted target data into a format that is compliant with the OData REST API implemented by the Target Service and load the transformed target data into the I2BE through the Target Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-77]   The INTEL-FS Spiral1 Target Data Migration Service shall identify associations to other IIEs in the extracted target data and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-78]   Using this ETL process, it shall be possible to migrate all target information, without any data loss, from INTEL-FS Spiral 1 into the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.13 Overlays Service

[64]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Metadata package.

3.1.13.1 API

[FBE-79]   The Overlays Service shall through the OData REST API support all IIE access actions on overlays (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-80]   The Overlays Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 34] and [US 35] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-81]   The Overlays Service shall after a create, update or delete change to an overlay, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.14 Intel-FS Spiral 1 Overlays Migration Service

[65]   The purpose of this service is to migrate overlays from INTEL-FS Spiral 1 into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.14.1 Extract, transform, load overlays

[FBE-82]   The INTEL-FS Spiral1 Overlays Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new overlays. It shall be possible through a configurable filter setting to filter the overlays that are extracted from INTEL-FS Spiral1.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-83]   The INTEL-FS Spiral1 Overlays Migration Service shall transform the extracted overlays into a format that is compliant with the OData REST API implemented by the Overlay Service and load the transformed overlays into the I2BE through the Overlay Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-84]   The INTEL-FS Spiral1 Overlays Migration Service shall identify associations to other IIEs in the extracted overlays and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-85]   Using this ETL process, it shall be possible to migrate all overlays, without any data loss, from INTEL-FS Spiral 1 into the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.15 Intelligence Requirements (IR) Management (IRM) Service

[66]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::IRMCM::IRM package.

3.1.15.1 API

[FBE-86]   The IRM Service shall through the OData REST API support all IIE access actions on IRM data (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-87]   The IRM Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 47], and [US 64] through [US 72] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-88]   The IRM Service shall after a create, update or delete change to IRM data, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-89]   The IRM Service API shall enable clients to manage a distributed RFI process (through the underlying choreography tasking message mechanism) that includes starting and stopping a request, forwarding the request to other ONs for action (or for information), etc.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.16 Intel-FS Spiral 1 IRM Data Migration Service

[67]   The purpose of this service is to migrate IRM data from INTEL-FS Spiral 1 into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.16.1 Extract, transform, load IRM data

[FBE-90]   The INTEL-FS Spiral1 IRM Data Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new IRM data. It shall be possible through a configurable filter setting to filter the target data that are extracted from INTEL-FS Spiral1.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-91]   The INTEL-FS Spiral1 IRM Data Migration Service shall transform the extracted IRM data into a format that is compliant with the OData REST API implemented by the IRM Service and load the transformed IRM data into the I2BE through the IRM Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[68]   Note: The transform will have to map between the INTEL-FS Spiral 1 RFI request-response protocol information (including its RFI forwarding mechanism) and the INTEL-FS Spiral 2 information structures needed for managing the RFI requesting process (i.e. choreography tasking message "ledger" as defined by the [INTEL-FS2-IM]).

[FBE-92]   The INTEL-FS Spiral1 IRM Data Migration Service shall identify associations to other IIEs in the extracted target data and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-93]   Using this ETL process, it shall be possible to migrate all IRM information (i.e. ICPs, indicators, RFIs, and RFI Responses), without any data loss, from INTEL-FS Spiral 1 into the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.17 Search Service

3.1.17.1 API

[FBE-94]   The Search Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 8], [US 48], [US 49], and [US 50] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-95]   The Search Service shall expose its functionalities though a REST API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-96]   The Search Service shall have support for saving and managing (create, read, update, delete, rename) search criteria as named searches. The named searches can be private to the client (security principal) or public (available to all users).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-97]   The Search Service shall constrain the search result set to match the policy for the particular client's (security principal) privileges (i.e. the client shall never receive search results that he/ she is not authorized to access).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.17.2 Searchable data

[FBE-98]   The Search Service shall support searching against all metadata attributes and on all IIE types.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-99]   The Search Service shall index and support full-text searches against all products files, all IIE attachments of textual type and all IIE metadata including inner objects and BSO status reports and choreography task messages (CTM).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-100]   The Search Service shall support searches against soft-deleted data and IIEs in different workflow state (see PublishedStatusType in [INTEL-FS2-IM]).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-101]   The Search Service shall never return search results for hard-deleted IIEs (this may require search re-indexing whenever an IIE is hard-deleted).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.17.3 Search engine

[FBE-102]   The Search Service shall support matching against strings as exact matches, and as pattern matches (using wildcards and a "LIKE operator").

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-103]   The Search Service shall support fuzzy matches (e.g. using the Levenshtein distance, and/ or the Soundex algorithm, and/ or Metaphone algorithm).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-104]   The Search Service shall support the NEAR (proximity) operator with client specified maximum distance between search tokens.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-105]   The Search Service shall support logical operators ('AND', 'OR', 'NOT' including grouping of logical expressions using parenthesis).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-106]   The Search Service shall support numerical equality test, greater than and smaller than tests, and timestamp tests (earlier than, within time window, later than).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-107]   The Search Service shall have support for geospatial searches.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-108]   The Search Service shall support geospatial coverage queries with standard geospatial primitives and operators including testing for a point being inside or outside an area (ellipse, rectangle, polygon, etc.)

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-109]   The Search Service shall support client applications in implementing facetted search based on classifications derived from the [INTEL-FS2-IM].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[69]   From https://en.wikipedia.org/wiki/Faceted_search: Faceted search is a technique which involves augmenting traditional search techniques with a faceted navigation system, allowing users to narrow down search results by applying multiple filters based on faceted classification of the items

[FBE-110]   The Search Service shall implement document clustering based on content of attachment and IIE metadata. The Search Engine shall have support for grouping the search results into different categories.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[70]   From https://en.wikipedia.org/wiki/Document_clustering: Document clustering (or text clustering) is the application of cluster analysis to textual documents. It has applications in automatic document organization, topic extraction and fast information retrieval or filtering.

[FBE-111]   The Search Service shall have support for synonym searches using configurable synonym rules (preferably using search-time synonym analysis).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[71]   Synonym analysis can be done at index-time or at search-time. Analysis at index time have performance advantages, but will require re-indexing whenever the synonym rules are changed, and that is why search-time synonym analysis is believed to be the preferred option.

[FBE-112]   The Search Service shall have support for returning search results as metadata and also text-snippets where the search token was found where the search token is tagged (to enable the client application to highlight the token in context of the document fragment it was found).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.18 Named Collections Service

3.1.18.1 API

[FBE-113]   The Named Collections Service shall through the OData REST API enable clients to group IIEs together as named collections where such named collections can be created, updated, and deleted (as required by for instance the user story [US 58]).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-114]   The Named Collections Service shall have support private named collections and shared public collections.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.1.19 Notification Service

3.1.19.1 API

[FBE-115]   The Notification Service shall implement server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 9], [US 12], and [US 14] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-116]   The Notification Service shall enable clients to register subscriptions in the form of a search criteria with the identification of the subscriber, a subscription channel/ queue on the SOA & IdM Platform, and a subscription identifier/ tag. The Notification Service shall dynamically detect when the search criteria is fulfilled, and send the search result on the specified subscription channel with the subscription identifier/ tag and the subscriber identification.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-117]   The Notification Service shall enable clients to register subscriptions in the form of a search criteria with the identification of the subscriber, an email address, and a subscription identifier/ tag. The Notification Service shall dynamically detect when the search criteria is fulfilled, and send the search result by email to the specified recipient with the subscription identifier/ tag.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-118]   The Notification Service shall enable clients to delete/ de-register subscriptions.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-119]   The Notification Service shall include a broadcast message function enabling (authorized) clients to push broadcast messages to all clients of the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[72]   The broadcast function can be used by the i2BE System Administrator to inform users of planned outages etc.

3.2   Backend services - Phase 2

3.2.1   I2BE to I2BE Synchronization Service

[73]   For availability and resilience reasons, it might be required to run multiple instances of the I2BE deployed to geographically dispersed data centres. In such scenarios, the multiple I2BE instances need to be synchronized so the same information/ content is available in all instances.

[74]   The synchronization may take place over SATCOM links and in these cases the synchronization software needs to be able to handle TCP communication with high latency (long round-trip delay times).

[75]   The synchronization between I2BE instances will also have to have support for air-gapped export/ import (for instance to move data between different network security domains).

3.2.1.1   General synchronization requirements

[FBE-120]   The I2BE to I2BE Synchronization Service shall exchange data between I2BE instances so that each I2BE instance has the same replica.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-121]   It shall be possible, through configuration settings, to filter the type of data to be synchronized between I2BE instances (by IIE type, releasability/ dissemination constraints, location and time of information, etc.) and it shall be possible to constrain product files and attachment files that can be synchronized (typically by defining a maximum file size).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-122]   The I2BE to I2BE Synchronization Service shall implement checks preventing circular replication situations (avoiding using unnecessary bandwidth), and it shall prevent creating duplicate entries in the repositories.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-123]   The I2BE to I2BE Synchronization Service shall log information about data transferred between I2BE instances enabling full audit trail of dissemination of I2BE data.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.1.2   Direct synchronization

[FBE-124]   The I2BE to I2BE Synchronization Service shall support different synchronization configurations including point-to-point, one-to many, many-to-one, many-to-many transfers.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-125]   The synchronization service shall work over high-speed/ low-latency networks as well as over high latency SATCOM links where the latter may need special Transmission Control Protocol (TCP) tuning.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-126]   The I2BE to I2BE Synchronization Service shall be able to handle cases where one of the I2BE instances is offline for a long period of time. The synchronization function shall identify the correct resume-point so that synchronicity can be achieved once the offline I2BE comes online. An example of a paused/ resumed synchronization could be when an I2BE instance is running on a ship with no network connection.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.1.3   Air-gapped synchronization

[FBE-127]   The I2BE to I2BE Synchronization Service shall support air-gapped import/ export through configurable export "drop point" and import "pull point". The exporting I2BE shall in this case keep track of what has previously been exported to the receiving I2BE such that each incremental export only contains previously un-exported data.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-128]   The data that is exchanged through the synchronization shall be wrapped in an "electronic envelope" that contains metadata on the data set to be synchronized. The envelop metadata attributes shall include the highest security classification and the most restrictive releasabilty constraint of the data within the data set.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.2   Presentation-conditioning Service

3.2.2.1   API

[FBE-129]   The Presentation-conditioning Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 51] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-130]   The Presentation-conditioning Service shall implement a function that - upon a client request - extracts the images and the associated metadata from STANAG 4545 files and return to the client the images in a browser-supported format (e.g. JPEG) and all the image metadata (in XML format). This functionality shall be available through a REST API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-131]   The Presentation-conditioning Service shall include (see Note below) a video conditioning service that implements Dynamic Adaptive Streaming over HTTP (DASH), i.e. MPEG-DASH (ISO/IEC 23009-1:2012) for streaming video and STANAG 4609 metadata to web browser client applications.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[76]   Note: The software for this functionality will be provided as Purchaser Furnished Item (PFI) source code and the work will be to include and adapt this PFI to run within the Presentation-conditioning Service. The PFI source code could possible also be used in support of [FBE-31].

3.2.3   Data Analytics Service

3.2.3.1   API

[FBE-132]   The Data Analytics Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 53], [US 54], [US

56] and [US 57] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-133]   The Data Analytics Service shall expose its functionalities though a REST API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-134]   The Data Analytics Service shall support common graph analytic functions by exposing a graph query language (preferably compliant with the emerging Graph Query Language (GQL) standard) through the REST API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-135]   The Data Analytics Service shall have support for saving and managing (create, read, update, delete, rename) graph query criteria as named queries. The named graph queries can be private to the client (security principal) or public (available to all users).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-136]   The Data Analytics Service shall have support for saving and managing (create, read, update, delete, rename) specific analysis and the analysis results in containers file (e.g. zip file). The analysis file shall be able to store the queries and filters applied to the I2BE repository to define and constrain the data set to be used for the analysis, miscellaneous text segments/ reports (e.g. as Microsoft Word file) describing analysis findings, images/ screenshots, and other client requested files (e.g. layout information for analysis views). The analysis files shall be private to the client (security principal).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-137]   The Data Analytics Service shall constrain the graph query result set to match the client's (security principal) privileges (e.g. the client shall never receive a graph query results that he/ she is not authorized for).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.3.2   Data analytics

[FBE-138]   The Data Analytics Service shall have support for synonym searches using configurable synonym rules.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-139]   The Data Analytics Service shall include centrality function, for a specified set of nodes (IIEs), to support calculation of Betweeness Centrality, Closeness Centrality, Degree Centrality, and Eigenvector Centrality.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-140]   The Data Analytics Service shall include a shortest path function that for two nodes (IIEs) calculate the shortest path between them.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-141]   The Data Analytics Service shall include a nodes similarity function that compares a set of nodes based on the nodes they are connected to (i.e. two nodes are considered similar if they share many of the same neighbours).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-142]   The Data Analytics Service shall include a function for generating geo-referenced heat maps in a common format (e.g. in KML). The heat maps generation shall be possible for any IIE type with temporal and spatial attributes. Two types of heat maps shall be supported: frequency-based and concentration-based.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-143]   The Data Analytics Service shall have support for calculating intersections between one or many nodes and one or many Geospatial and Features and report whether nodes are inside or outside the specified areas. Supported area types shall include circles/ ellipse, rectangles, and polygons.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.4   Collection Requirement (CR) Management (CRM) Service

[77]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::IRMCM::CM:CRM package.

3.2.4.1   API

[FBE-144]   The CRM Service shall through the OData REST API support all IIE access actions on CRM data (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-145]   The CRM Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 47], and [US 74] through [US 79] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-146]   The CRM Service shall after a create, update or delete change to CRM data, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-147]   The CRM Service API shall enable clients to manage a distributed CR requesting process (through the underlying choreography tasking message mechanism) that

includes submitting and stopping a request, forwarding the request to other ONs for action (or for information), etc.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.4.2   Priority scheme calculation

[FBE-148]   The CRM Service shall calculate the requirement ranking and scores for a set of CRs based on the chosen prioritization scheme. The ranking and score shall be available for clients through the OData client API.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.4.3   Transformation of CRs to NVG

[FBE-149]   The CRM Services shall, upon a client request, transform a set of client specified CRs, transform the set of CRs with all relevant attributes to the [NVG] format and return the transformed data as a [NVG] file to the client.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.5   Collection Operations Management (COM) Service

[78]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::IRMCM::CM:COM package.

3.2.5.1   API

[FBE-150]   The COM Service shall through the OData REST API support all IIE access actions on COM data (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-151]   The COM Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 82] through [US 87] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-152]   The COM Service shall after a create, update or delete change to COM data, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-153]   The COM Service API shall enable clients to manage a distributed COM tasking process (through the underlying choreography tasking message mechanism).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.6   JIPOE Service

[79]   The information to be managed by this service is identified in the [INTEL-FS2-IM] in the
            NATO::JISR::Staff::JIPOE package and in the NATO::BMD::Staff::JIPOE package.

3.2.6.1   API

[FBE-154]   The JIPOE Service shall through the OData REST API support all access actions
            on JIPOE-type IIEs (for an authorized client).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-155]   The JIPOE Service shall implement all the server-side functionality (i.e. anything
            not user-interface related) to fulfil the user stories [US-36] through [US-46] with
            backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-156]   The JIPOE Service shall after a create, update or delete change to any JIPOE-type
            IIE, post an event message to the SOA & IdM Platform as a notification that a
            change has occurred where the event message carry information on the type of
            IIE, identification of the changed IIE, and the type of change.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-157]   The JIPOE services shall provide a service for creating and managing (update and
            delete) named multi-criteria comparison rule sets.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.2.7   Terrain & Mobility Analysis Service

[80]   Note: Within this section the Terrain & Mobility Analysis Service is, for readability, generally
            referred to simply as "the Service".

3.2.7.1   Generating terrain & mobility analysis overlays

[FBE-158]   The Terrain & Mobility Analysis Service shall implement a Terrain Analysis function
            that upon a client request generates one or several overlays that depicts the areas
            where BM Units can reach and from which BM Units can operate. The service shall
            use the input parameters as defined in the table below and matching against
            geographical data calculate the possible operational areas (e.g. by greying out the
            no-go areas).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 3-2 Parameters provided by client when requesting a Terrain Analysis

Input Parameter	Remarks
Coverage area	Geographical area defined by a BMOA to constrain the analysis
Vehicle weights, heights, and widths	Maximum vehicle weights, heights, and widths from BM TECHINT to be matched against road network constraints (e.g. bridges, tunnels, small roads, etc.)

Vehicle turning radius	
Vehicle off-road ability/ Land use	This should include information on type of terrain where the vehicles can go off-road (e.g. sand, snow, wetland, etc.)
Maximum off-road distance	E.g. measured in kilometers
Slope limitations (degrees)	Maximum slope the vehicles can travel from BM TECHINT to be matched against road network data and terrain elevation data (in case the vehicles can go off-road)

[81]   A Mobility Analysis is a variant of the Terrain Analysis and will most likely involve similar calculations, but taking into account the relocation speed of the vehicle. The difference is that while the Terrain Analysis focus on where a BM Unit can travel (typically within a BMOA), the focus of the Mobility Analysis is to detect how far a BM unit can travel as a function of time.

[FBE-159]   The Service shall implement a Mobility Analysis function that upon a client request generates one or several overlays that depicts how far the BM Units can reach for a set of time intervals (e.g. within 1 hour, within 1 day, within a week etc.) as illustrated in the figure below (in this example the ranges are in minutes). The function shall use the input parameters as defined in the table below and matching against geographical data calculate the mobility ranges. The coloured range areas shall only depict areas that is accessible by the vehicles from the starting position (e.g. if a bridge is not dimensioned to support the vehicles, the mobility analysis shall show that the vehicles cannot cross the bridge).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Figure 3-1 Terrain and Mobility analysis with ranges

Table 3-3 Parameters provided by client when requesting a Mobility Analysis

Input Parameter	Remarks
Start position	Geographical location from which the BM Unit will start the movement
Time increments	In unit and extent (e.g. in 5 hour increments)
Vehicle relocation speed on roads	Average/ expected road speed of vehicle from BM TECHINT
Vehicle relocation speed off roads	Average/ expected off-road speed
Vehicle weights,	Maximum vehicle weights, heights, and widths from BM TECHINT

heights, and widths	to be matched against road network constraints (e.g. bridges, tunnels, small roads, etc.)
Vehicle off-road ability/ Land use	This should include information on type of terrain where the vehicles can go off-road (e.g. sand, snow, wetland, etc.)
Maximum off-road distance	E.g. measured in kilometers
Slope limitations (degrees)	Maximum slope the vehicles can travel from BM TECHINT to be matched against road network data and terrain elevation data (in case the vehicles can go off-road)

[FBE-160] The Service shall be implemented as OGC Web Processing Services (WPS).
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[82] Note: The Terrain Analysis WPS and the Mobility Analysis WPS should be implemented for being hosted within the NATO CoreGIS system

[FBE-161] The JIPOE services shall support collaboration on Courses of Action artefacts prior to these being approved and published.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

3.3 System Administration (SysAdm) tool

[83] For the operations and maintenance of the I2BE a System Administration (SysAdm) tool will be required.

[84] The SysAdm tool can include off-the-shelf and/ or customized applications with dedicated user interfaces for the administration tasks, and/ or include a number command line applications/ scripts.

[85] Note: In the current INTEL-FS Spiral 1, the usage of PowerShell scripts is often the preferred way to efficiently execute system administration/ maintenance tasks.

[GBE-81] The SysAdm tool shall be using English as language for all user interaction.
Verification: Demonstration

[GBE-82] The SysAdm tool shall comply with the NFRs as defined in the table below.
Verification: Demonstration

Table 3-4 Applicable NFRs (SysAdm tool)

Qualities	NFRs
Co-existence	[NFR-13]

3.3.1 Configurations and setup management functions

3.3.1.1 Manage data repositories

[FBE-162] The SysAdm tool shall enable an Authorized Administrator to create many data repositories where each repository is identified by a name (e.g., 'Exercise XYZ')).
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-163]   The SysAdm tool shall enable an Authorized Administrator to archive a data
repository, be able to restore a previously archived data repository (without any
data loss or data alteration), and be able to delete a data repository.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.1.2   Manage organizational nodes (ON)

[FBE-164]   The SysAdm tool shall enable an Authorized Administrator to create ONs and to
configure the ON Zulu offset to ensure that timestamps are correctly captured at
the ON.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[86]   The Zulu Offset will be used as required to compute the correct Zulu time (i.e., Greenwich Mean
Time) from local time settings and to display the correct local time (as required) computed from
the Zulu times recorded in the data.

3.3.1.3   Manage report templates

[FBE-165]   The SysAdm tool shall enable an Authorized Administrator to create and update
report templates to provide users with templates for producing reports.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-166]   The SysAdm tool shall enable an Authorized Administrator to create, update,
delete, and name global search criteria that will be accessible to users to use for
their searches.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.1.4   Manage synonym rules

[FBE-167]   The SysAdm tool shall enable an Authorized Administrator to update synonym
rules used for searching and graph querying.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.1.5   Manage gazetteers

[FBE-168]   The SysAdm tool shall enable an Authorized Administrator to add or delete a
gazetteer for an ON, and to specify the default gazetteer for the ON.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-169]   The SysAdm tool shall enable an Authorized Administrator to create, edit and
maintain gazetteer information, including maintaining gazetteer entries (i.e. Place
Name, Country, Region, Sub-region, Location).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-170]   The SysAdm tool shall enable an Authorized Administrator to import a gazetteer from a file.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-171]   The SysAdm tool shall enable an Authorized Administrator to configure the I2BE to use gazetteer with fictitious nation data sets, including fictitious country names and fictitious country codes.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.2   Domain-values management functions

[87]   Note: The different ONs will have different needs for domain values and hence the domain value set is customized for each ON.

3.3.2.1   Create/ update domain values

[FBE-172]   The SysAdm tool shall enable an Authorized Administrator to centrally manage domain tables and domain values for all ONs. This includes the ability to create new domain values, and configuring which domain values that shall be hidden/ unhidden for individual ONs. Note: The latter part shall ensure that the acceptance criteria of user story [US 5] is fulfilled.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-173]   The SysAdm tool shall enable an Authorized Administrator to view all domain values in table views where the hidden/ unhidden state of each value for each of the ONs are displayed. The Authorized Administrator shall be able to sort and filter these table views, and be able to make changes to one or many values in the table in a single operation.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-174]   The SysAdm tool shall enable an Authorized Administrator or Authorized Reference Data Manager to search for and filter domain values to ease the maintenance work (find and update).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.2.2   Import/ export of domain values

[FBE-175]   The SysAdm tool shall enable an Authorized Administrator to import domain values from files in a structured file format and export domain values to files in structured file formats.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.2.3   Synchronization with Information Model

[FBE-176]   The SysAdm tool shall have support for synchronizing updates to the domain
tables and domain values with the Information Model (see [INTEL-FS2-IM]).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.3   Content management functions

3.3.3.1   Import from files

[FBE-177]   The SysAdm tool shall enable an Authorized Administrator to import an ORBAT
(e.g. an ISR ORBAT) consisting of Actors and Assets/ Systems with subordination
information from a set of comma separated files (CSV), XML or JSON, into a
specified data set (Operational Exercise, Training, etc.). The tool shall allow the
System Administrator to map columns in the files to the appropriate IIE attribute
and automatically extract the BSOs representing Units, the Assets/ Systems, and
extract the relationships between the BSOs. Ultimately, the tool shall allow the
System Administrator to verify that there is no conflict with the information already
in the I2BE data set and subsequently "bulk import" the entire ORBAT and
associated Units and Assets/ Systems. In case the validation of the data prior to
import finds issue with the data, then the issues shall be identified and reported to
the System Administrator to enable corrective actions.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-178]   The SysAdm tool shall enable an Authorized Administrator to import BSO data,
including relationships between the BSOs, and all BSRs associated with the BSOs
from files in a structured data format into a specified data set (Operational
Exercise, Training, etc.) The tool shall allow the System Administrator to map
elements in the files to the appropriate IIE attribute and automatically extract the
BSOs, their BSRs, and the relationships between the BSOs. Ultimately, the tool
shall allow the System Administrator to verify that there is no conflict with the
information already in the I2BE data set and subsequently "bulk import" all the
BSOs with BSRs and also BSO-BSO relationships. In case the validation of the
data prior to import finds issue with the data, then the issues shall be identified and
reported to the System Administrator to enable corrective actions.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-179]   The SysAdm tool shall enable an Authorized Administrator to import Products from
comma separated files (CSV), XML or JSON, into a specified data set (Operational
Exercise, Training, etc.). The tool shall allow the System Administrator to map
columns in the files to the appropriate IIE attribute and automatically extract the
Product. Ultimately the tool shall allow the System Administrator to verify that there
is no conflict with the information already in the I2BE data set and subsequently
"bulk import" a potentially large set of Products where also the Product
attachments are fetched and pushed into the I2BE data set. In case the validation
of the data prior to import finds issue with the data, then the issues shall be
identified and reported to the System Administrator to enable corrective actions.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-180]   The SysAdm tool shall include an "undo function" that restores the data repository to the state before the bulk upload was executed (i.e. completely removes all the bulk-uploaded items).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.3.2   Delete and undelete

[FBE-181]   The SysAdm tool shall enable an Authorized Administrator to search and filter for soft-deleted entities, and then multi-select and hard-delete (permanently delete) such soft-deleted entities.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.3.3   Backup & restore

[FBE-182]   The SysAdm tool shall enable an Authorized Administrator to configure automatic backup of the entirety of an I2BE instance. It shall be possible to configure the frequency of and/ or time of day incremental backups and full backups.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-183]   The SysAdm tool shall enable an Authorized Administrator to manually command an incremental backup, and to manually command a full backup.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-184]   The SysAdm tool shall enable an Authorized Administrator to fully restore an I2BE instance from backups.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.4   Diagnostics functions

3.3.4.1   Log files

[FBE-185]   The SysAdm tool shall enable an Authorized Administrator to access log created by all I2BE produced Integration Services. (Note: This is particularly important for the audit trail checks of cross domain exchange between I2BE instances).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-186]   The SysAdm tool shall enable the System Administrator to access and inspect/ analyse log data from all the I2BE services.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-187]   The SysAdm tool shall enable an Authorized Administrator to configure the services logging functions (e.g. logging level, log file sizes, log file retention, etc.)

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-188]   The SysAdm tool shall enable an Authorized Administrator to archive log files from each of the I2BE services and I2BE provided Integration Services.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.4.2   Usage and performance indicators statistics

[FBE-189]   The SysAdm tool shall enable an Authorized Administrator to analyse the usage of the I2BE services OData API by accessing usage statistics; e.g. which part of the API is heavily used, which parts are not used much, usage peaks, average number of activation calls, historical trends, etc. The statistical numbers must be separable by access operations (Create, Read, Update, and Delete) and by ONs.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-190]   The SysAdm tool shall enable an Authorized Administrator to analyse the performance of the individual I2BE services. In particular, statistical data measuring the I2BE compliance with the NFR response time requirements shall be available for analysis through the SysAdm tool.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-191]   The SysAdm tool shall enable an Authorized Administrator to specify relevant performance thresholds/ criteria for the services. I.e. thresholds that triggers corrective actions through the Enterprise SMC.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.4.3   Synchronization health check

[FBE-192]   The SysAdm tool shall enable an Authorized Administrator to select any two I2BE instances and perform repository comparisons. It shall be possible check the entire repositories, and it shall be possible with more focussed comparisons limited by IIE type, time window, and other IIE filtering attributes. Any discrepancies in these checks shall be reported by the tool including the option to repair the discrepancy.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

3.3.5   Notification function

3.3.5.1   Broadcasting notification messages

[FBE-193]   The SysAdm tool shall enable an Authorized Administrator to write messages (intended to be read by users) and broadcast them using the I2BE Notification Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4   Integration Service Requirements

4.1   Integration services - I2BE destination

[88]   The focus of the deliverables described in this section is to implement a number of dedicated Integration Services for bringing information into I2BE.

4.1.1   Central Card Catalogue (CCC) Import Service

[89]   The CCC is the mechanism by which the BICES nations are sharing intelligence data. Basically the CCC is a File Transfer Protocol (FTP) server that is exchanging library cards in the [IPIWG] format where the library cards are describing the intelligence products.

4.1.1.1   Extract, transform, load products

[FBE-194]   The CCC Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the CCC for new products (i.e. product metadata, product file, and other attachments). It shall be possible through a configurable filter setting to filter the products that are extracted from the CCC.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-195]   The CCC Import Service shall transform the extracted product metadata into a format that is compliant with the OData REST API implemented by the Products Management Service and load the products (i.e. the metadata, the product file, and any attachments) into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-196]   The CCC Import Service shall identify associations the extracted products are part of, collect additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.1.2   Extract, transform, load RFI data

[FBE-197]   The CCC Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the CCC for new RFI data. It shall be possible through a configurable filter setting to filter the RFI data that are extracted from CCC.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-198]   The CCC Import Service shall transform the extracted RFI data into a format that is compliant with the OData REST API implemented by the IRM Service and load the transformed RFI data into the I2BE through the IRM Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-199]   The Import Service shall identify associations the extracted RFI data are part of, collect additional information on these associations, and transform those

associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.2   ETEE Import Service

[90]   In support of exercises the Education Training Exercise and Evaluation (ETEE) will at scripted times in the exercise provide products to be ingested into INTEL-FS. The expected mechanism for INTEL-FS to receive messages with pre-canned (prepared in advance) products will be through the SOA & IdM Platform.

4.1.2.1   Extract, transform, load products from ETEE

[FBE-200]   The ETEE Import Service shall when receiving a ETEE message (dedicated for INTEL-FS), transform (if required) the information in the message into a format that is compliant with the OData REST API implemented by the Products Management Service and load the transformed products into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.3   NATO CSD IPL Import Service

[91]   The NATO CSD ISR Product Library (IPL) will contain product type data of type documents/ reports, images, and video clips. The interfaces to the NATO CSD IPL are defined by [AEDP-17].

4.1.3.1   Extract, transform, load products

[FBE-201]   The NATO CSD IPL Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the NATO CSD IPL for products or product updates that are not already in the I2BE. It shall be possible through a configurable filter setting to filter the products to be extracted from NATO CSD IPL. Note: in this context 'product' means the product metadata, product file, and all attachments (e.g. related files).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-202]   The NATO CSD IPL Import Service shall transform the extracted product metadata into a format that is compliant with the OData REST API implemented by the Products Management Service and load the products (i.e. the metadata, the product file, and any attachments) into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-203]   The NATO CSD IPL Import Service shall identify associations the extracted products are part of, collect additional information on these associations, and transform those associations into a format that is compliant with the OData REST

API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.4   NATO CSD Geospatial and Features Import Service

[92]   The purpose of this service is to import Geospatial and Features from the NATO CSD into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

4.1.4.1   Extract, transform, load geographical areas

[93]   The NATO CSD implements an OData REST API for accessing its entities. This API (called the JIEService) is described in appendix A.2.1.9 in [NCSD-IWS-SDS].

[FBE-204]   The NATO CSD Geospatial and Features Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD Geospatial and Features Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-205]   The NATO CSD Geospatial and Features Import Service shall be able to extract Geospatial and Features from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-206]   The NATO CSD Geospatial and Features Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for changes to geographic areas of interest (GAOI) in the NATO CSD and upon detecting a GAOI changes, extract the Geospatial and Features from the NATO CSD.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-207]   It shall be possible through a configurable filter setting, to filter the geographic areas that shall be extracted from NATO CSD. The service shall be able to detect Geospatial and Features updates originating from the I2BE and not import those (to prevent export-import loops).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-208]   The NATO CSD Geospatial and Features Import Service shall transform the extracted geographic areas into a format that is compliant with the OData REST API implemented by the Geospatial and Features Service and load the transformed Geospatial and Features into the I2BE through the Geospatial and Features Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-209]   The NATO CSD Geospatial and Features Service shall identify associations the extracted geographic areas are part of, extract additional information on these

associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.5   NATO CSD ISR Organizations Import Service

[94]   The purpose of this service is to import ISR organization from the NATO CSD into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

4.1.5.1   Extract, transform, load ISR organizations

[95]   The NATO CSD implements an OData REST API for accessing its entities. This API is described in appendix A.2.1.9 in [NCSD-IWS-SDS].

[FBE-210]   The NATO CSD Organizations Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD Organizations Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-211]   The NATO CSD ISR Organizations Import Service shall be able to extract ISR organization data from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-212]   The NATO CSD ISR Organizations Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for changes to ISR organizations in the NATO CSD and upon detecting ISR organization changes, extract the ISR organization data from the NATO CSD.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-213]   It shall be possible through a configurable filter setting, to filter the ISR organizations that shall be extracted from NATO CSD. The service shall be able to detect ISR organization data updates originating from the I2BE and not import that data (to prevent export-import loops).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-214]   The NATO CSD ISR Organizations Import Service shall transform the extracted ISR organization data (with all its substructures including ORBAT, units, ISR systems, ISR asset status, command relationships, and locations) into a format that is compliant with the OData REST API implemented by the ISR Organizations Service and load the transformed ISR organization data into the I2BE through the ISR Organizations Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-215]   The NATO CSD ISR Organizations Import Service shall identify associations the extracted ISR organization data are part of, extract additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.6 NATO CSD IRM Data Import Service

[96]   The purpose of this service is to import IRM data from the NATO CSD into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

4.1.6.1 Extract, transform, load IRM data

[97]   The NATO CSD implements an OData REST API for accessing its entities. This API is described in appendix A.2.1.9 in [NCSD-IWS-SDS].

[FBE-216]   The NATO CSD IRM Data Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD IRM Data Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-217]   The NATO CSD IRM Import Service shall be able to extract IRM data (ICP, RFIs, RFI choreography tasking information, and products associated with requirements and RFIs) from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-218]   The NATO CSD IRM Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for all types of changes to IRM data in the NATO CSD and upon detecting IRM data changes, extract the IRM data from the NATO CSD.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-219]   It shall be possible through a configurable filter setting, to filter the IRM data that shall be extracted from NATO CSD. The service shall be able to detect IRM data updates originating from the I2BE and not import that data (to prevent export-import loops).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-220]   The NATO CSD IRM Import Service shall transform the extracted IRM data into a format that is compliant with the OData REST API implemented by the IRM Service and load the transformed IRM data into the I2BE through the IRM Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-221]   The NATO CSD IRM Import Service shall identify associations the extracted IRM data are part of, extract additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.7   NATO CSD CRM Data Import Service

4.1.7.1   Extract, transform, load CRM data

[98]   The NATO CSD implements an OData REST API for accessing its entities. This API is described in appendix A.2.1.9 in [NCSD-IWS-SDS].

[FBE-222]   The NATO CSD CRM Data Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD CRM Data Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-223]   The NATO CSD CRM Import Service shall be able to extract CRM data (CRs, ISR Requests, and ISR Request choreography tasking information) from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-224]   The NATO CSD CRM Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for all types of changes to CRM data in the NATO CSD and upon detecting CRM data changes, extract the CRM data from the NATO CSD.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-225]   It shall be possible through a configurable filter setting, to filter the CRM data that shall be extracted from NATO CSD. The service shall be able to detect CRM data updates originating from the I2BE and not import that data (to prevent export-import loops).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-226]   The NATO CSD CRM Import Service shall transform the extracted CRM data into a format that is compliant with the OData REST API implemented by the CRM Service and load the transformed CRM data into the I2BE through the CRM Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-227]   The NATO CSD CRM Import Service shall identify associations the extracted CRM data are part of, extract additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.8   NATO CSD COM Data Import Service

4.1.8.1   Extract, transform, load COM data

[99]   The NATO CSD implements an OData REST API for accessing its entities. This API is described in appendix A.2.1.9 in [NCSD-IWS-SDS].

[FBE-228]   The NATO CSD COM Data Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD COM Data Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-229]   The NATO CSD COM Import Service shall be able to extract COM data (CXPs, collection tasks, exploitation tasks, and the choreography tasking information) from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-230]   The NATO CSD COM Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for all types of changes to COM data in the NATO CSD and upon detecting COM data changes, extract the COM data from the NATO CSD.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-231]   It shall be possible through a configurable filter setting, to filter the COM data that shall be extracted from NATO CSD. The service shall be able to detect COM data updates originating from the I2BE and not import that data (to prevent export-import loops).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-232]   The NATO CSD COM Import Service shall transform the extracted COM data into a format that is compliant with the OData REST API implemented by the COM Service and load the transformed COM data into the I2BE through the COM Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-233]   The NATO CSD COM Import Service shall identify associations the extracted COM data are part of, extract additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9   APP11-D Reports Import Service

4.1.9.1   Extract, transform, load APP11-D reports

[FBE-234]   The APP11-D Reports Import Service shall be able to receive/ obtain the set of ADatP-3 messages in APP11-D XML format defined in the table below as messages from the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-1 ADatP-3 messages (in APP11-D XML format) to be received

Message	Description	XML message format definition
AEW_MISREP	Airborne Early Warning Mission Report	[APP11D-AEW_MISREP]
AIRINTREP	Air Intelligence Report	[APP11D-AIRINTREP]
ASSESSREP	Commanders Assessment Report	[APP11D-ASSESSREP]
BOMBWARN	Bomb Threat Warning	[APP11D-BOMBWARN]
CIINTREP	Counter-Intelligence and Security Report	[APP11D-CIINTREP]
CIINTSUM	Counter-Intelligence and Security Summary	[APP11D-CIINTSUM]
CISUPINTREP	Counter-Intelligence and Security Supplementary Report	[APP11D-CISUPINTREP]
ENSITREP	Enemy Land Forces Situation Report	[APP11D-ENSITREP]
EVENTREP	Events Report	[APP11D-EVENTREP]
FIRST_HOSTILE_ACT	First Hostile Act Report	[APP11D-FHOSTILEACT]
INCREP	Incident Report	[APP11D-INCREP]
INCSPOTREP	Incident Spot Report	[APP11D-INCSPOTREP]
INTREP	Intelligence Report	[APP11D-INTREP]
INTSUM	Intelligence Summary	[APP11D-INTSUM]
MARINTREP	Maritime Intelligence Report	[APP11D-MARINTREP]

MARINTSUM	Maritime Intelligence Summary	[APP11D-MARINTSUM]
MISREP	Mission Report	[APP11D-MISREP]
OWNSITREP	Own Land Forces Situation Report	[APP11D-OWNSITREP]
PWINTERREP	Prisoner of War Interrogation Report	[APP11D-PWINTERREP]
SUPINTREP	Supplementary Intelligence Report	[APP11D-SUPINTREP]

[100]   As INTEL-FS will be one of the first NATO applications that will be hosted on the SOA & IdM Platform there most likely initially will not be any producers of ADatP-3 APP11-D report messages on the SOA & IdM Platform. To enable testing of the APP11-D Reports Import Services, it will be necessary to implement test functions that produces the ADatP-3 messages as defined in the table above.

[101]   For each of the received APP11-D messages the service will transform the message into a readable report in a PDF file. To make these generated report documents intelligible the XML tags in the reports should be used as contextual labels in the report documents, e.g. <CountryCode>USA</CountryCode> in the message should be presented as "Country Code: USA", etc. in the report PDF file.

4.1.9.1.1   AEW_MISREP

[FBE-235]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-AEW_MISREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-236]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-AEW_MISREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.2   AIRINTREP

[FBE-237]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-AIRINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-238]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-AIRINTREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.3   ASSESSREP

[FBE-239]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-ASSESSREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-240]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-ASSESSREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.4   BOMBWARN

[FBE-241]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-BOMBWARN] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-242]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-BOMBWARN] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.5   CIINTREP

[FBE-243]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-CIINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in

the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-244]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-CIINTREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.1.9.1.6   CIINTSUM

[FBE-245]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-CIINTSUM] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-246]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-CIINTSUM] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.1.9.1.7   CISUPINTREP

[FBE-247]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-CISUPINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-248]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-CISUPINTREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.1.9.1.8   DIR

[FBE-249]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-DIR] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant

with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-250]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-DIR] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.9   ENSITREP

[FBE-251]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-ENSITREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-252]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-ENSITREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.10   EVENTREP

[FBE-253]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-EVENTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-254]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-EVENTREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.11   FIRST_HOSTILE_ACT

[FBE-255]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-FHOSTILEACT] message into a readable PDF file, and also map/

transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-256]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-FHOSTILEACT] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.12   INCREP

[FBE-257]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-INCREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-258]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-INCREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.13   INCSPOTREP Transform and Re-publish Integration Service

[FBE-259]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-INCSPOTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-260]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-INCSPOTREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.14   INTREP

[FBE-261]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-INTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-262]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-INTREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.15   INTSUM

[FBE-263]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-INTSUM] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-264]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-INTSUM] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.16   MARINTREP

[FBE-265]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-MARINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-266]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-MARINTREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.17   MARINTSUM

[FBE-267]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-MARINTSUM] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-268]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-MARINTSUM] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.18   MISREP

[FBE-269]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-MISREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-270]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-MISREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.19   OWNSITREP

[FBE-271]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-OWNSITREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently

load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-272]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-OWNSITREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.20   PWINTERREP

[FBE-273]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-PWINTERREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-274]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-PWINTERREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.9.1.21   SUPINTREP

[FBE-275]   The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-SUPINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-276]   To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-SUPINTREP] messages and publish/ send them on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.10 Air ORBAT Import Service

4.1.10.1 Extract, transform, load ORBATAIR

[FBE-277]   The Air ORBAT Import Service shall when receiving a [APP11D-ORBATAIR] message on the SOA & IdM Platform, transform the message into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed Air ORBAT into the I2BE through the ORBAT Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-278]   To support testing, the Air ORBAT Import Service shall also include a separate test function that fully populates and send [APP11D-ORBATAIR] messages on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.11 Land ORBAT Import Service

4.1.11.1 Extract, transform, load ORBATLAND

[FBE-279]   The Land ORBAT Import Service shall when receiving a [APP11D-ORBATLAND] message on the SOA & IdM Platform, transform the message into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed Land ORBAT into the I2BE through the ORBAT Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-280]   To support testing, the Land ORBAT Import Service shall also include a separate test function that fully populates and send [APP11D-ORBATLAND] messages on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.12 Maritime Task Organization Import Services

[102]   Maritime C2 information is obtained through the Maritime C2 Information Exchange [MARIX] RESTful services.

[103]   Note:
   (1)   The Maritime ORBAT is referred to as Task Organization.
   (2)   INTEL-FS2 will be the authoritative data source for the red ORBAT, but it will also need to import blue ORBAT data originating from C2 systems.

4.1.12.1 Extract, transform, load Maritime Task Organization

[FBE-281]   The Maritime Task Organization Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the [MARIX] services for updates to the maritime task organization. It shall be possible through a configurable filter

setting to filter the maritime task organization data to be extracted through the [MARIX] services.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-282]   The Maritime Task Organization Import Service shall transform the extracted maritime task organization data into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed maritime task organization data into the I2BE through the ORBAT Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.13 NJTS Import Service

4.1.13.1 Extract, transform, load NJTS target data

[FBE-283]   The NJTS Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the NJTS for new target data (including target lists and target folders with all their content). In the case that NJTS publishes event messages to the SOA & IdM Platform whenever there is a change to its target data, then the NJTS Import Service shall subscribe to the NJTS messages to obtain the target data and/ or to trigger the polling of the target data. It shall be possible through a configurable filter setting to filter the target data to be extracted from NJTS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[104]   The NJTS system does not currently exist. According to NATO acquisition plans, the NJTS system will be delivered in the same timeframe as INTEL-FS Spiral 2. The NJTS interface is currently unspecified, but is expected to be implemented with a RESTful API.

[FBE-284]   The NJTS Import Service shall transform the extracted target data into a format that is compliant with the OData REST API implemented by the Target Service and load the transformed target data into the I2BE through the Target Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-285]   The NJTS Import Service shall identify associations to other IIEs in the extracted target data and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.14 MIDB Import Service

[105]   The Modernized Integrated Database (MIDB) contains different types of battlespace objects that after mediations will be imported into INTEL-FS2.

[106]   Note: The MIDB interface to be used for this integration is not yet defined.

4.1.14.1 Extract, transform, load MIDB Unit and Equipment Holdings data

[FBE-286]   The MIDB Import Service shall at regular intervals (where the interval frequency shall be configurable), or at discrete manually controlled points in time, poll the MIDB for new BSO data of type Units and Equipment Holdings. It shall be possible through a configurable filter setting to filter the BSO data to be extracted from MIDB (filtering options shall include timestamps, and location).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-287]   The MIDB Import Service shall transform the extracted Unit and Equipment Holdings data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.14.2 Extract, transform, load MIDB Places/ Facilities and Equipment Holdings

[FBE-288]   The MIDB Import Service shall at regular intervals (where the interval frequency shall be configurable), or at discrete manually controlled points in time, poll the MIDB for new BSO data of type Places/Facilities and Equipment Holdings. It shall be possible through a configurable filter setting to filter the BSO data that are extracted from MIDB (filtering options shall include timestamps, and location).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-289]   The MIDB Import Service shall transform the extracted Places/Facilities and Equipment Holdings data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.14.3 Extract, transform, load MIDB Events

[FBE-290]   The MIDB Import Service shall at regular intervals (where the interval frequency shall be configurable), or at discrete manually controlled points in time, poll the MIDB for new BSO data of type Event. It shall be possible through a configurable filter setting to filter the BSO data that are extracted from MIDB (filtering options shall include timestamps, and location).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-291]   The MIDB Import Service shall transform the extracted Events data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.14.4 Extract, transform, load MIDB Persons

[FBE-292]   The MIDB Import Service shall at regular intervals (where the interval frequency shall be configurable), or at discrete manually controlled points in time, poll the MIDB for new BSO data of type Person. It shall be possible through a configurable filter setting to filter the BSO data that are extracted from MIDB (filtering options shall include timestamps, and location).

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-293]   The MIDB Import Service shall transform the extracted Persons data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.15 Asset Lists Import Service

4.1.15.1 Extract, transform, load asset lists

[FBE-294]   The Asset Lists Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the AirC2IS Asset List Services (see [AirC2IS ICD]) for updates to the asset lists. It shall be possible through a configurable filter setting to filter the asset list data to be extracted from AirC2IS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-295]   The Asset Lists Import Service shall transform the extracted asset list data into a format that is compliant with the OData REST API implemented by the JIPOE Service and load the transformed maritime task organization data into the I2BE through the JIPOE Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.16 Electronic Order of Battle (EOB) Import Service

[107]   EOB and emitter TECHINT data is maintained by the NEDB-NG system. Information from NEDB-NG will be pulled at regular intervals and imported into INTEL-FS2 as encyclopaedic data (i.e. as "read-only" data).

[108]   INTEL-FS will express EOB and emitter TECHINT data as specialised types of BSOs: Installations and facilities are specialisations of BSO places; electromagnetic emitters and platforms are specialisations of BSO equipment; electromagnetic parameters/ technical data (TECHINT) are specialisations of BSO equipment type

4.1.16.1 Extract, transform, load EOB data

[FBE-296]   The EOB Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the NEDB-NG system (see [CEOB-EF]) for new EOB

data. It shall be possible through a configurable filter setting to filter the EOB data that are extracted from NEDB-NG.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-297]   The EOB Import Service shall transform the extracted EOB data into a BSO and BSO status report format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed EOB data into the I2BE through the BSO Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-298]   The INTEL-FS Spiral1 BSO Migration Service shall through inspection of the extracted EOB data construct electronic ORBATs and transform the ORBAT data into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed electronic ORBAT into the I2BE through the ORBAT Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.1.17 BM Firing Event Import Service

[109]   The Networked Interoperable Real-time Information Services (NIRIS) Web Services enables clients to access tactical data that NIRIS has obtained from tactical data link. Included in the NIRIS Web Services is a RESTful Track Service (see chapter 5 in [NIRIS-WS-ICD]) that provides tracks in JSON format via the HTTP REST protocol. The RESTful Track Service includes a track filtering mechanism implemented in a RESTful Query Language (RSQL).

4.1.17.1 Extract, transform, load NIRIS missile track data

[FBE-299]   The BM Firing Event Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the NIRIS RESTful Track Service for missile launch tracks, missile in-flight tracks, and missile impact tracks. It shall be possible through a configurable filter setting to filter the missile track data to be extracted from NIRIS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-300]   The BM Firing Event Import Service shall combine missile launch track data, missile in-flight track data, and missile impact data, and transform this combined data into a historical firing event format (see NATO::BMD::Battlespace::Action::Event::HFE in the [INTEL-FS2-IM]) that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed missile track data into the I2BE through the BSO Management Service.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.2 Integration services – I2BE

[309]   The focus of the deliverables described in this section is to implement a number of dedicated Integration Services for exporting/ sharing information produced within I2BE to external applications and services.

4.2.1   Central Card Catalogue (CCC) Export Service

4.2.1.1   Export of products to CCC

[FBE-301]   The CCC Export Services shall detect new products and updates to existing products, and then read the product information through the Product Management Services OData REST API, transform the product information (that includes embedding product files) to the [IPIWG] format and post the information to the CCC.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-302]   It shall be possible to specify and refine filters for which products to export from I2BE to the CCC. The filtering options shall include filtering on data set (operational, training, exercise, etc.), geographical coverage areas, temporal data, source/ publisher, and classification/ releaseability, etc.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.2.1.2   Export of RFI data to CCC

[FBE-303]   The CCC Export Services shall detect new RFIs and RFI responses, and updates to existing RFI and RFI responses, and then read the RFI and RFI responses information through the IRM Service OData REST API, transform the information (that includes embedding any attachments) to the [IPIWG] format and post the information to the CCC.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-304]   It shall be possible to specify and refine filters for which RFIs and RFI responses to export from I2BE to the CCC. The filtering options shall include filtering on data set (operational, training, exercise, etc.), geographical coverage areas, temporal data, source/ publisher, and classification/ releaseability, etc.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.2.2   NATO CSD Export Service

[110]   The NATO Coalition Shared Data (CSD) contains two components that I2BE will export data to: the ISR Product Library (IPL) , and the ISR Workflow Service (IWS)

[111]   The NATO CSD contains a third component, the ISR Streaming Service. The I2BE will not have any integration points with this service.

4.2.2.1   Export of products to NATO CSD IPL

[FBE-305]   The NATO CSD Export Services shall detect new products and updates to existing products, and then read the product information through the Product Management Service OData REST API, transform the product information (that includes embedding product files and other attachments) into a format that is compliant with

the NATO CSD "IntelFS REST API" (see section 5.2.3.3 and appendix A.2.3 in [NCSD-IPL-SDS]), and upload the product to the NATO CSD IPL.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

[FBE-306]   It shall be possible to specify and refine filters for which products to export from I2BE to the NATO CSD IPL. The filtering options shall include filtering on data set (operational, training, exercise, etc.), geographical coverage areas, temporal data, source/ publisher, and classification/ releaseability, etc.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.2.2.2   Export of IRM&CM workflow data to NATO CSD IWS

4.2.2.2.1   Export of geographical areas

[FBE-307]   The NATO CSD Export Services shall detect new or updated Geospatial and Features where the change is originating in the I2BE. The service shall then read the Geospatial and Features through the Geospatial and Features Service OData REST API, transform the data into a format that is compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update Geospatial and Features in the NATO CSD IWS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.2.2.2.2   Export of ISR organization data

[FBE-308]   The NATO CSD Export Services shall detect new or updated ISR organization data where the change is originating in the I2BE. The service shall then read the ISR organization data through the ISR Organization Service OData REST API, transform the data into a format that is compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update ISR organization data in the NATO CSD IWS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.2.2.2.3   Export of IRM data to NATO CSD IWS

[FBE-309]   The NATO CSD Export Services shall detect new or updated IRM data where the change is originating in the I2BE. The service shall then read the IRM data through the IRM Service OData REST API, transform the data into a format that is compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update IRM data in the NATO CSD IWS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.2.2.2.4   Export of CRM data

[FBE-310]   The NATO CSD Export Services shall detect new or updated CRM data where the change is originating in the I2BE. The service shall then read the CRM data through the CRM Service OData REST API, transform the data into a format that is

compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update CRM data in the NATO CSD IWS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.2.2.2.5   Export of COM data

[FBE-311]   The NATO CSD Export Services shall detect new or updated COM data where the change is originating in the I2BE. The service shall then read the COM data through the COM Service OData REST API, transform the data into a format that is compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update COM data in the NATO CSD IWS.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.2.3   APP11-D Reports Export Service

4.2.3.1   Auto-generate AIRINTREP messages

[FBE-312]   The APP11-D Report Export Services shall detect updates to airfield BSOs (i.e. BSOs of type 'Place') and then subsequently interrogate the airfield BSO (through the I2BE OData REST API) to check the airfields status reports to see if there is any change to the Aircraft Equipment Lines. If there are changes to the Aircraft Equipment Lines then a message in [APP11D-AIRINTREP] XML format shall be automatically generated from the airfield BSO data and published/ sent on the SOA & IdM Platform.

Verification: Demonstration
Est. Cost[€]:   Contractor to provide cost estimate

4.2.4   Emulated INTEL-FS Spiral 1 Web Services

[112]   INTEL-FS Spiral 1 implements a number of Read-Only SOAP Web Services that enables external systems (e.g. TOPFAS and NCOP) to access its information.

[113]   Through the implementation of INTEL-FS Spiral 1 WS Emulation Services the I2BE data will be made available through web services that mimics the legacy INTEL-FS Spiral 1 web services

4.2.4.1   INTEL-FS Increment 1 SOAP Web Services

[FBE-313]   The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy I_INTEL-FS_SYSTEM_SERVICE (see table below) in accordance with [IFS1-ICD] as a façade for accessing the I2BE.

Verification: Demonstration, Integration with TOPFAS and NCOP
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-2 I_INTEL-FS_SYSTEM_SERVICE

Purpose	Methods
Enables the caller to access system objects or global values that can be used in the other services	GetAuthorisedOrganisationalNodeLogicalDatabaseCouples
	GetAuthorisedApplicationsTypes
	GetAuthorisedObjectTypes

[FBE-314]   The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy
             I_INTEL-FS_DOMAINVALUE_SERVICE (see table below) in accordance with
             [IFS1-ICD] as a facade for accessing the I2BE.

Verification: Demonstration, Integration with TOPFAS and NCOP
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-3 I_INTEL-FS_DOMAINVALUE_SERVICE

Purpose	Methods
Enables the caller to access domain values definition and details	GetDomainValueTypes
	GetDomainValues
	GetDomainValueById

[FBE-315]   The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy
             I_INTEL-FS_ENTITY_SERVICE (see table below) in accordance with [IFS1-ICD]
             as a facade for accessing the I2BE.

Verification: Demonstration, Integration with TOPFAS and NCOP
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-4 I_INTEL-FS_ENTITY_SERVICE

Purpose	Methods
Enables access to Intelligence Information Entities and their relationships.	Read
	GetLocation
	GetAttachments
	GetAttachmentsURL
	GetStatus
	GetAttachment
	GetAttachmentURL

[FBE-316]   The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy
             I_INTEL-FS_ORBAT_SERVICE (see table below) in accordance with [IFS1-ICD]
             as a facade for accessing the I2BE.

Verification: Demonstration, Integration with TOPFAS and NCOP
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-5 I_INTEL-FS_ORBAT_SERVICE

Purpose	Methods
Enables provision of ORBAT information (i.e., identification, strength, command structure, and disposition of the staff, units, and equipment). Enables the requester to select the 'root' of the organisational hierarchy, the number of levels to be returned, and the type of command relationship (e.g., TACOM, TACON, OPCOM, OPCON, Co-ordinating authority) to be returned	GetSubordinateUnits
	GetSubordinatePersons
	GetSubordinateOrganisations
	GetSuperiorUnits
	GetSuperiorPersons
	GetSuperiorOrganisations

[FBE-317]   The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy
              I_INTEL-FS_QUERY_SERVICE (see table below) in accordance with [IFS1-ICD]
              as a facade for accessing the I2BE.

Verification: Demonstration, Integration with TOPFAS and NCOP
Est. Cost[€]:   Contractor to provide cost estimate

Table 4-6 I_INTEL-FS_QUERY_SERVICE

Purpose	Methods
Enables submission and provision of responses to queries to authorised users or systems. The queries can contain full text and structured constraints.	GetSearchTemplateFromApplication
	GetSearchTemplateFromType
	OpenSearch
	RelationshipSearch
	OwnedObjectSearch
	Query

5   Non-functional Requirements (NFR)

[114]   NFR quality requirements is defined in accordance with ISO-25010 standard, and definitions in this section are based on ISO/IEC 25010:2011(E) - System and software quality models.

[115]   For monitoring of quality characteristics, the definitions in the table below will be used:

Table 5-1 Definitions used for monitoring NFR quality characteristics

Error (or Fault)	A design or source code or hardware flaw or malfunction that causes a Failure of one or more Configuration Items. A mistake made by a person or a faulty Process that affects a CI is also an Error (human Error). For this System, Human Error is generally not taken into consideration in measuring the quality Performance
Fault:	see Error
Failure:	Loss of ability to Operate to Specification, or to deliver the required output. The term Failure may be used when referring to Services, Processes, Activities, or Configuration Items
Critical Failure:	it is a failure that causes an immediate cessation of the ability to perform the required function/service
Incident:	An unplanned interruption to a service or reduction in the quality of a service
Problem:	A cause of one or more Incidents. The cause is not usually known at the time the Incident happens

5.1   Functional Suitability

[116]   ISO 25010: This characteristic represents the degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions.

[NFR-1]   Location accuracy shall be better than 1 meter (i.e., sub-meter accuracy) for translation of values (UTM, Latitude/Longitudes, others).

Verification: Demonstration and Analysis

5.2   Performance Requirements

[117]   ISO 25010: This characteristic represents the performance relative to the amount of resources used under stated conditions.

5.2.1   Response Times

[118]   ISO 25010: Time Behaviour is the degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements.

[NFR-2]   The time from restarting until all services is restored and fully operational again shall be less than 5 minutes for at least 99.5% of the Operational Time.

Verification: Demonstration and Analysis

[NFR-3]   Simple OData query operations against a repository containing 1 trillion entities shall be able to return results within 5 seconds for at least 99.5% of the Operational Time.

Verification: Demonstration and Analysis

[NFR-4]　　　For 10 concurrent simple OData query operations against a repository containing 1 trillion entities, each OData query operation shall return results within 10 seconds for at least 99.5% of the Operational Time.

Verification:　Demonstration and Analysis

[NFR-5]　　　Any faceted search operation against a repository containing 1 trillion entities shall be able to return results within 2 seconds for at least 99.5% of the Operational Time.

Verification:　Demonstration and Analysis

[NFR-6]　　　For 10 concurrent faceted search operations against a repository containing 1 trillion entities, with any type of search criteria, each search operation shall return results within 3 seconds for at least 99.5% of the Operational Time.

Verification:　Demonstration and Analysis

[NFR-7]　　　Any graph-oriented query operation against a repository containing 1 million linked entities shall be able to return results within 5 seconds for at least 99.5% of the Operational Time.

Verification:　Demonstration and Analysis

[NFR-8]　　　For 10 concurrent graph-oriented query operations against a repository containing 1 million linked entities, with any type of graph-query criteria, each query operation shall return results within 10 seconds for at least 99.5% of the Operational Time.

Verification:　Demonstration and Analysis

5.2.2　Capacity

[119]　　　ISO 25010: Capacity. Degree to which the maximum limits of a product or system parameter meet requirements.

[120]　　　Capacity parameters can include the number of items that can be stored, the number of concurrent users, the communication bandwidth, throughput of transactions, and size of database.

[NFR-9]　　　The services shall be able to a handle trillion IIEs without any critical failure for at least 99.5% of its Operational time.

Verification:　Analysis

[NFR-10]　　The services shall be able to serve 2000 concurrent users/ connections without any critical failure for at least 99.5% of its Operational time.

Verification:　Demonstration and Analysis

[NFR-11]　　The services shall be able to receive 2 million new IIEs per day without any critical failure for at least 99.5% of its Operational time.

Verification:　Demonstration and Analysis

[NFR-12]　　Pending sufficient network bandwidth, replication/ synchronization of 2 million IIEs between I2BE instances per day shall be possible without any critical failure for at least 99.5% of its Operational time.

Verification:　Demonstration and Analysis

5.3   Compatibility

[121]   ISO 25010: Compatibility. Degree to which a product, system or component can exchange information with other products, systems or components, and/or perform its required functions, while sharing the same hardware or software environment.

5.3.1   Co-existence

[122]   ISO 25010: Co-existence. Degree to which a product can perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product.

[NFR-13]   The implemented applications and services shall be capable of operating within the NS and MS WAN environment (including servers, network, services and workstations) in the presence of the latest approved NATO Security Settings without any critical failure for 99.5% of its operational time.

Verification: Demonstration

5.3.2   Interoperability Requirements

[NFR-14]   Any new version of the I2BE application programming interfaces (API) exposed to client applications shall be fully backward compatible for a minimum of three releases/ versions, and for a minimum of 1 year in 99.5% of the time. To be fully backward compatible, a version of the API with no breaking changes must be available and functioning.

Verification: Test

5.4   Reliability

[123]   ISO 25010: Reliability. Degree to which a system, product or component performs specified functions under specified conditions for a specified period of time.

[124]   MTBF (Mean time between Failures) is defined as the mean time between two consecutive failures.

[125]   MTBCF (Mean time between critical failures) is defined as the mean time between two consecutive CRITICAL failures.

5.4.1   Availability

[126]   ISO 25010: Availability. Degree to which a system, product or component is operational and accessible when required for use.

[127]   Inherent Availability (Intrinsic) assumes ideal support (i.e., unlimited spares, no delays, etc.); only design related Failures are considered.

[128]   Mission Inherent Availability (Intrinsic) assumes ideal support (i.e., unlimited spares, no delays, etc.); only design related CRITICAL Failures are considered

[NFR-15]   The Inherent Availability shall be better than 99.5%

Verification: Analysis, Using MTBF data

[NFR-16]   The Mission Inherent Availability shall be better than 99.97%.

Verification: Analysis, Using MTBCF data

5.4.2   Fault Tolerance and Recoverability

[129]   Fault Tolerance is the property that enables a system to continue operating properly in the event of the failure of some of its components. A fault-tolerant design enables a system to continue its

intended operation, possibly at a reduced level, rather than failing completely when some part of the system fails.

[130]   Graceful Degradation is the ability of a computer, machine, electronic system or network to maintain limited functionality even when a portion of it has been destroyed or rendered inoperative (either by a fault or deliberately).

[131]   Based on the principle of gracefully degradation the following recovery time have been defined:

Table 5-2 Recovery Time by Failure Criticality

Failure Type	Recovery Time
Failure	4 hours
Critical Failure	10 minutes

[132]   ISO 25010: Fault Tolerance. Degree to which a system, product or component operates as intended despite the presence of hardware or software faults.

[133]   ISO 25010: Recoverability. Degree to which, in the Event of an interruption or a Failure, a product or system can recover the data directly affected and re-establish the desired state of the system.

[NFR-17]   For 99% of the possible Failures in any service, the service shall be recovered or be replaced by an alternative service, in no more than the amount of Recovery Time defined in the table above, without loss of any previously persisted data.

Verification: Test and Analysis

5.5   Security

[134]   ISO 25010: Degree to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization.

[135]   ISO 27001 (Information Security): Information security is all about protecting and preserving information. It's all about protecting and preserving the confidentiality, integrity, authenticity, availability, and reliability of information.

[136]   Security, within the context of Information Technology (IT), is defined as the capability of the software product to protect information and data so that unauthorised persons or systems cannot read or modify them and such that authorised persons or systems are not denied access to them.

[137]   I2UA will operate in the "System High" mode of operation (see [AC/35-D/2004-REV3] for definitions of Security Modes of Operation). That is, all individuals with access to the system are cleared to the highest classification of the information stored, processed or transmitted within the system, but not all individuals with access to the system have a common need to know for the information stored, processed or transmitted within the system.

[NFR-18]   The services shall implement relevant security techniques to protect against any security vulnerabilities as identified by Open Web Application Security Project (OWASP), see [OWASP], so that no such security vulnerabilities occurs for 99.5% of its Operational time.

Verification: Test

[NFR-19]   The services shall implement protection mechanisms against data spillage between the different repositories (Operational, Exercise, Training, etc.) so that for 99.5% of its Operational time no spillage occurs (exempt from this will be operator error by-passing implemented security mechanisms).

Verification: Test

5.6   Maintainability

[138]   ISO 25010: This characteristic represents the degree of effectiveness and efficiency with which a product or system can be modified to improve it, correct it or adapt it to changes in environment, and in requirements.

[139]   The MTTR to be considered is the mean time needed to restore services after a failure in the operative condition, excluding administrative and logistics delay times.

[140]   The MaxTTR to be considered is the maximum time needed to restore services in the operative condition, excluding administrative and logistics delay times.

Table 5-3 Maintainability by Failure Criticality

Failure Type	MTTR	MaxTTR
Critical Failure	1 hours	4 hours
Failure	2 hours	8 hours

[NFR-20]   On the hypothesis of an operational time of 24/7/365 (24 hours per day, 7 days a week, 365 days per year), the MTTR and MaxTTR shall not exceed the time limits defined in the table above for each single maintenance action for 99.5% of its Operational Time.

Verification: Test and Analysis

[NFR-21]   The applications and services shall be able to isolate any occurring Faults/Errors and provide error diagnostics reports that identifies the Error/Fault for 90% of its Operational Time.

Verification: Analysis and Inspection

[NFR-22]   The developed source code shall exhibit a Technical Debt Ratio (TDR) lower than 5% when calculated using [SonarQube] in its default setting for TDR calculations.

Verification: Inspection

[NFR-23]   Automated regression tests and Continuous Integration shall ensure that for 99% of the times the applications and services are modified, and a release candidate produced, the change does not adversely affected existing functionalities/ features.

Verification: Demonstration and Inspection

[NFR-24]   The OData REST API and the Data Access Layer (DAL) shall be consistent with [INTEL-FS2-IM] 99% of all services releases.

Verification: Demonstration and Inspection

5.7   Portability, Installability, and Replaceability

[141]   ISO 25010: Portability. Degree of effectiveness and efficiency with which a system, product or component can be transferred from one hardware, software or other operational or usage environment to another.

[142]   ISO 25010: Installability. Degree of effectiveness and efficiency with which a product or system can be successfully installed and/or uninstalled in a specified environment.

[143]   ISO 25010: Replaceability. Degree to which a product can replace another specified software product for the same purpose in the same environment.

[NFR-25]   It shall be possible to run fully automated installation and/ or uninstallation of the applications and services for 99.5% of the times.

Verification: Demonstration

[NFR-26]   It shall be possible to install replace a previous release with a new release in a fully automated way without loss of any user data and/ or configuration settings in 99.5% of the times.

Verification: Demonstration