



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Μόνιμη Αντιπροσωπεία της Ελλάδος
στο ΝΑΤΟ

ΑΔΙΑΒΑΘΜΗΤΟ
ΕΠΕΙΓΟΝ

Αρμόδιος: Ασχος (ΜΕ) Δημήτριος Κανταρτζόγλου Βρυξέλλες, 29 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 (μ.η.)
Πλ.Κάνιγγος

Υπουργείο Ανάπτυξης
/Γενική Γραμματεία Βιομηχανίας (μ.η.)
/Δνση Διεθνών Βιομηχανικών Σχέσεων

Πλ.Κάνιγγος
Τεχνικό Επιμελητήριο Ελλάδος
/Δνση Ε Επαγγελματικής Δραστηριότητας, (μ.η.)
Νίκης 4

ΘΕΜΑ: 8^η Τροποποίηση Πρόσκλησης Υποβολής Προσφορών IFB-CO-14873-INTELF2, Διαγωνιστικής Διαδικασίας Έργου: «Intelligence Functional Services (INTEL-FS) - Spiral 2 and BMD functions in INTEL-FS»

1. Διαβιβάζεται, συνημμένως, 7^η Τροποποίηση Πρόσκλησης Υποβολής Προσφορών (Invitation for Bids/IFB), για διαγωνισμό εν θέματι έργου, εκ μέρους ΝCΙΑ, ως φιλοξενούντος έθνους.
2. Καταληκτική ημερομηνία υποβολής προσφορών παραμένει η 29^η Απριλίου 2021, 12:00 τ.ώ.
3. Ενδιαφερόμενες εταιρίες αναζητήσουν πληροφορίες μέσω καθορισμένου σημείου επαφής (Point of Contact/ΠΟC, βλ. παρ. 6 τροποποίησης).
4. Παρακαλούμε για τις ενέργειές σας.

ΛΑΜΠΡΙΔΗΣ

Συν. Σελ: 374

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

ΑΔΙΑΒΑΘΜΗΤΟ



NATO UNCLASSIFIED

Acquisition Directorate

Boulevard Léopold III
B-1110 Brussels, Belgium

NCIA/ACQ/2021/6734

25 March 2021

To: All Nominated Bidders and Distribution List

Subject: Invitation For Bid IFB-CO-14783-INTELS2 Amendment 8

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-INTELS2 NCIA/ACQ/2020/6369, dated 22 December 2020
D. IFB-CO-14783-INTELS2 Amd. 1, NCIA/ACQ/2021/6475, dated 29 January 2021
E. IFB-CO-14783-INTELS2 Amd. 2, NCIA/ACQ/2021/6574, dated 11 February 2021
F. IFB-CO-14873-INTELS2 Amd. 3, NCIA/ACQ/2021/6587, dated 22 February 2021
G. IFB-CO-14873-INTELS2 Amd. 4, NCIA/ACQ/2021/6624, dated 24 February 2021
H. IFB-CO-14873-INTELS2 Amd. 5, NCIA/ACQ/2021/6660, dated 5 March 2021
I. IFB-CO-14873-INTELS2 Amd. 6, NCIA/ACQ/2021/6673, dated 11 March 2021
J. IFB-CO-14873-INTELS2 Amd. 7, NCIA/ACQ/2021/6697, dated 15 March 2021

Dear Prospective Bidders,

1. The purpose of this Amendment 8 is to:
 - a. Publish Release 7 of Bidders' questions and NCI Agency responses;
 - b. Issue revised IFB documents (Book II).
2. Clarification Requests (CR) and their respective responses that were released in IFB Amendments 1 – 7 have been greyed out for your convenience.
3. Revised bidding documents provided with this IFB Amendment 8 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.
4. 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 – 7 (References D – J).
5. 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.



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6. 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-INTELS2@ncia.nato.int.

FOR THE DIRECTOR OF ACQUISITION:

Daniel Gaertner Digitally signed by Daniel Gaertner
Date: 2021.03.25 16:36:41 +01'00'

Daniel K. Gaertner
Senior Contracting Officer

Attachment:

- 1) Responses to Clarification Requests, Release Number 7
- 2) Revised IFB Documents:
 - 2.1 File # 09: Book II – Part IV, SOW I2UA
 - 2.2 File # 10: Book II – Part IV, SOW I2UA Annex A, SRS
 - 2.3 File # 12: Book II – Part IV, SOW I2BE
 - 2.4 File # 13: Book II – Part IV, SOW I2BE Annex A, SRS



Distribution List for IFB-CO-14783-INTELS2 Amendment 8

NATO Delegations (Attn: Infrastructure Adviser):

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Attachment 1: Responses to Clarification Requests, Release Number 7

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 <i>INTEL-FS_User_Manual</i> , the <i>INTEL-FS_Administrator_Manual</i> , and the <i>INTEL-FS_System_Design_Specification_-_62789015_424_-_V0.14</i> 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 not in the possession of any such algorithms/ implementation. However, the Bi-SC AIS CoreGIS system, which is implemented on the ESRI ArcGIS 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	<ol style="list-style-type: none"> [IPIWG] doc as file is empty [MARIX] doc as link seems to not be accessible [OASIS Odata OAS 1.0, 2016] doc as there is no file neither link associated 	<ol style="list-style-type: none"> 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. 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 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 projects be totally independent? i.e. Different Purchaser personnel, Different Contractor key personnel, separate kick-off and WP meetings etc.	Purchaser's personnel does <u>not</u> 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	Book 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 certifications 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 Package, but in the other sections, it is in the Engineering Package.	It is part of the Engineering 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 Engineering package. The table in Section 3.7 of the Bidding Instructions is corrected by IFB Amendment 1.
CR24	13_CO-14873-INTELF2-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 <i>Inherent</i> 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 <i>Inherent</i> availability can be assessed.
CR25	13_CO-14873-INTELF2-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-INTELF2-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. <ul style="list-style-type: none"> • 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 N CIA. 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 activities and factor them into the cost of individual implementation 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]: <i>"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 "</i> .

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 nonfunctional requirements like advance graph queries (with fast response times) and link analysis / social network analysis and a solution including a graph database should be able to fulfil those requirements. The choice of a graph database (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: <i>INTEL-FS_-_System_Design_Specification_-_62789015_424_-_V0.14</i>)

CR40		How many business domains, processes, services and workflows are in scope of the target state application landscape?	<p>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 identified as "xxxx Migration Service".</p> <p>There are four principal processes/ workflows: Dissemination, Colation, Request and Task.</p> <p>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.</p>
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?	<p>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.</p> <p>The number of users will be several thousand.</p>
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?	<p>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 <i>Domain of Discourse</i> .</p> <p>There are four principal processes/ workflows: Dissemination, Colation, Request and Task.</p> <p>All IIEs are subject to the Dissemination Workflow. <i>ProductIIEs</i> in conjunction with <i>BattlespacellEs</i> are subject to the Colation workflow. Within the IRMCM staff function, RFIs and ISRRs are the subjects of <i>Request</i> workflows; CollectionTasks and ExploitationTasks are the subject of <i>Task</i> workflows.</p>
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	<p>IFB Documents 14A and 14B contain a complete specification of the INTEL-FS Spiral 2 Information Model. These documents both contain a section <i>_Conventions and Migration::INTEL-FS Spiral Reference</i> 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.</p>

CR45		<p>Could we have more information on GeoView?</p> <ul style="list-style-type: none"> • 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? 	<p>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 <i>VC ICD 1-3</i>). The 2D parts of the VC (which is what will be used in INTEL-FS) is implemented in OpenLayers.</p> <p>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.</p> <p>The aim is to use the GeoView “as is”, no feature gap has yet been identified in the VC.</p>
CR46		<p>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?</p>	<p>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)</p>
CR47		<p>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”</p>	<p>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.</p>
CR48		<p>Can you disclose the Spiral 1 ICD document.</p>	<p>The Spiral 1 ICD has been uploaded to the IFB portal under Supporting Documents.</p>
CR49		<p>Where do the Acceptances take ? Can it be done virtually?</p>	<p>As stated in SOW section 2.4.5.2.6 on the Delivery Acceptance Review “<i>If agreed between Purchaser and Contractor, the meeting could be done as a video-conference meeting</i>” .</p>
CR50	Book I Bid Instruction Section 1.2.2	<p>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?</p>	<p>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 <u>all</u> Requirements have been accepted.</p>
CR51	Book I Bid Instruction Section 1.2.3	<p>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?</p>	<p>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.</p>

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	<p>[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_SOAIMD_Wave1and4_ICD_v8.0 document provides a logical interoperability view of SOA & IdM platform.</p> <ul style="list-style-type: none"> • 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-INTELF2-Book-II-Part IV SOW I2BE Annex B Information Model - Battlespace Partition - 14b_CO-14873-INTELF2-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 separately 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		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 initial 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-INTELF52-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, <i>Software Licenses</i> . 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-INTELF52-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-INTELF52-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-INTELF2, 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-INTELF2-Book-II-Part IV SOW I2BE Annex B Information Model - Battlespace Partition and 14b_CO-14873-INTELF2-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] <i>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; ..</i> ”

<p>CR84</p>	<p>IFB-CO-14873-INTELS2 Book I - Bidding Instructions</p>	<p>IFB-CO-14873-INTELS2 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-INTELS2 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?</p>	<p>Contractor's facilities shall be able to handle material up to NATO RESTRICTED. Article 16, <i>Security</i>, 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 <i>"the Contractor's premises shall be able to handle up to NATO Restricted."</i></p>
<p>CR 85 start CR Release 3 here - do not include with CR Release 2</p>	<p>Book I-Bidding Sheets I2BE</p>	<p>Should Contractor deliver any HW or HW Components to any NATO deployment site of INTELS2? Or Will Contractor deliver only SW Applications with COTS? For COTS products, how many (running) license will be delivered to the Purchaser by Contractor?</p>	<p>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.</p>
<p>CR86</p>	<p>N/A</p>	<p>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?</p>	<p>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).</p>
<p>CR87</p>	<p>N/A</p>	<p>What are the main gaps of Spiral 1 solution this solution willing to solve?</p>	<p>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.</p>

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 specified in the information model is realized; in particular supporting a seamless mediation with the STANAG 4559 workflow services; * The information platform 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?	<p>* 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.</p> <p>* 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)</p>
CR98	Bidders Conference	What AJP's are relevant for considering the process from the User perspective conducting INTEL business? AJP 2?	<p>AJP-2.1 INTELLIGENCE PROCEDURES AJP-2.7 ALLIED JOINT DOCTRINE FOR RECONNAISSANCE AND SURVEILLANCE STANAG 4559 AEDP-19 ISR Workflow Architecture</p>
CR99	Bidders Conference	STANAGs that need to be consider?	<p>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</p>
CR100	Bidders Conference	Are these technical doctrines harmonized with the process one (AJP, AIntPs)?	<p>AJP-2.1 INTELLIGENCE PROCEDURES AJP-2.7 ALLIED JOINT DOCTRINE FOR RECONNAISSANCE AND SURVEILLANCE STANAG 4559 AEDP-19 ISR Workflow Architecture</p>
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?	<p>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.</p>
CR102	Bidders Conference	JIPOE the new IPB (Intelligence preparation of the battlespace/-ground)?	<p>The term "JIPOE" replaces the former term "IPB".</p>
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?	<p>Web Service interfaces INTEL-FS Spiral 1 are being consumed by other Bi-SC AIS system like TOPFAS and NCOP.</p>

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-INTELF52-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-INTELF52-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	<i>A question was received regarding contractor eligibility, summarized as follows:</i> 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 that 'an implementation of the eXtensible Access Control Markup Language (XACML) version 3 architecture' should be implemented within I2UA. However it seems to us that the implementation should be placed 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 NCI'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 be provided by NCI.... ". 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] and NCI 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]	<p>“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”</p> <p>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 .</p> <p>Please confirm that you want the Contractor to include the price of this SOWG without any detailed assumption.</p>	<p>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.).</p> <p>[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.</p>
CR129	[SOWG-373]	<p>« The Contractor shall at the Deliverable Acceptance Review demonstrate that the any API implemented as part of the deliverable is fully documented “</p> <p>Please confirm this sentence is correct and that no word is missing</p>	<p>The requirement has in the I2BE SOW in Amendment 6 been rephrased to "<i>The Contractor shall at the Deliverable Acceptance Review demonstrate that API changes (if any) are fully documented</i>".</p>
CR130	CO-14176-SOA-IDM	<p>Are only Docker and Kubernetes Pods deployment supported on the SOA&IdM Platform or also Virtual Machines?</p>	<p>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.</p>
CR131	CO-14176-SOA-IDM	<p>Is JWT also supported by the IdM Platform?</p>	<p>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.</p>
CR132	CO-14176-SOA-IDM	<p>How do the services contribute to (access) logging and audit? Which interface and schema has to be supported?</p>	<p>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.</p>
CR133	CO-14176-SOA-IDM	<p>Is an API Gateway provided by the SOA IDM Platform?</p>	<p>No, an API Gateway is not provided by the platform.</p>
CR134	CO-14176-SOA-IDM	<p>Is the Sidecar Proxy for authorization provided by the SOA IDM Platform?</p>	<p>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.</p>
CR135	GENERAL	<p>Is there a specific template to use for Solution Description Document(SDD)?</p>	<p>There is no template. The content for the SDD is described in SOW chapter 2.5.3.2</p>
CR136	GENERAL	<p>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?</p>	<p>Please note that in IFB Amendment 3, Bidding Instructions paragraph 3.2.2 increased the size limit of any emails submitted to 15 MB.</p> <p>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.</p>
CR137	GENERAL	<p>Could alternative solutions for the software requirements be mentioned in the Solution Description Document(SDD)?</p>	<p>The bidder shall propose one and only one solution.</p>

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 management 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 <i>project execution</i> . 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.
CR168	INTEL-FS SPIRAL 2 - USER APPLICATIONS (I2UA) BOOK II - PART IV - SRS SYSTEM REQUIREMENT SPECIFICATION (SRS)	DATA SETS different meanings. GUA 30, GUA 31 refers to the "Global Data Set" where User Applications are connected and could be: (i.e. operational data set, training data set, exercise data set, ...) FUA 555, FUA 84 and many others refers to ADS (Application Data Sets). GUA 92, GUA 93, GUA 94, refers to "data set". Does this "data set" refers to a subset of the Application Data Set which have been filtered? Or does it refer to an Application Data Set itself? We assume that these requirements (GUA 92, GUA 93 and GUA 94) refer to a data subset. Related to this: Is it required for every application to manage several ADS (Application Data Sets) at the same time, e.g, for comparing them? We assume that there will be only one active ADS at each application to be exploited by user. When another ADS want to be used, ADS will have to be modified or replace. Please clarify whether this assumptions are correct.	The data set in [GUA 30] and [GUA 31] refers to the repository data set (in Spiral 1 these repository data set were called logical databases). The repository data set means the full set of data being used for an operation, mission, or activity. The application data set (ADS) is a subset of the repository data set where the user is in control of selecting the ADS from the repository data set. The I2UA SRS in Amendment 8 has updated [GUA 30] and [GUA 31] to explicitly state that those are repository data sets. The assumption that the data presented in Table Views (ref [GUA 92], [GUA 93], and [GUA 94] are data subsets is correct. It is not a general requirement that applications shall be able to handle multiple application data sets (ADS). The assumption that users replace or modify the ADS with new content is correct.
CR169	INTEL-FS SPIRAL 2 - USER APPLICATIONS (I2UA) BOOK II - PART IV - SRS SYSTEM REQUIREMENT SPECIFICATION (SRS) Integrated search.	Some requirements refers to applications integrated search (FUA 359, FUA 360, FUA 420, FUA 421, FUA 422, FUA 459...). For this application integrated search, shall search results be shown In every opened view components or shall these results be shown in a new table-view associated to the integrated search?	The details of the user interface (providing good UX) will be for the contractor to design. The purpose of this integrated search requirement is that the user shall not need to leave the application to go to the separate Search Application to search. The application-integrated search could be a simple and application-specialized search tool with the aim of quickly adding items to the ADS; this could be done in a dialog window.

CR170		First increment execution will start after the Kick-Off (EDC + 1 month) Meeting, and then Workpage Start-Up Meeting and then Increment Start-up Meeting. Could you please confirm this?	As defined in SOW requirement [SOWG-156], the Kick-Off meeting shall <i>not start any later</i> that one month after EDC. The WP start-up and Increment Start-Up meetings are expected to start as soon as possible after the Kick-off meeting.
CR171		What are the duration of Kick-Off Meeting, Workpage Start-Up Meetings, Increment Start-Up Meetings? Is there any foreseen duration of these meetings?	The Kick-off meeting is expected to require no more than 1 day, the WP start-up meeting is expected to require no more than 5 days, and the Increment Start-up meeting is expected to require no more than 2 days. The I2UA and I2BE SOWs have been updated in Amendment 8 to clarify this.
CR172	Book II-Part IV-SOW I2BE Annex A SRS	The following documents are referenced in some of the provided SOA & IdM documents; but not found in the "Reference Documents\SOA and IDM Platform". Can you also provide these missing documents? SOAIDM-SDS-LIFECYCLE_AUTOMATION, SOAIDM-SDS-APPLICATION_SERVICES, SOAIDM-SDS-OBSERVABILITY	The requested documents (SOAIDM-SDS-LIFECYCLE_AUTOMATION, SOAIDM-SDS-APPLICATION_SERVICES, SOAIDM-SDS-OBSERVABILITY) will be made available for the contractor at Contract Award.
CR173	Book II-Part IV-SOW I2BE Annex A SRS	Although the requirements of IIE Migration Services are very similar to the Integration Import Services, it is stated that IIE Migration Services are to be developed as Non-native Hosted Services whereas Integration Services are as Native Services. Is there a technical reason/constraint for this difference?	The intention was not to state that the IIE Migration Services should be developed as Non-native Hosted Services. The BE SRS has been updated in Amendment 8 to clarify that there is no such constraint on the migration services.
CR174	Book II-Part IV-SOW I2BE Annex A SRS	Is "Simple OData query operations" mentioned in [NFR-3] and [NFR-4] applicable to only IIE Domain Services (i.e. Products Management Service, ORBAT Management Service etc.) and not to Search Service and Data Analytics Service?	Yes, the performance requirement for the Search Service and Data Analytics Service are covered by [NFR-5], [NFR-6], [NFR-7], and [NFR-8].
CR175	Book II-Part IV-SOW I2BE Annex A SRS	In CR60, it is stated that "There will be data from approximately 3 million information entities collected over many years that will have to be migrated.". And in [NFR-11], it is stated that "The services shall be able to receive 2 million new IIEs per day". However, handling of 1 trillion entities (in requirements [NFR-3], [NFR-4], [NFR-5], [NFR-6] and [NFR-9]) does not seem to be aligned with these given and anticipated numbers. Can you confirm that it is really 1 trillion to be handled with these requirements?	NCIA can confirm that the number is 1 trillion, but only for [NFR-6]. The reason for the trillion requirement in [NFR-6] is that INTEL-FS Spiral 2 may received automatically processed sensor data and the ingest rate can potentially be very high. These automated sensor-data will not be IIEs as defined by the information model (they will be small documents) and they will not be created through the backend services. The requirement in [NFR-6] states that the search engine must be able to efficiently search this high volume of indexed searchable data (e.g. using Elasticsearch). The other requirements stating trillions of entities have in the SRS in Amendment 8 been corrected to 100 million entities (in this case they will be IIEs as defined by information model).
CR176	Book II-Part IV-SOW I2BE Annex A SRS	Is there any constraint for selection of RDBMS? If not, how should the licensing be handled for any proposed RDBMS (such as SQL Server/Oracle)? Does NATO have license for any RDBMS that can be used in INTEL-FS2? Or is it an option that NATO provides Database Services as SaaS together with SOA & IdM Platform?	There are no RDBMS constraints. Bidders should include the costs for any licenses necessary for the proposed solution. In accordance with Section 22 of the Contract Special Provisions, the NCI Agency may choose to remove certain licenses from the contract, procure them through established enterprise agreements, and provide them as PFE to the contractor. The SOA & IdM Platform will not provide database services.
CR177	Book II-Part IV-SOW I2BE Annex A SRS	6- NATO::BMD::Battlespace package is mentioned in SRS but it is not found in the Information Model documents. Can you provide the model for NATO::BMD::Battlespace?	The BMD battlespace information is fully integrated into the battlespace package. The text in the SRS paragraph [55] referred to an older (pre IFB) organization of the information model. The SRS paragraph [55] in Amendment 8 has been updated to reflect that the NATO::BMD::Battlespace does not exist.
CR178	Book II-Part IV-SOW I2BE Annex A SRS	To meet the NFRs, is it possible to request/suggest different deployment infrastructure/model per service basis? Such as, dedicated nodes with dedicated SSD disks for cluster of search services.	The proposed solution shall make the assumption that the underlying IaaS and PaaS can deliver the required performance and scale-out capacity to support INTEL-FS in meeting the NFRs.

N A T O U N C L A S S I F I E D



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 1.4

24/03/2021

N A T O U N C L A S S I F I E D

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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)
24 Mar 2021	1.4	Provided expected duration for Kick-Off meeting, WP Start-up Meeting, and Increment Start-up Meeting

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.

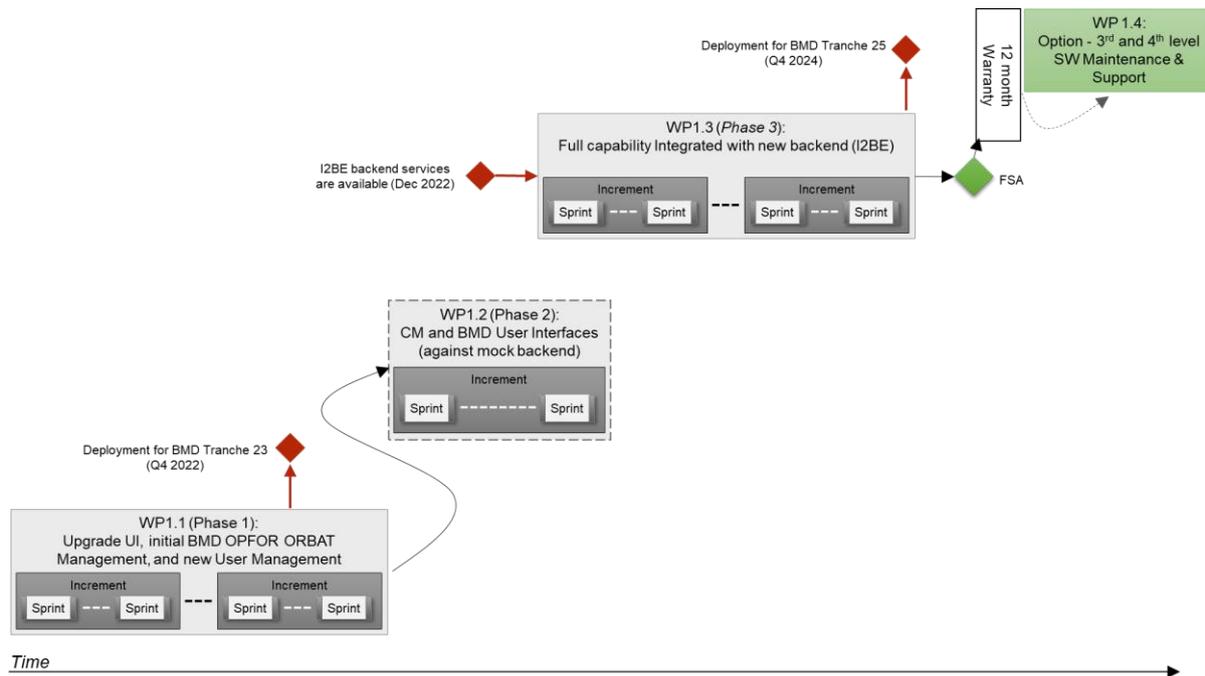
1.2 Purpose

- [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 RESTRICTED (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-INTELF2, 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 SECRET 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 SECRET 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 SECRET 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] Level of Support: 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] Level of Maintenance: 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] First Level Support Process: 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 RESTRICTED 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.

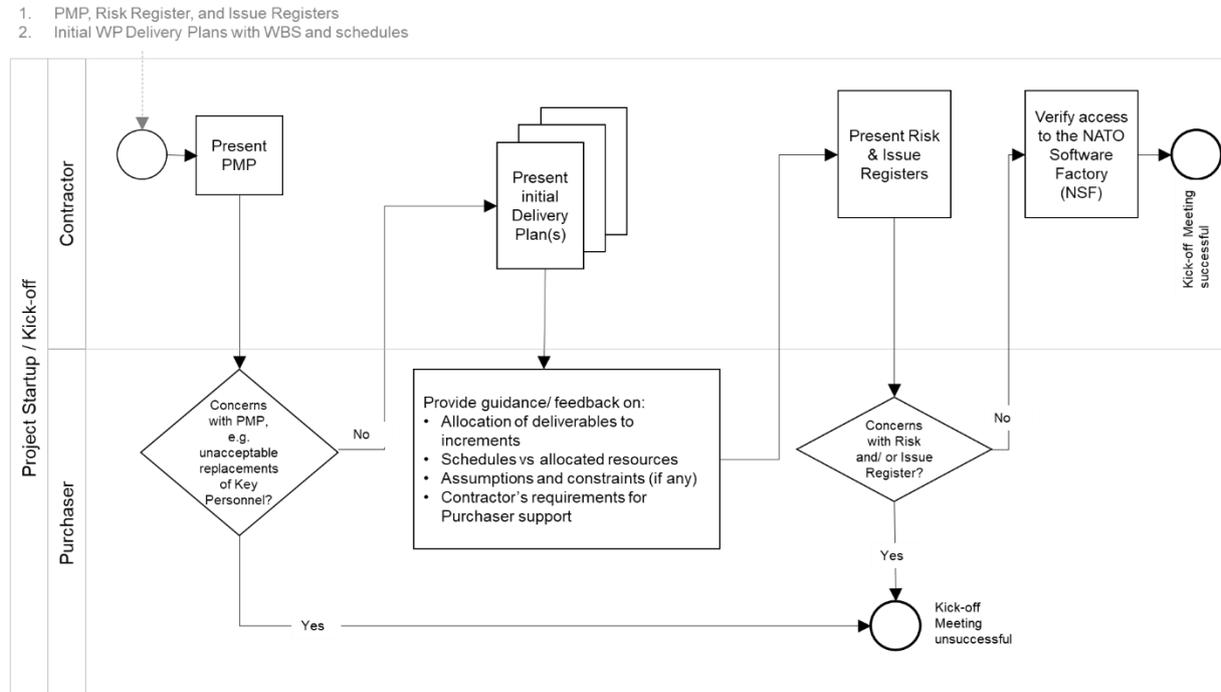
2.4.3 Kick-Off Meeting

- [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 is expected to require no more than one day, and 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 is expected to require no more than five days, and 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.

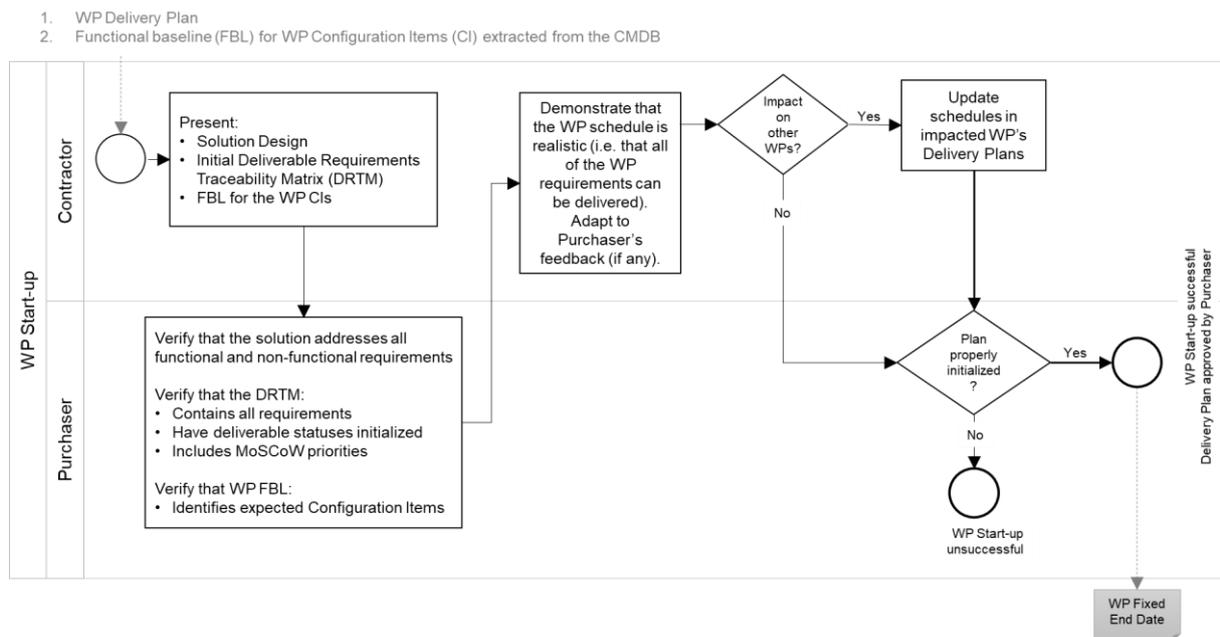
[SOWG-163] The Contractor shall at the meeting present the refined WP Delivery Plan. The presentation shall be:

- (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 chooses 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



[74] An outcome of the WP Start-up meeting is the identification of a Fixed WP End-date.

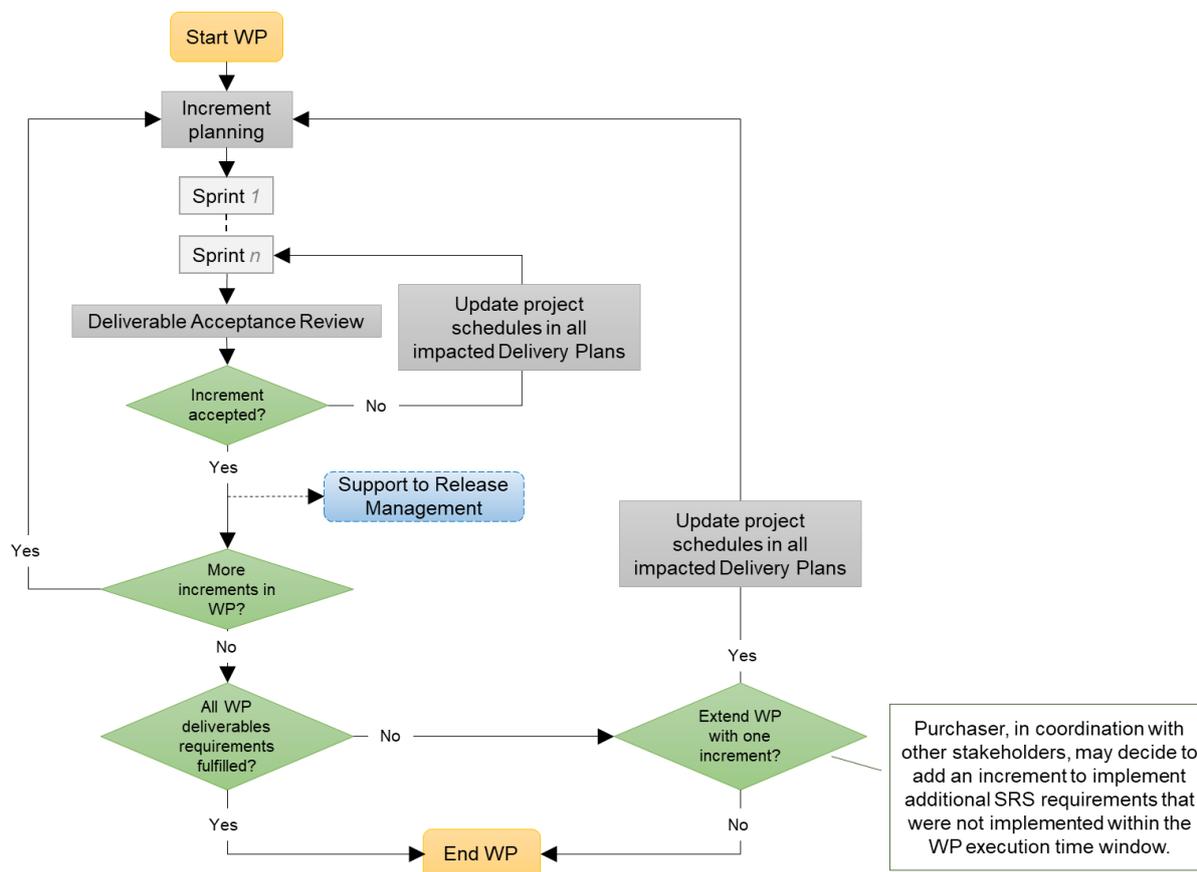
2.4.4.2 WP Execution

[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.

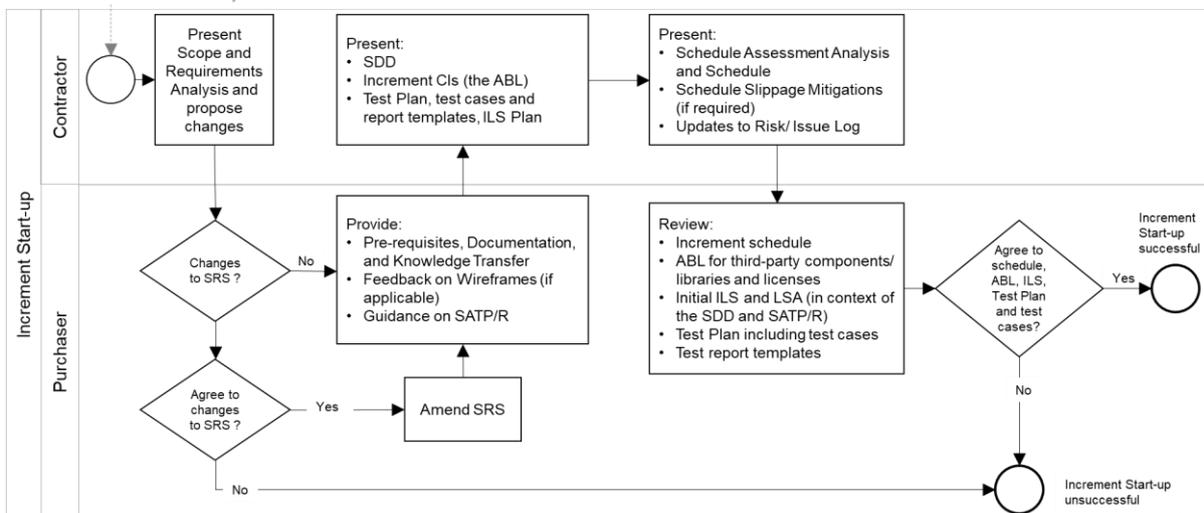
- [SOWG-168] The time and duration of each Increment Start-up Meeting shall be in accordance with the schedule established in the Delivery Plan at the WP Start-up meeting.
- [SOWG-169] The Contractor's key personnel shall meet with the Purchaser's Project Manager. The meeting is expected to require no more than two days, and 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 wireframes¹ 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

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

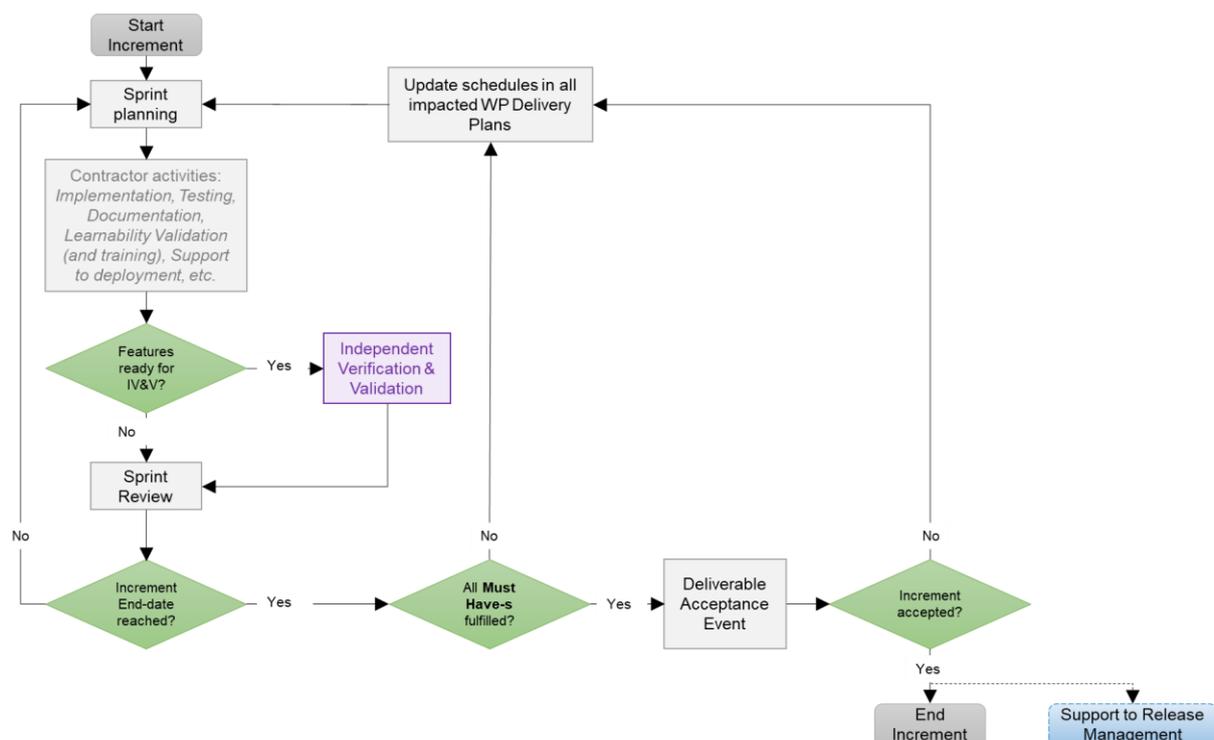


2.4.5.2 Increment Execution

- [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: <ul style="list-style-type: none"> • 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).

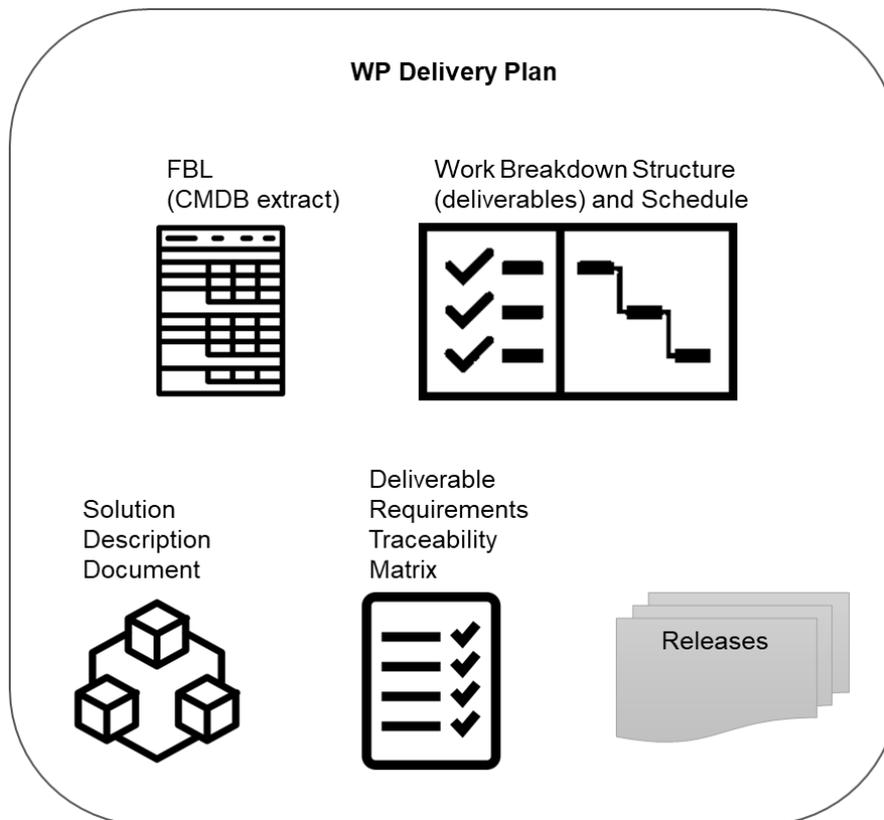
[SOWG-270] The CMP shall define the CM organisation including the Configuration Manager role and any other supporting CM personnel. Note: CM personnel shall have sufficient knowledge, experience, responsibility, authority, organisational freedom, organisation independence and security clearance to review 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.

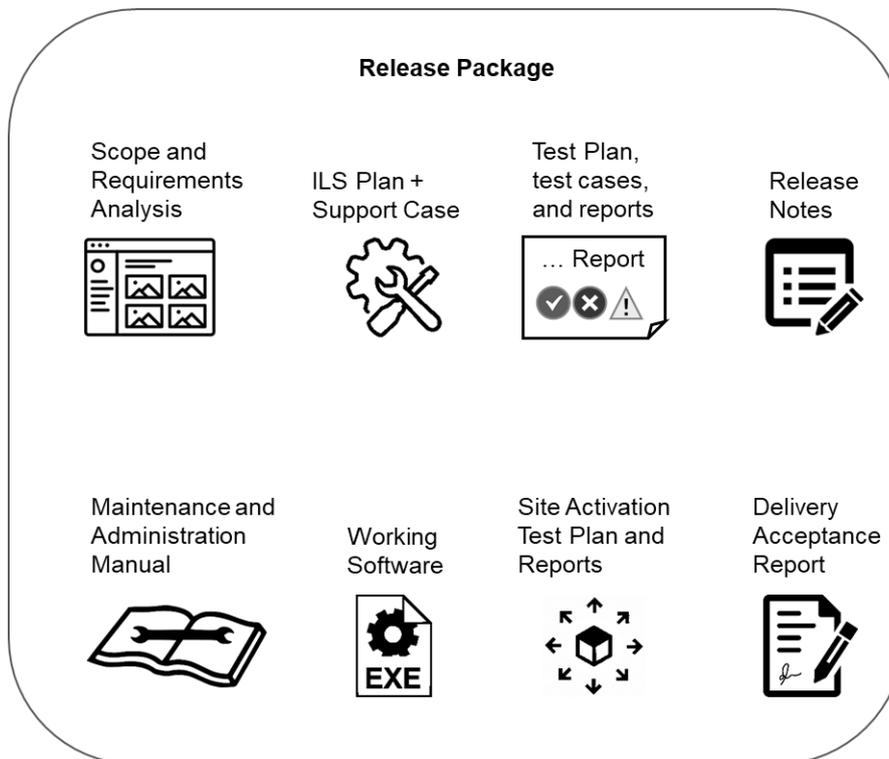
2.5.4 Release Package

[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 SECRET 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 SECRET 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 SECRET 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 SECRET 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.

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

SYSTEM REQUIREMENT SPECIFICATION (SRS)

Version 1.4

24/03/2021

N A T O U N C L A S S I F I E D

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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.
24 Mar 2021	1.4	Clarified the difference between Repository Data Set and Application Data Set

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

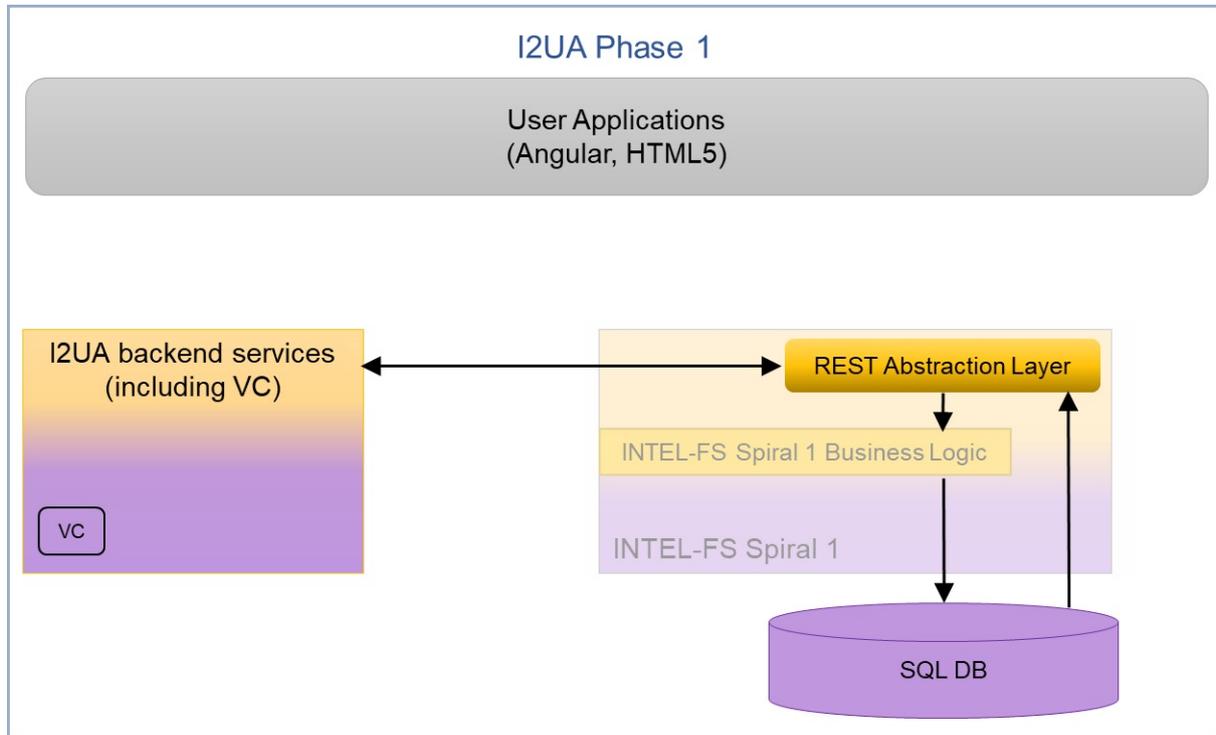
- [7] Within this SRS, general functional requirements applicable to most or all user applications are numbered as [GUA-number], application-specific functional requirements are numbered as [FUA-number], non-functional requirements (NFR) are numbered as [NFR-number], while narrative text is numbered 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-INTELF2, INTEL-FS SPIRAL 2 - Information Model
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InformationModel]	Book II - Part V, NCI Agency
[INTEL-FS2-UserStories]	CO-14873-INTELF2, 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 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

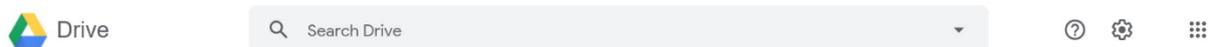
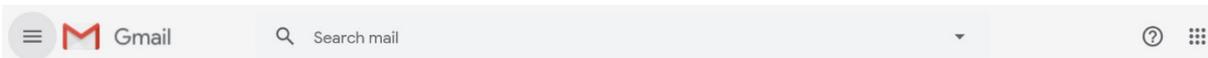


Figure 2-2 Example 2 of main menu bar - Gmail



[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 repository 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 repository data set at the time (per session) to prevent data leakage between repository 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 cursor 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 repository 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 suppress 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.

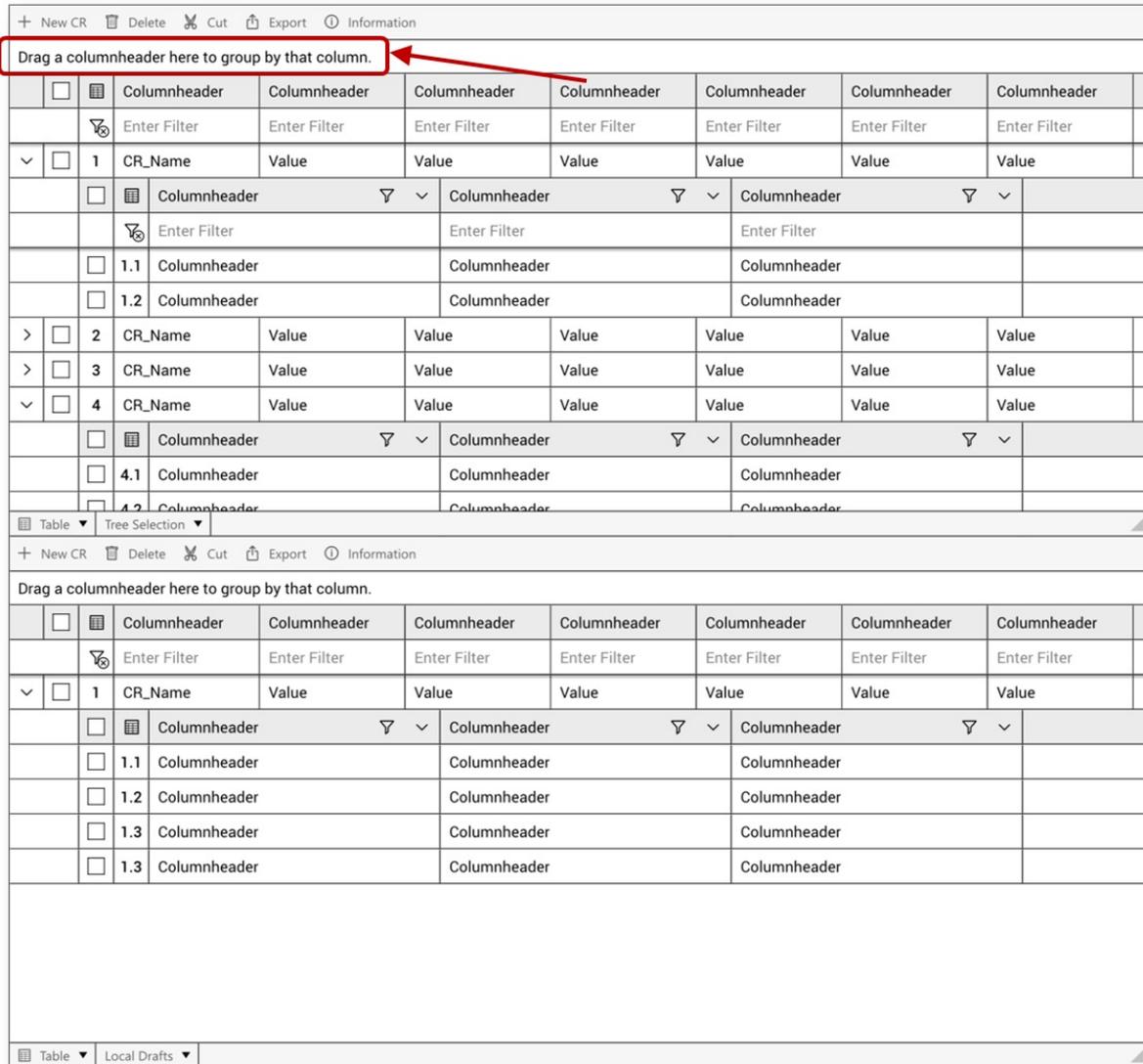
Verification: [Demonstration and Inspection](#)

[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 user cannot change a cell's 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.

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.

Verification: [Demonstration](#)

[GUA-94] It shall be possible to present two separate user defined data sets in the Table View side by side for comparison with synchronous scrolling.

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 Gantt View.

Verification: [Demonstration](#)

[GUA-126] It shall be possible to hide and un-hide columns in the grid part of the Gantt 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](#)

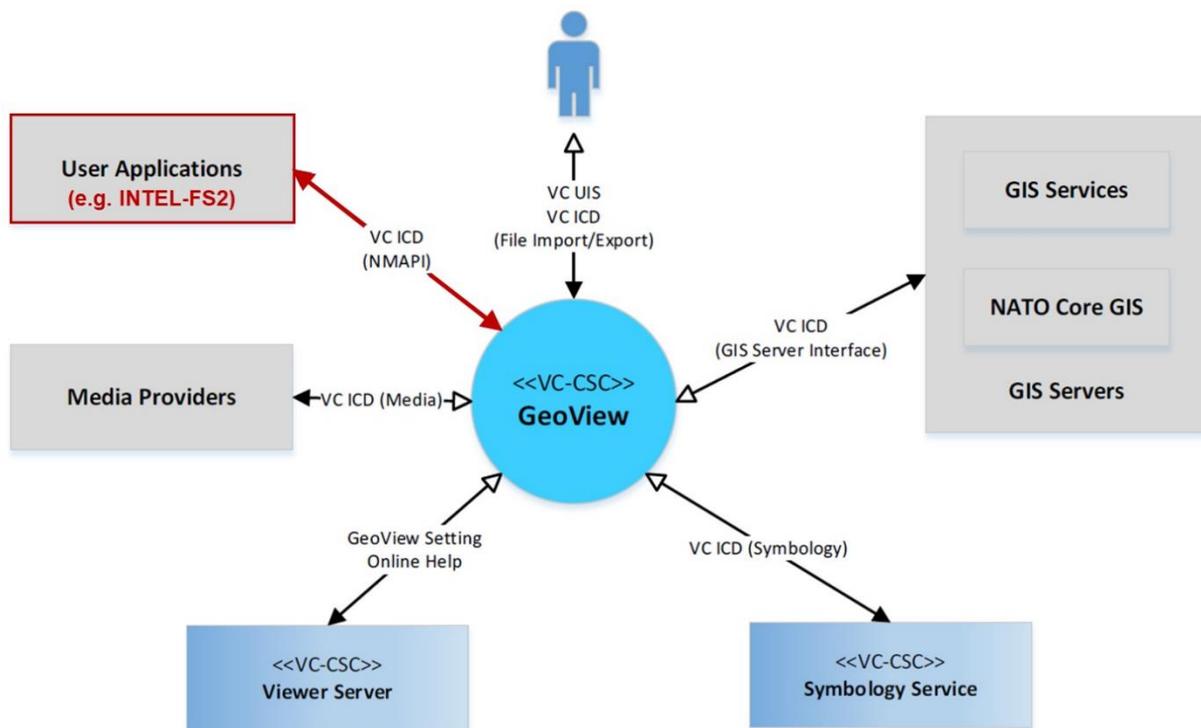
[GUA-128] It shall be possible to scroll horizontally and vertically in both the data grid part and the timeline part of the Gantt View.

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.feature.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.feature.plot map.feature.plot.batch map.feature.update
I2UA shall be able to draw icons, pictures, and geometric shapes on GeoView	map.feature.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.feature.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.feature.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.feature.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 user defined 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 to 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 RESTRICTED 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 RESTRICTED 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 RESTRICTED 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 cursor 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 IIEs, 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 RESTRICTED 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

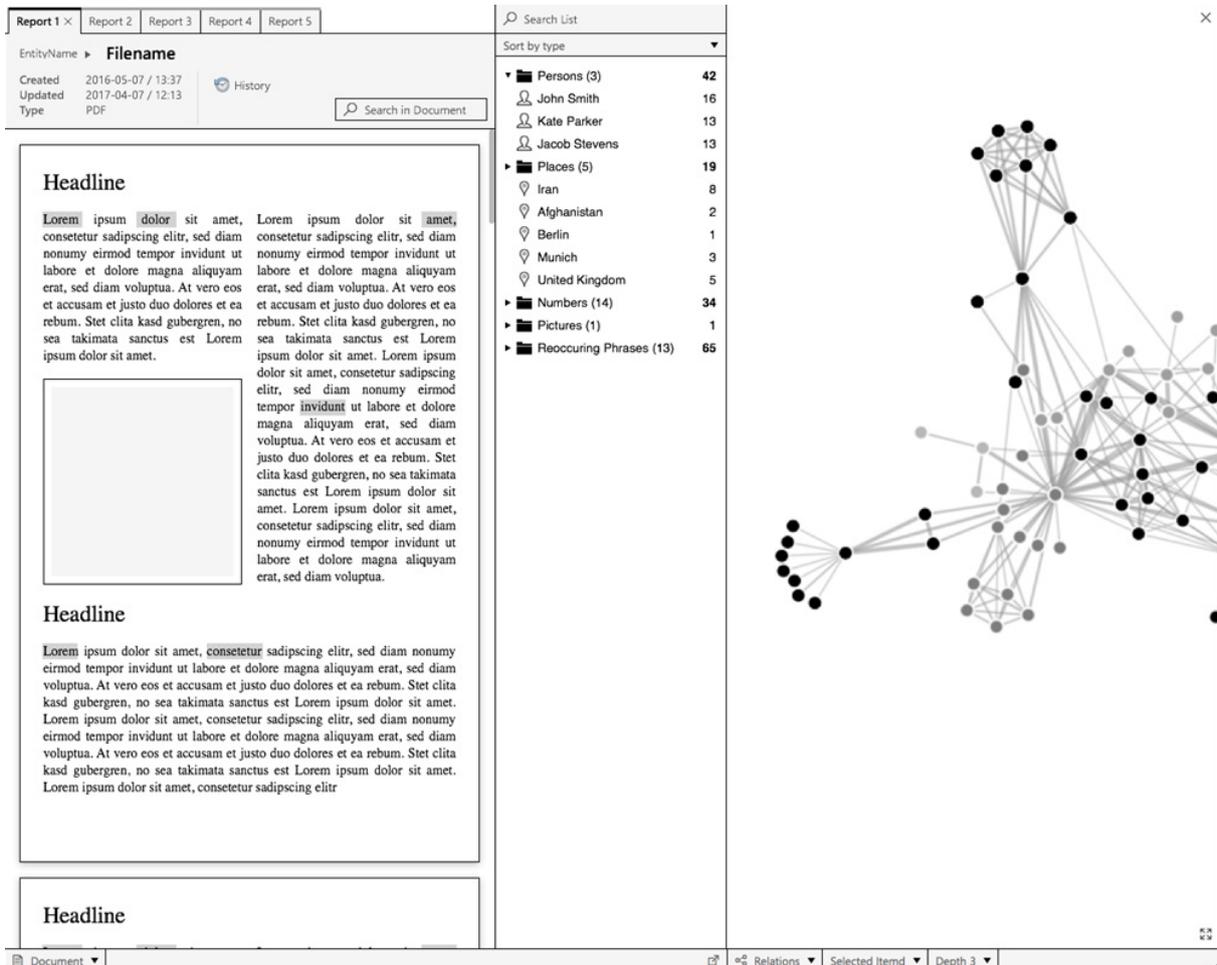
[FUA-153] The Previewing Report Reader shall support identification of existing BSOs in the text (an example of a Report Reader with BSO identification is shown in the figure below. For BSOs that already exist as objects in the INTEL-FS repository, and that are found in the text, the user can use the 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

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

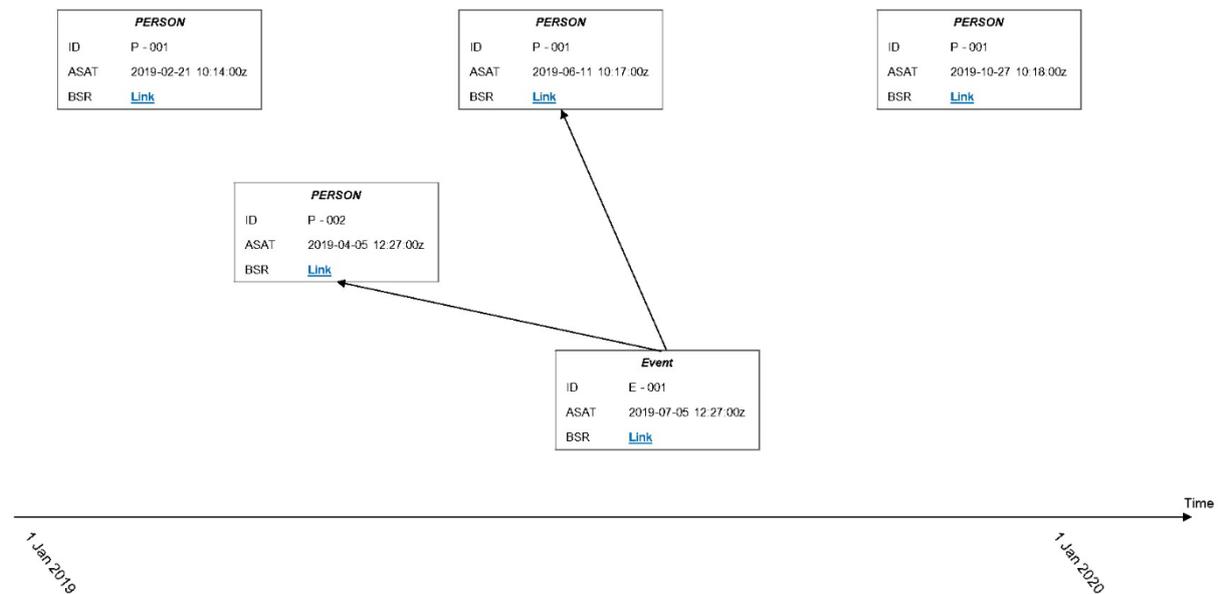
Est. Cost[€]: Contractor to provide cost estimate

[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

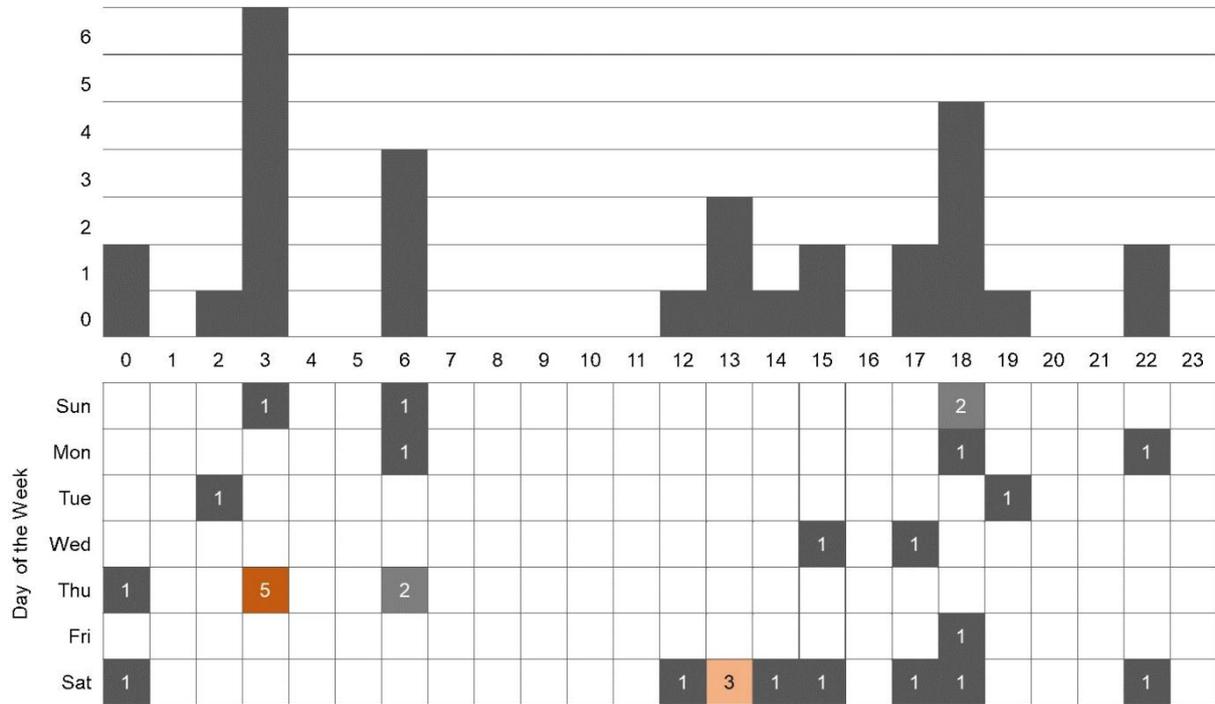
4.1.8.8 Pattern of life (PoL) analysis functionalities

[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

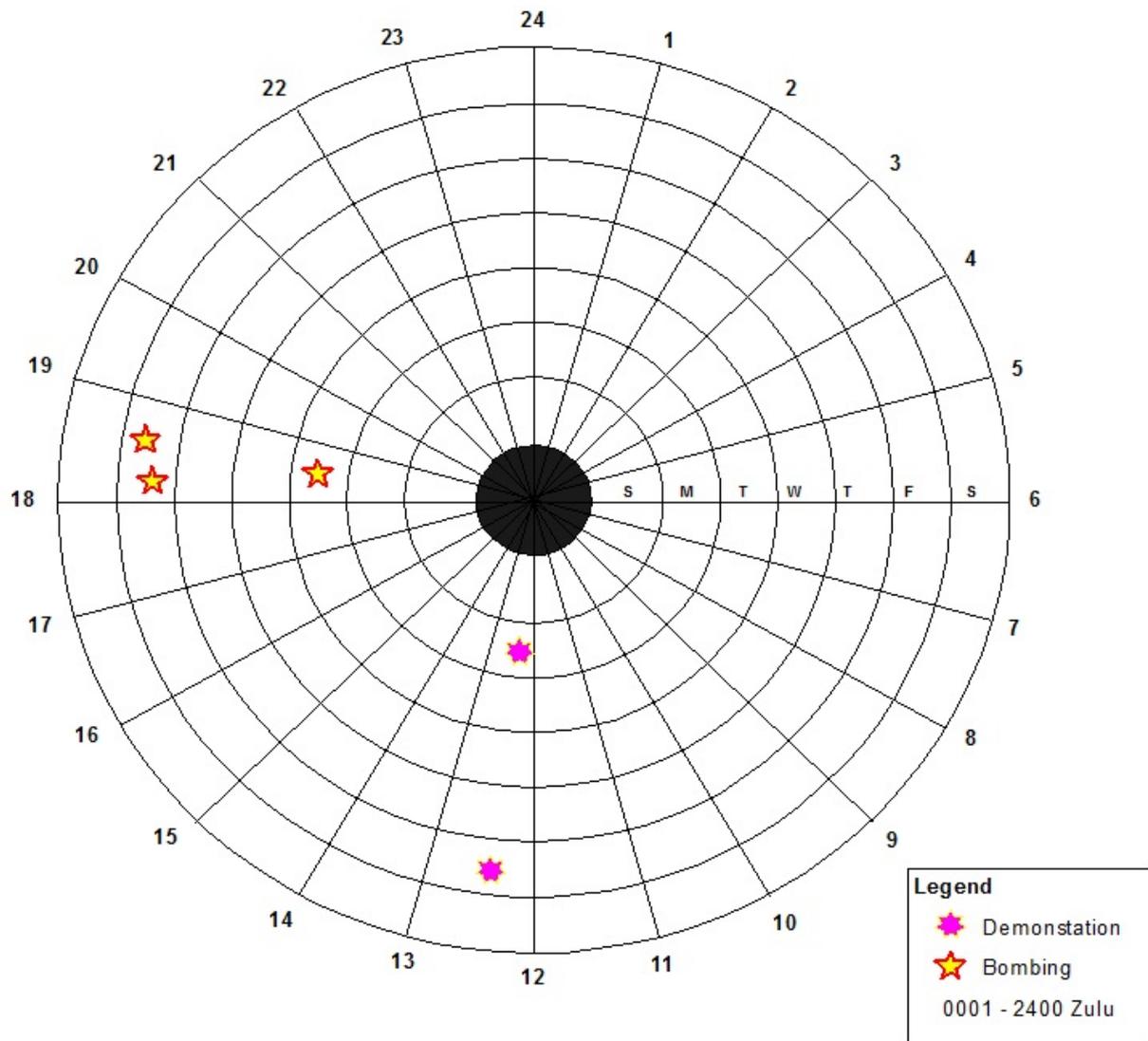
Figure 4-4 Event histogram combined with day of week and time of day



[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

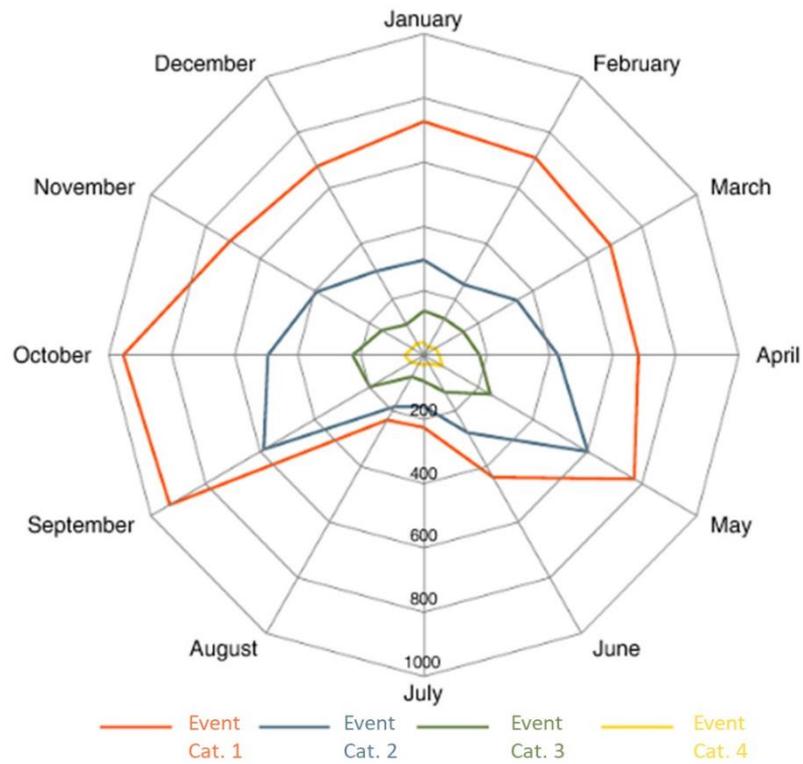
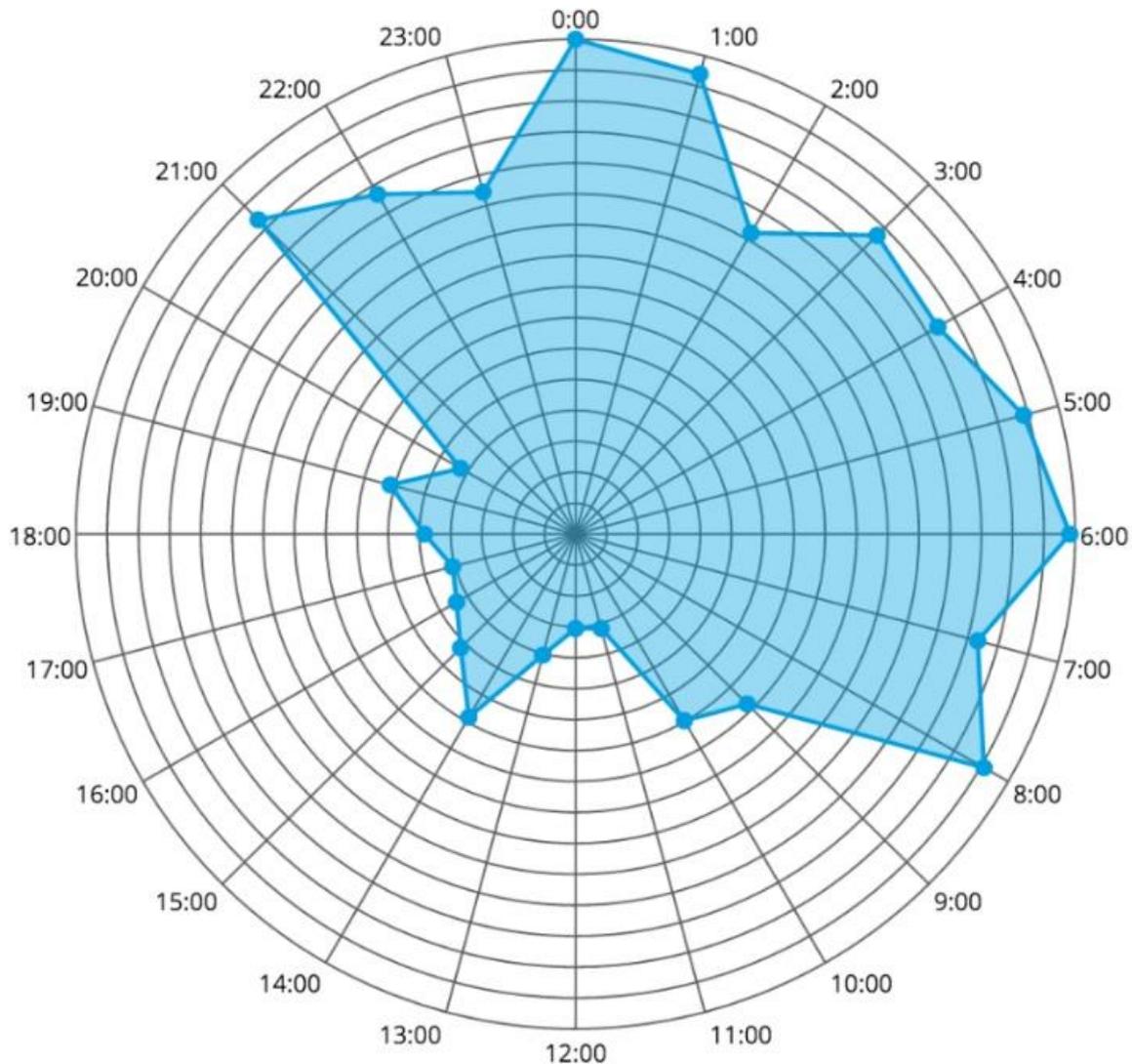


Figure 4-7 Another example of Radar Chart Visualisation of Temporal Data; this time with time-of-day on the circumference



[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 Synchronism 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)

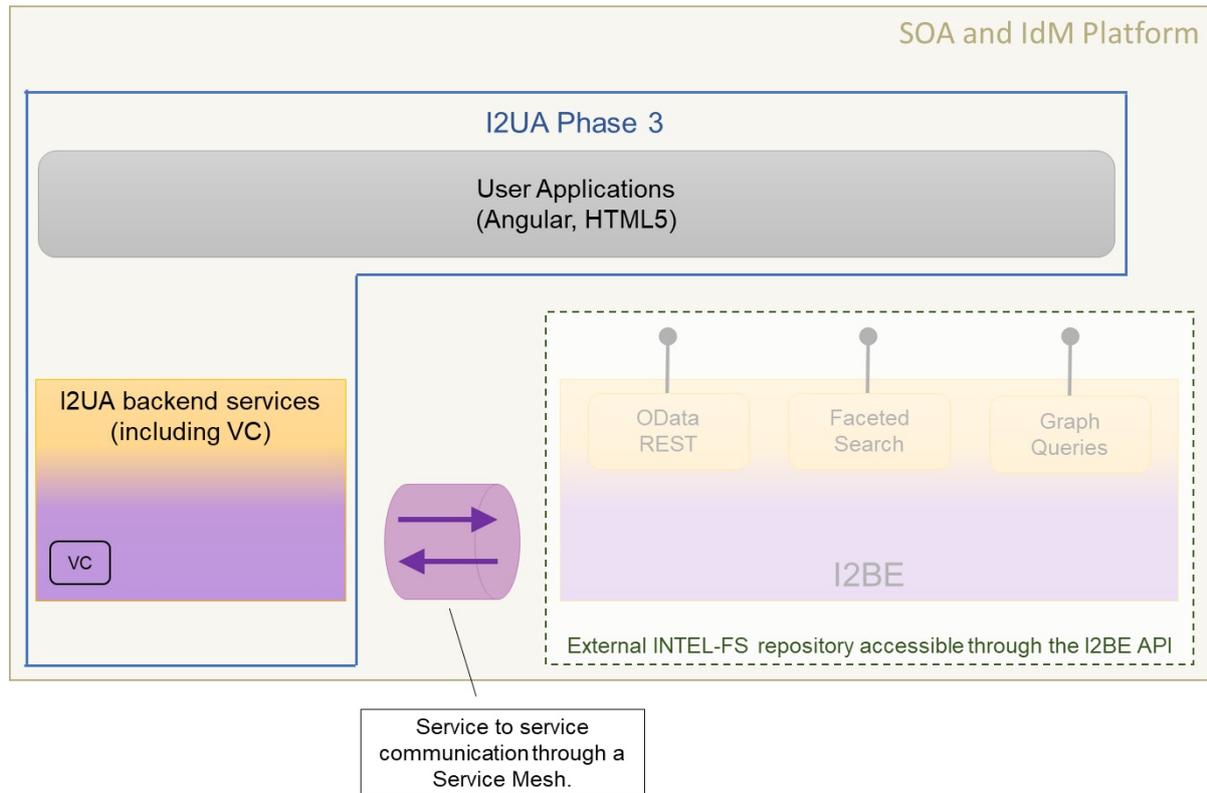
Est. Cost[€]: Contractor to provide cost estimate

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 the figure above, include services for faceted search and graph queries in 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
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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 AII 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.

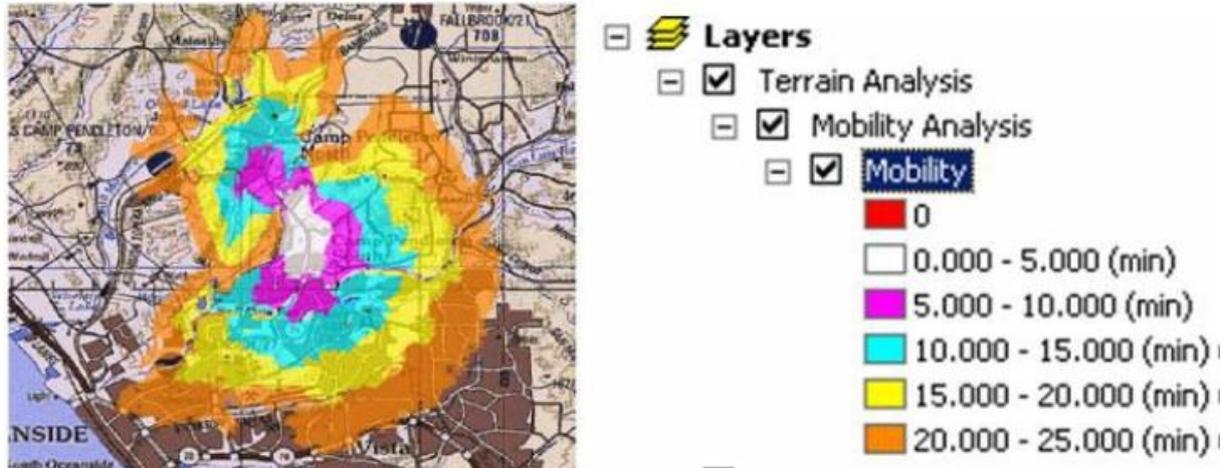
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

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)
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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 show 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 Gantt View shall be implemented using, or including, the Gantt 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 Gantt 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

N A T O U N C L A S S I F I E D



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

**INTEL-FS SPIRAL 2 - BACKEND SERVICES (I2BE)
BOOK II - PART IV - SOW**

STATEMENT OF WORK (SOW)

Version 1.5

10/03/2021

N A T O U N C L A S S I F I E D

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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
09 Feb 2021	1.2	IFB Amendment 2: Minor clarification
16 Feb 2021	1.3	IFB Amendment 3: Clarifications on IV&V and UAT
10 Mar 2021	1.4	IFB Amendment 6: Added REST API to the list of PFI, provided clarifications for the Warranty and API documentation, and clarified API documentation.
24 Mar 2021	1.5	Provided expected duration for Kick-Off meeting, WP Start-up Meeting, and Increment Start-up Meeting

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 set of backend services hereafter referred to as INTEL-FS2 BE, or I2BE.
- [4] The user applications will be procured through a different contract. The procurement of the user applications is described in a separate SOW.

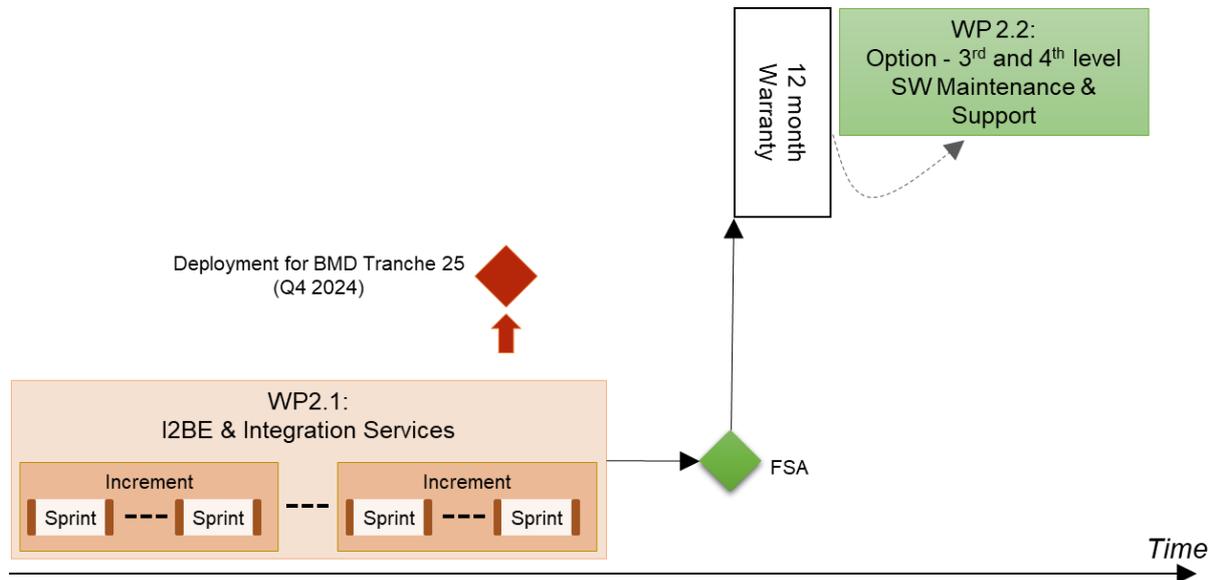
1.2 Purpose

- [5] The purpose of the present contract is to procure the new NATO-owned INTEL-FS backend services (I2BE) for deployment to the NATO Command Structure (NCS) operational network.
- [6] The I2BE will replace the current web application backend part of INTEL-FS Spiral 1.
- [7] The I2BE 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, all the implementation work will be organized in one single work packages (WP 2.1). In addition an optional work package (WP 2.2) is defined for the eventuality of the Contractor, post the warranty period, is providing 3rd and 4th level software (SW) 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 implementation work will include:
 - (1) Implementation of a new, scalable, and high performance backend for INTEL-FS that will replace the current INTEL-FS Spiral 1 backend;
 - (2) Implementing an OData application programming interface (API) enabling client application to access the INTEL-FS data;
 - (3) Implement access control to all services that are compliant with the new Bi-Strategic Command Automated Information System (Bi-SC AIS) identity management (IdM) platform;
 - (4) Implement the new backend solution as services to be hosted on the service oriented architecture (SOA) and IdM Platform;
 - (5) Adding new functionalities (that does not exists in the existing INTEL-FS Spiral 1) in support of Ballistic Missile (BM) Defence (BMD) and Collection Management (CM);
 - (6) Integration testing with the new INTEL-FS front end application (I2UA) and verification that the project user stories are properly served by the backend services;
 - (7) Implementation of a number of integration services for importing data from other systems, and for exporting INTEL-FS data to other systems;
 - (8) Delivery of system administration tools
- [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).
- [13] A second and optional work package (WP 2.2) is defined for the eventuality of the Contractor, post the warranty period, is providing software (SW) maintenance support (3rd level support).

- [14] The Contractor is expected to apply the Scrum agile process framework for managing the implementation work and to apply both Domain Driven Development (DDD) methodology and Behaviour Driven Development (BDD) methodology (the latter for test and verification purposes).
- [15] 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.
- [16] 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. The CLIN delivery times in the SSS is defined through the increment number where the deliverable is expected to be delivered

1.4 Purchaser's Responsibilities

- [17] 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.
- [18] 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).
- [19] The Purchaser's Project Manager will be supported by specialists in certain areas who may, from time to time, be delegated to act on the Project Manager's behalf in their area of expertise.
- [20] 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.
- [21] The Purchaser will provide the Contractor with available technical descriptions of external NATO interfaces if such descriptions are required for the work.
- [22] 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)

- [23] 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).
- [24] The Purchaser will equip the Contractor with one NATO RESTRICTED (NR) laptop to be used for sharing of NR material.
- [25] The Purchaser will provide the Contractor with a set of user accounts on the NATO Software Factory (NSF), see section 2.4.1.
- [26] The Purchaser will provide the Contractor with the Service Oriented Architecture (SOA) and Identity Management (IdM) Platform, see [SOA-IdM].
- [27] The Purchaser will provide the Contractor with a reference test environment for system integration testing (this will be provided within the NSF).

- [28] The Purchaser will provide the Contractor with the current INTEL-FS Spiral 1 software.
- [28a] 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]).
- [29] The Purchaser will provide the Contractor with the source code for the STANAG 4609 video conditioner, for additional details.

1.6 Conventions

- [30] Requirements in the SOW are formulated using the form “shall”. Context information supporting the requirements definition is provided using the form “will”.
- [31] “Shall” statements are contractually binding; “Will” statements are non-mandatory, or they imply intent on the part of the Purchaser.
- [32] Mandatory requirements in the SOW are preceded by a unique heading number, consisting of a prefix, followed by a number.
- [33] Informational or context information not conveying any requirement on the Contractor is preceded by a number heading in brackets, [xx], without prefix letters.
- [34] The term “the Purchaser” means the NCI Agency or its authorised representatives.
- [35] Whenever requirements are stated herein to “include” a group of items, parameters, or other considerations, “include” means “include but not limited to”.
- [36] Whenever reference is made to a section or paragraph, the reference includes all subordinate and referenced paragraphs.
- [37] 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

- [38] 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

- [39] 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

- [40] 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
[INTEL-FS2-UserStories]	CO-14873-INTELFS2, INTEL-FS SPIRAL 2 - USER APPLICATIONS (I2UA) BOOK II - PART IV – USER STORY DOCUMENT (USD), 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

[41] 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

[42] 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 SECRET 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 SECRET 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 SECRET clearance.

2.1.1.4 Other Key Roles

- [43] 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)

- [44] 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

- [45] 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".
- [46] 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

- [47] Security aspects relevant to the Contractor's work are defined in the Contract Special Provisions document (see [INTEL-FS2-Special-Provisions]) 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

- [48] The Purchaser reserves the right to perform Reviews and Quality audits at any of the Contractor (or Sub-Contractor(s)) facilities.
- [49] 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

- [50] Level of Support: 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.
- [51] Level of Maintenance: 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.
- [52] First Level Support Process: 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
- [53] 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.
- [54] 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.
- [55] 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.
- [56] 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.
- [57] 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

[58] 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)

[59] 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)

- [60] 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.
- [61] 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 RESTRICTED 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.

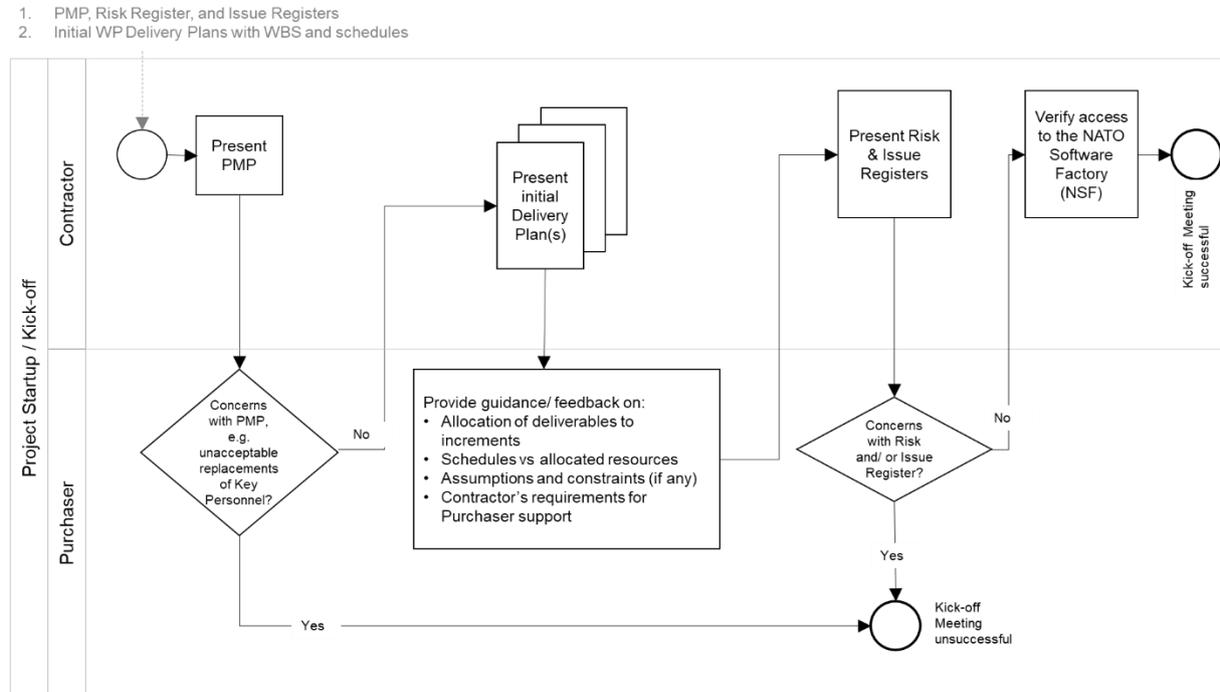
2.4.3 Kick-Off Meeting

- [62] 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.
- [63] 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.
- [64] 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 is expected to require no more than one day, and 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.
- [65] 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.
- [66] The Purchaser will provide feedback to the Contractor on the WBS and schedule.
- [67] 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

[68] 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 is expected to require no more than five days, and 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.

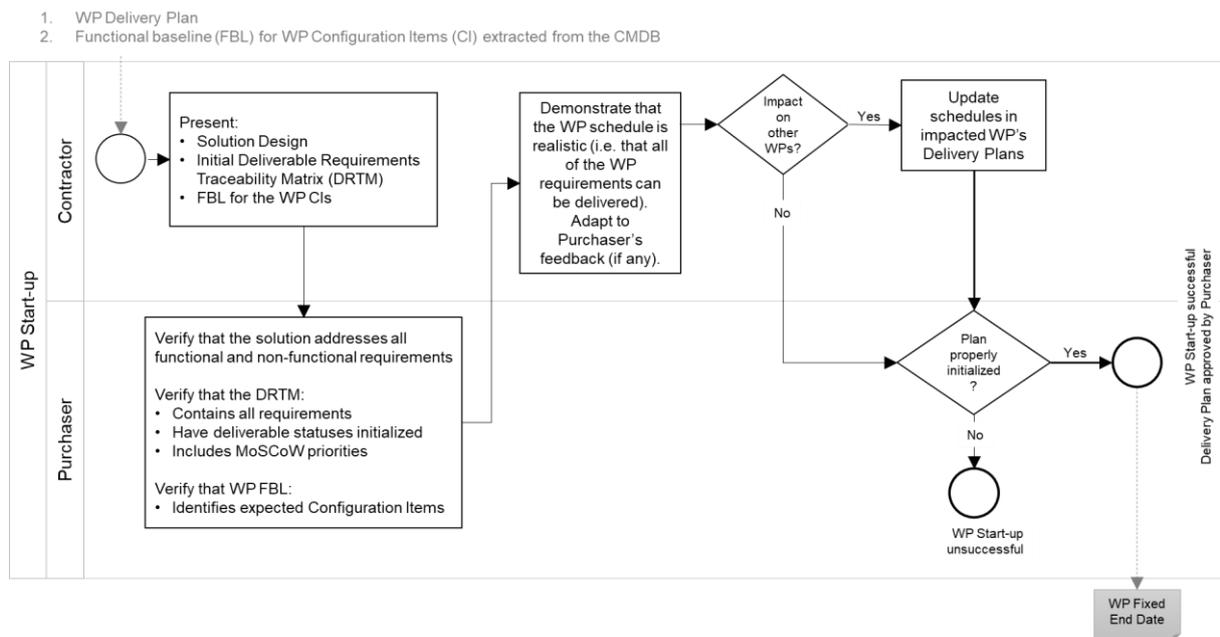
[SOWG-163] The Contractor shall at the meeting present the refined WP Delivery Plan. The presentation shall be:

- (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.

[69] The Purchaser will review the Delivery Plan and if agreeing with the plan give Contractor permission to proceed.

[SOWG-164] In case the Contractor chooses 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



[70] An outcome of the WP Start-up meeting is the identification of a Fixed WP End-date.

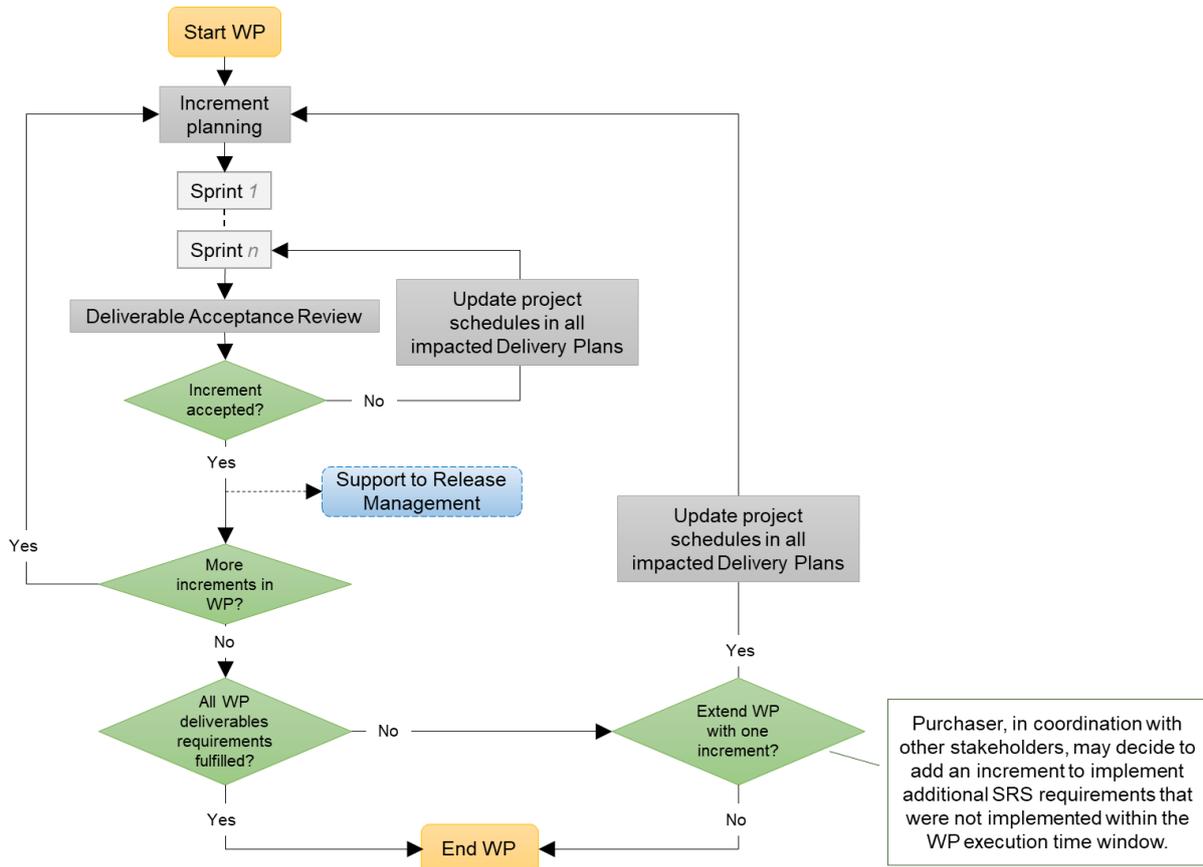
2.4.4.2 WP Execution

[71] 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.

[72] 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.

- [73] 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.
- [74] 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

- [75] The preparation for and the conduct of the Increment-Start-up Meeting is depicted in Figure 2-4.

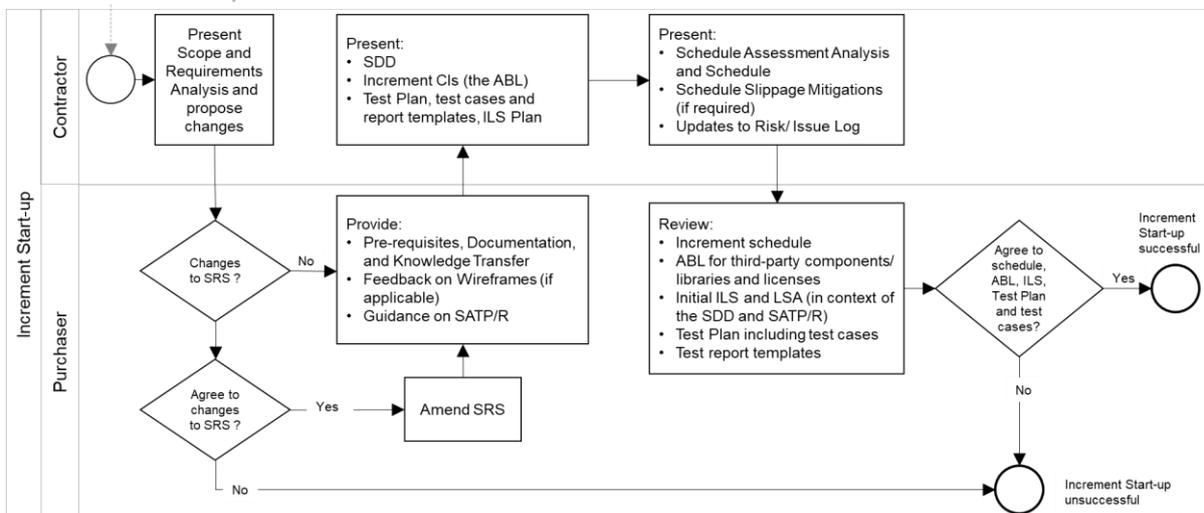
- [SOWG-168] The time and duration of each Increment Start-up Meeting shall be in accordance with the schedule established in the Delivery Plan at the WP Start-up meeting.
- [SOWG-169] The Contractor's key personnel shall meet with the Purchaser's Project Manager. The meeting is expected to require no more than two days, and 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 wireframes¹ 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.
- [76] 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

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.
- [77] 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.
- [78] 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

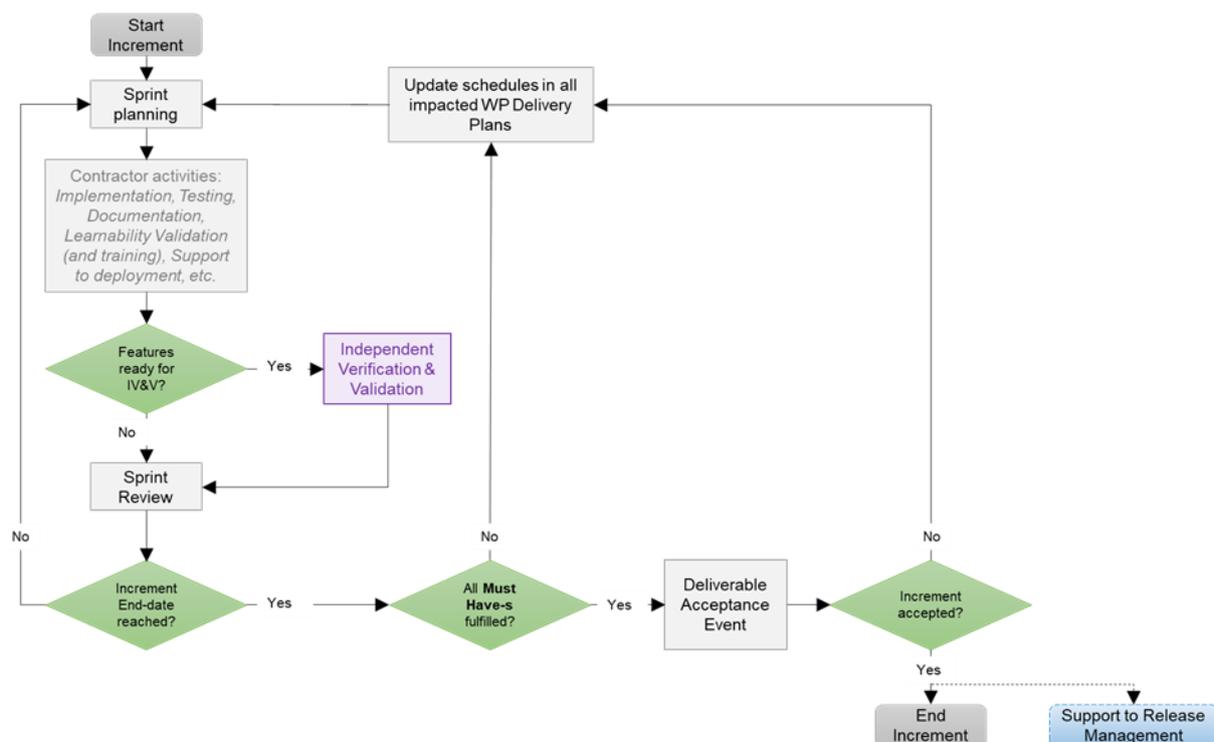


2.4.5.2 Increment Execution

- [79] After a successful Increment Start-up the project will, as shown in Figure 2-5 run through a number of sprints.
- [80] 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.
- [81] 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.
- [82] 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.
- [83] 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.)
- [84] 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).
- [85] 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	<p>The failure of testing of a requirement.</p> <p>The failure results in the termination of the complete system or one or more component of the system.</p> <p>The failure causes extensive corruption of data.</p> <p>The failed function is unusable and there is no acceptable alternative method to achieve the required results.</p>
Major	<p>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.</p> <p>Examples:</p> <ul style="list-style-type: none"> • 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	<p>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.</p>
Minor	<p>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.</p>
Cosmetic	<p>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.</p>

Table 2-4 Priorities for defect classification

Priority	Definition
Urgent	<p>The defect shall be resolved as soon as possible. Required to complete independent verification and validation activities.</p>
Medium	<p>The defect shall be resolved in the normal course of development activities. It can wait until a new build or version is created.</p>
Low	<p>The defect is an irritant which should be repaired, but repair can be deferred until after more serious defects have been fixed.</p>

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%.

[86] 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.

[87] 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

- [88] 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).

- [89] 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.
- [90] 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).
- [91] 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).

[92] 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)

[93] 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.

[94] 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

[95] 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.

[96] 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

[97] The Deliverable Acceptance Review serves as an Increment Close-out Meeting.

[98] 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

[99] 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).

[100] 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)

[101] 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

[102] 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

- [103] 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.

- [104] 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.

[105] 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).

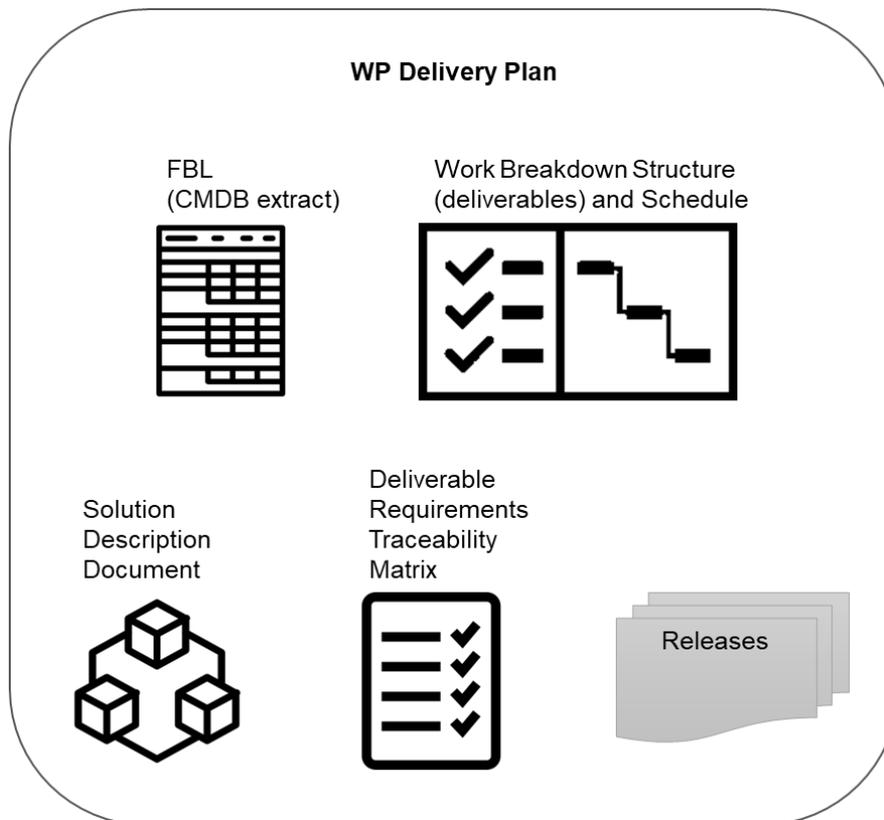
[SOWG-270] The CMP shall define the CM organisation including the Configuration Manager role and any other supporting CM personnel. Note: CM personnel shall have sufficient knowledge, experience, responsibility, authority, organisational freedom, organisation independence and security clearance to review 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

- [106] This section identifies documentation artefacts that are specific to the planning and execution of a work package (WP).
- [107] 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



- [108] 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.
- [109] 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.
- [110] 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).
- [111] 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)

[112] 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

- [113] 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)

- [114] The DRTM will be used to track the progress on all the individual requirements of the WP deliverables as defined in the SRS.
- [115] 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.

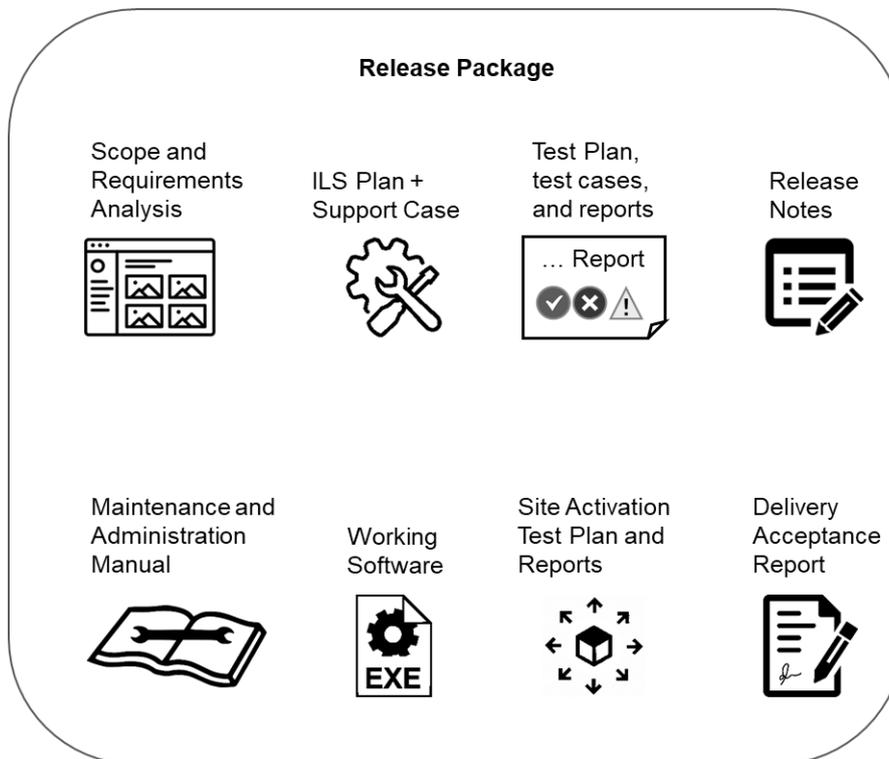
2.5.4 Release Package

[116] 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.

[117] 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

[118] See section 2.3.2 and section 2.3.4.3.

2.5.4.3 Test Plan and Reports (TP/R)

[119] 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)

- [120] 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)

- [121] 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)

- [122] 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)

- [123] 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.
- [124] 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

[125] 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 OData REST API, OWASP, Web-applications, Graph Databases, modern search engines, service-oriented architectures, enterprise integration;
- (4) Have a NATO SECRET clearance.

3.1.2 Software Architect

[SOWG-362] The Contractor shall designate a Software Architect for the project; who shall maintain the INTEL-FS Spiral 2 Information Model in IBM Rational Software Architect (RSA).

[SOWG-363] The Contractor's Software Architect shall meet the following qualifications:

- (1) Have a bachelor's degree in Computer Science, or related/ equivalent studies;
- (2) Have three years of experience of information modelling in Unified Modeling Language (UML) in projects similar to this project in technical scope;
- (3) Have documented expert skills in usage of modelling tools like IBM RSA, or Sparx Enterprise Architect, or similar UML modelling tools;
- (4) Have a NATO SECRET clearance.

3.1.3 Scrum Master

[SOWG-364] 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-365] The Contractor's Scrum Master shall meet the following qualifications:

- (1) Have a bachelor 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 SECRET clearance.

3.1.4 Test Director

- [SOWG-366] 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-367] 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, Gherkin test-scenarios, SpecFlow and/ or Cucumber, etc.) for Azure DevOps;
 - (4) Have documented expert knowledge and experience with OData REST API, OWASP, Web-applications, graph databases, search engines, service-oriented architecture, enterprise integration;
 - (5) Have documented expert knowledge in implementing continuous integration build pipelines, testing of SOA services, and automated security testing;
 - (6) Have a NATO SECRET clearance.

3.1.5 Software Developers

- [SOWG-368] The Contractor shall designate a team of SW developers experienced with high performance and scalable backend services including search and graph query/ analytics services, and with enterprise integration activities
- [SOWG-369] The Contractor's backend 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 OData REST API, Web-applications, graph databases, search engines, enterprise integration and mediation services;
 - (3) Should have experience of working with Docker, Kubernetes, Kafka, Elasticsearch, and the Apache Camel framework;
 - (4) Have a NATO SECRET clearance.

3.2 Augmentation of SOW General Requirements

3.2.1 Additional requirements for increment start-up

- [SOWG-370] The Contractor shall at the increment start-up meeting (see section 2.4.5.1) identify the user stories that the deliverable(s) for the increment will support and the Contractor shall demonstrate that the solution for the deliverable(s), as described in the SDD, will provide sufficient functionality in the backend services to fully support all aspects of the identified user stories.

3.2.2 Additional requirements to the Deliverable Acceptance Review

- [126] The Purchaser will use the Deliverable Acceptance Review to verify that there is a consistency between the [INTEL-FS2-InformationModel] and the implementation of the deliverables.

- [SOWG-371] The Contractor shall at the Deliverable Acceptance Review demonstrate that
- (1) Forward-transformations from the information model has been used (to the maximum extent possible) for database schemas (if applicable), data access layer, application programming interfaces, domain value tables, and documentation, etc.;
 - (2) If applicable, the information model has been updated to reflect the increment deliverable implementations;
 - (3) That the information model is properly managed as a configuration item.
- [SOWG-372] The Contractor shall at the Deliverable Acceptance Review through the System Integration Tests (SIT) and Reporting (see section 2.4.5.2.2.7) demonstrate that the backend services fully supports the relevant user stories and acceptance criteria as defined in [INTEL-FS2-UserStories]. This means all required backend functionality to fulfil the user story acceptance criteria is provided (where backend functionality means anything that is not user interface related and that normally would run on the client side).
- [SOWG-373] The Contractor shall at the Deliverable Acceptance Review demonstrate that API changes (if any) are fully documented.

3.2.3 Additional requirements for supporting release to production

- [SOWG-374] 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-375] The Contractor shall, after FSA, in the Warranty period, continue to provide the 3rd level and 4th level support.

3.3 WP2.1 Service-oriented backend and integration services

3.3.1 Deliverables

- [127] Table 3-1 below show an extract of the SSS for WP 2.1 identifying the high-level CLIN numbers for the deliverables of the WP (for further breakdown and details of deliverables, see the SSS spreadsheet).

Table 3-1 WP 2.1 SSS high-level CLIN numbers

CLIN	Description	Delivery at increment number
1	Backend services – Phase 1	
1.1	IIE to IIE Association Service	1
1.2	Geospatial and Features Service	1
1.3	Intel-FS Spiral 1 Geospatial and Features Migration Service	1

1.4	Products Management Service	1
1.5	Intel-FS Spiral 1 Products Migration Service	1
1.6	Collation Tasking Management Service	2
1.7	Battlespace Object (BSO) Management Service	2
1.8	ORBAT Management Service	2
1.9	Intel-FS Spiral 1 BSO Migration Service	2
1.17	Search Service	2
1.10	ISR Organization Service	3
1.13	Overlays Service	3
1.14	Intel-FS Spiral 1 Overlays Migration Service	3
1.18	Named Collections Service	3
1.11	Targets Service	4
1.12	Intel-FS Spiral 1 Target Data Migration Service	4
1.15	Intelligence Requirements (IR) Management (IRM) Service	4
1.16	Intel-FS Spiral 1 IRM Data Migration Service	4
1.19	Notification Service	4
2	Backend services – Phase 2	
2.1	IIE to IIE Synchronization Service	6
2.2	Presentation-conditioning Service	6
2.4	Collection Requirement (CR) Management (CRM) Service	6
2.3	Data Analytics Service	7
2.6	JIPOE Service	7
2.7	Terrain & Mobility Analysis Service	7
2.5	Collection Operations Management (COM) Service	8
3	System Administration (SysAdm) tool	
3.1	Configurations and setup management functions	5
3.2	Domain-values management functions	5
3.3	Content management functions	5
3.4	Diagnostics functions	5
3.5	Notification function	5
4	Integration services - I2BE destination	
4.1	Central Card Catalogue (CCC) Import Service	5
4.2	ETEE Import Service	8
4.15	Asset Lists Import Service	8
4.17	BM Firing Event Import Service	8
4.10	Air ORBAT Import Service	9
4.11	Land ORBAT Import Service	9

4.12	Maritime Task Organization Import Services	9
4.3	NATO CSD IPL Import Service	10
4.4	NATO CSD Geospatial and Features Import Service	10
4.5	NATO CSD ISR Organizations Import Service	10
4.6	NATO CSD IRM Data Import Service	10
4.7	NATO CSD CRM Data Import Service	10
4.8	NATO CSD COM Data Import Service	10
4.13	NJTS Import Service	11
4.14	MIDB Import Service	11
4.16	Electronic Order of Battle (EOB) Import Service	11
4.9	APP11-D Reports Import Service	12
5	Integration services – I2BE source	
5.1	Central Card Catalogue (CCC) Export Service	5
5.4	Emulated INTEL-FS Spiral 1 Web Services	6
5.2	NATO CSD Export Service	10
5.3	APP11-D Reports Export Service	12

3.3.2 Additional Requirements for Site Activations

[128] 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-376] In addition to the regular support for deployment of every release to the production staging environment (see [SOWG-314]) the Contractor shall also provide support for up to 15 installations and site activations on actual servers in production.

[SOWG-377] 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.

[129] Note: The installation and activation to production is normally executed from Purchaser's facility in Mons-Belgium.

[SOWG-378] The Contractor shall also during this work package be responsible for corrective maintenance of software produced by the Contractor.

[SOWG-379] 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 WP 2.2 Optional 3rd and 4th Level Maintenance and Support

[130] 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-380] The Contractor shall provide one year of 3rd Level and 4th Level Maintenance and Support for the I2BE 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-381] 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.

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**INTEL-FS SPIRAL 2 - BACKEND SERVICES (I2BE)
BOOK II - PART IV - SRS**

SYSTEM REQUIREMENT SPECIFICATION (SRS)

Version 1.3

24/03/2021

N A T O U N C L A S S I F I E D

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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]
24 Mar 2021	1.3	Clarified that there is no constraint on the INTEL-FS Spiral 1 Migration Services to developed as Non-Native Hosted Services.

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-INTELF2, INTEL-FS SPIRAL 2 – Initial Information Model Book II - Part V, NCI Agency
[INTEL-FS2-UserStories]	CO-14873-INTELF2, 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 AEW-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;
- (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). Note: While it is preferred that all I2BE services are implemented as Non-Native Hosted Services, this preference does not apply to the INTEL-Fs Spiral 1 Migration Services which could be implemented as Native Hosted Services. 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. Note: This requirement does not apply to the INTEL-FS Spiral 1 Migration Services (see section 3.1.3, 3.1.5, 3.1.9, 3.1.12, 3.1.14, and 3.1.16).
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 through 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 through 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 is 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.

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. through 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Identify existing organizations by their Name
Unit	<ul style="list-style-type: none"> • Identify existing units by their Name
Events	<ul style="list-style-type: none"> • Identify events from date/time-stamps matching existing event’s Start Date

Places	<ul style="list-style-type: none"> •Identify existing places/ locations by their Name •Identify existing places/ locations by their Basic Encyclopedia (BE) number
Equipment	<ul style="list-style-type: none"> •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 through 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 faceted 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 releasability 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 through 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 Betweenness 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

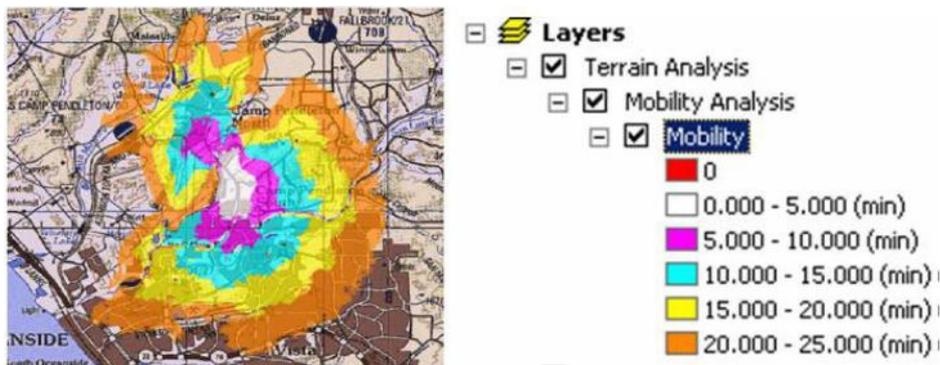


Table 3-3 Parameters provided by client when requesting a Mobility Analysis

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-INCSPTREP] 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-INCSPTREP] 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 100 million intelligence information 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 100 million intelligence information 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 handle 100 million 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](#)