ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Μόνιμη Αντιπροσωπεία της Ελλάδος
στο ΝΑΤΟ

Aikaterini Nikaki
15.04.2021 15:27

ΑΔΙΑΒΑΘΜΗΤΟ
ΕΠΕΙΓΟΝ

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Βρυξέλλες, 15 Απριλίου 2021
Α.Π.: 1916

ΠΡΟΣ: ΥΠΕΘΑ/ΓΔΑΕΕ/ΔΑΕΤΕ (μ. η.)

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

ΘΕΜΑ: 9η Τροποποίηση Πρόσκλησης Υποβολής Προσφορών IFB-CO-14873-INTELFS2, Διαγωνιστικής Διαδικασίας Έργου: «Intelligence Functional Services (INTEL-FS) - Spiral 2 and BMD functions in INTEL-FS»

1. Διαβιβάζεται, συνημμένως, 9η Τροποποίηση Πρόσκλησης Υποβολής Προσφορών (Invitation for Bids/IFB) για διαγωνισμό εν θέματι έργου, εκ μέρους NCIA, ως φιλοξενούντος έθνους.

2. Καταληκτική ημερομηνία υποβολής προσφορών παραμένει η 29η Απριλίου 2021, 12:00 τ.ώ.

3. Ενδιαφερόμενες εταιρίες δύνανται αναζητήσουν πληροφορίες μέσω καθοριζομένου σημείου επαφής (Point of Contact/POC, βλ. παρ. 6 τροποποιήσεως).

4. Παρακαλούμε για τις ενέργειές σας.

ΣΕΚΕΡΗΣ

Συν. Σελ: 287

ΑΚΡΙΒΕΣ ΑΝΤΙΓΡΑΦΟ
Η υπάλληλος της Μ.Α. ΝΑΤΟ
Αικατερίνη Νικάκη
ΠΕ ΕΠ&ΠΛ Α'

Acquisition Directorate

Boulevard Léopold III
B-1110 Brussels, Belgium

NCIA/ACQ/2021/6746
2 April 2021

To: All Nominated Bidders and Distribution List

Subject: Invitation For Bid IFB-CO-14783-INTELFS2 Amendment 9

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

References:
A. AC/4-D/2261(1996 Edition), Procedures for International Competitive Bidding
B. AC/4-D(2008)0002-REV2, International Competitive Bidding Using Best Value Evaluation Methodology, dated 15 July 2015
C. IFB-CO-14783-INTELFS2 NCIA/ACQ/2020/6369, dated 22 December 2020
D. IFB-CO-14783-INTELFS2 Amd. 1, NCIA/ACQ/2021/6475, dated 29 January 2021
E. IFB-CO-14783-INTELFS2 Amd. 2, NCIA/ACQ/2021/6574, dated 11 Feb. 2021
F. IFB-CO-14873-INTELFS2 Amd. 3, NCIA/ACQ/2021/6587, dated 22 Feb. 2021
G. IFB-CO-14873-INTELFS2 Amd. 4, NCIA/ACQ/2021/6624, dated 24 Feb. 2021
H. IFB-CO-14873-INTELFS2 Amd. 5, NCIA/ACQ/2021/6660, dated 05 March 2021
I. IFB-CO-14873-INTELFS2 Amd. 6, NCIA/ACQ/2021/6673, dated 11 March 2021
J. IFB-CO-14873-INTELFS2 Amd. 7, NCIA/ACQ/2021/6697, dated 15 March 2021
K. IFB-CO-14873-INTELFS2 Amd. 8, NCIA/ACQ/2021/6734, dated 25 March 2021

Dear Prospective Bidders,

1. The purpose of this Amendment 9 is to:

    a. Publish Release 8 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 – 8 have been greyed out for your convenience.

3. Revised bidding documents provided with this IFB Amendment 9 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 – 8 (References D – K).

NATO Communications and Information Agency
Agence OTAN d'information et de communication
Avenue du Bourget 140
1110 Brussels, Belgium
www.ncia.nato.int

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.

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-INTELFS2@ncia.nato.int.

FOR THE DIRECTOR OF ACQUISITION:

Daniel Gaertner

Digitally signed by Daniel Gaertner
Date: 2021.04.02 01:47:40 +02'00'

Daniel K. Gaertner
Senior Contracting Officer

Attachment:

1) Responses to Clarification Requests, Release Number 8

2) Revised IFB Documents:
   - 2.1 File # 07: Book II – Part II, Special Provisions
   - 2.2 File # 09: Book II – Part IV, SOW I2UA
   - 2.3 File # 12: Book II – Part IV, SOW I2BE
   - 2.4 File # 13: Book II – Part IV, SOW I2BE Annex A, SRS

NCIA/ACQ/2021/6746

Distribution List for IFB-CO-14783-INTELFS2 Amendment 9

NATO Delegations (Attn: Infrastructure Adviser):

Albania
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NATO HQ

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

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

SACTREPEUR, Attn: Infrastructure Assistant

SHAPE, Attn: J3 & J2

Strategic Commands

HQ SACT Attn: R&D Contracting Office

ACO Liaison Office

All NATEXs

Attachment 1: Responses to Clarification Requests, Release Number 8

Index no. NCI Agency	IFB Ref.	Bidder's Question	NCIA Response
CR1	N/A	Is it possible to download into the web site INTELFS-1 Spiral 1 SRS, User Manuel, SDD, etc. or any suitable project document to be able to understand the scope/coverage of the Spiral 1.	The *INTEL-FS_User_Manual* , the *INTEL-FS_Administrator_Manual* , and the *INTEL-FS_-_System_Design_Specification_-_62789015_424_-_V0.14* are available under the IFB Portal/Supporting Documents
CR2	N/A	Should be key personnel employee of the bidder or is it possible to be a sub-contractor employee?	It is acceptable for Key Personnel to be employees of either the prime contractor or subcontractors. However, for any Key Personnel that are subcontractor employees, the bid shall (as specified in SOW section 2.5.2.1) clearly explain their responsibilities and their authority within the prime contractor's organization.
CR3	N/A	Do all possible sub-contractor's employees need to possess NATO-SECRET status also?	Yes, all resumes/CVs submitted with the bid for the PMO and Technical Team (SOW 2.1.1 and 3.1) must demonstrate a NATO SECRET clearance.
CR4	N/A	What is the expected number of deployments/servers? Some of the 3rd party COTS could be licenced per CPU, how should it be reflected in price?	The solution shall be running on the SOA Platform as a PaaS and ITM as IaaS. There should not be any license constraints linked to servers.
CR5	N/A	Are the licenses of operating systems on the server-side in the scope of the BID?	The solution must run on the SOA Platform (the PaaS) so as long as the OS is supported by the SOA Platform there will be no need to include OS costs in the bid.
CR6	N/A	Who and how will be the final authority for an interface between UE and BE especially in the case that both projects will be implemented by different bidders?	An initial API will be provided by NCIA that will be an automatic forward transformation from the information model, and will be baselined as a configuration item for the initial version of the API. This initial API will be provided to both I2UA and I2BE Contractor at Contract Award. The BE contractor will in the contract period be responsible for the evolution, improvement, and maintenance of the API, but NCIA will be the approving authority for changes to the API.
CR7	N/A	According to [FBE-201]: AEDP-17 defines CORBA and WS interface for CSD. Which one should be used for NATO CSD IPL integration?	For the information going from INTEL-FS to the NATO CSD neither of the AEDP-17 interfaces will be used. The NATO CSD implements a REST API dedicated for INTEL-FS to use to share information with coalition through the NATO CSD (see NATO CSD documentation on the IFB portal). For import of data from the NATO CSD IPL to INTEL-FS, the Contractor is free to chose which interface in the NATO CSD to use.
CR8	N/A	Which edition and baseline of STANAG 4559 NSILI (CSD) implement NATO CSD IPL?	The NATO CSD is contracted to be implemented in accordance with STANAG 4559 Edition A Version 1, March 2018.
CR9	N/A	Is it possible to reuse some existing algorithm or even existing implementation e.g. for The Terrain & Mobility Analysis [FBE-159]	NCIA is is not in the possession of any such algorithms/ implementation. However, the Bi-SC AIS CoreGIS system, which is implemented on the ESRI ArcgGIS platform, may have built-in functions that can be used for implementing these functions. The resulting solution shall as stated in the SRS [FBE-160] be implemented, and the solution should be hosted on the CoreGIS (i.e. in the ESRI ArcGIS platform). It will be the bidder's responsibility to evaluate what existing support in ESRI ArcGIS that can be used for these services.
CR10	N/A	Which operating system is used on the backend side?	See answer to CR5
CR11	N/A	Is FMN compliancy expected in the scope of the project? If yes, which Spiral and which services?	The integration services to be implemented are defined by Backend SRS. FMN compliance is not a direct requirement in the contract (the SRS defines the contractual deliverables).
CR12	N/A	Is GeoView component responsible for rendering APP-6 symbols according to given code, both point and line symbols?	Yes.
CR13	N/A	Is [INTEL-FS2-InformationModel] doc for SOW I2UA, SRS I2UA, SOW I2BE and SRS I2BE fully covered by doc 14a et 14b of IFB package?	The document 14a and 14b is a documentation extract from the IBM Rational Software Architect (RSA) implementation of the information model using the IBM BIRT tool to auto-generate a PDF view of the model. The full IBM RSA information model (in UML) will be provided to the Contractor at Contract Award.

CR14	N/A	1. [IPIWG] doc as file is empty 2. [MARIX] doc as link seems to not be accessible 3. [OASIS Odata OAS 1.0, 2016] doc as there is no file neither link associated	1. The [IPIWG] documentation is downloadable as a Zip file from the IFB portal. The zipped file when downloaded can be extracted into a folder which contains 7 XML scheme documents. There are no PDF documentation of IPIWG. 2. The [MARIX] URL works, but to access the site you will need to have a user account for the NATO ACT TIDE portal. An account can be requested using this URL: https://tide.act.nato.int/request 3. The documentation identified under [OASIS Odata OAS 1.0, 2016] can be found on the internet using a Google search (e.g. at http://docs.oasis-open.org/odata/odata-openapi/v1.0/odata-openapi-v1.0.html)
CR15	General	If the same contractor wins both bids, will the execution of the two pojects be totally independent? i.e. Different Purchaser personnel, Different Contractor key personnel, separate kick-off and WP meetings etc.	Purchaser's personnel does not have to be different. However, the bid needs to demonstrate that the Contractor's Team is sufficiently resourced according to a resource plan that realistically can deliver the project in accordance with the contracted schedule. All meetings under project execution (Kick-Off, WP meetings etc.) will have to be run separately.
CR16	ok II - Part IV - SOW I2BE -	What is meant by "documented expert knowledge" mentioned in the Personnel Qualifications? Is a certificate expected which covers the topics mentioned? There may not be any certificatations for some of the topics in the qualifications.	The CV must detail the work experience for the required skill. I.e. to describe when were the skills required, what was the context of how the skill was acquired (what work was done), what was the level of involvement and duration of the person in the work in the skill area.
CR17	General	What is planned "Effective Date of Contract" approximately?	It is estimated that EDC will be Q4 2021.
CR18	N/A	How and when will the Purchaser provide INTEL-FS Spiral 1 source code and relevant documents? Will there be a handover from the Contractor of INTEL-FS Spiral 1 project?	The INTEL-FS Spiral 1 source code will be made available to the contractor through the NSF at contract award.
CR19	Book I-Bidding Sheets I2BE	Does the distribution of price to the requirements affect the price bid evaluation or technical bid evaluation? Is it used as an indication of the level of understanding of the Bidder for the requirements?	The technical bid evaluation is done without any knowledge of any price information. As part of the price evaluation, if the distribution of price to requirements appears to be intentionally unbalanced, NCIA may ask the contractor to clarify.
CR20	General	Is there any limitation or preference of the Purchaser for the programming language for development of BE?	See backend SRS section 2.1.2 for SOA & IdM Platform compliancy. .Net and/ or Java are both supported by the SOA & IdM Platform
CR21	Book I-Bidding Instructions - 3.7 & 4.5.2.2.14. & 3.6.4.2.	Is Draft Delivery Plan for all WPs is the part of the Part-I Engineering Package or Part-II Management Package. In the table 3.7 it seems to be Management Pacakge, but in the other sections, it is in the Engineering Package.	It is part of the Enginering package. The table in Section 3.7 of the Bidding Instructions is corrected by IFB Amendment 1.
CR22	Book II-Part IV-SOW I2UA Annex A SRS	How will the non-functional requirements (i.e. Response time, Capacity) be verified for only UA without taking the BE into consideration? (I2UA SRS: NFR-2, NFR-3, NFR-4)	The BE NFRs are defined by the BE SRS and those can be verified through testing against the BE API. That means the BE performance will be known, and the UA performance can then be assessed (relative to the BE performance).
CR23	N/A	In Bidding Instructions, Draft Delivery Plan is included in Management Section of Volume-3 but is recommended to be moved to Engineering Section.	That was an error; the Delivery Plan is part of the Enginering package. The table in Section 3.7 of the Bidding Instructions is corrected by IFB Amendment 1.
CR24	13_CO-14873-INTELFS2-Book-II-Part IV SOW I2BE Annex A SRS section 5.4.1	Req ID: NFR-15 & NFR-16 Q// how verification analyze can be performed? There will be no “idealized” network conditions for latencies as stated in [127] and [128].	The purpose of *Inherent* is to take all factors that are not related to the quality of the delivered SW out of the equation for calculating availability. The deployed solution will then be observed under operation and the *Inherent* availability can be assessed.
CR25	13_CO-14873-INTELFS2-Book-II-Part IV SOW I2BE Annex A SRS section 5.4.2	Req ID: NFR-17 Q// is term “without loss of data” relates to persistent data only? Or also includes transient or session data at time of failure as well?	Persistent data only. The SRS in Amendment 1 clarifies this.

CR26	13_CO-14873-INTELFS2-Book-II-Part IV SOW I2BE Annex A SRS section 4.1.15	Req ID: FBE-294 & FBE-295 Q// ICD for assets of AirC2IS is required to be able to make a cost estimation on requirements	The AirC2IS ICD is available in the Referenced Documents folder on the IFB portal (see file AirC2IS_SDS_Annex_04_ICD)
CR27	N/A	In WP1.1, 1.2 and 1.3 sheets of SSS I2UA (and Bidding Sheets I2UA) and WP2.1 sheet of SSS I2BE (and Bidding Sheets I2BE), the price is required to be broken down into the given requirements (capabilities). In addition to the capability development, there are other activities (requirements) to be performed in this project. Some examples are listed below. We consider distributing the prices of those activities into the SSS requirements proportionally. If some of those SSS requirements are needed to be deleted throughout the execution of the project, the total price from the below activities will decrease by an amount which is equal to the price portion distributed to the deleted SSS requirements. We assess that the total effort/price of the below activities should not change linearly according to SSS requirements changes. Please advise how to formulate this subject in the price calculations. • Contractor support to Purchaser IV&V as given in I2UA SOW [84] and I2BE SOW [80] • Contractor attendance to UAT as given in I2UA SOW [SOWG-223] and I2BE SOW [SOWG-223] • Contractor attendance to Deliverable Acceptance Review I2UA SOW [SOWG-224] and I2BE SOW [SOWG-224] • Contractor support to Purchaser's accreditation activities as given in I2UA SOW [SOWG-227], [SOWG-228] and [SOWG-230], and I2BE SOW [SOWG-227], [SOWG-228] and [SOWG-230] • Contractor support site installation as given in I2UA SOW [SOWG-378] and [SOWG-379], and I2BE SOW [SOWG-376] and [SOWG-377] • Training material development and training delivery to Purchaser and /or End User Personnel as given in I2UA SOW Section 2.3.5 and I2BE SOW Section 2.3.5	* IV&V: Contractor should maximize the use of test automation as indicated in the SOW (BDD and ATDD) with integration with IV&V test recording system. IV&V resources will participate in the SOW defined events. The Contractor will have to respond to enquiries from IV&V. * UAT: As each increment results in a deliverable that can be submitted in a UAT, i.e. the expected number of UATs are known. * Deliverable Acceptance Review: Same as for UAT, the expected number of DARs are known. * Support to RFC: The RFC process will be mostly handled by NCIA. If the Contractor delivers SW (by increments) that is easily installed, has no major defects, and is documented in accordance with the Contract, then the Contractor's involvement with the RFC process will be low. The assistance will be required in the case when there are problems (e.g. with installation and with SW issues) * The training requirement is for the purchaser's O&M team, and training material needs to be delivered for each increment. No end user training is required, beyond what is defined for the Learnability Tests The bidder needs to estimate the costs of the non-developmental activites and factor them into the cost of individual impementation requirements. It is not anticipated that any potential deletion of requirements would significantly impact the non-developmental activities.
CR28	Book I – Bidding Instructions Annex B-C-D	Can you provide bidders with an editable document templates for all of these annexes B1-16 + C + D ?	Appendix B through D from the Bidding Instructions has been uploaded to the IFB portal in the Supporting Documents folder
CR29	N/A	What measures do you have in place to prevent the builder of SPIRAL 1 to benefit from its current incumbent provider position and ensure transparency of competition ?	There is no Contractor currently working on INTEL-FS Spiral 1. Since the handover and end of the warranty, INTEL-FS Spiral been maintained by NCIA. All bids will be evaluated against the criteria stated in the IFB, and will only be made available for review to the NCIA evaluators. The source code of INTEL-FS Spiral 1 will be provided to the contractor at contract award.
CR30	N/A	By reading the documentation and analyzing the functional requirements and user stories, we understand that our software is able to fulfill an important amount of these requirements and to integrate with specialized third parties for the parts that are not covered. Since our user interfaces are based on Angular and HTML5, would it be acceptable for NATO to be proposed highly configurable COTS (commercial off the shelf software, out of the box) products instead of bespoke development? By using software that is covering both AU and BE in an integrated manner, implementation risks are lowered, time to market shortens and maintenance is more efficient.	There is no restriction preventing a contractor from proposing highly configurable COTS, as long as all of the requirements are fulfilled. However, please note that: 1. It is important the back-end is separated from the front-end, and that the only interaction between the two happens through the BE API. 2. The bids for the back-end and front-end must be submitted separately from one another, with no caveats that NCIA must accept both bids together. A bid that deviates from these two points will be considered non-compliant.
CR31	N/A	Is NATO providing the infrastructure to meet the non-functional requirements (performance, recovery time, up time, concurrency, etc.) ?	The Purchaser will provide the infrastructure to meet the NFR. However when not ideal, the NFR measurements/ assessment will remove/ subtract the impact of the NATO infrastructure.

CR32	N/A	If T2 (above) answer is yes, is NATO open to receive our recommendations regarding the types, sizing, etc. of the hardware, operating system and possible virtualization layers?	This is a pure SW acquisition project that will rely on NATO PaaS and IaaS. The proposed solution will have to work with existing NATO PaaS and IaaS.
CR33	N/A	Can NATO indicate which of the requirements are already met in Spiral 1 and current technology used for it ?	The functionality that exists in Spiral 1 can be seen from the INTEL-FS Spiral 1 User Manual and Administrator Manual that is available under 'Supporting Documents' on the IFB portal. Also, the IFB Information model (document 14a and 14b) documents the information model for what has been implemented in Spiral 1 (see section on NATO::_Conventions and Migration::_INTEL-FS Spiral 1 Reference). However, as Spiral 1 does not meet the implementation requirements as defined by this IFB (neither for frontend, nor backend), the potential for code reuse from Spiral 1 in Spiral 2 will be limited. An "exception" to the limited SW reuse is identified in the I2UA SRS paragraph [49]: "*Note: NCI Agency is already in possession of a software (SW) tool, and its source code, that has implemented functionality in Angular 9 that interfaces with a REST abstraction layer in INTEL-FS Spiral 1 as depicted Figure 1-1. This UI software (that is also compliant with [HMI-C4ISR]) fulfils many of the acceptance criteria of several of the user stories below including [US-18], [US 21], [US 23], [US 24], [US 25], [US 26], and [US 27]. This source code will be available with the INTEL-FS Spiral 1 software* ".
CR34		Are the mentioned technologies fixed or contractor can provide technology recommendations e.g. Angular, Neo4J has been mentioned as the framework?	NCIA is striving towards SW reuse and componentization across applications and functional area services (FAS). In this effort Angular should be the UI framework chosen by most new FASes, and Angular will be the preferred framework INTEL-FS. The IFB specifies backend functional and nunfunctional requirements like advance graph queries (with fast response times) and link analysis / social nework analysis and a solution including a graph database should be able to fulfil those requirements. The choice of a graph databse (e.g. Neo4J) is not fixed and the Contractor can propose a different databases with graph support, or a different solution architecture that can fulfill the functional and non-functional requirements of the IFB. Note: Angular and Neo4J are both already used with the INTEL-FS SW.
CR35		NSF is recommended as the foundation toolchain (DevOps based) for custom software development lifecycle. Does this toolchain need to be leveraged both for Application and Backend Service development and deployment as a standard?	Yes
CR36		Please confirm the deployment preference for both I2UA (Application) and I2BE (Backend) systems viz. on-premises / private secured cloud	As stated in the I2BE SRS, the backend services shall run on the SOA & IdM Platform. The I2UA shall be able to run in a browser on any computer connected to the NATO network.
CR37		Per our understanding, there will be an transient / intermediate release for new application pointing to old backend and then a following release for new application with new backend services: a. Are the migration timelines flexible and what is the business impact in case of delays? b. There is a mention of existing REST Abstraction /API services layer (section 1.3 of I2UA SRS) which can be leveraged to support the transient state (I2UA Phase 1). Please provide the REST API, business logic and system architecture documentation.	a. The roll-out for the new backend that involves migration, will be done incrementally for a limited number of users at the time. The legacy capability will need to be available until the new capability is deemed robust and stable. The impact to the business must be minimal/ zero. b. This is still work in progress with an expected deployment to production in Q2 this year, the abstraction layer API is not stable and available yet. INTEL-FS Spiral 1 architecture information is provided through the INTEL-FS Spiral 1 System Design Specification that has been uploaded to the IFB portal under Supporting Documents.
CR38		We can see that some parties on the bidders list have been involved in INTEL-FS Spiral 1 and/or in the design of Spiral 2. Will these parties be excluded from bidding? If not, in what way will NATO guarantee a level-playing field?	No bidders will be excluded from bidding. The INTEL-FS Spiral 2 solution will architecturally be very different from Spiral 1. No Industry has been involved in the design of Spiral 2; the design of the Spiral 2 solution is solely done by NCIA.
CR39		Could you please provide the details (documentation reference) covering INTEL-FS Spiral 1 application system architecture and technology landscape	The INTEL-FS Spiral 1 System Design Specification has been uploaded to the IFB portal (file name: *INTEL-FS_-_System_Design_Specification_-_62789015_424_-_V0.14*)

CR40		How many business domains, processes, services and workflows are in scope of the target state application landscape?	The number of services can be enumerated from the IFB I2BE SRS in the sections listing the Functional Services and the Integration Services. It should be noted that some of the services are intended to perform migrations from Spiral 1 - these are idetified as "xxxx Migration Service". There are four principal processes/ workflows: Dissemination, Colation, Request and Task. In terms of Business Domains (and depending on the interpretation of "Business Domain") the target application state will provide support to the standard Intelligence Procedures found in the Allied Joint Doctrine AJP-2.1. At the highest level, these include all phases of the Intelligence Cycle; Intelligence Requirements Management; Collection Management; Intelligence Support to Targetting; The JISR Cycle; Support to Ballistic Missile Joint Intelligence Preparation of the Operating Environment; Support to Electronic Order of Battle Management; Support to IED Incident Mangement. All of these higher level procedures are supported by some or more of the services defined in the I2BE SRS.
CR41	VC-ICD 1-3	Section 3 of VC-ICD 1-3 document provides an overview of Geo-View Visualization Components (GIS, File Import/Export, NMAPI for user applications, Media services, GeoView online help, Symbology service). Please provide the approx. number of visualization component services and users for the new application platform?	NCIA foresees one VC to be used with each instantiation of the Web Client (i.e. the different UI applications as defined in the I2UA SRS will share the one instantiation of the VC). The main reason for that is that each instance of the VC will require a high amount of memory. The number of users will be several thousand.
CR42		14 loosely coupled applications are mentioned in scope. Are there any dependencies in terms of data and domain services across these applications?	There should be no need for any intra-client dependencies between these User Applications beyond the sharing of a single VC.
CR43	INTEL-FS User Manual	In the INTEL-FS User Manual (INTEL-FS 1.5.0 build cb0514b) there is a mention of IIE (Intelligence Information Entity) management workflows supported by the front end application. How many business subject areas/Intelligence Information Entity domains are in scope?	From the INTEL-FS Spiral 2 information model, in documents 14A and 14B, it can be seen that there are 172 Intelligence Information Entities in the Spiral 2 *Domain of Discourse* . There are four principal processes/ workflows: Dissemination, Colation, Request and Task. All IIEs are subject to the Dissemination Worfklow. *ProductIIEs* in conjunction with *BattlespaceIIEs* are subject to the Colation workflow. Within the IRMCM staff function, RFIs and ISRRs are the subjects of *Request* workflows; CollectionTasks and ExploitationTasks are the subject of *Task* workflows.
CR44	I2UA SRS document	Section 2.1.1 – I2UA SRS document : "[INTEL-FS2-InformationModel] implicitly includes the information managed by Spiral 1 because it extends from the principal components of Spiral 1." Please provide the Intelligence Information Entity data model documentation as per INTEL-FS2-InformationModel	IFB Documents 14A and 14B contain a complete specification of the INTEL-FS Spiral 2 Information Model. These documents both contain a section *_Conventions and Migration::INTEL-FS Spiral Reference* which shows the principal information aspects of Spiral 1: Battlespace Object Management (including support to Counter-IED); Intelligence Requiements Managment (including RFIs and Indicators); Intelligence Support to Targetting and ISR Product catalogue Management.
CR45		Could we have more information on GeoView? • On what software is this build? • If needed can an alternative be proposed or is GeoView the basis that should be used? • is GeoView an "as is" and the basis that should be used?	Information on the usage of GeoView is provided through the ICD that has been provided in the Reference Document section on the IFB portal (see document *VC ICD 1-3*). The 2D parts of the VC (which is what will be used in INTEL-FS) is implemented in OpenLayers. An alternative GeoView solution is not an option. The VC GeoView is a standardized component that will be used in multiple FASes to lower overall CAPEX and OPEX to NATO. The aim is to use the GeoView "as is", no feature gap has yet been identified in the VC.

CR46		The overall project is split in 2 contracts that can be under the leadership of 2 separate companies. Who is responsible of the overall integration and the entire function?	As defined in the I2BE SRS, the Backend Contractor is responsible for delivering backend services that support the User Stories through the API. An initial API will be provided by NCIA as a configuration item, it will be maintained and improved by the backend contractor. NCIA will be the approving authority for changes to the API (see also answer to CR6)
CR47		Can you define what is an “Apparent Successful Bidder” . Is there an additional step to go from the status of “Apparent Successful bidder” to “ successful bidder”	The term "apparent" successful bidder is used, as the contract award will not be made until: a) the debrief period for unsuccessful bidders has been completed; and b) a successful pre-award meeting has been held with apparent successful bidder. The purpose of the pre-award meeting is to ensure a complete understanding of the technical requirements, schedule and contract terms and conditions, and to clarify any minor ambiguities that remain following the evaluation phase.
CR48		Can you disclose the Spiral 1 ICD document.	The Spiral 1 ICD has been uploaded to the IFB portal under Supporting Documents.
CR49		Where do the Acceptances take ? Can it be done virtually?	As stated in SOW section 2.4.5.2.6 on the Delivery Acceptance Review *"If agreed between Purchaser and Contractor, the meeting could be done as a video-conference meeting"* .
CR50	Book I Bid Instruction Section 1.2.2	Could you provide clarification or the concept, with examples, in regards to Book I Bid Instruction Section 1.2.2 “… on a fixed Price Incentive Fee (FPIF) basis” as to what would constitute the eligible targets to receive the Incentive?	The incentive fee is described in Book II, Part II, Contract Special Provisions, Section 6. There are two incentive milestone dates for each contract (CSP, Section 6.3). If all Applications/Services have passed the Initial Acceptance by this milestone date, the earned incentive will be 5% of the value of the Applications/Services for which all Requirements have been accepted.
CR51	Book I Bid Instruction Section 1.2.3	Could you define what you consider as an “Agile Methodology” in Book I Bid Instruction Section 1.2.3 and provide amplification as to what a contractor can expect during the contract period. For example how would changes in design and/or delivery using this “Agile Methodology” from the as bid FFP baseline be funded?	What some might consider as "fully agile" - a high level scope with significant room for ongoing changes - will not be implemented on INTEL FS 2. The elements of Agile methodology that apply to these contracts are defined by the DSDM principles in the SOW. Primarily, this involves frequent deliveries and acceptances, based around sprints and increments; frequent payments; and the ability to reprioritize requirements. The scope is fixed; any minor changes that are required later in the project could be partially managed by removing some of the lower priority requirements if they're no longer necessary.
CR52		With your FPIF and Agile delivery methodology, what are the Key Metrics that NATO will be using in order to measure that the Contractor has met the requirements and met the Acceptance Criteria?	The delivery acceptance requirements are defined through the SOW and SRS, see also answer to CR above.
CR53		Are the User Stories going to be sufficient for a contractor to use for Acceptance Criteria?	The acceptance criteria are defined in the SOW. User Stories are not by themselves sufficient. General functional requirements, specific functional requirements, and non-functional requirements as specified in the applicable SRS are also included in the deliverable acceptance criteria.

CR54	I2BE SRS	[GBE-6] of section 2.1.2.1 of I2BE SRS document states "All I2BE services (taken to mean the full set of Phase I, Phase II and integration services specified herein) shall be hosted upon the SOA & IdM Platform, and re- use and/ or integrate with the SOA & IdM Platform services". [15] of section 1.7 of I2BE SRS document: "..the bulk of the Spiral 2 effort concerns itself with technology refresh, migration and 're-platforming' (see [18]) of existing back end, full stack capabilities to the SOA & IdM Platform". Fig 8 – Interoperability Landscape in section 5.1 of NU_SOAIDM_Wave1and4_ICD_v8.0 document provides a logical interoperability view of SOA & IdM platform. • Please provide the details (documentation reference) of SOA and IdM platform covering: end to end physical system architecture (with supporting technologies) and ETL (Extract, Transform and Load) framework services to populate Intelligence	The documentation of the SOA and IdM Platform that is currently available has been provided on the IFB portal in the Referenced Documents section.
CR55	IFS1-ICD	Section 2 of IFS1-ICD document provides an overview of the implemented INTEL-FS Spiral 1 system. The scope covers intelligence requirements management and processing, information collection and processing and intelligence dissemination. Is the scope same for target INTEL-FS (New) backend system or there will be new functionalities/enhancements?	The scope of INTEL-FS Spiral 2 is defined through the IFB SOWs and annexes. INTEL-FS Spiral 2 will have more functionality and will have increased interoperability and integration with other Bi-SC AIS FASes.
CR56	IFS1-ICD	Section 3 of IFS1-ICD document provides an overview of INTEL-FS External Interfaces (inbound and outbound). a. How many of these interfaces are in the impact analysis scope of re-platforming? b. Are there any re-usable components (utilities, API definitions etc.) which can be leveraged for re-platforming?	Bidders should expect all interfaces to be affected by the re-platforming. The WSDL files for the SOAP services defined in Chapter 5 of the ICD should be reusable; these WSDL files will be applicable for the deliverable defined in section 4.2.4 in the Backend SRS.
CR57	IFS1-ICD	Section 4 & 5 of IFS1-ICD document provides the overview and definitions of INTEL-FS services. a. How many of these services are in the impact analysis scope of re-platforming? b. Are there any re-usable components (utilities, information data models etc.) which can be leveraged for re-platforming?	See answer above. Additionally, note that the Spiral 2 information model incorporates the Spiral 1 information model.
CR58	I2BE SRS	[14] of section 1.7 of I2BE SRS document: "The significant part of the Initial Information Model [INTEL-FS2-IM] is based on existing production systems (IRM, CM, BSO, Products, EOB, etc.) that these I2BE services will be replacing". Please provide the details (documentation reference) of Initial Information Model as per [INTEL-FS2-IM].	The Information Model is provided in document 14a_ and 14b_ of the IFB: *- 14a_CO-14873-INTELFS2-Book-II-Part IV SOW I2BE Annex B Information Model - Battlespace Partition* *- 14b_CO-14873-INTELFS2-Book-II-Part IV SOW I2BE Annex B Information Model - Staff Partition*)
CR59	N/A	Please provide the details (documentation reference) for Spiral 1 INTEL-FS backend data sources (description, quantity etc.) and data collection interface types (Event based, API based etc.). How many Spiral 1 data sources and interfaces are in scope of target INTEL-FS backend platform (New)?	The main data sources for INTEL-FS Spiral 1 are the CCC, MIDB, JTS, and organically created data. The CCC source/ interface is in the scope of Spiral 2 (see BE SRS section 4.1.1 and 4.2.1). The MIDB source is also in scope of Spiral 2 (see BE SRS 4.1.14). JTS (now N-JTS) will continue to be a source for INTEL-FS Spiral 2 (see BE SRS section 4.1.13)
CR60	N/A	How much data history (volume and period) needs to be migrated from Spiral 1 to the new backend platform?	There will be data from approximately 3 million information entities collected over many years that will have to be migrated. Note that the Spiral 2 information model builds upon, and incorporates, all of the Spiral 1 information model; this should ease the migration effort.
CR61	Book I-Bidding Sheets I2BE Annex B-13.	If the contractor will submit bid for both of the BE and UA, can proposed Key Personnel be the same personnel for both of the bid IFB-CO-14873-INTEL-FS2-BE and IFB-CO-14873-INTEL-FS2-UA? Or Should contractor propose different key Personnel (PM, QAM, CM, TL, TD, etc.) for both of the bid?	Contractor Key Personnel do not have to be different for each contract. However, the bid needs to demonstrate that the Contractor's Team is sufficiently resourced according to a resource plan that realistically can deliver the project in accordance with the contracted schedule. All meetings under project execution (Kick-Off, WP meetings etc.) will have to be run separately.

CR62	Book II – Part II – Contract Special Provisions - 4.4	Where are the priorities of the requirements (Must-have, Should-have or Could-have) given in the IFB? Will these priorities be decided during project execution by Purchaser?	The priorities will be provided to the Contractor as part of the pre-award discussions prior to Contract Award.
CR63	Book II – Part II – Contract Special Provisions - 7.5.3	In relation to the article 7.5.3 and 7.5.4 of the "Special provisions" could you please clarify whether the Contractor, may invoice at once the 100% of the value of the accepted Requirements but wait for the warranty payment of 10% of the total value of the accepted Requirements in four quarterly payments, or, Contractor is expected to invoice seperately each time? (e.g; 90% for acceptance, 10%*0,25 four times in the warranty period)"	The contractor will invoice 90% of the value of the accepted Requirements. The remaining 10% will be invoiced during the Warranty period. As an example, if the total value of the accepted Requirements from EDC to FSA = EUR 5,000,000, then 4,500,000 would be invoiced/paid following the Incremental acceptances; and 500,000 would be allocated to the warranty period. For this 500,000, four quarterly invoices of 125,000 would be submitted/paid during the 1-year warranty.
CR64	Book II - Part IV - SOW I2BE - 1.5 PFI	Will Contractor pay any price to the Purchaser for the NR laptop to be used for sharing of NR material?	The NR laptop will be lent to the Contractor as PFI; the Contractor does not need to pay for this.
CR65			
CR66	Book II - Part IV - SOW I2UA	Which NATO site INTELFS2 will be deployed? How many locations? Which countries? Will be the deployment and system activation activities under the responsibility of the Contractor or Contractor will only support the Purchaser (on-site support and/or remote support)? To be able to make detailed schedule and plan the travel for these deployment activities, it's needed to know the location of sites.	INTEL-FS Spiral 2 will be deployed to the NATO IT Modernization (ITM) data centres. The NCIA INTEL-FS Support Staff will be responsible for the deployment; the Contractor will be required to support the NCIA Support Staff. For the initial deployment(s), on-site support (at NCIA premises in Belgium or the Netherlands) will be required, for subsequent deployment (pending how successful and easy the intial deployment was) remote support should suffice.
CR67	Book I-Bidding Instructions	Will Contractor deliver Test Plan/Master Test Plan in the Volume III Technical bid package?	Bidders shall provide details on the bidders approach to testing in the Solution Description Document, which is part of the Technical Volume (Volume III) (see also BI section 4.5.2.2.9 and 4.5.2.2.10).
CR68	Bidding Instructions	The document « 02_IFB-CO-14873-INTELFS2-Book I-Bidding Instructions" mentions that 2 distinct proposals and contracts must be considered by the bidders. Can you detail how NCIA will manage the consistency and the coordination between the two parts on the final system which are linked technically and in terms of functionalities ?	Consistency and coordination will be achieved through the Contract First Development/ Approach (i.e. the API).
CR69		For "COTS" included in the solutions (Front or Back) is the annual maintenance included in the option of level 2 and 3 of maintenance ?	The IFB, for both contracts, specifies a work package of optional 3rd and 4th level support an maintenance. Maintenance costs of COTS (i.e. 4th level) must be included in the cost of the optional 3rd and 4th level Support and Maintenance WP. Please note Section 22.3 of the Contract Special Provisions, *Software Licenses* . The Purchaser may exclude from the contract the purchase of software licenses which may be procured by the Purchaser through centralized contracts.
CR70	Bidding Instructions	In "02_IFB-CO-14873-INTELFS2-Book I-Bidding Instructions" it is mentioned that "The proposed solution describes a sound approach to eventual consistency in a distributed (multi-instance) environment configuration (i.e. in a high availability and robustness configuration)". Will NCIA intend to provide high level specifications for the infrastructure which will support the Intel FS Applications (Back end and Front End) (Network bandwidth, latency, recovery points...) between implementation sites ?	NCIA requires a solution that implements eventual consistency between instances of I2BE running in availability zones of a cloud-based solution. The Contractor is not responsible for any infrastructure components.
CR71	General Provisions	In "08_CO-14873-INTELFS2-Book-II-Part III General Provisions" it is mention that : "The Contractor shall ensure the design of the system includes sufficient redundancy and other Reliability, Maintainability, Availability and Testability measures to ensure the RAM requirements in this Contract are achieved and attained at an optimal Total Cost of Ownership (TCO), minimizing preventive maintenance, manpower requirement and usage of special-to-type tools and test equipment". Can NCIA specify the infrastructure KPI underlying those applications measurement (RTO/RPO, SLA, …) ?	The RAM assessments will be done on the software's inherent qualities focusing solely on the design-related failures. Effects of the infrastructure will be excluded/ subtracted from the RAM assessments.

CR72	SOW I2UA and SOW I2BE And Contract Special provisions	The program is composed of 2 separate contracts. One for I2UA one for I2BE . We understand that for I2UA we will have either to connect to legacy BE or emulate new functions or Interface with new I2BE for BE we will have to emulate Interfaces for each “system” and then Integrate and tests with new I2UA . We can then consider the development of two Independent Subsystems. Then who will be responsible for system Integration ?	Both the I2UA and I2BE contracts will be implemented using a Contract First Development (CFD) approach through the API. When both the I2UA and I2BE are complying with the API there is no system integration (the I2UA and I2BE are "pre-integrated" through the API).
CR73	Special Clauses §10	FSA acceptance of each sub system :Please confirm that only requirements of respective SSS documents will be used to conduct FSA on each sub system	NCIA confirms that only the Requirements listed in the I2UA Front-end SSS will be used to conduct FSA for the I2UA Front-end contract, and only the Requirements listed in the I2BE Back-end SSS will be used for the FSA for the I2BE Back-end contract.
CR74	Special Clauses §10	FSA : Please confirm that there is only one FSA (Not one for each Increment) and it corresponds to the system Acceptation (system meaning either UA either BE sub system)	There will be only one FSA for each contract, and the FSA for the I2UA is independent of the FSA of I2BE and vice versa.
CR75	Special Clauses §10	FSA What is the planned duration of the FSA	Unless there are unforeseen issues that haven't previously been resolved, the FSA should not require more than a day to conduct.
CR76	SOW I2UA SOWG 155	What happens if Covid remains and we cannot invite NCIA?	All the implementation work shall be conducted using the NATO Software Factory, and meetings can be done virtually/ remotely.
CR77	SOW I2UA [97] (2)	IV&V :“Run additional tests. These additional tests may use different data sets, and may include extended system-to-system integration tests; “. Those tests are not part of the Test Plan?	The IV&V tests are not part of the Contractor's Test Plan.
CR78	SOWG I2BE SOW-361	Technical personnel qualifications : NATO Secret Clearances. When we have the requirement [SOWG-70] The Contractor shall ensure that all software implementation activities in the NSF is kept at NATO UNCLASSIFIED level and when secure software engineering environment is at NATO RESTRICTED LEVEL . ¨Please clarify which profiles really need to be NATO SECRET Level and for which task?	All software will be implemented in the NSF at NATO UNCLASSIFIED level. NATO SECRET level will be required for any on-site work at any of NCIA's premises. Such work will include testing implemented software with operational data.
CR79		Location : SOW I2BE [60] :We understand that the development will have to be done on the DevSecOps Platform (the NSF) . NCIA providing remote connection facilities to Contractor(s) . Could you please provide more details	Details on the NSF is provided in the SOW in section 2.4.1. Access to the NSF is provided through a VPN connection.
CR80	SOW I2BE Reference documents :	Reference documents : CO-14873-INTELFS2, INTEL-FS SPIRAL 2 – Information Model Book II -Part V, NCI Agency. We don’t have this document in the ones provided with IFB	The files (*14a_CO-14873-INTELFS2-Book-II-Part IV SOW I2BE Annex B Information Model - Battlespace Partition* and 1*4b_CO-14873-INTELFS2-Book-II-Part IV SOW I2BE Annex B Information Model - Staff Partition*) were too big to send by email. The files are available to the bidders through the IFB portal.
CR81	SOW I2BE [28]	The Purchaser will provide the Contractor with the current INTEL-FS Spiral 1 software. Does it include Source code. When will it be provided ? Is it possible to have it during Bid phase?	The software, including source code, will be provided at Contract Award.
CR82	SOW I2BE [11] (4)	Sentence :”Integrating with the new backend solution into the new service-oriented architecture (SOA) as native hosted services;” Please clarify this sentence	In the updated SOW provided with this IFB Amendment, the sentence has been corrected to "*(4) Implement the new backend solution as services to be hosted on the service oriented architecture (SOA) and IdM Platform* " (only the integration services will have to be *native* hosted).
CR83	SOW I2BE [12]	The delivered SW at the end of each increment will have to have a quality at the level of being ready for deployment to production. The deployment of new software modules will be lead by the Purchaser with support from the Contractor. There might be multiple deployments to production of incrementally delivered functionality, e.g. deployment in support of the BMD tranche 25, and a final deployment prior to final system acceptance (FSA)” . The warranty starts after FSA . Does it means that Modules delivered at the end of one Increment are not supported? Or shall we include in the price the support of the first delivery until one ear after FSA ?	While incrementally delivered software to production will be supported operationally by NCIA staff, the Contractor will be responsible for correcting any software bugs found in the delivered software (see [SOWG-181] [SOWG-181] *The Sprint Work Plan shall include: …(2) Tasks to implement bug-fixes in the case bugs has been discovered in software functionality previously delivered by the Contractor under this contract;*. .."

CR84	IFB-CO-14873-INTELFS2 Book I - Bidding Instructions	IFB-CO-14873-INTELFS2 Book I - Bidding Instructions states: 1.5.3. The Contractor will be required to handle and store classified material to the level of "NATO RESTRICTED". and 1.5.4. The Contractor shall have the appropriate facility and personnel clearances at the date of Contract Signature. Should the Contractor be unable to perform the Contract due to the fact that the facility/security clearances have not been provided by their respective national security agency, this lack of clearance cannot be the basis for a claim of adjustment or an extension of schedule, nor the lack of clearance be considered a mitigating circumstance in the case of an assessment of Liquidated Damages or a determination of Termination For Default by the Purchaser under the Prospective Contract. but CO-14873-INTELFS2 Book II - Part II - Contract Special Provisions states: 16.10 The Contractor's facilities and personnel shall meet NATO security regulations to permit handling and storage of information classified up to and including NATO SECRET. so: which is it for the Contractor's facilities, NATO RESTRICTED or SECRET?	Contractor's facilities shall be able to handle material up to NATO RESTRICTED. Article 16, *Security,* of the Contract Special Provisions has been updated to reflect this correction by deleting paragraph 16.10. Paragraph 16.2 is correct in stating that *"the Contractor's premises shall be able to handle up to NATO Restricted."*
CR 85 start CR Release 3 here - do not include with CR Release 2	Book I-Bidding Sheets I2BE	Should Contractor deliver any HW or HW Components to any NATO deployment site of INTELFS2? Or Will Contractor deliver only SW Applications with COTS? For COTS products, how many (running) license will be delivered to the Purchaser by Contractor?	The contractor will not deliver any HW or HW components. The contractor will deliver only SW. COTS components being part of the INTEL-FS solution should not have any run-time licenses. If run-time licenses are unavoidable, then the licenses will have to be tailored for a Cloud-based environment with users accessing INTEL-FS through Web-browser. The bidder should then assume 3 data centres serving 2000 concurrent users with horizontal scaling elasticity to fulfil the INTEL-FS non-functional requirements. For any Development Licenses; 10 developer licenses will suffice.
CR86	N/A	Please describe the operational perspective of the platform: who will be using it, where (HQ, field, etc.), and when is it planned to be operationally deployed?	The solution will be deployed to the ITM data centers. Users in a number of organizations will be connecting using the NATO Communication System (NCS).
CR87	N/A	What are the main gaps of Spiral 1 solution this solution willing to solve?	As described in the Bidders Conference presentation slide 14, the primary objectives of the project are the "re-platforming", adding new capabilities, and implementing a number of integration cases with other Bi-SC AIS capabilities.
CR88	N/A	In terms of design and development - Please explain your expectations from a vendor which provides an existing intelligence platform (COTS) with high customizability to user workflows and data models?	The solution must comply with the requirements as defined in the IFB, which include: * The full Information Model must be realized; * An Odata REST API for accessing the information entities must be delivered; * The Odata REST API is forward transformed from the information model (i.e. for any API changes these are first done in the model and then forward transformed to an API specification); * The workflow models as specifed in the information model is realized; in particular supporting a seemless mediation with the STANAG 4559 workflow services; * The information platfom is hosted on the SOA & IdM Platform; * There is full support for, and integration with, the IdM mechanism of the SOA & IdM Platform (to include dynamic policy based IAM through ABAC Decision Points, XACML,etc.).
CR89	N/A	Please provide some examples of the common sources to be integrated with the I2BE. Is there a central DB to integrate with?	The integration cases are defined in Chapter 4 in the Backend SRS.

CR90	N/A	Our intelligence platform's User Interface is being developed using REACT libraries and can be integrated with external components written in Angular framework. Can this be considered as an appropriate solution for the I2UA requirements, or would this fail the key requirements?	A solution that includes existing REACT libraries could be considered appropriate (although this obviously depends on the entire Technical Volume submitted). There is nothing specific about using REACT libraries that would render the bid technically non-compliant. For implementation of new UI functionality, Angular shall be used (see Front End SRS [GUA-15]).
CR91	CR6	it is stated (CR6) that the initial API provided by NCIA will be an automatic forward transformation from the information model. Considering that is is far from being enough to define the API that will be necessary to support all US and AC from the I2UA, how will the I2UA contractor be involved in the further development of the API, which seems to be performed solely by the I2BE contractor with approval by NCIA?	The Front-end contractor's Scope and Requirements Analysis (see [SOWG 170]) at the start of each Increment Startup will need to identify potential shortcomings in the API and the API's ability to provide the backend support for the delivery of the front-end deliverables. NCIA will assess the Front end Contractor's API input and if an API change is deemed necessary, engage with the Back end Contractor to facilitate the change. As the API is mainly an OData API (SQL on URL) over a stable information model only minor refinements of the API should be expected.
CR92	Bidding Instructions 3.7.1 Bidding instructions 3.3.3.3 CR1	According to "Responses to Clarification Requests #1" Draft Delivery Plan is part of the Engineering package. This aspect is clear. Bidding Instructions 3.7.1 indicates the Draft Delivery Plan and the Solution Description Document to be part of only one PDF document. Bidding instructions 3.3.3.3 about package Making indicates the Delivery Plan to be and independent document from SDD: - 14873-UA/BE-Company Name–Vol III–Tech1-SDD - 14873-UA/BE-Company Name–Vol III–Tech4-DelPlan From our point of view it would be more clear to keep both documents separately. Therefore, we recommend to update Bidding instructions 3.7.1 to indicate Engineering package to contain 2 documents for SDD and DelPlan.	Book I, Bidding Instructions, Section 3.7.1 in IFB Amendment 3 has been updated to reflect the requirement to provide the Solution Description Document and the Draft Delivery Plan as separate documents. Section 3.3.3.3 has also been modified to update the names of the individual files submitted as part of the bid.
CR93	Bidders Conference	With the evals being done simultaneously can responses (tech and financial) be submitted together or do they still need to be submitted separately?	Yes, the technical, administrative and price volumes should all be submitted together. Please review Section 3.3.1 of Book I, Bidding Instructions: "The bid shall be consolidated into one email…" Only in the event the size of the email exceeds the limit should multiple emails be submitted. Later in Section 3.3, the names of the individual files that make up the bid are provided. Please note that the size limit of the emails in Section 3.2.2 has been increased to 15 MB.
CR94	Bidders Conference	when does the Initial acceptance takes place in this scheme	The term "Initial Acceptance" means the delivery of all Must Have requirements for any given Deliverable. Those Requirements which must be accepted in order to achieve "Initial Acceptance" will be designated in the SSS prior to contract award.
CR95	Bidders Conference	Many front end apps are using .NET so using Angular imply complete re-write?	INTEL-FS Spiral 1 will be re-written as a result of the "re-platforming", so the assumption of a complete re-write is correct.

CR96	Bidders Conference	Do you think it is possible to be more specific about the support of the contractor for the IV&V and UAT?	The SOWs in IFB Amendment 3 have been updated with the additional information provided below. The support to IV&V includes: * Presenting test plans and test cases at Increment startup meeting * Present and report on test results at sprint review meetings * Support ad hoc discussions on test results (e.g. in case IV&V identifies potential bugs) * Support NCIA in getting additional installations (on the NSF) setup (the expectation here is that the SW is easily installable and that NCIA personnel will be able to do this without contractor support) * Provide answers to question the Change Manager may have to the software submitted into the RFC process The support to UAT includes: * Participating in person for the first UAT. This first event is expected to last between 3-5 days. For this first UAT the first "production environment" will be installed and personal presence will be required. * For subsequent UATs, as long as the released software can be installed and operated by NCIA personnel Contractor's support can be provided remotely. Such remote assistance includes: Phone-support for any technical issues and Ad Hoc video/teleconference meetings to discuss UAT findings.
CR97	Bidders Conference	Bidders are encouraged to re-use existing NATO solutions. To support this, the IFB states that COTS may be provided as Purchaser Funded Items. To satisfy Intel FS 2 geospatial requirements (ie: Terrain & Mobility Analysis Service, Geospatial and Features Service), could Core GIS COTS tools (Esri ArcGIS) be provided as PFI?	* The Terrain & Mobility Service shall be implemented as OGC Web Processing Services (WPS) (see [FBE-160] in BE SRS) and it should be implemented for being hosted within the NATO CoreGIS system (see BE SRS [82]). This means that the solution should be hosted on CoreGIS (i.e. ESRI ArcGIS) instances in the Bi-SC AIS/ ITM environment. The inclusion of the WPS service in Bi-SC AIS CoreGIS instances is not expected to require additional licenses for these services in the Core GIS. However if the Contractor sees the need for any additional products/licenses the Contractor shall identify and cost them in the bid. As stated in paragraph 22.1 of the Contract Special Provisions, the Agency reserves the right to provide these licenses as PFE later on in the project. * The Geospatial and Feature service are services for managing Intelligence Information Entities, they are not geo-spatial services (even if the name could suggest so)
CR98	Bidders Conference	What AJPs are relevant for considering the process from the User perspective conducting INTEL business? AJP 2?	AJP-2.1 INTELLIGENCE PROCEDURES AJP-2.7 ALLIED JOINT DOCTRINE FOR RECONNAISSANCE AND SURVEILLANCE STANAG 4559 AEDP-19 ISR Workflow Architecture
CR99	Bidders Conference	STANAGs that need to be consider?	This question was asked within the context of the Information Model. The INTEL-FS model refers to the STANAGs listed below. Please be advised that the INTEL-FS model does not require the entirety of these other models. The INTEL-FS model imports some concepts/ types from these models. STANAG 5643 Multilateral Interoperability Programme Information Model STANAG 4559 AEDP-17, 18 & 19 STANAG 6545 Common Electronic Order of Battle Exchange Format STANAG 4774/ 4778 Confidentiality Labelling STANAG 7149/ APP-11 NATO Message Catalogue
CR100	Bidders Conference	Are these technical doctrines harmonized with the process one (AJP, AIntPs)?	AJP-2.1 INTELLIGENCE PROCEDURES AJP-2.7 ALLIED JOINT DOCTRINE FOR RECONNAISSANCE AND SURVEILLANCE STANAG 4559 AEDP-19 ISR Workflow Architecture

CR101	Bidders Conference	Do you have total number of attributes for IntelFS 1? Is this in the order of 100,000+ attributes or more like 20,000+ attributes?	The Information Model for Spiral1 has approximately 300 classes and approximately 3000 attributes. It should be noted that this is across the set of Intelligence Information Entities and it is not the total number of classes in the application. The total number of classes in the application contains also all of the framework and implementation code.
CR102	Bidders Conference	JIPOE the new IPB (Intelligence preparation of the battlespace/-ground)?	The term "JIPOE" replaces the former term "IPB".
CR103	Bidders Conference	Could we assume IntelFS 1 applications are mostly standalone and do not have online interfaces among each other as well as other Bi command systems?	Web Service interfaces INTEL-FS Spiral 1 are being consumed by other Bi-SC AIS system like TOPFAS and NCOP.
CR104	Bidders Conference	From your presentation we understand that INTEL-FS Spiral1 UI provides good UX and only requires technology refresh and not full re-design. Is this statement correct?	The INTEL-FS Spiral 1 UI originated in the NITB UI around 2005-2007 and was designed to look like Microsoft Outlook. The UX understanding has evolved a lot since then, and the UI needs modernization so that it looks more like modern Web Applications, e.g. similar to modern Web sites like Amazon.com etc. This means that the a full redesign of the UI will be required.
CR105	Bidders Conference	Work description document includes availability target value and mentions MIL-STD-1388 as a reference document. In addition to these, MTBF and MTTR values of system units/components are demanded. All of these remind us of hardware units/LRUs; however, not the software configuration items -- either developed or COTS. The answer given for CR-32 says that "This is a pure SW acquisition Project." Therefore; is it true that no hardware analysis will be needed? Secondly, do you suggest/dictate any other NATO reference document/procedure to follow for this Project, for software reliability analysis?	No HW analysis will be needed. All of the LSA and RAMT related activities will be performed on the SW product as these activities are not limited to HW components. Additional NATO standards are not mandated, so the Contractor can use the industry best practices to build the reliability models for the SW components.
CR106	Bidders Conference	During the technical evaluation i've heard that the vendors' name is stripped from al pertinent documents. true?	This is not correct. It is not feasible to remove all vendor names (including company logos, header/footer information, etc.) in the received bid documentation, so this will not be done.
CR107	Bidders Conference	There is a mistake in the last slide #96 about the weight of technical subvolumes. In the slide it said: M = Management Weighted Score (50 %); E = Engineering Weighted Score (30 %); S = Supportability Weighted Score (20%);" Shouldn't it be Management = 30% and Engineering 50% instead? According to bidding instructions "4.2. Best Value Award Approach and Bid Evaluation Factors"	Yes, this was a mistake in the presentation. The updated version of the presentation uploaded to the IFB portal under Supporting Document has corrected this mistake.
CR108	N/A	What's expected time period between Contract Award and EDC of project?	The current schedule foresees approximately two months from the notification of the successful bidder until contract award. EDC is expected within two weeks of contract award.
CR109	N/A	What configuration of Atlassian Jira tool is provided by NSF? Is it expected that Jira will be used as Configuration Management tool?	For SW configuration control GitLab will be used. The CMDB solution is for the contractor to design. The NSH Jira configuration includes: * JIRA DataCentre * Plugins: Links Hierarchy, SumUp, Misc Workflow Extensions * Jira is currently integrated with TestRail – but Testrail will most likely be replaced by (or at least augmented with) Zephyr Scale (used to be called Test Management for JIRA) (and is delivered as JIRA plugin) * Integrated with NSF GitLab (so that git commits are linked to JIRA issues and the JIRA has links to the related git commits) * Project Teams will get project admin rights on their own projects. Workflows/item types etc can be customized, but may require support from the NSF team to implement these.
CR110	N/A	Is there a set of automated tests for the current solution? Is it expected to reuse it?	In terms of automated tests, unfortunately there exists very little that could be reused.
CR111	N/A	The design of automated tests is fully in the responsibility of the Contractor?	Yes, design and implementation of automated tests is a Contractor responsibility.
CR112	N/A	There is mentioned that Purchaser will provide source code of STANAG 4609 video conditioner in "12_CO-14873-INTELFS2-Book-II-Part IV SOW I2BE Amd 1". In which language is that video conditioner?	It is written in C# as a wrapper around other off-the-shelf libraries (e.g. FFMPEG).

CR113	N/A	What is the volume of the data migrated using ETL processes? All data processed when Spiral 1 was used?	There are around 3 million information entities in INTEL-FS Spiral 1. A significant amount of that data pre-dates the INTEL-FS Spiral 1, but was migrated into Spiral 1 when this Spiral 1 was deployed to production.
CR114	N/A	ETL processes are expected to run in specific increment or until Spiral 1 services are retired?	The Spiral 1 migration services needs to be able to handle a situation of new data appearing in Spiral 1 after initial migration has taken place, i.e. until Spiral 1 services are retired.
CR115	N/A	The document „09_CO-14873-INTELFS2-Book-II-Part IV SOW I2UA Amd 1“ says in point [11] „To support the BMD ORBAT functionality the Contractor will have to implement some interim backend logic“. This interim backend logic will be implemented in current Spiral 1 implementation?	The backend logic to support BM OPFOR ORBAT function for early delivery to BMD Tranche 23 does not necessarily have to be implemented in the Spiral 1 legacy code. If feasible, the BM OPFOR ORBAT functionality could be implemented outside of the Spiral 1 code. The important aspect of the work is to provide BM OPFOR ORBAT management functionality in the user interface.
CR116	N/A	We understand that current implementation is .NET based but why Technical Lead needs documented expert knowledge in C# and .NET when the scope is reimplementation in Angular?	The .Net/ C# expertise will be required in Phase 1 of work. The Technical Lead needs to be able to understand how the Spiral 1 SW works.
CR117	N/A	Are Service Specifications (SOWG-292 - SOWG-295) as a part of SDD relevant for UA which is a consumer of services and does not define services?	Service Specifications are not relevant for the UA work. As stated in [SOWG-290] "The SDD shall include annexes that documents implemented server-side services (if any), …" As the UA is not implementing server side services, no service specifications will need to be produced.
CR118	N/A	A major version of Angular framework is released in about one year period, so we can expect two or three major releases during project implementation. Is it expected that all applications will use the same version of Angular (actual in the project start), or they will be upgraded to actual version so at the end of the project all UAs will use the most actual version of Angular?	The non-functional requirements of the IFB does not mandate a common version of Angular, nor that it has to be the latest version by the end of the project.
CR119	N/A	Requirement FUA-20 says “in case … based on Windows operating system “. Should we consider other than Windows Operating systems? What is used instead of Active Directory in such case?	NATO Bi-SC AIS environment is a Windows environment and there is no need to consider any other operating systems.
CR120	N/A	There are several requirements (such as FUA-867, FUA 369, FUA-890, FUA-891) related to calculations of Launch Point error ellipse, salvotime etc. Will Purchaser provide formulas/algorithms for such calculations?	The launch point ellipses are not calculated within INTEL-FS, this information is received through the BM Firing Event Import Services (see BE SRS section 4.1.17). The salvotime calculation is very simple: the salvos are simple groupings of launch events based on a user definable salvo "time out value".
CR121	N/A	*A question was received regarding contractor eligibility, summarized as follows:* The prime contractor would be from a NATO Nation; its parent company is also based in a NATO Nation. A portion of the work, however, would be performed by a fully-owned subsidiary that is not based in a NATO nation.	The NATO eligibility rules are strict. The Agency does not have the authority to grant a waiver to the eligibility rules for a situation such as this. If a company submits a bid described in this situation, with a subsidiary from a non-NATO nation performing a portion of the work, they would not be able to sign Annex B-12 as part of the Bid Administration volume. This would render the bid non-compliant.
CR122	N/A	[GUA-49] requirement seems to indicate than 'an implementation of the eXtensible Access Control Markup Language (XACML) version 3 architecture' should be implemented within I2UA. However it seems to us than the implementation should be place within SOA & IdM services and I2UA should use it rather than implement itself. Please clarify if the XACML implementation will be in the SOA & IdM and I2UA will use it, or I2UA shall implement another XACML architecture.	XACML will be implemented within a SOA&IdM Platform's Policy Decision Point (PDP) called by a Policy Enforcement Point (PEP) in the I2UA. The I2UA SRS in IFB Amendment 5 has been updated with a new paragraph [229] that explicitly states this.
CR123	N/A	We would like to know if it is permitted to act as subcontractor for different consortia? We would like to offer our expertise via different proposal consortia. The offered expertise will be practically the same in all proposals, because we intend to bid only on 1 part. In the past there have been Invitations to Tender (from other customers) where we were only allowed to bid 1 time with 1 consortium. Does that apply for the INTELFS2 bid as well?	From the NCI Agency's perspective, companies are free to act as a subcontractor for multiple prime contractors. Any exclusivity/non-exclusivity arrangements are between the companies, and are not NCIA's responsibility. Therefore, if Company A and Company B are both submitting competing bids as prime contractors, Company Z is free to act as a subcontractor to both of them.

CR124	CSP	19 SYSTEMS WARRANTY 19.2 Following FSA, the Contractor shall provide a one-year warranty for the supplies and services delivered under this Contract in accordance with the terms and conditions stipulated in Part IV - Statement of Work, Section 13, and Clauses 27 and 31 of the Contract General Provisions There is no section 13 in SOW for I2BE . Please Indicate which part of the SOW we shall refer to	In the updated Contract Special Provisions provided with Amendment 6, Section 19 has been corrected to refer to "Statement of Work, Section 2.3.7".
CR125	SOW I2BE 1.5	In answer to CR6 it is indicated that “an Initial API will we be provided by NCIA…. “. Could you please add this PFI in chapter 1.5 of SOW I2BE	Section 1.5 of the I2BE SOW provided with Amendment 6 has been updated to reflect this.
CR126	SOW I2BE 1.5 and 2.4.1	[25] an d NCIA will provide user accounts on NSF. Could you please confirm - that all necessary development tools will be accessible on NSF . - that We just have to provide development Computers in our premises . - No specific SW (for instance for security reasons)will have to be installed on these computers	The development tools that will be provided are listed in SOW 2.4.1. The NSF will not provide the integrated development environment (IDE).
CR127	SOW I2BE [SOWG-133]	The Contractor shall ensure that the warranty conditions remain valid even if the software is relocated/ redeployed to an equivalent platform during the warranty period . Could you please explain what could be an equivalent platform	An equivalent platform will have the same amount, or better, computing resources (CPU, memory, and storage capacity), the same operating system, and a version of the Platform as a Service (PaaS) that is the same or backward compatible with the previous version of the PaaS. This clarification has been added to [SOWG-133] in the SOWs with Amendment 6.
CR128	[SOWG-135]	“The Contractor shall provide 3rd Level maintenance, when requested by the Purchaser, to define the solution to a problem (corrective maintenance) or to maintain up to date software configuration (adaptive maintenance following changes to the underpinning hardware, firmware and software environment) e.g. security patches, operating system upgrades, minor software configuration changes due to operational/interface needs” It seems that for example Operating system upgrades can not be included in 3rd level maintenance . It should be preferable that SOWG-135 shall be managed under a change Order . Please confirm that you want the Contractor to include the price of this SOWG without any detailed assumption.	There is no Change order/request foreseen for this requirement, the scope is clear and that scope is expected to be priced by the Contractor in the bidding phase already. The Contractor is expected to provide all necessary Level 3 maintenance and support to keep the SW operational in case the Purchaser makes changes in the underlying infrastructure (such Purchaser changes can be to HW, FW or SW environment and examples are given as security updates, operating system upgrades, etc.). [SOWG-135] has been updated in the SOWs in Amendment 6 to reflect that changes to the underpinning hardware, firmware and software environment will be done by the Purchaser.
CR129	[SOWG-373]	« The Contractor shall at the Deliverable Acceptance Review demonstrate that the any API implemented as part of the deliverable is fully documented “ Please confirm this sentence is correct and that no word is missing	The requirement has in the I2BE SOW in Amendment 6 been rephrased to "*The Contractor shall at the Deliverable Acceptance Review demonstrate that API changes (if any) are fully documented* ".
CR130	CO-14176-SOA-IDM	Are only Docker and Kubernetes Pods deployment supported on the SOA&IdM Platform or also Virtual Machines?	The SOA Platform is based on the use of containers. The Platform Foundation, which provides the Container and Kubernetes infrastructure, sits on Virtual Machines provided by the underlying Infrastructure as a Service (IaaS). Therefore the platform itself does not support VMs, but the IaaS will support the deployment of VMs. “External Services” running on VMs can still take advantage of some of the Platform Services, but will not get the full benefit of deployment on the Platform. The Bidder should note the requirements in section 2.1.2.1 and the expectations for the solution to be hosted on the SOA & IdM platform.
CR131	CO-14176-SOA-IDM	Is JWT also supported by the IdM Platform?	Yes, the platform supports the Open ID Connect (OIDC) specification, which uses JWTs. There will be an IdP that will be able to issue JWTs.
CR132	CO-14176-SOA-IDM	How do the services contribute to (access) logging and audit? Which interface and schema has to be supported?	Services hosted on the platform have to implement an Observability contract to allow the platform to retrieve observability data. This is defined in the SOA Platform ICD. External Services will be monitored using the Beats family of components.
CR133	CO-14176-SOA-IDM	Is an API Gateway provided by the SOA IDM Platform?	No, an API Gateway is not provided by the platform.

CR134	CO-14176-SOA-IDM	Is the Sidecar Proxy for authorization provided by the SOA IDM Platform?	Yes, the Side Car proxy is an integral part of the Platform Foundation. Furthermore, a PEP will be provided to do authorisation for common application runtimes.
CR135	GENERAL	Is there a specific template to use for Solution Description Document(SDD)?	There is no template. The content for the SDD is described in SOW chapter 2.5.3.2
CR136	GENERAL	Solution Description Document(SDD) is expected to be single PDF file. Could extra attachments be provided for submission in case the PDF file size exceeds the specified limit?	Please note that in IFB Amendment 3, Bidding Instructions paragraph 3.2.2 increased the size limit of any emails submitted to 15 MB. It is acceptable for bidders to split the SDD (or any other document) and submit in multiple emails in case this is necessary to remain under the size limitation. Paragraph 3.3.3 of the Bidding Instructions has been updated to clarify this.
CR137	GENERAL	Could alternative solutions for the software requirements be mentioned in the Solution Description Document(SDD)?	The bidder shall propose one and only one solution.
CR138	GENERAL	What are the restrictions on using third-party javascript component libraries with paid commercial license?	There are no restrictions beyond what is stated in the IFB. The cost will need to be included in the bid, and the license shall be registered with NCIA as the end user (see SOW requirement [SOWG-124]).
CR139	SOWG-361	Is it a must for the technical leader to have documented expert experience in Angular framework? Is it acceptable to have React experience instead of Angular? Will the bid be non-compliant if some of the stated technical qualifications are not met? To be more specific, Angular, C# and .Net in paragraph 3 and social network analysis in paragraph 5?	As the I2UA contract shall be implemented in Angular (see I2UA SRS requirement [GUA-15]), expert experience in Angular will be considered a very important skill to have. If a proposed Key Personnel lacks or has inferior qualifications, this will be given a lower score without necessarily rendering the bid non-compliant. Please note paragraph 4.3.1.2.2.1.2 of the Bidding Instructions states: "Bidders are advised that any Bid whose Technical Proposal receives a score of less than 20% of the total unweighted raw score possible in any of the sub-criteria listed in Section 4.5 of this document may be determined by the Purchaser to be non-compliant and not considered for further evaluation."
CR140	SOWG-365	Is it a must for the Test Director to have all the qualifications stated in this section?	As answered above, missing or inferior qualifications may result in a lower score in that area of the bid evaluation, without necessarily rendering the bid non-compliant.
CR141	SOWG-367	Do all software developers have to have a UX design certification? Will the bid be non-compliant if some of the software developers do not meet some of the requirements in paragraphs 2,3 and 4?	No, all software developers do not need to have UX design certification. As above, for the I2UA evaluation a team that has documented strong UX experience will score better than one that does not have this documented experience and skills.
CR142	SOWG-9	Is it a must for the project manager to meet all the qualifications (i.e. having masters degree) stated in SOW ?	As answered above, missing or inferior qualifications may result in a lower score in that area of the bid evaluation, without necessarily rendering the bid non-compliant.
CR143	GENERAL	Having analyzed those four FS1 documents from the past; however, no text/evidence has been found against reliability/availability requirements of the Software. It is suspected that such analyses/measurements can be observed in one of the test procedures/reports. Is it possible that these documents/lists (samples only) are shared at this time of the bidding process?	The Agency will not share test results from previous projects at this stage.
CR144	[GUA-12], [FUA-63], [FUA-607], [FUA-224], [FUA-261], [FUA-390], [FUA-391], [FUA-392]	Will backend services be provided for PDF export operations?	Yes, see backend SRS requirement [FBE-26]
CR145	[FUA-148], [FUA-433], [FUA-474]	Will XSD schema documents be provided for XML export operations whose output will be used by external applications?	As there is no defined XML exchange formats, the purchaser cannot commit to providing such schemas. This means that the bidder needs to plan for defining the XML schemas.
CR146	[FUA-147]	Will KML import/export operations be handled by backend services? If not will any front-end library be provided?	There are no such services defined for the I2BE. However, see response to CR148 below explaining the capabilities of the C4ISR Visualization Component (VC)
CR147	[GUA-143]	Will KMZ import/export operations (zip/unzip) be handled by backend services?	There are no such services defined for the I2BE.

CR148	[GUA-143]	Will NVG import/export operations be handled by backend services? If not will any front-end library be provided?	In relation to the import/ export requirements as defined in Table 2-8 in the I2UA SRS, the C4ISR Visualization Component (VC) can import NVG and KML/ KMZ files. The VC can export NVG, KML/ KMZ, Shape, and PNG files.
CR149	[FUA-65]	[FUA-65] requires products to be exported to a file that will be used by the Joint Exercise Management Module (JEMM). Would you clarify Product export file format that will be used by the Joint Exercise Management Module (JEMM) externally?	Additional information has been added to Section 4.1.2.8 of the I2UA SRS of Amendment 6 that clarifies that the product exchange file is the product information as defined by information model exported in such a way that it can be easily re-imported using the back-end OData API. The additional clarification to requirement [FUA-65] has also been updated in the SSS and Bidding Sheet for the I2UA.
CR150	[FUA-70]	Will there be backend services for handling PDF editing and collation operations of BSO Management Application's PDF Viewer component?	There will be no PDF editing. The backend will extract the raw text from the PDF file to support the collation operations; see requirement [FBE-54] in backend SRS.
CR151	[FUA-94]	Does BSO import request function mentioned in requirement [FUA-94] involve file import?	No, I2UA will expand the graph by getting related BSOs through the I2BE API.
CR152	[FUA-135], [FUA-395]	Which file format will be used for exporting search results in the Search Application?	That will be for the contractor to define as part of the technical solution.
CR153	[FUA-155]	Is there any restriction on the file format when importing/exporting search queries?	Requirements pertaining to this is defined in I2UA SRS section 2.1.3.
CR154	[FUA-413]	Which file format will be use when exporting CR ("bag of CRs")/CRL/CTL?	This is defined in the acceptance criteria to User Story [US 79], see [AC 79-1], [AC 79-2], [AC 79-3] and [AC 79-4].
CR155	[FUA-454]	Which file format will be used when exporting Tasks ("bag of tasks") and CXP?	This is defined in the acceptance criteria to User Story [US 86], see [AC 86-1], [AC 86-2], [AC 86-3] and [AC 86-4].
CR156	[GUA-43]	Is it an expected function of the Table View component to handle pasting of tabular data with multiple rows and columns from MS Office?	This has not been defined as a requirement in the IFB.
CR157	[FUA-307]	Are the named query notifications generated when the result of the query changes (i.e. when a new item is added or removed) or when the query itself is modified?	It shall be generated when the result of a search/ query changes. See also [FBE-116] in the backend SRS.
CR158	[US 5], [FBE-172]	Does [US 5] covers with [FBE-172]? How can user management application access domain values on a specific node. Will user managemenet application get domain values from backend services of ON's or save all domain values to its own database?	[FBE-172] will cover [US 5]. The I2UA requirement [FUA-5] is removed from the I2UA SRS in Amendment 6. Also the I2BE SRS is updated in IFB Amendment 6 to emphasise that [FBE-172] will cover [US 5]. The text changes to the requirements have also been updated in the SSS and Bidding Sheet Excel files for both I2UA and I2BE in Amendment 6.
CR159	General	Will user management application has PEP, PDP, PAP implementations for authorization and authentication requirements or will they be provided by SOA/IdM platform ?	PDP and PAP services will be provided by the SOA & IdM Platform, and a PEP will be provided to do authorisation for common application runtimes. See also answer to CR122 above.
CR160	SOW Book II-Part IV-SOW I2BE	How many main Work Pacakges will be in the I2BE Contract, WP2 only or WP2.1, WP 2.2? Will Work Package Start-up Meeting be conducted only at the begining of the project after Kick-Off Meeting? Or Will WorkPackage Startup Meeting be conducted for each phase WP2.1 and WP2.2?	For the backend there will be one WP for the implementation of the I2BE (named WP2.1) and a second WP for the Maintenance and Support work (named WP 2.2). The SOW Chapter 2 defines the work to be done within the project up until FSA, so the WP start-up meeting (as defined in the SOW) is for the I2BE only applicable for WP2.1.
CR161	SOW Book II-Part IV-SOW I2BE Annex A SRS	Geospatial Services - In which format map data will be served and processed?	The geospatial services are provided by the Core GIS system which is implemented using ESRI ArcGIS. CoreGIS (ArcGIS) supports the OGC standards (see for instance https://enterprise.arcgis.com/en/server/latest/publish-services/linux/ogc-support-in-arcgis-server.htm)
CR162	SOW Book II-Part IV-SOW I2BE Annex A SRS	Geospatial Services - What type of coverage data will be provided for height calculation? For what purpose? Will there be weather?	Different formats of elevation data can be made available through Core GIS, including DTED, SRTM, and LiDAR. Weather information is provided through the NAMIS system (see ICD found in the Reference Documents folder on the IFB portal)
CR163	SOW Book II-Part IV-SOW I2BE Annex A SRS	Geospatial Services - What kind of information will it be extracted from the map data?	Map data will generally only be used for displaying in the C4ISR Visualization Component (VC) where the VC does the displaying directly. The other usage of map data will be for generating terrain and mobility overlays (see BE SRS section 3.2.7.1)

CR164	SOW Book II-Part IV-SOW I2BE Annex A SRS	In the NFR-11 ,The services shall be able to receive 2 million new IIEs per day without any critical failure for at least 99.5% of its Operational time. What will be the instant maximum data entry?	The requirement is 2 million a day; there is no instant (or burst) requirement. The I2BE shall be able to manage 2000 concurrent users/ connections (see SRS requirement [NFR-10]).
CR165	Book I-Bidding Instructions 3.3 & SOW Book II-Part IV-SOW I2UA [SOWG-231]	According to the SOW, File names should be [NU|NR]_[Contract number]_[Name of document]_[v0.x|v1.0].[filename extension] According to the BI, convention defined as "14873-UA/BE-Company Name–Vol III–Tech2-PMP" is only for e-mail subject line, not for filename. Filename should be according to the SOW-231. Could you please confirm this?	The SOW defines file name convention for files produced during *project execution* . The Bidding Instructions defines the file name convention for the files to be submitted for the bid in Section 3.3.3, and defines the email subject line in Section 3.3.1.
CR166	Book II – Part II – Contract Special Provisions 17.10	According to Contract Special Provisions 17.10, in our bid packages should'nt our files (e.g PMP, QAP, etc) include our company Logo in the header/footer/coverage page?	CSP Section 17.10 refers to software delivered under the awarded contract, not files submitted as part of the bid. Bidders are free to include their company logo in their bids.
CR167	SOW Book II-Part IV-SOW I2UA	How many main Work Pacakges will be in the I2UA Contract, WP1 only or WP1.1, WP 1.2, WP1.3 and WP1.4? Will Work Package Start-yp Meeting be conducted only at the begining of the project after Kick-Off Meeting? Or Will WorkPackage Startup Meeting be conducted for each phase WP1.1, WP1.2 and WP1.3?	There will be one WP Startup Meeting for each of the three work packages during the project execution (until FSA); that means a WP Startup Meeting for WP1.1, another startup meeting for WP1.2, and also a startup meeting for WP1.3. The optional WP1.4 that follows the Warranty will not require a WP Startup Meeting as defined by SOW 2.4.4.1.
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 *not start any later* 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 [NFR0-6] 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 RDMBS 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.
CR179	Geoview general	1- Will geoview be displayed as a background panel and all other applications open over it or geoview will be one of the widgets on the screen like relationship view ?	Geoview will run in its own browser window.
CR180	2.1.4.6 Online Help	Can online help be a standalone application? Can help content display in another tab? Do users need to authenticate to edit help contents? Do users need to authenticate to see help contents?Is the help application required to be an angular application or can it be a separate php application?Does help application need to save help contents to its backend?	There is nothing in the I2UA IFB requirements preventing the online help from being a standalone application as long as it can be activated from the I2UA (see requirement ([FUA-27], [FUA-47], etc.). There are no specific authentication requirements for the editing of help content; built-in contributor-control in Wiki solutions should suffice. The Help application does **not** need to be an Angular application. The I2UA will need to persist the help information in the Bi-SC AIS IaaS, but this is not done through the I2BE. It is solely a responsibility of the I2UA to manage the Help content.
CR181	Book I-Bidding Instructions 4.5.3.4.5	Can one of the relevant examples that will be provided by the bidder belong to the Bidder's Sub Contractor's experience? Is there any constraint about the experience Contract, such as contract price, end date of the contract, duration of the Contract? Can it be an ongoing contract?	Yes, relevant examples can include subcontractor's experience. There are no constraints for the experience, but the experience needs to provide enough details to enable NCIA to assess the relevance of the experience.
CR182	Book II - Part IV - SRS of I2BE	For the requirements related with the response times (NFR-3 to NFR-8), should the authentication and authorization processes be included in the measurement of response times? Are the expected response times only for pure search and query operations without authentication and authorization?	The response times are for pure search and query operations (i.e. measured with zero time for authentication and authorization). This is reflected in the I2BE SRS provided with Amendment 9.
CR183	Book II - Part IV - SOW of I2BE	What will be the scope of the trainings given to the Purchaser? Will only the trainings be given to the Purchaser O&M Team to maintain the system at Level 1, 2 and 3 and to test, operate and maintain the system? Or will End Users be also trained to be able to use the INTEL-FS2 Applications and Services?	As specified in the SOW, the training will only be for O&M Staff.

CR184	Book II - Part IV - SOW of I2BE	There is a tight timeline especially for the first increments since there will be additional activities and work (Kick-off, WP Startup Meeting, common development setup) overlapping with the development of the first increment scope. Will the successful bidder be allowed and supported to start working before the EDC and/or before Kick-off?	The successful bidder is free to start, but NCIA cannot provide any engineering support prior to EDC. The bidder should plan for the additional time needed for Increment 1 in the Delivery Plan as described in SOW 2.5.3.1.
CR185	Book II - Part IV - SOW of I2BE	Is it possible that the duration of the increments are adjusted by the contractor? For example, may the first two increments be extended to 4 months (4 Sprints) and 3.rd and 4.th increments be reduced to 2 months (2 Sprints), as long as the deadline of Phase 1 is not exceeded?	In the delivery plan, the Contractor will need to adjust the length of the Increment to the level of effort for that Increment. So the answer to the example in the question is Yes, the first two Increments could last 4 months each and the two following Increments could last 2 months each.
CR186	Book II - Part IV - SOW of I2BE	In the answer of CR18 in the Clarification Request Release, it's indicated, "Source code of the INTEL-FS Sprial-1 will be made available to the contractor through the NSF at contract award." In the SOW in the 2.4.3 Kick-Off Meeting Section, after successful Kick-Off Meeting Purchaser gives Contractor permission to proceed and according to [SOWG-160] "The Contractor shall verify that the Contractor's key personnel (in particular the SW developers) have access to the NSF" When will access to the NSF be made available to the Contractor, at the contract award or after successful Kick-Off Meeting?	NCIA will provide initial NSF access at Contract Award. This initial access may not include all of the Contractor's personnel, but will allow the Contractor to access the INTEL-FS source code.
CR187	Bidding Instructions 3.6.5.3.2.	According to Bidding Instructions "The Bidder shall provide proof of the Bidder's premises being authorized and certified to handle information (physically and electronically) at the NATO Restricted level." How should this proof/certificate be provided? Maybe together with the PMP, inside the PDF file "14873-UA/BE-Company Name–Vol III–Tech3-PMP" to be provided as part of the Technical Offer (Volume III)?	The Bidders shall include this proof/certificate together with the Draft PMP as part of file: "14873-*UA/BE-Company Name* –Vol III–Tech3-PMP".
CR188	Bidding Instructions 3.3.3.3 & 4.5.2	Bidding Instructions is not explicitly requesting to provide a Draft (Master) Test Plan as part of the Technical Offer. However, the criteria used to evaluate the Engineering Part states that the SDD must include information about testing methodology, which is usually defined in the (Master) Test Plan: "4.5.2.2.9 The draft SDD describes a sound approach to Continuous Integration (CI) and Continuous Delivery (CD) adapted for the capability to be delivered and for usage within the NATO Software Factory. The SDD describes what type of tests will be automated, and how the automated tests will be implemented, as well as how the reporting of such tests will be automated. 4.5.2.2.10. The draft SDD demonstrates an approach to the software development that will ensure a high degree of test automation (e.g. using behaviour driven development (BDD) and/ or Acceptance Test Driven Development (ATDD) methodologies).". Does the Draft SDD really need to explicitly include such testing details, or could the Draft SDD refer to the sections of the Draft (Master) Test Plan where such info is available, and the Draft (Master) Test Plan be provided along with the Draft SDD, or the Draft PMP?	A separate Master Test Plan is not asked for in the IFB, and will not be required for the contracted work. The bid will be evaluated in accordance with evaluation criteria in the Bidding Instructions and the SDD will need to include the required information to enable this evaluation. The bidder can, if desired, organize this information in a separate chapter in the SDD in the form of a Master Test Plan.
CR189	Special Provisions 16.10	What is the purpose of the section 16.10, whose only content is the word "Reserved"?	In Amendment 2, a change was made to delete paragraph 16.10 from the Contract Special Provisions (please see CR 84).
CR190	Special Provisions 10 and SOW I2BE 2.4.5.2.6	Paragraph 10.2 of the Special Provisions states: "The final contracted Increment for the Back-end BE contract shall end at EDC+36 months." Section 2.4.5.2.6 of the SOW I2BE states: "[97] The Deliverable Acceptance Review serves as an Increment Close-out Meeting." which can be understood as: an Increment ends with its Deliverable Acceptance Review. And therefore: - the Deliverable Acceptance Review of the last contracted BE increment (the #12) should be at EDC + 36 months, - the FSA meeting will be held some weeks after, considering the time required by the Contractor to prepare the FSA report (Special Provisions 10.4), and the time (up to 3 weeks) the Purchaser can schedule the FSA meeting after the Contractor requests it (Special Provisions 10.5). However, the slide 47 of the Bidders Conference presentation seems to indicate that the FSA is at EDC + 36 months. Could you please clarify which milestone is expected at EDC + 36 months, either the Deliverable Acceptance Review of BE Increment 12 or the BE FSA, and update the IFB accordingly if necessary?	It will be the Deliverable Acceptance Review of the final contracted BE Increment that will occur at EDC + 36 months. FSA is expected to take place within a few weeks after that. For the UA contract, the Deliverable Acceptance Review of the final contracted Increment will occur at EDC + 32 months.

CR191	Special Provisions 6.3	Paragraph 6.3.3 of the Special Provisions states: "The second Incentive Milestone will be four weeks prior to the respective FSA, as defined in Section 10." We understand the second incentive milestone for the BE contract should be at, or just after, BE Increment 12 Deliverable Acceptance Review, since this is the milestone where the fulfilment of the requirements is reviewed. Considering previous clarification request, could you please confirm whether the second BE incentive milestone is expected at EDC + 36 months, or EDC + 35 months, or <any other alternative that could apply>, and update the IFB accordingly if necessary?	The intent of Paragraph 6.3.3 of the Contract Special Provisions is to define the second Incentive Milestone as four weeks prior to the end of the final Increment (for the BE contract, this is four weeks prior to EDC + 36 months; for UA, four weeks prior to EDC + 32 months). To fix this to a specific date, this paragraph has been revised in IFB Amendment 9 to clarify that the second Incentive Milestone date is EDC + 35 months for the BE contract; and EDC + 31 months for the UA contract.
CR192	Special Provisions 6.3	Paragraph 6.3.2 of the Special Provisions states: "For the Back-end (BE) contract, the first incentive milestone will be EDC+12 months for all back-end services listed under CLIN 1 of that contract." Considering CLIN 1 back-end services are allocated in the SSS to Increments 1 to 4, we understand the first BE incentive milestone should be at, or just after, Increment 4 Deliverable Acceptance Review. Although it is requested to run the 12 BE Increments in 36 months, it could be difficult that BE Increment 4 finishes at EDC + 12 months (unless setting different durations for the different increments), since the first increment does not start at EDC. There is a series of activities to be performed before the first increment can start, i.e.: those related to the kick-off meeting (approx. EDC +1 month), the WP 2.1 start-up meeting and the Increment 1 start-up meeting. From our lessons learnt we know these initial tasks could last around 2 or 3 months, also considering the time in advance the inputs for these meetings must be provided (1 week per each). In practice this would mean that after these initial activities there would be around 33 months for the 12 increments; that is, 11 months per each 4 increments. Considering the above we were wondering whether running the BE Increment 4 Deliverable Acceptance Review, and the first BE incentive milestone, at EDC+12 months is a must, or otherwise whether the first BE incentive milestone can be shifted at e.g. EDC + 14 months.	The start-up time for an agile project should be much shorter. The first incentive milestone for the BE contract will remain at EDC+12 months.
CR193	SOW I2BE 2.4.5.2	According to Figure 2-5 Increment Execution, we expect the Deliverable Acceptance report can be prepared immediately after the sprint meeting of the last sprint of the Increment, and as soon as ready delivered and the Deliverable Acceptance Review be called, and then (in 1-week time) held. It is not clear whether the IV&V and UAT activities conducted by the Purchaser, and supported by the Contractor, affect or not the date of the Deliverable Acceptance Review. If they do, this may not be a problem for most of the increments, because IV&V and UAT of one increment could run in parallel with the next increment; however, it could be a problem for increments 4 and 12, since an incentive fee is associated to them, so fulfilling the incentive fee milestones on time could be jeopardised by these Purchaser-conducted activities, maybe having this an impact also on potential liquidate damages. Could you please clarify IV&V and UAT impact, if any, on the Deliverable Acceptance Review date, and reflect it on IFB if deemed necessary?	Any delays to Purchaser acceptance of the final Increment before an Incentive Milestone (for the BE contract, these are Increments 4 and 12), solely caused by NCIA, will not cause the Contractor to miss an Incentive it would otherwise have earned. For a delay to be deemed the fault of NCIA, the Contractor must have enabled the Purchaser to do the IV&V activity in parallel with the increment development, and the Delivery Acceptance Report provided by the Contractor must clearly document and prove that the Must Have requirements for that Increment have been met.
CR194	Special Provisions and SOW I2BE 2.4.5.2.7	According to Special Provisions 10.4, we expect the FSA report can be prepared immediately after the successful Deliverable Acceptance Review of the last Increment, and as soon as ready delivered and the FSA requested, and then (in max. 3-week time) held. It is not clear whether the Deployment to Production activities conducted by the Purchaser (and supported by the Contractor) after the Deliverable Acceptance Review of the last Increment, affect or not the date of the FSA. Could you please clarify the impact on FSA date, if any, of the last Increment's Deployment to Production, and reflect it on IFB if deemed necessary?	Any delay in the deployment to production will not impact the FSA date.

CR195	SOW I2BE	Jira+GitLab vs Azure DevOps: In SOW for I2BE there are several requirements and references to Jira: "[85] Note: The Purchaser is expecting to use Jira tool with a Test Event Management plugin as the test reporting tool. [SOWG-190] The Contractor shall manage defects in the NSF Jira tool (see [Jira])." [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." Additionally, in answer to CR109, GitLab is mentioned, although it does not appear in the SOW: "For SW configuration control GitLab will be used." However, SOW I2BE contains some requirements and references to Azure DevOps: "[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-367] The Contractor's Test Director shall meet the following qualifications: (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;" It seems that a combination of Jira+GitLab and Azure DevOps will have to be used during the project: - Jira for requirement management, defect management and DRTM, - GitLab for SW configuration control, - Azure DevOps for configuration management, It is not clear why knowledge and experience in Azure DevOps is requested to the Test Director, whilst "The Purchaser is expecting to use Jira tool with a Test Event Management plugin as the test reporting tool". Could you please provide a complete picture of the environment to be used? Could it be possible to use a single environment for all the activities, either based on Jira or based on Azure DevOps?	NCIA will provide information on the usage of NSF at Contract Award. The Bidder shall note the NSF does not provide an out-of-the-box CMDB solution. The Bidder shall define how the CMDB will be realized (see bidding instructions paragraph 4.5.4.3.2) either using available tooling in NSF or by identifying additional tooling as required.
CR196	SRS I2BE 5.6	In chapter 5.6 Maintainability, [139] and [140] state that "the MTTR/MaxTRR to be considered is the mean/maximum time needed to restore services after a failure …" As far as our knowledge: - Mean/Max Time To Restore/Recovery is not related to Maintainability, but to Availability, in which case it would be better located in chapter 5.4.1 Availability, - the Maintainability-related meaning of MTTR would be "Mean Time To Repair/Resolve". Could you please clarify the intended meaning of MTTR and MaxTTR, and the ISO 25010 characteristic related to it? In case MTTR and MaxTTR refer to mean/max time to Repair/Resolve, then the values defined in Table 5-3 of [NFR-20] do not seem to be appropriate, since they should include the time for detecting the failure, diagnosing the problem, and repairing the issue, but also the time spent ensuring that the failure won't happen again.	MTTR and MaxTTR are defined in paragraphs [139] and [140] in the SRS. The intent is to use these parameters as a quality measurement of the delivered software. The time spent ensuring that the failure does not happen does not have any impact on the MTTR and MaxTTR assessments.
CR197	SOW I2BE 2.3 & 2.5	In SOW requirements [SOWG-84], [SOWG-100] and [SOWG-347], the acronym "SM&C" is used, but its meaning is not declared. We understand SM&C stands for "Service Management & Control". Could you please confirm and update the SOW declaring the exact meaning of "SM&C" acronym?	SM&C is defined in the IFB document 15_CO-14873-INTELFS2-Book-II-Part V Abbreviations and Acronyms as "*Service Management and Control* ". The two SOWs in Amendment 9 has been updated with an expansion of the acronym in its first usage.

CR198	SOW I2BE 2.3.5.3 & 2.4.5	Reading the following requirement in section 2.4.5.2.7 Supporting the release to production: "[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. " our understanding is that the Training Course to the Purchaser must be provided only for those increments whose delivered SW is released to production, but not necessarily for all the increments. However, the wording at the end of the following requirement in section 2.3.5.3 Training the Purchaser's O&M team: [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. is somehow confusing, since it is stating "as many times as the Contractor delivered software is made ready for deployment to production", because according to the following paragraph from chapter 1.3 Scope of Work: "[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 SW accepted at the end of each increment will always be ready for deployment to production. If our understanding of [SOWG-229] above is correct, then we kindly suggest to slightly reword [SOWG-119] for finishing with "as many times as the Contractor delivered software is made ready for deployment deployed to production".	Requirement [SOWG-119] in Amendment 9 has been rephrased to clarify when the O&M team training will take place, i.e. the Purchaser may ask for O&M team training after each Increment, but will normally combine the training of multiple Increment deliverables in one combined training event.
CR199	SOW I2BE	NUnit is mentioned in the requirements [SOWG-187], [SOWG-208], [SOWG-318] and [SOWG-367]. Only in the first one, [SOWG-187], NUnit is a, let's say, "strong" request (shall), to "make the output from the [automated] tests (i.e. test results) available in the NUnit report XML format". However, the other three requirements are mentioning NUnit just as a potential option to be used. Could you please explain the purpose of providing the automated test results in NUnit report XML format? Can any other unit testing framework (e.g. JUnit in case of developing in Java) be used? In such case, will the requirement [SOWG-187] (providing the test results using the NUnit report XML format) still apply?	The purpose of the requirement is to ensure that the test results can be automatically ingested into Azure DevOps and into the Jira tool with a Test Event Management plugin and processed by these tools. The SOWs in Amendment 9 have been updated to reflect this. This means that a format other than NUnit XML can be used.
CR200	In Section 2.3 of "CO-14873-INTELFS2-Book-II-Part IV SOW UA Annex User Stories" [16]	[16] describes "importing file" as a way of creation of product. However, there is no detail on product creation process (format of file, limitations, content etc.) via file import. Does "by importing files" mean "creating an empty form with a product file"?	This is referring to importing previously exported products where the export contains all details of the product (i.e. metadata and attachments). The export of such products for later import is described in the user story document in section 2.3.1.3.
CR201	SOW I2UA 2.4.4	Can a work package or an increment start before the previous work package or increment ends? Can we plan overlapping intervals for work packages or increments?	NCIA will only be able to support a sequential execution of the Increments. To accelerate development and delivery, the Contractor is free to start the next Increment before finishing the previous, but should not expect that NCIA will be able to provide support to this advanced work.
CR202	Bidding Instructions 3.6.4.2	What exactly is a Delivery Plan? We understand that it is a set of documents (mentioned in SOW I2UA 2.5.3), can you please confirm? Also, will we provide 3 separate Delivery Plans for 3 work packages of UA, each containing a separate SDD for that work package?	The delivery plan is defined by SOW section 2.5.3. As defined in paragraphs 3.6.4.2 and 4.5.2.2.14 in the Bidding Instructions, each work package shall have its own delivery plan. i.e. for the UA contract three (3) separate Delivery Plans shall be delivered.

NATO Communications and Information Agency
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IFB-CO-14873-INTELFS2
Amendment 9

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

BOOK II

PART II
CONTRACT SPECIAL PROVISIONS

Introduction

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

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

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

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

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

Table of Contents

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2 ORDER OF PRECEDENCE

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

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

2.1.1 The signature page

2.1.2 Part I – Schedule of Supplies and Services

2.1.3 Part II – Contract Special Provisions

2.1.4 Part III – Contract General Provisions

2.1.5 Part IV – Statement of Work

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

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

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

2.1.9 Part V – Abbreviations and Acronyms

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

3 INTERPRETATIONS, DEFINITIONS AND ACRONYMS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

4 SCOPE

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

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

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

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

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

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

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

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

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

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

5 CONTRACT TYPE AND CONSIDERATION

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

5.2 This is a Fixed Price Incentive Fee contract.

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

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

- All travel, per diem and accommodation costs;
- All executive management, administrative or other support effort;
- All facility or other overhead costs;
- All other direct costs.

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

6 INCENTIVE FEE

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

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

6.3 There are two Incentive Milestones dates:

6.3.1 For the Front-end (UA) contract, the first Incentive Milestone will be EDC+18 months for all deliverables listed under CLIN 1 and CLIN 2 of that contract. The second Incentive Milestone will be EDC+31 months (one month prior to the completion of the final contracted Increment) for all deliverables listed under CLINs 3 and 4.

6.3.2 For the Back-end (BE) contract, the first Incentive Milestone will be EDC+12 months for all back-end services listed under CLIN 1 of that contract. The second Incentive Milestone will be EDC+35 months (one month prior to the completion of the final contracted Increment) for all deliverables listed under CLINs 2, 3 and 4.

6.3.3

6.4 The incentives will be applied as follows:

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

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

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

7 INVOICING AND PAYMENT

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

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

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

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

7.5 Payment Schedule:

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

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

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

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

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

8 OPTIONS

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

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

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

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

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

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

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

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

9 ACCEPTANCE PROCEDURES – AGILE DEVELOPMENT

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

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

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

10 FINAL SYSTEMS ACCEPTANCE (FSA)

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

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

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

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

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

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

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

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

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

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

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

11 TERMINATION FOR DEFAULT

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

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

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

12 TERMINATION FOR CONVENIENCE OF THE PURCHASER

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

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

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

13 LIQUIDATED DAMAGES

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

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

13.3 For any Requirement listed in the SSS that has not been accepted at two designated points: 1) Four weeks after the first Incentive Milestone date; and 2) The end of the final contracted Increment as stated in paragraph 10.2; the Purchaser may asses liquidated damages in the amount of one-tenth of one per cent (0.1%) of the value of that sub-CLIN as set forth in the SSS per day of delinquent delivery/performance.

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

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

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

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

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

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

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

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

13.7.3 By reclaiming such damages through appropriate legal remedies.

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

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

14 CONTRACT ADMINISTRATION

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

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

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

14.4 All notices and communication shall be effective upon receipt.

14.5 Official Points of Contact are:

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

15 PARTICIPATING COUNTRIES

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

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

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

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

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

16 SECURITY

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

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

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

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

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

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

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

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

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

16.10 Reserved.

17 INTELLECTUAL PROPERTY

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

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

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

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

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

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

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

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

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

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

18 KEY PERSONNEL

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

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

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

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

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

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

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

19 SYSTEMS WARRANTY

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

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

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

20 SOFTWARE WARRANTY

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

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

21 PURCHASER FURNISHED ITEMS

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

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

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

22 SOFTWARE LICENSES

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

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

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

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

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

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

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

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

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

24 ACCEPTANCE OF DESIGN DOCUMENTATION

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

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

25 INDEMNITY

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

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

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

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

26 PLACE AND TERMS OF DELIVERY

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

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

27 SUPPLEMENTAL AGREEMENT(S), DOCUMENTS AND PERMISSIONS

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

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

28 COMPREHENSION OF CONTRACT AND SPECIFICATIONS

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

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

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

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

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

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

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

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

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

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

30 EXPORT AGREEMENT AND LICENSE

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

31 INDEPENDENT CONTRACTOR

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

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

32 FORCE MAJEURE

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

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

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

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

ANNEX B. KEY PERSONNEL

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

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

ANNEX C. CONTRACTOR BACKGROUND IPR

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

Item	Description / IP Ownership	Indicate if COTS[1]

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

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

ANNEX D. SUBCONTRACTOR AND THIRD PARTY IPR

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

Item	Description / IP Ownership	Indicate if COTS[1]

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

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

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

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

STATEMENT OF WORK (SOW)

Version 1.5

01/04/2021

TABLE OF CONTENTS

INDEX OF FIGURES

INDEX OF TABLES

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
01 Apr 2021	1.6	Clarified the acronym SM&C, the usage of test reporting output format, and the time of O&M team training

1 Introduction

1.1 Background

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

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

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

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

1.2 Purpose

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

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

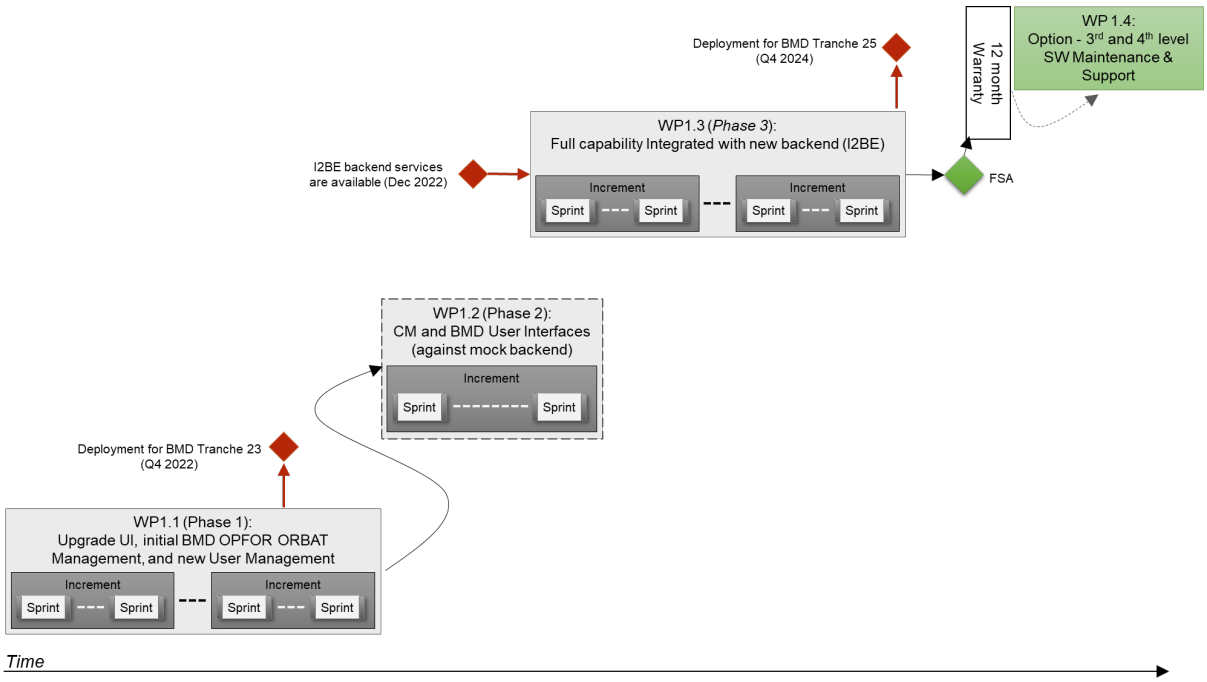
[7] The I2UA system requirements is defined in the Annex A to this SOW.

1.3 Scope of Work

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

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

Figure 1-1 Work Packages, Increments, and Sprints



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

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

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

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

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

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

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

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

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

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

[19] The deliverables of the work is defined in the Schedule of Services and Supplies (SSS) where each deliverable will have by contract line item number (CLIN), a cost, and an expected delivery time information. The CLIN delivery times in the SSS is defined through the increment number when the deliverable is expected.

1.4 Purchaser's Responsibilities

[20] The following services and items will be provided by the Purchaser for the performance of the Contract.

(1) Access to Subject Matter Experts (SME) and required NATO documentation during project execution;
(2) Provide purchaser furnished items (PFI) as per section 1.5 of this SOW;
(3) Coordinating access to NATO sites the Contractor will have to visit.

[21] The Purchaser's Project Manager (PM) will act as the Purchaser's representative and will be the primary interface between the Contractor and Purchaser after the Effective Date of Contract (EDC).

[22] The Purchaser's Project Manager will be supported by specialists in certain areas (e.g. the project Technical Lead) who may, from time to time, be delegated to act on the Project Manager's behalf in their area of expertise.

[23] Neither the Project Manager, nor any other NATO personnel may make changes to the terms and conditions of the Contract, but may only provide the Purchaser's interpretation of technical matters. All changes to the Contract will be made through the Purchaser's contracting office only.

[24] The Purchaser will provide the Contractor with available technical descriptions of external NATO interfaces if such descriptions are required for the work.

[25] The Purchaser will make available to the Contractor the facilities necessary to test and demonstrate the delivered software's interoperability with required external NATO interfaces.

1.5 Purchaser Furnished Items (PFI)

[26] The Purchaser will provide access to reference test environment and integration testbed facilities for the required testing activities under this contract at the Purchaser's facility (either The Hague-Netherlands or Mons-Belgium).

[27] The Purchaser will equip the Contractor with one NATO RΞSTRICTED (NR) laptop to be used for sharing of NR material.

[28] The Purchaser will provide the Contractor with a set of user accounts on the NATO Software Factory (NSF), see section 2.4.1.

[29] The Purchaser will provide the Contractor with the Service Oriented Architecture (SOA) and Identity Management (IdM) Platform, see [SOA-IdM].

[30] The Purchaser will provide the Contractor with a reference test environment for system integration testing (this will be provided within the NSF).

[31] The Purchaser will provide the Contractor with the current INTEL-FS Spiral 1 software.

[31a] The purchaser will provide the Contractor with an initial version of the OData REST API for accessing INTEL-FS entities. This API will be created by a forward transformation from the INTEL-FS Spiral 2 information model (see [INTEL-FS2-InformationModel]).

[32] The Purchaser will provide the Contractor with C4ISR Visualization Component (VC), see SRS for additional details.

[33] The Purchaser will provide the Contractor with a software library for the video player component, see SRS for additional details.

1.6 Conventions

[34] Requirements in the SOW are formulated using the form “shall”. Context information supporting the requirements definition is provided using the form “will”.

[35] “Shall” statements are contractually binding; “Will” statements are non-mandatory, or they imply intent on the part of the Purchaser.

[36] Mandatory requirements in the SOW are preceded by a unique heading number, consisting of a prefix, followed by a number.

[37] Informational or context information not conveying any requirement on the Contractor is preceded by a number heading in brackets, [xx], without prefix letters.

[38] The term “the Purchaser” means the NCI Agency or its authorised representatives.

[39] Whenever requirements are stated herein to “include” a group of items, parameters, or other considerations, “include” means “include but not limited to”.

[40] Whenever reference is made to a section or paragraph, the reference includes all subordinate and referenced paragraphs.

[41] The convention to be used for dates appearing in free text (e.g. quoting dates of meetings) is day-month-year and not month-day-year.

1.7 Structure

[42] This SOW is structured as follows:

- Chapter 1: Introduction of the project;
- Chapter 2: Specification of general requirements for the SOW where those requirements are of a general nature (i.e. applicable to most NATO software acquisition projects);
- Chapter 3: Specification of project specific SOW requirements that are of a character that have been specially identified for this project.

1.8 Applicable documents

[43] Applicable documents provide details not explicitly set out through this SOW. They shall be considered by the Contractor as requirements associated with this SOW.

Table 1-1 Applicable documents

[ACMP-2009-SRD-41]	Examples of CM Plan Requirements, Edition A, Version 1, March 2017, NATO Standardization Office (NSO)
[AQAP-2110]	NATO Quality Assurance Requirements for Design, Development and Production, Edition D Version 1, JUNE 2016, NATO Standardization Office (NSO)
[INTEL-FS2-Special-Provisions]	CO-14873-INTELFS2, INTEL-FS SPIRAL 2 – CONTRACT SPECIAL PROVISIONS – Book II, Part III, NCI Agency
[INTEL-FS2-General-Provisions]	CO-14873-INTELFS2, INTEL-FS SPIRAL 2 – CONTRACT GENERAL PROVISIONS – Book II, Part III, NCI Agency
[NCIA AI TECH 06.03.01, 2016]	NATO Communications and Information Agency - Agency Instruction 06.03.01, "Identification of Software Assets", 2016.

1.9 Reference documents

[44] Reference documents are documents providing contextual information that is relevant to this project. They shall be used by the Contractor to support his activity.

Table 1-2 Reference documents

[ADMP-1]	Guidance for Developing Dependability Requirements, Edition A, Version 1, 14 August 2014, NATO non-classified
[ADMP-2]	Guidance for Dependability In-Service, Edition A, Version 1, August 2014, NATO non-classified
[AIA/ASD SX000i, 2016]	International guide for the use of the S-Series Integrated Logistic Support (ILS) specifications (issue 1.1)
[ALP-10]	NATO Guidance on Integrated Logistics Support for Multinational Armament Programs
[ASD S3000L]	International Procedure Specification for Logistics Support Analysis (LSA), 2011
[C-M(2002)49-G]	Enclosure “G” to C-M(2002)49: Classified Project and Industrial Security, Amdt 12, Sep 2015
[DOORS]	IBM® Engineering Requirements Management DOORS, https://www.ibm.com/support/knowledgecenter/en/SSYQBZ_9.7.0/com.ibm.doors.requirements.doc/topics/c_welcome.html
[INTEL-FS2-InformationModel]	CO-14873-INTELFS2, INTEL-FS SPIRAL 2 – Information Model Book II - Part V, NCI Agency
[Jira]	Atlassian Jira, https://www.atlassian.com/software/jira
[MIL-HDBK-338B]	Electronic Reliability Design Handbook, US Department of Defense, 1 October 1998
[MIL-HDBK-470A]	Designing and Developing Maintainable Products and Systems, Volume 1, US Department of Defense, 4 August 1997
[MIL-STD-1388-1A]	Logistics Support Analysis, 11 April 1983
[MIL-STD-1388-2B]	Logistics Support Analysis Records, 28 March 1991
[MIL-STD-1629A]	Procedures for Performing A Failure Mode, Effects and Criticality Analysis (FMECA), 24 November 1980
[SOA-IdM]	CO-14176-SOA-IDM Service Oriented Architecture (SOA) and Identity Management (IdM) Platform – Wave 1, System Design Specification (SDS) and Interface Control Document (ICD), NCI Agency
[SonarQube]	SonarQube, https://www.sonarqube.org/

2 General Requirements

[45] This section defines requirements that generally could be applied to acquisition of any software application for the NATO Bi-SC AIS.

2.1 Project Management Requirements

[46] The goal of the Contractor's project management will be to guide the project through a controlled, well-managed, visible set of activities to achieve the desired results and, wherever possible, to eliminate problems and to ensure that those problems that do occur are identified early, assessed accurately, and resolved quickly in partnership with the Purchaser.

2.1.1 Project Management Office

[SOWG-1] The Contractor shall establish and maintain a Project Management Office (PMO) to perform and manage all efforts necessary to discharge all his responsibilities under this Contract.

[SOWG-2] The Contractor shall provide all necessary manpower and resources to conduct and support the management and administration of operations in order to meet the objectives of the project, including taking all reasonable steps to ensure continuity of personnel assigned to work on this project.

[SOWG-3] The Contractor shall use PRINCE2 or a similar and internationally recognized Project Management standard for the direction, governance and management activities for the entire project.

[SOWG-4] The personnel identified below shall be considered as Key Personnel in accordance with the Special Provisions of this Contract.
(1) Project Manager;
(2) Quality Assurance Manager;
(3) Configuration Manager;
(4) Technical Team (see section 3).

[SOWG-5] Location of work: Unless otherwise specified by the Work Package or approved by the Purchaser, the main effort for this Project shall be carried out in the Contractor's premises.

[SOWG-6] The Contractor's team shall be located together to enable agile execution of the work (e.g. conducting daily stand-up meetings).

2.1.1.1 Project Manager

[SOWG-7] The Contractor shall designate a Project Manager (PM), who shall direct and co-ordinate the activities of the Contractor's project team.

[SOWG-8] The Contractor's Project Manager shall be prepared at all times to present and discuss the status of Contract activities with the Purchaser's Project Manager, Contracting Officer, or Technical Lead.

[SOWG-9] The Contractor`s Project Manager shall meet the following qualifications:
(1) Have a master's degree in management, engineering, or business administration;
(2) Have a formal certification through Project Management Institute or equivalent source, PRINCE 2 certified or equivalent;

(3) Have seven years of experience in managing projects similar to this project in technical and financial scope;
(4) Have a NATO SΞCRET clearance.

2.1.1.2 Quality Assurance Manager

[SOWG-10] The Contractor shall designate a Quality Assurance Manager; who shall be responsible for all Quality Assurance Manager for activities under this Contract.

[SOWG-11] The Quality Assurance Manager shall report to a separate manager within the Contractor's organisation at a level equivalent to or higher than the Project Manager.

[SOWG-12] The Contractor's Quality Assurance Manager shall meet the following qualifications:
(1) Have a bachelor's, or higher, degree in Computer Science, or related/ equivalent studies;
(2) Have worked at least four years with quality control methods and tools;
(3) Have worked at least four years with supporting system development and test projects;
(4) Have a NATO SΞCRET clearance.

2.1.1.3 Configuration Manager

[SOWG-13] The Contractor shall designate a Configuration Manager, who shall be responsible for all configuration activities conducted under this Contract.

[SOWG-14] The Contractor's Configuration Manager shall meet the following qualifications:
(1) 3 years' experience as Configuration Manager in Projects of a similar nature, both in terms of the products to be delivered and the level of technicality;
(2) Have a NATO SΞCRET clearance.

2.1.1.4 Other Key Roles

[47] The required qualifications for other key roles in the Contractor's project team are defined in section 3 (Project-Specific Requirements)

2.1.2 Project Management

[SOWG-15] The Contractor shall establish and maintain a Project Management Plan (PMP) as defined in section 2.5.2.1.

[SOWG-16] The Contractor shall provide the initial baseline version of the PMP at the kick-off meeting and maintain it throughout the period of performance of the Contract.

[SOWG-17] After approval by the Purchaser, the final version of the PMP shall be the official document against which the Contractor is expected to conduct the performance of the Contract.

[SOWG-18] The approval of the PMP by the Purchaser signifies only that the Purchaser agrees to the Contractor's approach in meeting the requirements. This approval in no way relieves the Contractor from its responsibilities to meet the requirements stated in the Contract. The requirements of the Contract

supersede any statement in the PMP in case of any conflict, ambiguity or omission.

[SOWG-19] The Contractor shall ensure that the Purchaser always have access to the latest version of the PMP, and that the PMP remains current throughout the duration of the Project to reflect the actual state of the Contractor's organisation and efforts.

2.1.3 Risk Management

[SOWG-20] The Contractor shall establish a risk management process and perform risk management throughout the period of performance of this Contract.

[SOWG-21] The Contractor shall document, update and maintain status of all risks in the Risk Register (see section 2.5.2.2).

[SOWG-22] The Contractor shall update and maintain the Risk Register throughout the period of performance of the Contract.

2.1.4 Issue Management

[SOWG-23] The Contractor shall establish and maintain a process for identifying, tracking, reviewing, reporting and resolving all project issues.

[SOWG-24] The Contractor shall develop and maintain an Issue Register (see section 2.5.2.3) where all project issues are recorded and tracked regardless of their status.

[SOWG-25] The Contractor shall use the Issue Register to track reported bugs in software previously delivered by the Contractor under this Contract.

[SOWG-26] The Contractor shall update and maintain the Issue Register throughout the period of performance of the Contract.

[SOWG-27] The Contractor shall ensure that the Purchaser always have access to the latest version of the Issue Register.

2.1.5 Configuration Management

[SOWG-28] The Contractor shall be responsible for all necessary Configuration Management activities throughout the duration of the Contract.

[SOWG-29] The Contractor shall establish and maintain a Configuration Management Plan (CMP) in compliance with section 2.5.2.4 that describes how the Contractor will implement Configuration Management within the project.

[SOWG-30] All Contractor and Purchaser activities and milestones related to CM shall be identified and included in the Delivery Plans schedules (see section 2.5.3.1).

[SOWG-31] The Contractor shall be responsible for the Configuration Status Accounting (CSA) and reporting for all CIs.

[SOWG-32] Upon request from the Purchaser, the Contractor shall support configuration audits to demonstrate that the actual status of all CIs matches the state of CIs as registered in the CSA reports; this support shall include:
(1) Providing the required baseline documentation;
(2) Answering questions from the Purchaser's Auditor;
(3) Summarizing the audit results in a Configuration Audit Report and providing this report the Purchaser's approval.

[SOWG-33] The Contractor shall ensure that the Configuration Baselines and CIs are persistently stored, maintained and managed in the Configuration Management Database CMDB.

[SOWG-34] The Contractor shall keep the CMDB consistent and updated throughout the duration of the project.

[SOWG-35] The Contractor shall before FSA conduct a handover of a fully populated CMDB instance (including the full history of all changes to the CIs) to the Purchaser.

[SOWG-36] The Contractor shall solve any deficiencies found during the Configuration Management Audits within the agreed timeframe and update the baseline accordingly.

2.1.5.1 Configuration Management (CM) Database (CMDB) and CM Tools

[SOWG-37] The Contractor shall establish and maintain a CMDB that persists the Configuration Items (CIs) attributes, (inter-) relationships/ dependencies, and Configuration Baselines.

[SOWG-38] The CMDB and CM Tools shall to the maximum extent possible integrate with, or use, the Azure DevOps tools provided within the NSF.

[SOWG-39] The CMDB and CM Tools shall to the maximum extent possible support DevOps practices and integrate with tools used for automated deployment to production where such deployment scripts also are managed as CIs.

[SOWG-40] Each CI in the CMDB shall be assigned a unique identifier.

[SOWG-41] The CIs in the CMDB shall be organized around working and executable software units (e.g. applications or executable services).

[SOWG-42] The top-level CIs in the CMDB shall be broken down into a tree/ hierarchy of its parts and sub-parts consisting of deliverables, the relevant documentation of these deliverables, all dependent third party components and libraries and respective documentation.

[SOWG-43] The CMDB shall have support for tracing higher and subordinate CIs using CI identifiers or other CI attributes.

[SOWG-44] It shall be possible from the CMDB, at any time, to generate Configuration Status Reports for any specified baseline where the report provides a full history on all CIs in the baseline including information on changes, deviations/ waivers, releases, etc.

[SOWG-45] The CMDB/ CM Tools shall support generation of Configuration Status Accounting (CSA) Reports in two different formats:
(1) Readable document format (either in PDF or Microsoft Word format);
(2) XML format in accordance with a Contractor proposed XML schema.

[SOWG-46] A baseline in the CMDB shall:
(1) Be defined by version controlled artefacts that all resides in the proper repositories in the NSF;
(2) Include (off-the-shelf) software and (off-the-self) software license(s) where all software license(s) shall be registered with the NCI Agency as the end-user;
(3) Include all (supporting) documentation, e.g. off-the-shelf OEM manuals, operations and maintenance support documentation, training

documentation, quality assurance documentation, security documentation, configuration management documentation, and warranty documentation.

[SOWG-47] The CMDB shall implement support for baselining of Configuration Items (CIs) into the Functional Baseline (FBL), Allocated Baseline (ABL), and Product Baseline (PBL).

[SOWG-48] It shall be possible from the CMDB and CM Tools to generate a package (as one or several electronic files) with all the artefacts included in a PBL release.

[SOWG-49] The Contractor's PBL version numbering strategy shall be compliant with [NCIA AI TECH 06.03.01, 2015].

[SOWG-50] The Contractor shall not use any names that can be associated with the Contractor (e.g. company name) on any of the developed software artefacts (i.e. file names, class names, XML namespaces, etc.)

[SOWG-51] The CM Tools using the CMDB shall have support for comparison of baselines and precisely identify the changes to the individual items from one baseline to the other (including versions of third-party software components and libraries).

2.1.5.2 Engineering Change Proposals (ECP)

[48] The ECPs can be categorized by type and class as defined in Table 2-1

Table 2-1 ECP type and class

Type	Class	Definition
NP (New Product)	I	The development of a new capability in order to implement functionalities to meet new requirements.
PE (Product Enhancement)	I	The addition or modification of functionalities to existing capabilities to meet changing requirements (change in the fit-for-purpose).
PC (Product Correction)	I or II	The correction of existing capabilities in order to maintain their functionalities to meet existing requirements (change in the fit-for-use).
DC (Documentation Change)	II	The correction or improvement of documentation. This type of ECP does not affect any other configuration item type.

[SOWG-52] The Contractor shall prepare and process the ECP for engineering, design, or development changes.

[SOWG-53] The Contractor shall use the configuration control procedures specified in the CMP for the preparation and processing of ECPs.

[SOWG-54] The Contractor shall use the ECP format as defined in the CMP when submitting ECPs.

[SOWG-55] The Contractor shall in the ECP:
(1) Include a unique ECP reference number;
(2) Describe the rationale for the change;
(3) Describe the nature of the change (Deletion, Modification, or Addition);

(4) Describe what impact the change will have on the delivered capability's cost, schedule, scope, and/or performance (this description shall include any trade-offs that shall be considered);
(5) Identify the SOW and SRS section(s) affected;
(6) Include, or reference, an updated Solution Decision Document (SDD), see section 2.5.3.2, that records the analysis and options considered for the proposed change;
(7) Propose a Priority and a Schedule for the change;
(8) Propose a Classification for the change (as either Class I or Class II ECPs as defined in Table 2-1).

[SOWG-56] Class I ECPs shall have to be mutually agreed upon by the Contractor and Purchaser.

[SOWG-57] The Contractor shall submit all Class II ECPs to the Purchaser for review and classification concurrence before starting implementation of the change.

[SOWG-58] The Contractor shall, after the Purchaser's approval of the ECP, update the SDD with a reference to the Purchaser-approved ECP.

[SOWG-59] Where a change affects more than one document, or affects documents previously approved and delivered, the Contractor shall update and properly reflect the change in all baseline documents affected by that change.

[SOWG-60] The Contractor shall place all submitted ECPs under configuration control.

2.1.5.3 Requesting Deviations/ Waivers

[49] A Request for Deviation (RFD) is defined as "planned departure" from a specific requirement where "departure" defined as the "inability of a product to meet one of its functional performance or technical requirements".

[50] A Request for Waiver (RFW) is defined as "unplanned departure" from a specific requirement.

[SOWG-61] If required, the Contractor shall submit RFDs/ RFWs for Purchaser's approval.

[SOWG-62] The Contractor shall be aware that permanent departures from contractual requirements shall be accomplished by ECP action rather than by RFD.

[SOWG-63] The Contractor shall use the RFD/ RFW format as defined in the CMP when submitting RFDs/ RFWs.

[SOWG-64] The Contractor shall in the RFD/ RFW:
(1) Include a unique reference number;
(2) Identify the requirement that cannot be fully met (to include references to the affected CLIN in the SSS and the requirement(s) in the SRS);
(3) Describe what impact the departure will have on cost, schedule, ILS, scope, and/or performance;
(4) Description of the deviation/ waiver;
(5) Justify the departure from the specific requirement.

[SOWG-65] The Contractor shall place all submitted RFDs/ RFWs under configuration control.

2.1.5.4 Deficiency Reporting

[SOWG-66] The Contractor shall establish and maintain a process for reporting, tracking, and resolving deficiencies.

[SOWG-67] The Contractor shall use Deficiency Reports (DRs) to document problems during the design, configuration, implementation, or operation of the system.

[SOWG-68] The Contractor shall close out DRs after the identified problem is resolved.

[SOWG-69] The Contractor shall place all DRs under configuration control.

2.1.6 Security Aspects

[51] Security aspects relevant to the Contractor's work are defined in the Contract Special Provisions (see [INTEL-FS2-Special-Provisions]) document and in the Contract General Provisions document (see [INTEL-FS2-General-Provisions]). This section identifies additional security oriented requirements related to the execution of the Contractor's work.

[SOWG-70] The Contractor shall ensure that all software implementation activities in the NSF is kept at NATO UNCLASSIFIED level.

2.2 Quality Assurance (QA) Requirements

[SOWG-71] The Contractor shall comply with the requirements as defined [AQAP-2110].

[SOWG-72] The Contractor shall provide a Quality Plan (QP) as defined by [AQAP-2110] to the Purchaser.

[SOWG-73] The Contractor shall manage the QP as a living document subject to revision/update, as required.

2.2.1 Audits

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

[53] Audit activities at Sub-supplier's facilities do not relieve the Contractor and Subcontractors from any contractual quality responsibilities.

[SOWG-74] The Contractor shall fully support the Purchaser in performing Reviews and Quality audits at any of the Contractor (or Sub-Contractor(s)) facilities activities and in particular:
(1) Host inspection visits by Purchaser's auditors;
(2) Make himself available for answering questions and furnishing information related to the project;
(3) Allow the Purchaser's auditors to inspect and monitor the Contractor's processes applicable to this project.

[SOWG-75] The Contractor shall transfer to the Purchaser's auditors all information deemed necessary to perform the activities, on his own initiative or on request by Purchaser's auditors.

2.3 Integrated Logistics Support (ILS) Requirements

2.3.1 General

[SOWG-76] [The Contractor activities and milestones related to ILS shall be identified and included in the WP Delivery Plans.

[SOWG-77] The Contractor shall use the [ALP 10-2016] and [AIA/ASD SX000i, 2016] specification as guidance when establishing and conducting the ILS Process (i.e. Integrated Logistics Support – ILS Process), in accordance with the requirements of the contract.

[SOWG-78] The Contractor shall use [ADMP-1], [ADMP-2], [MIL-HDBK-338B], [MIL-HDBK-470A], [MIL-STD-1388-1A], [MIL-STD-1388-2B] and [ASD S3000L] as guidance when establishing and conducting the Logistic Support Analysis (LSA) programme, including the Reliability, Availability, Maintainability and Testability (RAMT) programme, in accordance with the requirements of the Contract.

[SOWG-79] All ILS related deliverables and activities shall be aligned with the incremental delivery approach of the project, and be delivered as required.

2.3.2 Integrated Logistics Support Plan (ILSP)

[SOWG-80] The Contractor shall provide and maintain an ILSP, tailored to the project and in accordance with the requirements of this section.

[SOWG-81] The Contractor shall detail in the ILSP how ILS will be designed, managed, procured and provided throughout the system lifetime.

[SOWG-82] The Contractor shall provide an updated version of the ILSP to the Purchaser for each milestone for Purchaser acceptance, and update it as required to reflect the changes in baselines.

[SOWG-83] The Contractor shall cover the following sections at minimum including the processes to perform the related activities in ILSP:

(1) The Contractor’s ILS organization, roles, responsibilities and procedures;
(2) Maintenance Concept (Maintenance Plan, detailed Maintenance Level definitions and tasks);
(3) Planning of supply support (System Inventory, Codification, Recommended Spare Parts and Consumables list);
(4) Design Influence:
    (a) RAMT Programme planning, activities, processes;
    (b) Logistics Support Analysis planning, activities and processes;
    (c) Support Case planning, releases and processes.
(5) Support and Test Equipment Lists;
(6) Computer Resources (licences, SWDL etc.);
(7) Manpower and Personnel Requirements;
(8) Technical Documentation (organization, process, inputs, reviews, release schedule);
(9) Planning of packaging, handling, storage, and transportation (PHS&T);
(10) Planning of supply chain security;
(11) In-Service Support Plan (ISSP).

[SOWG-84] The Contractor shall provide an In Service Support Plan (ISSP) as an annex to the ILSP and the ISSP shall cover the following topics at minimum with practical instructions:

(1) The Contractor's Support organization, roles, responsibilities, processes and procedures (until FSA; during warranty and optional support period);
(2) Description of the system of interest (SOI) in scope of integrated support,
(3) Description of the integrated support concept, including the maintenance concept, warranty concept, customer support concept, service management & control concept including but not limited to the incident, problem management, release and deployment management, and configuration and change management;
(4) Description of the parties involved, their responsibilities for the various levels of support (with indication of start and end dates), interfaces, response times and POC details;
(5) Description and allocation of operation, Service Management and Control (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 for each incremental deliverable. Normally this training will be conducted within four weeks after the Purchaser's deliverable acceptance (see section 2.5.4.7), but the Purchaser may decide to combine O&M team training of multiple increment deliverables and postpone an increment's O&M team training until such time that a combined O&M team training event can be conducted.

[SOWG-120] The training shall normally take place in person at the Purchaser's premises (in the Netherlands or in Belgium at the discretion of the Purchaser), but a video conference might be acceptable.

2.3.6 Supply Support

2.3.6.1 System Inventory

[SOWG-121] The Contractor shall provide the Purchaser's ILS POC with a System Inventory in electronic Microsoft Excel format at least 14 (fourteen) calendar days before each software release.

[SOWG-122] The System Inventory shall include, in separate chapters, all items furnished under this Contract, as follows and as applicable:
(1) All SW artefacts – i.e. all SW tools, SW test equipment, etc.;
(2) All Purchaser Furnished Items (PFI);
(3) All documentation, such as manuals, handbooks and drawings;
(4) All training materials.

[SOWG-123] Additionally, the Contractor shall provide a detailed Software Distribution List (SWDL), which shall detail comprehensively all CSCIs and associated software, firmware or feature/performance licenses provided under this Contract. The SWDL shall include, the following data elements:

(1) CSCI identification number;
(2) Nomenclature;
(3) Version number;
(4) License key (if applicable);
(5) License renewal date (if applicable);
(6) Warranty expiration date;
(7) Date of distribution.

[SOWG-124] The Contractor shall make sure that all licenses are registered with the NCI Agency as end-user.

2.3.6.2 Physical labelling (if applicable)

[SOWG-125] In case hardware (CD, USB, memory stick, hard drive etc.) is used to deliver or transfer the software by the Contractor, then this hardware shall be physically labelled with the contract information, CLIN, identification, release date and security classification. The label shall be durable and non-erasable to ensure proper identification is warranted at all times.

2.3.6.3 SW shipment (if applicable)

[63] Note: As all software should be developed in the NSF, the two following requirements only apply to software developed outside of the NSF.

[SOWG-126] Unless clearly specified otherwise, the Contractor shall be responsible for the delivery of Installation packages (physical/electronic media) of all SW, firmware and modifications provided under this Contract from Contractor's premises to the respective implementation destination.

[SOWG-127] 14 (fourteen) calendar days before each delivery of supplies, the Contractor shall provide the Purchaser with a Notice of Delivery comprising the following details:
(1) Shipment Date;
(2) Purchaser Contract Number;
(3) CLIN;
(4) Consignor's and Consignee's name and address;
(5) Number and type of Installation media and/or Packages/Containers;
(6) Number of 302 Forms used (if applicable).

2.3.6.4 Customs

[SOWG-128] The Contractor shall be responsible for customs clearance and/or export licences of all deliveries into their destination countries. It is the Contractor's responsibility to take into account delays at customs. The Contractor shall therefore consider eventual delays and arrange for shipment in time. Under no circumstances can the Purchaser be held responsible for delays incurred, even when utilising Purchaser provided Customs Form 302 (if applicable).

2.3.7 Warranty Requirements

[SOWG-129] The Contractor shall warrant that all software furnished under this Contract and all installation work performed under this Contract conform to the requirements and is free of any defect in code or workmanship for a period starting at date of Final System Acceptance (FSA) to date of FSA plus one (1) year.

[SOWG-130] The Contractor shall support the system as part of the project implementation scope from the first site activation until FSA milestone is successfully completed. During this period, the Contractor shall provide on-site and off-site maintenance and support services as required.

[SOWG-131] The Contractor shall integrate the 3rd Level Maintenance and Support services within its warranty services, to be provided off-site from the Contractor's premises or on-site from the Purchaser premises, as required due to the corrections in SW. If the on-site Level 3 support is requested by the Purchaser for additional technical support or due to the changes in SW environment without any reported SW deficiency, then the Contractor shall provide this on-site support up to 6 times a year without any additional cost to the Purchaser.

[SOWG-132] The Contractor shall provide a specific Customer POC for all warranty and support requests. The Contractor shall detail all the warranty and support requirements in its ISSP including the roles and responsibilities.

[SOWG-133] The Contractor shall ensure that the warranty conditions remain valid even if the software is relocated/ redeployed to an equivalent platform during the warranty period. The “equivalent platform” will have the same amount, or better, computing resources (CPU, memory, and storage capacity), the same operating system, and a version of the Platform as a Service (PaaS) that is the same or backward compatible with the previous version of the PaaS.

[SOWG-134] The Contractor shall fix all software defects as per the Contractor’s internal procedures with the highest priority allocated. The Contractor shall provide the workaround within maximum 3 business days and the fixed solution within 20 business days after the Purchaser has provided the failure notification in written. The Contractor shall follow the Configuration and Change Management processes before the release of each fix. For this purpose the Contractor shall identify the changes, propose to the Purchaser, perform the test activities required and perform the Release Management activities.

[SOWG-135] The Contractor shall provide 3rd Level maintenance, when requested by the Purchaser, to define the solution to a problem (corrective maintenance) or to maintain up to date software configuration (adaptive maintenance following Purchaser’s changes to the underpinning hardware, firmware and software environment e.g. security patches, operating system upgrades, minor software configuration changes due to operational/interface needs).

[SOWG-136] If the Contractor becomes aware at any time before acceptance by the Purchaser that a defect exists in any Contract deliverables, the Contractor shall coordinate with the Purchaser and promptly correct the defect.

[SOWG-137] During the warranty period, the Contractor shall be responsible for supplying all COTS software upgrades and updates.

[SOWG-138] The availability of COTS software upgrades and updates shall be made known to the Purchaser and, if proposed for introduction by the Contractor (including any corrective action for an identified fault), shall always be subject to Purchaser approval. The Contractor shall support the Purchaser to update the CMDB with information on all changes made to CIs in the warranty period.

[SOWG-139] The Contractor shall provide Technical Assistance, during business hours between 08.30-17.30 CET, to the Purchaser or his representatives during the warranty period. Technical assistance information details shall be indicated in the ISSP.

[SOWG-140] The Technical Assistance shall provide on-call support in English for requests that correspond to information demands limited to the perimeter of delivered products, evolution proposals, problem reports, or any information needed by the Purchaser or its representatives, which are not included in the supplied technical documentation. The Contractor shall not be responsible for the correction of defects in Purchaser furnished property, except for defects in installation, unless the Contractor performs, or is obligated to perform, any modifications or other work on such property. In the event described above, the Contractor shall be responsible for correction of defects that result from the modifications or other work.

2.3.7.1 COTS Component Warranty Requirements

[SOWG-141] The contractor shall warrant the COTS Software components warranty whose duration shall be consistent with the identified Warranty Period.

[SOWG-142] The Contractor shall coordinate the COTS Software warranty activation with the Purchaser in order to facilitate the system's handover to the Service Provision Authority.

2.3.7.2 Developed Components Warranty Requirements

[SOWG-143] The Contractor shall be able to extend the warranty for a further period based on Purchaser's request.

[SOWG-144] The price of the extended warranty shall be consistent with the bid prices, and shall be negotiated at the time of extension.

[SOWG-145] The Extended warranty shall provide the same coverage as the original warranty and guarantee of the reliability of the Software Component under conditions of ordinary use.

2.4 Work Execution Requirements

2.4.1 NATO Software Factory (NSF)

[64] The NCI Agency is moving towards a short-cycle capability development approach embracing a high degree of componentization and reuse through services, leading to composite capabilities with a much shorter time to in-service value, cost optimization and transparency. The approach makes use of standardized software engineering processes and common tooling in a test and development cloud DevSecOps Platform (the NSF) shared by NCI Agency, Industry and potentially by Nations.

[65] The NSF toolchain includes a number of tools that the Contractor can make use of in execution of this work including:

(1) Azure DevOps
(2) GitLab
(3) Jira
(4) Jenkins
(5) Nexus

(6) SonarCube

[SOWG-146] The Contractor shall, unless otherwise agreed with Purchaser, use the NSF as the platform for all software engineering, implementation work, and testing (including system integration testing).

[SOWG-147] As the Contractor can only create and maintain engineering artefact at unclassified level on the NSF, the Contractor shall
(1) On occasions be able to use mock data values (e.g. mock domain values) and/ or data structures to enable work at unclassified level;
(2) For any module/ component where it is not feasible to do work at unclassified level (using mock data is not feasible), be able to do the work in Contractor's own secure software engineering environment at NATO RΞSTRICTED level.

[SOWG-148] The Contractor shall when feasible use existing NSF tooling (see list above) for managing the project engineering artefacts. The Contractor may propose additional tooling for managing engineering artefacts on the NSF for Purchaser's approval.

[SOWG-149] The Contractor shall organize the engineering artefacts in a structured and logical way that will enable the Purchaser to quickly find any artefacts based on context (e.g. work package, increment/ deliverable, etc.) and artefact type.

2.4.2 Meetings – General Requirements

[SOWG-150] Meetings and phone calls shall be conducted in English.

[SOWG-151] Unless otherwise specified, at least one week before all meetings required under this Contract, the Contractor shall send an invitation, including:
(1) Purpose;
(2) Agenda;
(3) List of participants;
(4) Date, hour, place, duration.

[SOWG-152] The Contractor shall record meeting minutes and provide the minutes to the Purchaser within 3 working days.

[SOWG-153] The Minutes shall include:
(1) Date, place, and time of the meeting;
(2) Purpose of the meeting;
(3) Name of participants;
(4) Approval of previous meeting's minutes and all resolutions
(5) Record of principle points discussed, actions taken, and decisions made;
(6) Copies of materials distributed at the meeting.

[SOWG-154] The minutes shall not be used as a mechanism to change the terms, conditions or specifications of the Contract nor as a vehicle to alter the design or configuration of equipment or systems. Such changes shall only be made by agreement, amendment or by authorized mechanisms as set forth in the Contract.

[SOWG-155] If meeting facilities at a Purchaser location are not available at the specified Purchaser location in the time frame required to support an in-person meeting, the Contractor shall:

(1) Reschedule the meeting to such time as meeting facilities are available at the Purchaser location, with no further adjustment to schedule or cost; or
(2) Provide suitable meeting facilities (e.g., hotel meeting facility) for the meeting/review at no additional cost to the Purchaser; or
(3) Arrange to host the meeting at the Contractor's facility. This facility shall be provided at no additional cost to the Purchaser.

2.4.3 Kick-Off Meeting

[66] The Purchaser will prior to the Kick-Off Meeting provide the initial MoSCoW prioritization to all the requirements as defined in the SRS. Note: The periodization is used in this contract for scheduling reasons. I.e. at the end of the project all requirements are expected to be fulfilled.

[67] The MoSCoW priorities for the WP requirements will be updated at regular interval based on the performance and progress of the work delivered by the Contractor.

[68] The preparation for and the conduct of the Kick-Off meeting is depicted in Figure 2-1.

[SOWG-156] The Contractor's key personnel shall meet with the Purchaser's Project Manager no later than 1 month after efficient date of contract (EDC). The meeting 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.

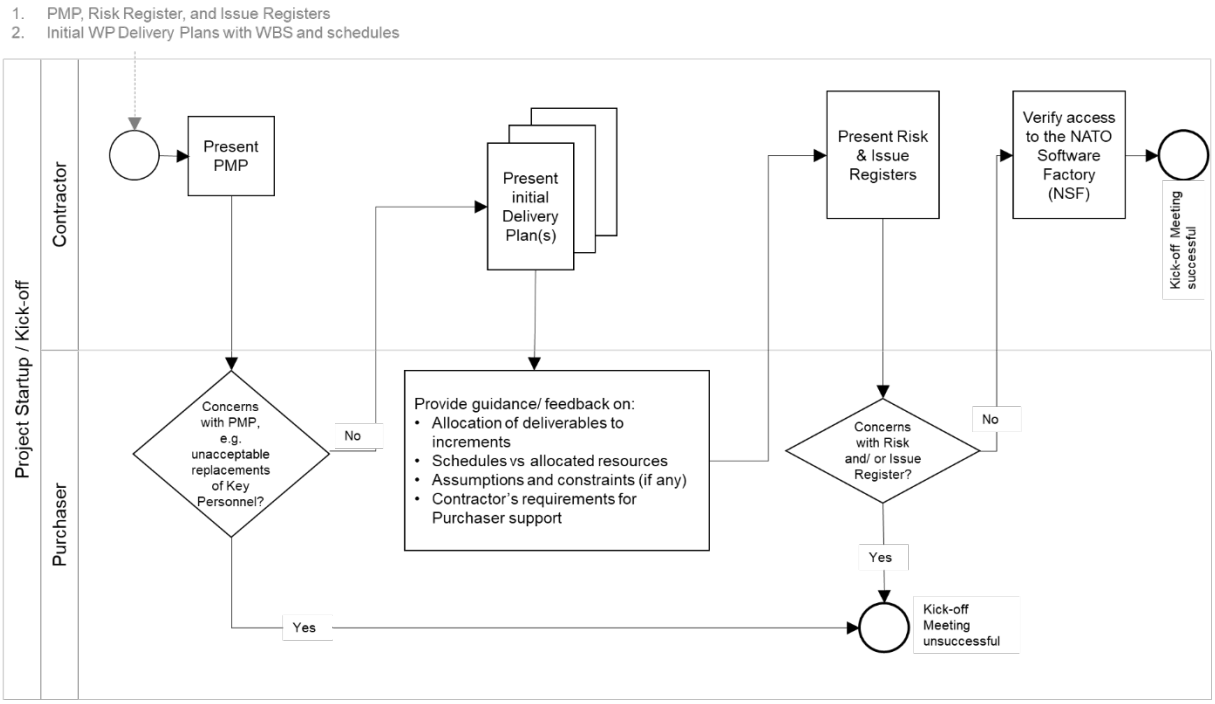
[70] The Purchaser will provide feedback to the Contractor on the WBS and schedule.

[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

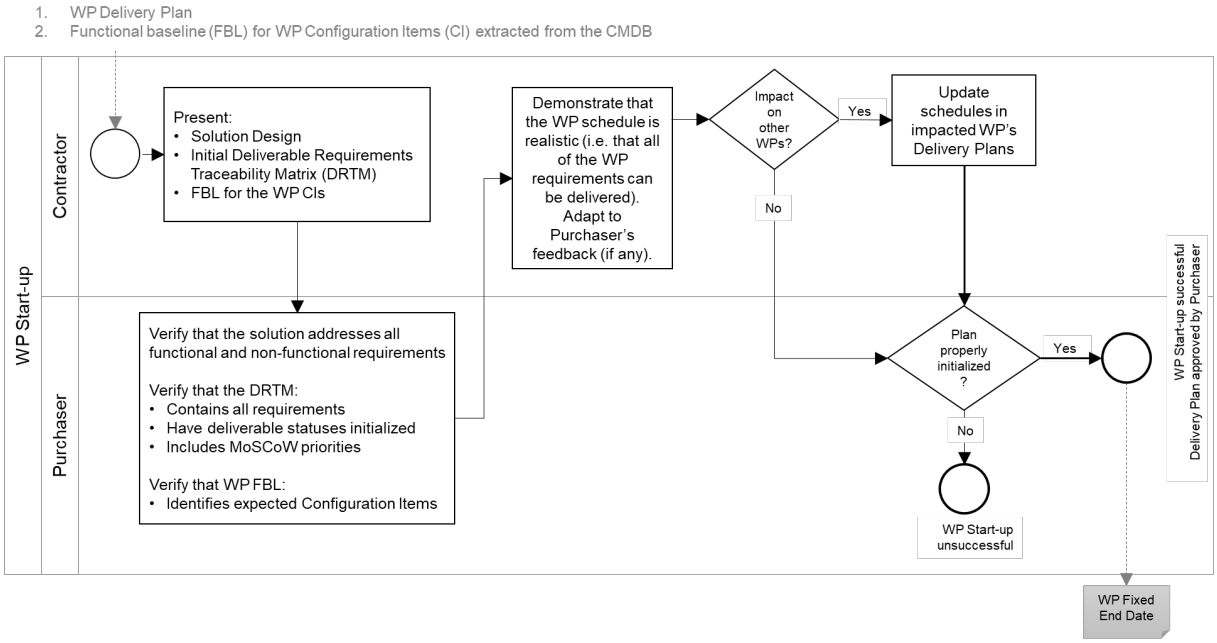
(a) Contain all WP requirements;
(b) Define delivery status for each requirement (NOT_STARTED);
(c) Specify initial MoSCoW priority for each requirement.

[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 choses to adapt the Delivery Plan to accommodate any Purchaser's recommendation and those changes have an impact of any other work packages, then the Contractor shall update all affected Delivery Plans.

Figure 2-2 WP Start-up Meeting



[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.

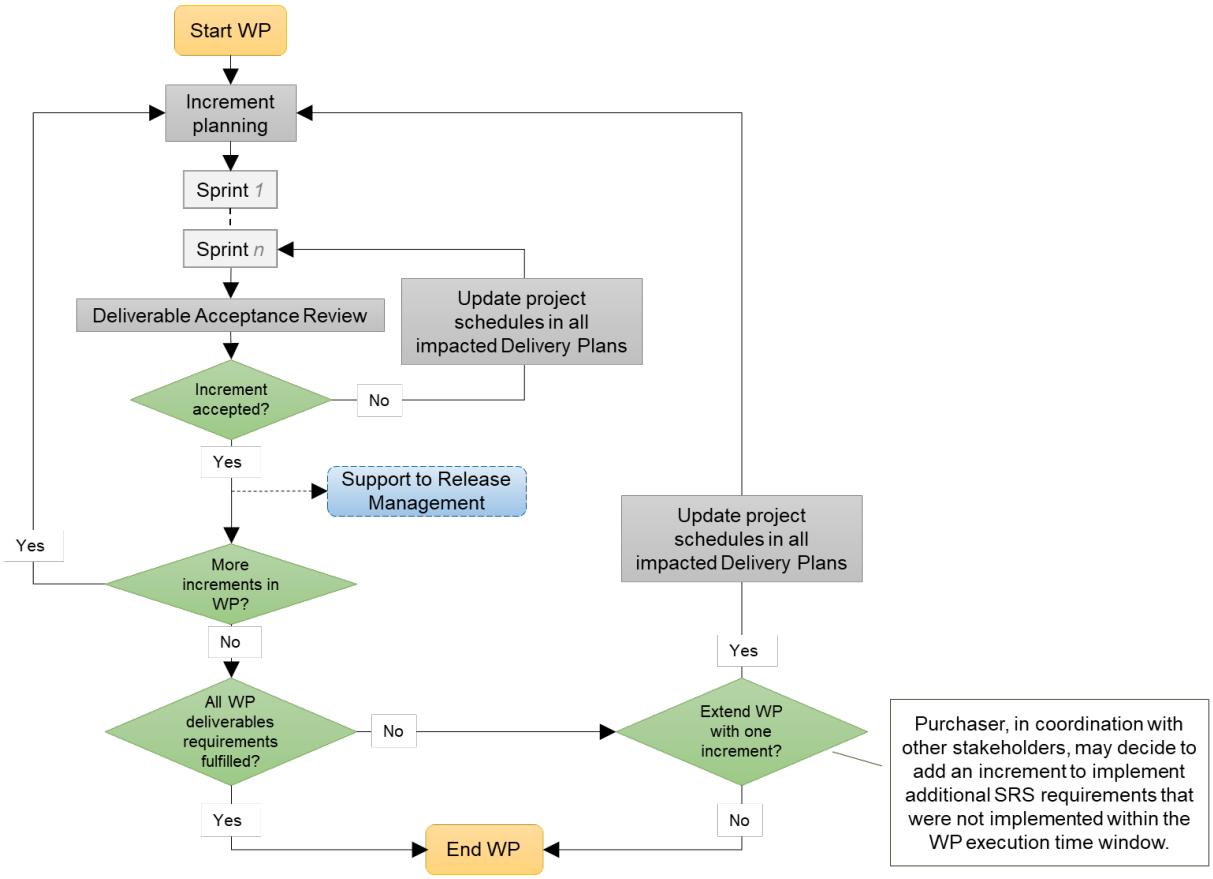
[SOWG-165] The Contractor shall be cognisant of the fixed WP End-date and throughout the WP track the progress of implemented deliverables against the fixed WP End-date, and whenever a potential schedule slippage is identified take corrective actions to prevent the schedule slippage.

[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 wireframes[1] for all user interfaces to be implemented;
(2) An Integrated Logistics Support (ILS) Plan (see section 2.5.4.2);
(3) A Test Plan including test cases and test report templates (see section 2.5.4.3);
(4) If applicable, Site Activation Test Plan and Report templates (see section 2.5.4.6);
(5) An extract of the CMDB, in the form of an Allocated Baseline (ABL) that is an enrichment of the FBL that now includes information on third-party components and libraries and their licence costs and/ or constraints.

[SOWG-171] The Contractor shall prior to the meeting provide the Purchaser with the latest version of the Solution Description Document (SDD) with content in accordance with section 2.5.3.2.

[SOWG-172] The Contractor shall prior to the meeting, with a minimum of one week notice to the Purchaser, state the need for:
(1) Prerequisites and required documentation;
(2) Purchaser provision of specific subject matter knowledge transfer.

[SOWG-173] The Contractor shall one week prior to the meeting provide the Contractor with a Schedule Assessment Analysis that:
(1) Report on accumulated schedule slippage over previous WP increments (if any) and the estimated impact on the on the WP Fixed End-date.
(2) Report on mitigations that will be implemented in the starting increment to reduce the schedule slippage with the goal of delivering the WP in accordance with the WP Delivery Plan schedule.

[80] The Purchaser will at the meeting review:
(1) The Scope and Requirements Analysis. If proposed changes are deemed to resolve inconsistencies or ambiguities, or suggests no-cost improvements, the

[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.

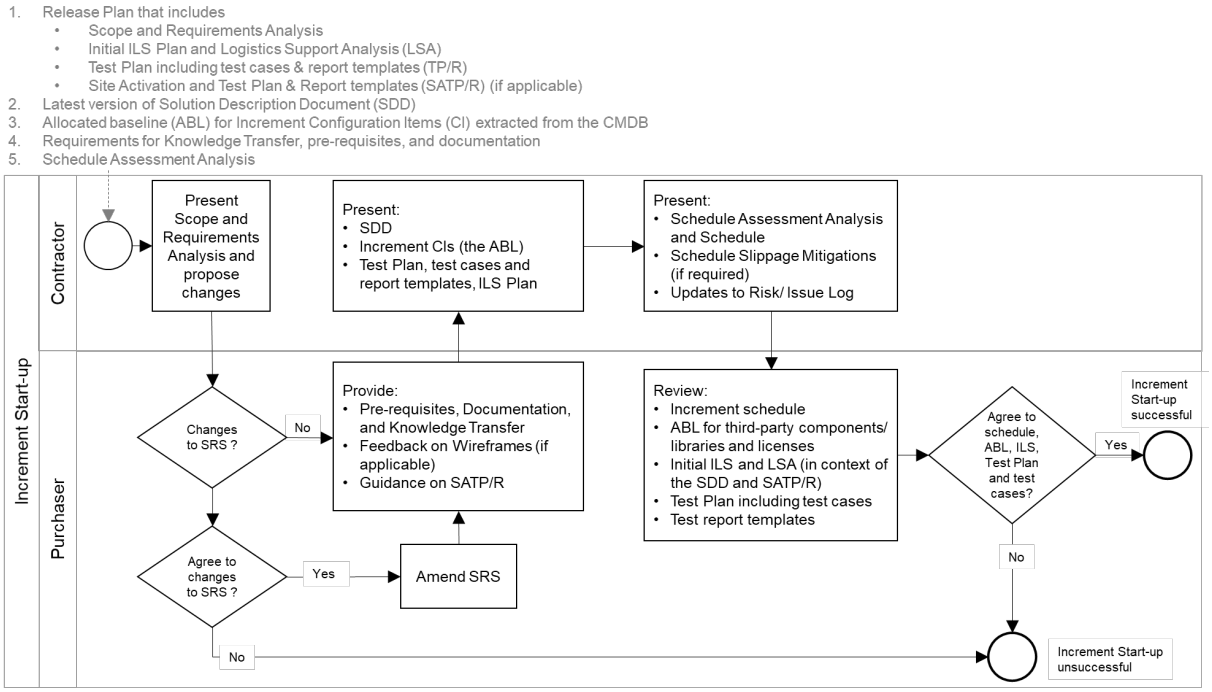
[81] The Purchaser will support the Contractor with:

(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



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;

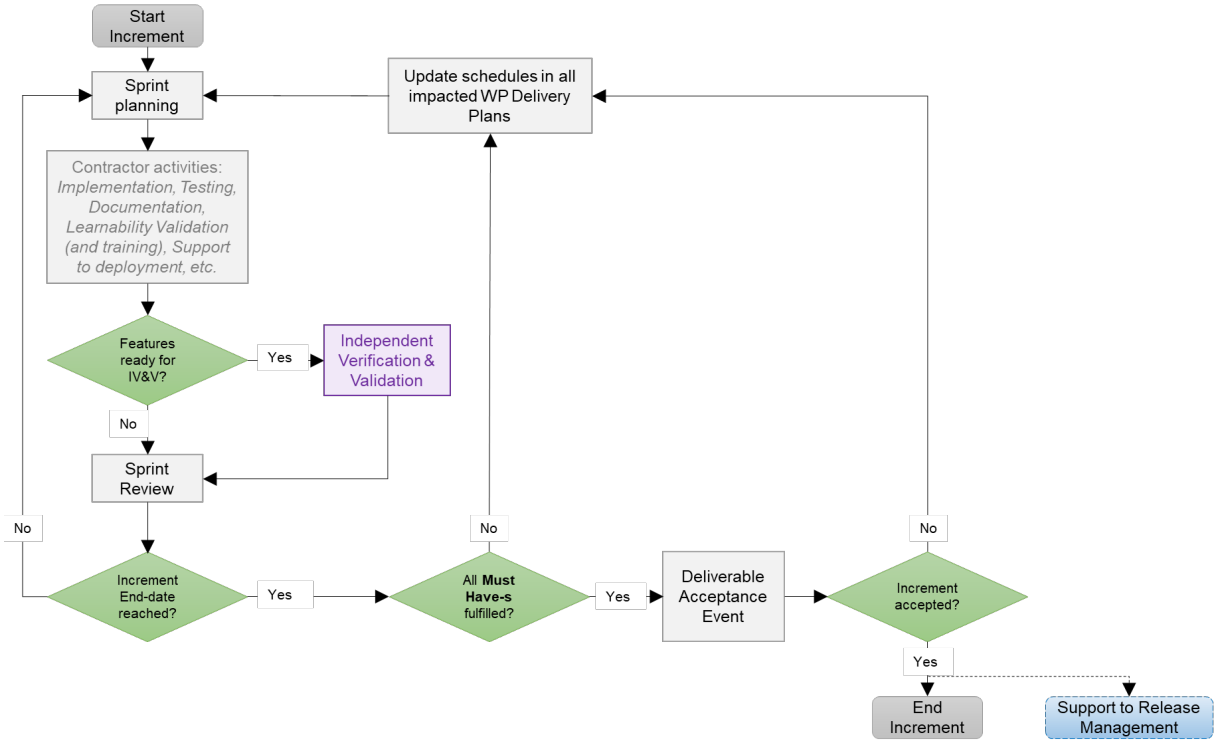
(3) Participating in ad hoc discussions on test results (e.g. in case IV&V identifies potential bugs);
(4) Supporting Purchaser in setting up additional installations on the NSF (the expectation here is that the SW is easily installable and that Purchaser's personnel will be able to do this without contractor 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 a format that can be automatically imported and used by Azure Devops and in the Jira tool with a Test Event Management plugin (e.g. using the NUnit report XML format).

[SOWG-188] Test reports shall be uploaded to the Purchaser test reporting tool in the NSF. The report entry in the reporting tool includes shall include an input field reserved for Purchaser's use (to add remarks to the test result).

[89] Note: The Purchaser is expecting to use Jira tool with a Test Event Management plugin as the test reporting tool.

2.4.5.2.2.2 Defect management process

[SOWG-189] The Contractor shall record provide a reporting and defect management process to be applied throughout the duration of the Project.

[SOWG-190] The Contractor shall manage defects in the NSF Jira tool (see [Jira]).

[SOWG-191] The Contractor shall classify all deficiencies in accordance with the Purchasers' categorization nomenclature for all defects and non-compliances as defined by Table 2-2, Table 2-3, and Table 2-4.

Table 2-2 Definitions for defect categorization

Attribute	Definition
Severity	The severity of a defect is the degree of impact that the failure has on the development or operation of a component, a system or a user function. The severity shall initially be proposed by the tester but shall officially be set in agreement with all the stakeholders. When agreement cannot be reached, the Purchaser's PM will set the severity.
Priority	The priority of a defect defines the order in which defects shall be resolved. The priority of the defect shall initially be proposed by the tester but shall officially be set in agreement with all the stakeholders. When agreement cannot be reached, the Purchase's PM will set the priority.
Category	The type of observation identified during the execution of a test case.

Table 2-3 Classification of defects based on severity

Severity	Definition
Critical	The failure of testing of a requirement. The failure results in the termination of the complete system or one or more component of the system. The failure causes extensive corruption of data. The failed function is unusable and there is no acceptable alternative method to achieve the required results.
Major	A significant failure that causes severely impaired functions but does not prevent operational processing. Applies to conditions under which the complete system or one or more component of the system are partially inoperative, but are still usable by the users. A work around may be available, but it may require manual intervention. Examples: • Absence of expected modules/ object or Unit • Failure of business operational process that affects a large group of users • Complete failure of a module
Moderate	The failure does not result in the termination and all functions are available but causes the system to produce incorrect, incomplete or inconsistent results. When resources are available and budgeted, should be resolved.
Minor	The failure does not result in termination and does not damage the functioning of the system. The desired results can be easily obtained by working around the failure.
Cosmetic	The failure is related to the look and feel of the application, typos in a document or user interfaces (amongst others), and not part of the immediate usability or contractual requirements. The failure does not adversely affect the overall system operation.

Table 2-4 Priorities for defect classification

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

2.4.5.2.2.3 Software Quality Metrics Reporting

[SOWG-192] The Contractor shall, within the Contractor's continuous integration build pipeline, set up an automated software metrics analysis (e.g. using the NSF SonarQube) which shall provide the required software quality metrics for the Software Quality Metrics Report (SQMR) as defined in section 2.5.4.3.4.

[SOWG-193] The test coverage reported in the SQMR shall be higher than 80%.

[90] Note the coverage information can be collected using test runner tools like dotCover (see https://www.jetbrains.com/dotcover) when running unit tests and integration tests etc.

[SOWG-194] An SQMR shall be produced for the relevant deliverable each time new software is committed back to the deliverable's software repository.

2.4.5.2.2.4 Source Code Review Reporting

[SOWG-195] The Contractor shall establish routines for peer review of the developed software and produce source code review reports (SCRR) as defined in section 2.5.4.3.5.

2.4.5.2.2.5 Security Tests and Analysis and Reporting

[SOWG-196] The Contractor shall, within the Contractor's continuous integration build pipeline, set up automated security test that tests security aspects of the implemented software in accordance with the OWASP Testing Guide. The automated security tests shall include:
(1) Static Application Security Testing (SAST) (e.g. using the NSF SonarQube);
(2) Dynamic Application Security Testing (DAST) (e.g. using OWASP ZAP);
(3) Dependency checking (i.e. security scanning of third-party libraries);
(4) Security-related unit and integration tests.

[SOWG-197] The Contractor shall during source code reviews shall also consider security in accordance with the OWASP Code Review Guide.

[SOWG-198] The Contractor shall document all security test and analysis findings in a Security Test Report (SecTR), see section 2.5.4.3.6.

2.4.5.2.2.6 Functional and Non-functional Tests and Reporting

[SOWG-199] The Contractor shall whenever feasible develop automated tests, using a BDD and/ or Acceptance Test Driven Development (ATDD) methodologies, which tests functional requirements in the SRS and automatically report the test results to the Purchaser's test reporting tool. For functional requirements in the SRS where automated tests are not feasible, the Contractor shall define manual test cases so that with the combination of automated and manual tests, all functional requirements in the SRS are tested.

[SOWG-200] The Contractor shall develop automated and/ or manual tests that tests all testable non-functional requirements in the SRS.

[SOWG-201] The Contractor shall whenever feasible, and when it provides test value, implement unit tests to ensure correct functional and non-functional behaviour of the delivered software.

[SOWG-202] The Contractor shall perform regression analysis and conduct regression testing against dedicated regression test cases and report the results as regression tests.

[SOWG-203] The Contractor shall as part of these tests conduct, prepare training material for the Learnability Tests as defined in section 2.4.5.2.3.

[91] Note: The training material for the Learnability Test will always have to be developed. However, the Purchaser may decide from reviewing the training material that the user interface is intuitive and that the actual Learnability Test event will not be required.

[SOWG-204] The Contractor shall, if not deemed unnecessary by the Purchaser (see comment above), conduct a Learnability Test event and document the results from this event (see section 2.4.5.2.3 for details).

[SOWG-205] The Contractor shall update the DRTM (see section 2.5.3.3) and link the DRTM to the functional and non-functional test results.

[SOWG-206] The Contractor shall document all function, non-functional, and regression tests in the Deliverable Functional and Performance Test Report (DFPTR), see section 2.5.4.3.7.

2.4.5.2.2.7 System Integration Tests (SIT) and Reporting

[SOWG-207] The Contractor shall in the Test Plan and test cases for the System Integration Tests identify all external interfaces and develop dedicated test cases for each interface.

[SOWG-208] The Contractor shall, within the continuous integration build pipeline, set up automated testing of all interfaces that the software implements that can be consumed by external systems. The automated test of such interfaces shall:
(1) Be implemented as a test harness using an appropriate test framework (e.g. using the NUnit framework)
(2) Test all methods of all services according to documented interface/ service specifications.

[SOWG-209] The Contractor shall deploy the software to a Purchaser Provided reference environment and verify that the implemented software can consume needed services provided by other Bi-SC AIS systems (e.g. Open Geospatial Consortium (OGC) services provided by the NATO CoreGIS system).

[SOWG-210] The Contractor shall document all SIT tests results in the System Integration Test Report (SITR), see section 2.5.4.3.8.

2.4.5.2.2.8 Continuous Integration & Continuous Delivery Assessment Report

[SOWG-211] The Contractor shall, within the continuous integration and continuous delivery (CI/CD) build pipeline, set up automated deployment to a Purchaser provided reference environment and verify that the software functions correctly on a platform running the latest NATO security settings.

[SOWG-212] For software with a user interface the continuous integration shall include automated tests to verify that users can log on and access the application (e.g. using tools like Selenium Webdriver).

[SOWG-213] Behavioural aspects of the delivered software shall be tested using behaviour driven development (BDD) testing through usage of Gherkin scenarios with a test runner (e.g. Cucumber).

[SOWG-214] The Contractor shall report on the tests in the Continuous Delivery Assessment Report (CDAR), see section 2.5.4.3.9.

2.4.5.2.3 Learnability Test

[92] Any developed software that includes user applications with a graphical user interface will normally have a non-functional requirement on the developed applications Learnability. The purpose of the Learnability requirement is to put a high emphasis on delivering good user experience (UX).

[93] The Purchaser will select a group of people representing the users that are new to the user application developed by the Contractor. The test will be conducted as follows:
(1) The Contractor will perform a short training session on the user interfaces for the users;
(2) The Users will subsequently be given a set of tasks covering most of the user interface's functionality, and will be given a time limit to perform these tasks;
(3) The result of the users' performance in conducting the selected tasks will be used to assess the Learnability of the user interface.

[94] The Purchaser will most likely select people that will be responsible for providing training on the new user application as the users for these tests. This means that the Purchaser will use these Learnability Tests as an opportunity to 'Train the Trainers".

[SOWG-215] The Contractor shall produce training material for any new UI functionality. This training material shall:
(1) Be in the form of a PowerPoint presentation;
(2) Be based on screenshots from the application user interface;
(3) Describe all features of the deliverables user interface.

[SOWG-216] The Contractor shall develop a Learnability Test to be used for assessing the test-users' performance and efficiency in conducted a representative set of key tasks. The Learnability Test shall:
(1) Include tasks covering all main features of the user interface;
(2) Enable a user that is a fast learner to conduct all the test steps in a relatively short time (maximum 10 minutes if feasible);
(3) Define a time limit for how much time the users will be given to conclude the test. This time limit shall be justifiable (e.g. 1.5 times the time it takes the Contractor to do the tests);
(4) Be designed such that each user's performance is recorded and can be evaluated (e.g. through recorded screen captures, or expected results entered into the application data set, etc.);
(5) Be of a binary nature (i.e. pass or fail).

[95] Note: The Purchaser may from studying the Learnability Training material, and from hands-on experience with the delivered software, decide that it will not be necessary to execute the actual Learnability Test event as described in requirements [SOWG-217] through [SOWG-220] below.

[SOWG-217] The Learnability Tests shall normally be done in person with the Purchaser's selected user group at the Purchaser's facility (either The Hague-Netherlands, Brussels-Belgium or Mons-Belgium, at the discretion of the Purchaser), but, if feasible, a video conference might be acceptable.

[SOWG-218] The Contractor shall train the users using the prepared training material (PowerPoint slides) and, if required, perform some limited demonstrations using the application.

[SOWG-219] The Contractor shall start the test, time the tests, and stop the tests after an agreed end time.

[SOWG-220] The Contractor shall review the individual test results for all the test users and calculate the following statistics:
(1) The percentage of users passing each of the tests;
(2) The percentage of passed tests versus the total number of tests;

(3) The percentage of passed tests for 80% of the tests with the highest score (i.e. identify the 20% most difficult tests and remove them from the result set before calculating the statistics).

[96] The Purchaser will compare the test results and the calculated statistics against the Learnability requirement in the SRS.

2.4.5.2.4 Independent Verification and Validation (IV&V)

[97] The Purchaser will be conducting IV&V activities that will:

(1) Independently repeat tests conducted by Contractor with the aim of recreating the test results reported by the Contractor;
(2) Run additional tests. These additional tests may use different data sets, and may include extended system-to-system integration tests;
(3) Verify that the software can be installed and maintained as described in the Maintenance and Administration Manual (MAM) see section 2.5.4.4;
(4) Verify that the successful site activation can be verified using a Site Activation Test Plan and Report (SATP/R), see 2.5.4.6 (each release will normally be installed at a minimum to one site, the Purchaser production staging environment).

[SOWG-221] The Contractor shall support the Purchaser in installing the latest version of the software in up to two separate installations after every sprint.

[98] The installation of the latest software should be so simple that the Purchaser is able to perform the installation without support. The Purchaser will need these installed versions for parallel ongoing IV&V activities.

[SOWG-222] The Contractor shall, if required, travel to the Purchaser's facility to support such installation.

2.4.5.2.5 UAT

[99] At the end of each increment the Purchaser will conduct a user acceptance test (UAT) event that will verify that the new features delivered within the increment is able to support operational intelligence processes and is ready for operational use.

[100] The UAT will be organized by the Purchaser and it will be conducted from the Purchaser's facility using an installation on the Purchaser's production staging environment.

[SOWG-223] The Contractor shall be physically present at the first UAT event with the right personnel to be able to support the UAT event. For all other UAT events the Contractor shall provide remote support (e.g. through video conferences) to discuss UAT findings.

2.4.5.2.6 Deliverable Acceptance Review

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

[102] The Deliverable Acceptance Review can take place when all Must Have requirements defined for the increment deliverables have been delivered, and there are no recorded defects with a severity above "Minor" (see section 2.4.5.2.2.2).

[SOWG-224] At the end of each Increment, the Contractor shall by default meet, in person, with the Purchaser's Project Manager and Purchaser's subject matter experts (SME) at the Purchaser's facility (either The Hague-Netherlands, Brussels-Belgium or Mons-Belgium, at the discretion of the Purchaser) for a

Deliverables Acceptance Review. If agreed between Purchaser and Contractor, the meeting could be done as a video-conference meeting.

[SOWG-225] The Contractor shall one week prior to the Deliverables Acceptance Review provide the Deliverable Acceptance Report (DAR) as defined in section 2.5.4.7.

[SOWG-226] The Contractor shall at the Deliverables Acceptance Review Meeting present:
(1) The updated Deliverable Requirements Traceability Matrix (DRTM) (see section 2.5.3.3) that reflect the deliverables and tests produced/ reported in this release;
(2) A calculation for the total value of the invoice to be submitted for the release. The invoice value shall be calculated as the sum the individual cost value of all successfully delivered requirements in the release.

2.4.5.2.7 Supporting the release to production

[103] Following a successful Deliverable Acceptance Review the Purchaser may proceed with the release management process to obtain the approval to deploy the implemented capability to the production environment. The result of this approval process will be that the implemented capability is included on the NATO Approved Fielded Product List (AFPL).

[104] With the implemented capability on the AFPL list, the Purchaser will seek to deploy it onto the production environment.

[SOWG-227] The Contractor shall support the security testing (penetration tests) of the release management process.

[SOWG-228] The Contractor shall support the Purchaser in meetings, and other communication, with the Change Advisory Board.

[SOWG-229] The Contractor shall, prior to deployment to production, provide Administrator training for the Purchaser's O&M support staff, see section 2.3.5.3.

[SOWG-230] The Contractor shall support the Purchaser in deploying the implemented capability to the production environment.

2.4.6 Final System Acceptance (FSA)

[105] The FSA requirements are defined in the Contract Special Provisions document, see [INTEL-FS2-Special-Provisions].

2.5 Documentation Requirements

2.5.1 Cross-cutting (General) Document Requirements

[106] The Purchaser's default software packages for managing projects are:
(1) Microsoft Office Professional;
(2) Microsoft Project.

2.5.1.1 Formatting and Naming Conventions

[SOWG-231] The Contractor shall use filenames for all documentation deliverables in compliance with the following filename convention [NU|NR]_[Contract

number]_[Name of document]_[v0.x|v1.0].[filename extension] and the fields used in the filename convention shall be used as follows:
(1) [NU|NR] is the classification of the document: NATO Unclassified or NATO Restricted;
(2) [Contract number] is the official Purchaser contract number;
(3) [Name of deliverable] is the Contractor proposed, Purchaser agreed designation of the deliverable;
(4) [v0.x|v1.0] is the version number in the range (v0.1, v0.2, …, v0.9, v0.10, v0.11, …) for drafts not eligible for acceptance and with v1.0 only for the final deliverable;
(5) [filename extension] is the standard filename extension, but ".zip" may be used to aggregate multiple files.

[SOWG-232] COTS documents, such as a vendor supplied user manual, shall retain their original filenames and shall hence not be renamed according to the above filename convention.

[SOWG-233] All documentation produced under this contract shall adhere to the same presentation style (cover pages, approval pages, headers, footers, headings and paragraphs, font types and sizes within headings and paragraphs), irrespective of the source of the document within the Contractor's team, including any subcontractors except COTS equipment documentation.

[SOWG-234] All documentation (including source code comments) shall be written in UK English.

[SOWG-235] The first page shall show the document title, project title, contract number as well as version number and issue date, if applicable, and which shall also be shown on each subsequent page bottom. The first page shall also include the classification headers and footers with the highest classification of information contained in the entire document (including annexes and appendices).

[SOWG-236] Header and Footer Marking shall show the NATO classification, normally —NATO UNCLASSIFIED — or — NATO RESTRICTED —.

[SOWG-237] Developed documentation shall contain a Table of Contents. It shall be noted that depending on the type of document, a Table of Content might not be required. This shall be agreed between the Purchaser and Contractor beforehand.

[SOWG-238] All documents shall contain a preface, containing details of related documents and information on how to navigate the document.

[SOWG-239] All documents produced under this Contract shall use sans-serif fonts (e.g. Arial, Helvetica, Calibri, etc), and obey the following principles:
(1) Headings shall be numbered and use bold font-types of sizes higher than the body text (the higher the Heading in the document hierarchy, the larger the font-size);
(2) No document shall use Headings below level 6 (i.e. 1.1.1.2.3.1 Heading Text);
(3) Body text (under the headings) shall not use fonts smaller than Arial 10 pt (or equivalent size if another font type(s) is (are) selected);
(4) Any graphic material generated under this Contract, including network diagrams, shall not use font sizes smaller than Arial 8 (or equivalent size if another font type(s) is (are) selected).

[SOWG-240] Larger font sizes than those specified above shall be selected if the corresponding text or drawing is to be reduced in size when embedded in the document, in order to guarantee that the PDF output keeps the font size as specified.

[SOWG-241] All documentation developed in Microsoft Word shall be printable if required and therefore the page format shall be A4, printable in loose-leaf form, and possible to be presented bound in stiff backed covers with 4-ringed binders which permit the removal and insertion of individual pages and drawings.

[SOWG-242] The convention to be used for numbers appearing in textual documents is for a comma to be the thousands separator and a period to be the decimal separator (e.g., 1,365,276.24).

[SOWG-243] The convention to be used for dates appearing in free text (e.g., quoting dates of meetings) is day-month-year and not month-day-year.

[SOWG-244] Where documents contain many complex specialized or strongly domain oriented terminologies these shall be defined in a glossary.

2.5.1.2 Distribution

[SOWG-245] Documentation shall not contain warnings limiting the rights to use or reproduce the document. The Purchaser reserves the right to make additional copies of any documentation provided under this contract for his internal use.

[SOWG-246] All contractual documentation (e.g., change proposals, invoices, etc.) shall be delivered electronically unless specified otherwise by the Purchaser Contracting Officer.

[SOWG-247] All electronic copies shall be delivered in a format which is best suited for review and maintenance by the Purchaser. In general the following guidelines shall be used:
(1) Microsoft Word shall be used for generating text document;
(2) Microsoft Excel shall be used for tabular or matrix data;
(3) Microsoft Project shall be used for schedule; and
(4) Microsoft PowerPoint shall be used for briefings.

[SOWG-248] The Contractor shall submit documentation, intended for review by the Purchaser in electronic formats compatible guidelines in [SOWG-247].

[SOWG-249] The Contractor shall submit all final and accepted versions of documentation deliverables in electronic format, as PDF. For non-COTS documentation, the documentation shall also be delivered in an editable Microsoft Office format.

[SOWG-250] Documentation shall be distributed as follows:
(1) For all documents unless otherwise instructed: an electronic copy to the Purchaser's Project Manager;
(2) For contractual documents: an electronic copy to the Purchaser's Contracting Officer and if required and additional hard copy.

2.5.1.3 Review and Updates

[107] The Purchaser will when reviewing a document provide comments, corrections, and suggested changes to the Contractor within two weeks of receipt, unless specified differently in this Contract

[108] The Purchaser reserves the right to return without review a document that has significant deficiencies.

[SOWG-251] All documentation is subject to Purchaser approval.

[SOWG-252] The Contractor shall not rely on the Purchaser review to fill in deficiencies or obtain missing Purchaser information.

[SOWG-253] The Contractor shall resubmit the document as a revised draft incorporating the Purchaser's comments within two weeks after receipt, unless specified differently in this SOW.

[SOWG-254] If there is a change to an already delivered deliverable, then the Contractor shall be responsible for updating all documentation pertaining to the specific deliverable where the deliverable documentation is affected by the change.

2.5.2 Project Management Documentation Package

2.5.2.1 Project Management Plan (PMP)

[SOWG-255] The PMP shall identify all major Contractor operating units and any Subcontractors involved in the work and a description of the portion of the overall effort or deliverable item for which they are responsible.

[SOWG-256] The PMP shall cover all aspects of the project implementation, including the Contractor's project management methodology, project control processes, personnel assignments, and external relationships necessary to provide the deliverables as required by this Contract.

[SOWG-257] The PMP shall be sufficiently detailed to ensure that the Purchaser is able to assess the Contractor plans, capabilities, and ability to satisfactorily implement the entire project in conformance with the requirements as specified in this SOW.

[SOWG-258] The PMP shall identify key personnel in the project organization, their qualifications, and their responsibilities.

[SOWG-259] The PMP shall describe the Contractor's, and Subcontractors', approach to security management, including personnel and facility security.

[SOWG-260] The PMP shall identify Assumptions and Constraints.

[SOWG-261] The PMP shall describe methodology used for cost and schedule estimation

[SOWG-262] The PMP shall include a master schedule that defines the project start-up, all major milestones (to include increment start-up and increment end dates), the project durations (in months from the start-up), and the project end-date.

[SOWG-263] The PMP shall define all expected Purchase involvements and all expected Purchaser Furnished Items (PFI) and associated timelines.

2.5.2.2 Risk Register

[SOWG-264] The Risk register shall list all project risks, and indicating for each risk the following information (but not limited to):

(1) Risk identifier: unique code to allow grouping of all information on this risk;
(2) Description: brief description of the risk;
(3) Risk category (e.g. management, technical, schedule, quality and cost risks);

(4) Impact: effect on the project if this risk were to occur;
(5) Probability: estimate of the likelihood of the risk occurring;
(6) Risk rating (High, Medium, Low);
(7) Proximity: how close in time is the risk likely to occur;
(8) Response strategy: avoidance, mitigation, acceptance, transference
(9) Response plan(s): what actions have been taken/will be taken to counter this risk;
(10) Owner: who has been appointed to keep an eye on this risk;
(11) Author: who submitted the risk;
(12) Date identified: when was the risk first identified;
(13) Date of last update: when was the status of this risk last checked;
(14) Status: e.g. closed, reducing, increasing, no change.

[SOWG-265] It shall be possible to export the Risk Register to Microsoft Excel.

2.5.2.3 Issue Register

[SOWG-266] The Issue Register shall comprise the following information (but not limited to):
(1) Issue Number or Trouble Ticket Number (in case the issue is received through 1st Level Support Service Desk);
(2) Issue Type (Request for change, Schedule slippage, 2nd Level Support, general issue such as a question or a statement of concern);
(3) Author;
(4) Date identified;
(5) Date of last update;
(6) Description;
(7) Criticality;
(8) Resolution Analysis;
(9) Status.

[SOWG-267] It shall be possible to export the Issue Register to Microsoft Excel.

2.5.2.4 Configuration Management Plan (CMP)

[SOWG-268] The CMP shall in general comply with the requirements of a CMP as defined in [ACMP-2009-SRD-41], and shall be in the format defined by section 2.1 in [ACMP-2009-SRD-41].

[SOWG-269] Any requirements in the [ACMP-2009-SRD-41] deemed by the Contractor to be not applicable for this contract shall in the CMP be specifically defined as not applicable (N/A) followed by a short justification why the requirement is not applicable.

[109] Note: Requirements in [ACMP-2009-SRD-41] that are expected to be declared N/A for a SW acquisition contract are found in:
(1) Paragraph 3.2.1 - Hardware Configuration Item (HWCI) Identification;
(2) Paragraph 3.7 - Drawing library;
(3) Paragraph 5.1.3 - Interface Control Working Group (ICWG).

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

[SOWG-271] The CMP shall be tailored to the requirements of the technical solution, specifically addressing how CM shall be achieved in an Agile project.

[SOWG-272] The CMP shall be maintained as a living document subject to revisions and updates, as required.

[SOWG-273] The CMP shall be placed under configuration control throughout the period of performance the Contract.

[SOWG-274] The CMP shall identify and define all top-level configuration items (CI) to be delivered under this Contract and where these top-level CIs are traced to deliverables as defined in the SSS.

[SOWG-275] The CMP shall define the format for Engineering Change Proposals (ECP) to be used during this Contract.

[SOWG-276] The CMP shall defined the format for Request for Deviation (RFD)/ Request for Waiver (RFW) to be used during this Contract.

[SOWG-277] The CMP shall describe how the Configuration Management Database (CMDB) will be implemented.

[SOWG-278] The CMP shall define the format for the human readable Configuration Status Accounting (CSA) Report.

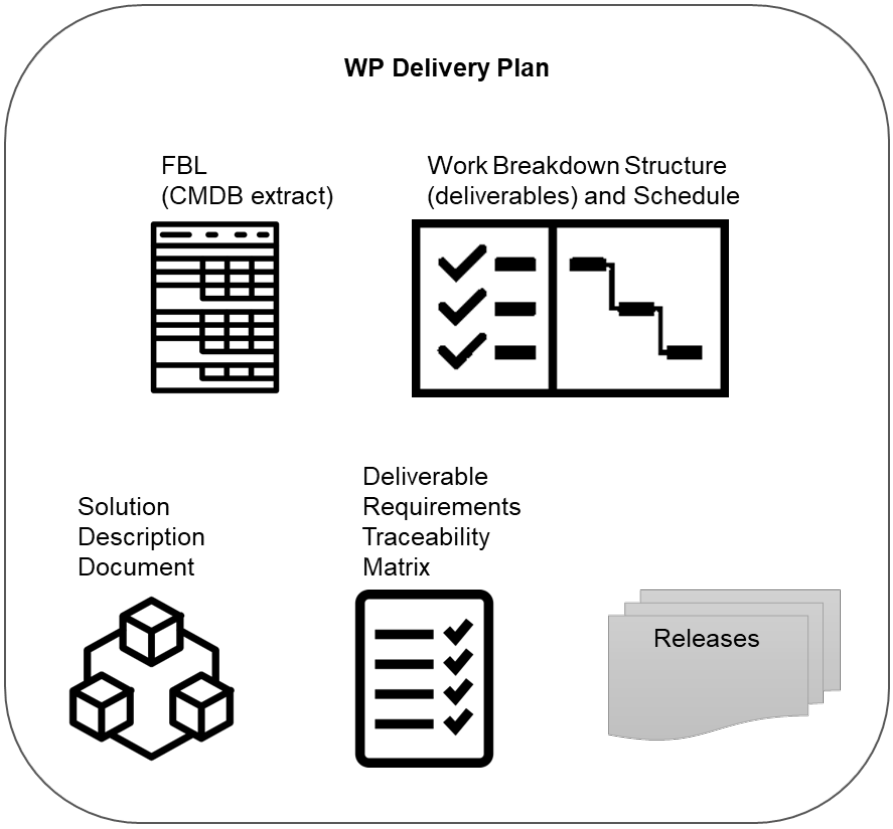
2.5.3 WP Delivery Plan

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

[111] As shown in Figure 2-6 the WP Delivery Plan consists of:

(1) A Functional Baseline (FBL) extract from the CMDB;
(2) A Work Breakdown Structure (WBS) identifying all WP deliverables and schedule information for when the individual deliverable is planned to be delivered;
(3) A Solution Description Document (SDD) describing the solution design, solution decisions, and service specifications for implemented services;
(4) A Deliverable Requirements Traceability Matrix (DRTM);
(5) A number of Release documentation sets (see section 2.5.4).

Figure 2-6 WP Delivery Plan



[112] The requirements defined for a deliverable will each have a Contractor defined cost assigned to it prior to starting an increment and prior to the final prioritization of the deliverable's requirements.

[113] The requirements defined for a deliverable will be prioritized using the MoSCoW prioritization scheme where the Purchaser prior to starting the increment work, decides the individual priorities of the deliverable's requirements.

[114] A deliverable will be accepted at the end of an increment pending all of the defined Must Have requirements have been fulfilled, and the deliverable passes all the required tests (see section 2.5.4.7).

[115] The cost of the implemented deliverable will be calculated as the sum of the individually fulfilled requirements.

2.5.3.1 Work Breakdown Structure (WBS) with Schedule (WBS/ Schedule)

[SOWG-279] The WBS/ Schedule shall identify each of the deliverables (e.g. applications, services, etc.) using the deliverables identifying code from the CLIN number in the SSS.

[SOWG-280] The WBS/ Schedule shall group the deliverables by Increment where each Increment is identified by a unique number.

[SOWG-281] The Level-of-Effort (LOE) in number of person-days shall be defined for each of the deliverables in the WBS/ Schedule.

[SOWG-282] It shall be possible to view the WBS/ Schedule as a Gantt chart where the start and end time of the increment is depicted. I.e. it shall from this schedule

be possible to identify the time window when a particular deliverable will be delivered.

[SOWG-283] The WBS/ Schedule shall show all key events within the Work Package. The key events shall include:
(1) All Increment Start-up and Increment Review meetings;
(2) All Sprint Planning and Review meetings (where the duration of a sprint is expected to be 3 or 4 weeks);
(3) All Test Events.

[SOWG-284] The WBS/ Schedules for each of the Delivery Plans shall be placed under configuration control throughout the period of performance the Contract.

2.5.3.2 Solution Description Document (SDD)

[116] The purpose of the SDD is to describe solution decisions to a level of detail that the enable the Purchaser to assess the solution's feasibility and ability to fulfil the requirements as defined by the SRS.

[SOWG-285] The SDD shall include a design that includes:
(1) Diagrams identifying key components and services and how they relate to each other;
(2) Description of purpose of each of the identified components/ services and a short description of the business logic it will implement;
(3) Identification of key technologies and frameworks to be used;
(4) Identification of all 3rd party components and/ or libraries to be used and including licensing information on these;
(5) Assessment of the proposed solution against the non-functional requirements as defined in the SRS.

[SOWG-286] The SDD shall record all fundamental solution decisions. Each such decision shall include:
(1) An Issue or Problem Statement paragraph/ subsection, that describes the issue/ problem and including motivation for change, and a reference to SRS requirements, if applicable;
(2) An Assumption paragraph/ subsection, that provides background information on (external) context, expected future situations, etc.;
(3) An Alternatives paragraph/ subsection, that describes the alternatives that have been considered, and their implications. These considerations shall include assessment of the alternative against non-functional requirements (including RAMT), risk of obsolescence, lifecycle costs, licensing constraints, and compute resources requirements (processing power and memory);
(4) A Decision and Justification paragraph/ subsection, that identifies the recommended solution and justifies why this is the preferred solution.

[SOWG-287] The SDD shall identify all COTS and FOSS components and libraries to be included in the solution where this identification shall include Vendor Name, Product Name, SW version, and the full details of the component/ library's lifecycle cost and constraints (license/ subscription fee, licence type, etc.)

[SOWG-288] The SDD shall include detailed information on all aspects of the Contractor's Continuous Integration (CI) and Continuous Delivery (CD) pipeline. This shall include information on the tooling planned to be used, the approach to automated testing in general, automated integration testing, and automated security testing.

[SOWG-289] The SDD shall, if required, include an Annex for documenting user interface wireframes or mock-ups.

[SOWG-290] The SDD shall include annexes that documents implemented server-side services (if any), see section 2.5.3.2.1 below.

[SOWG-291] The SDDs for each of the Delivery Plans shall be placed under configuration control.

2.5.3.2.1 Service Specifications

[117] The purpose of a Service Specification is to document the service such that:
(1) SW developers implementing functionality that consumes the service have sufficient information to build functionality that can successfully interact with the service;
(2) Maintenance of the service is possible as the SW maintenance team will have sufficient information to enable them to understand the inner workings of the service.

[SOWG-292] Service Specifications shall include machine-readable interface files, in a standardized format/ representation (e.g. OpenAPI for describing RESTful services, Web Services Description Language (WSDL) files for SOAP services, etc.)

[SOWG-293] Service Specifications shall, when applicable, include documentation of, or reference to, an underlying information model.

[SOWG-294] Service Specifications shall include documentation of the business logic and business rules implemented by the service.

[SOWG-295] Service Specification shall include documentation on the service non-functional/ performance characteristics (e.g. response times).

2.5.3.3 Deliverable Requirements Traceability Matrix (DRTM)

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

[119] The Purchaser will provide the contracted requirements as an extract from the Purchaser's requirement management system (see [DOORS]) in a format that can be imported into Jira (see [Jira]).

[SOWG-296] The DRTM shall be integrated with (or if feasible fully implemented in) the Jira tool (see [Jira]) on the NSF (the Jira tool will be provided as PFI in the NSF).

[SOWG-297] The DRTM shall record the delivery status for all requirements. The delivery status of a requirement shall be {NOT_STARTED, IN_DEVELOPMENT, COMPLETE}.

[SOWG-298] The DRTM shall for each requirement record references to the location(s) in the software where the requirement is implemented (e.g. file(s), package(s), classes).

[SOWG-299] The DRTM shall for each requirement include the verification method based on the SRS. The verification methods are defined in Table 2-5.

Table 2-5 Verification methods

Method	Description
Analysis	The processing of accumulated data obtained from other qualification methods. Examples are reduction, interpretation, or extrapolation of test results; analysing the performance of design by running simulations. This method can be used if a test scenario cannot be created at the Test Environment.
Test	The operation of the software element or component, using instrumentation or other special test equipment to collect data for later analysis. Controlled condition, configurations, and inputs are used in order to observe the response. Results are quantified and analysed. This method can be used where user interaction is involved and when computations with input data are necessary.
Demonstration	The operation of the software element or component, that relies on observable functional operation not requiring the use of instrumentation, special test equipment, or subsequent analysis. This method is used to demonstrate a capability to be provided by the requirement.
Inspection	The visual examination of software code, documentation, etc. This method can be used where testing is not possible (e.g. the maximum number of items used as a limitation inside the code).
Special Case	Any special qualification methods for the software element, such as special tools, techniques, procedures, facilities, and acceptance limits.

[SOWG-300] The DRTM shall for each requirement, in the COMPLETE state, record a reference to the requirement test result within the Deliverable Functional and Performance Test Report (DFPTR) (see section 2.5.4.3.7).

[SOWG-301] The DRTM shall include a comments field with the test results records that shall be reserved for the Purchaser's use (the Purchaser will use this comments field to raise comments to the test results).

[SOWG-302] The DRTM shall for each requirement, in addition to recording the individual test result for the requirement, also include a reference to the Deliverable Acceptance Report (DAR) (see section 2.5.4.7), identifying the requirement was formally accepted by the Purchaser.

[SOWG-303] The DRTM shall for each requirement record that a requirement has been invoiced by providing a reference number to the invoice where the Contractor requested payment for the requirement.

[SOWG-304] The DRTM shall for each invoiced requirement record the invoice number and date.

[SOWG-305] The DRTM shall record the current MoSCoW priorities for all requirements in the work package {M, S, C, W}.

[SOWG-306] The DRTM shall for each requirement record the date for the last change to the requirement's tracking information.

[SOWG-307] The Contractor shall be able to provide the DRTM in Excel format to the Purchaser where the information is organized in accordance with the following rules:

(1) The Excel spreadsheet shall contain the complete DRTM where each attribute of the DRTM is represented by a column, and where each row represents a requirement;
(2) The Excel spreadsheet shall be sortable by column values;
(3) It shall be possible to organize the information around the individual deliverables for the work package. I.e. all requirements pertaining to a deliverable can be grouped together in subsequent rows in the matrix.

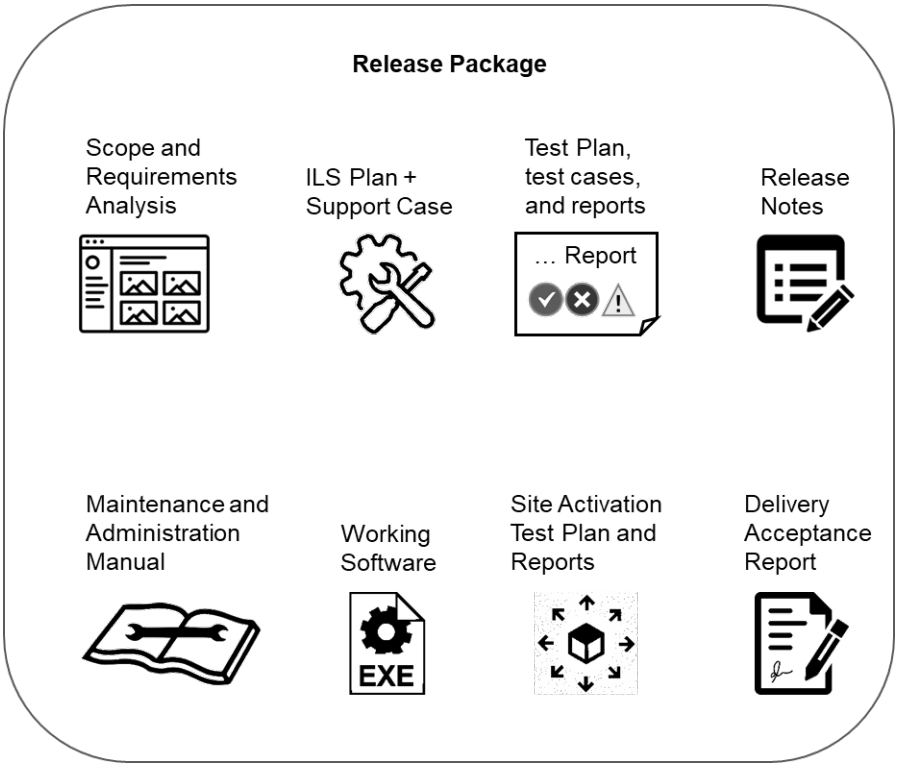
[SOWG-308] The DRTM shall be placed under configuration control throughout the period of performance the Contract.

2.5.4 Release Package

[120] This section identifies documentation artefacts that are specific to the planning and execution of the work required to produce a software release (where the release could be deployed to production). Each WP increment will result in a release; i.e. working software including a set of deliverables.

[121] As shown in Figure 2-7 the Release Package consists of:
(1) A Scope and Requirements Analysis (SRA);
(2) An Integrated Logistics Support (ILS) Plan (ILSP) and a Support Case;
(3) A Test Plan including test cases and Reports (TP/R);
(4) A Release Note;
(5) A Maintenance and Administration Manual;
(6) A working software component;
(7) Site Activation Test Plans and Reports (SATP/R);
(8) A Deliverable Acceptance Report (DAR).

Figure 2-7 Release Package



2.5.4.1 Scope and Requirements Analysis (SRA)

[SOWG-309] The SRA shall include an analysis of all requirements pertaining to the deliverables planned for the next release where this analysis shall:
(1) Identify potential issues with the requirements for the planned release;
(2) Propose changes to the requirements definitions to resolve inconsistencies or ambiguities, or to suggest no-cost improvements.

[SOWG-310] The SRA shall identify any pre-requisites, documentation, and knowledge transfer required for implementation of the Increment's deliverables.

[SOWG-311] The SRA shall provide UI wireframes (e.g. using Balsamiq Wireframes) or mock-ups for any deliverables in the release that includes user interface (UI) components (the UI wireframes or mock-ups shall also be recorded in the SDD).

[SOWG-312] The SRA shall identify all documentation artefacts required for the release (to be configuration controlled with the PBL). This list shall include Release Notes, Maintenance and Administration Manual, and Service Specifications (if applicable), etc.

[SOWG-313] The SRA shall include a general Site Activation Test Plan & Report (SATP/R) that shall defines how the deliverables can be deployed to production, and define the test steps to verify a successful deployment.

[SOWG-314] Each release shall as a minimum plan for deploying to a staging server on the production environment where the Contractor shall support the Purchaser in the installation and activation at the site.

[SOWG-315] The SRA and all its individual artefacts shall be placed under configuration control throughout the period of performance the Contract.

2.5.4.2 Integrated Logistic Support Plan (ILSP) and Support Case

[122] See section 2.3.2 and section 2.3.4.3.

2.5.4.3 Test Plan and Reports (TP/R)

[123] The purpose of the TP/R is to plan for and record the results of all tests, verification and validation activities for the deliverables of the release.

2.5.4.3.1 General

[SOWG-316] The TP/R shall be structured in accordance with the deliverable configuration items and the TP/R also shall form configuration items. I.e. the TP/R shall be included in the PBL.

[SOWG-317] The TP/R shall include:
(1) Overall Test Plan;
(2) All test cases for the deliverables planned for the release;
(3) Software Quality Metrics Report (SQMR);
(4) Source Code Review Report (SCRR);
(5) Security Test Report (SecTR);
(6) Deliverable Functional and Performance Test Report (DFPTR);
(7) System Integration Test Report (SITR);
(8) Continuous Delivery Assessment Report (CDAR).

[SOWG-318] Whenever feasible the test reports shall be automatically generated (e.g. through the NUnit report XML format).

[SOWG-319] All manually written test reports (in a document format) shall on their front page show how many tests cases that passed, failed or were not run.

2.5.4.3.2 Overall Test Plan

[SOWG-320] The Overall Test Plan shall describe the Contractor's approach to testing. I.e. how the Contractor will conduct tests that will collect the results to populate the individual reports as defined in section 2.5.4.3.4 through 2.5.4.3.9 below.

[SOWG-321] The Overall Test Plan shall include templates for all the individual test reports.

2.5.4.3.3 Test cases

[SOWG-322] The test cases shall document and describe all the test steps that meet or demonstrate Purchaser's requirements with an expected Test Result and pass/fail result.

[SOWG-323] Whenever feasible, the test cases shall be defined, documented and implemented as executable test code (e.g. as Gherkin scenarios) to enable fully automated tests.

2.5.4.3.4 Software Quality Metrics Report (SQMR)

[SOWG-324] The SQMR shall be auto-generated from full SonarCube (see [SonarCube]) static code analysis and dependency checking.

[SOWG-325] The SQMR shall include an analysis on the test coverage achieved.

2.5.4.3.5 Source Code Review Report (SCRR)

[124] Source code reviews is expected to be produced as a result of peer review of implemented source code. However, tool-based source code analysis (e.g. HP Fortify) could be used instead or in combination to the manual reviews.

[SOWG-326] The SCRR shall document the source code review findings, and record any action items (or issues) resulting from such reviews, and the latest status of these action items (or issues). The SCRR shall include assessments on:
(1) Readability of developed code;
(2) Level of, and quality of, comments embedded in the source code. E.g.:
  (a) Comments explaining the purpose of a class;
  (b) Comments explaining what a function does, including descriptions of input parameters and return values;
  (c) Comments explaining member variables; what the variable means (including unit of measure where appropriate;
  (d) Comments on type definition explaining what the type represents;
(3) Compliance with programming style guides and naming conventions;
(4) Security vulnerability analysis against the Open Web Application Security Project (OWASP) identified vulnerabilities.

2.5.4.3.6 Security Test Report (SecTR)

[SOWG-327] The SecTR shall record the results of source code analysis of security vulnerabilities, of manual security tests, and of automated security tests.

[SOWG-328] The SecTR shall describe any security measures that aim to mitigate security issues identified in the SecTR.

2.5.4.3.7 Deliverable Functional and Performance Test Report (DFPTR)

[SOWG-329] The DFPTR shall report the results of tests that verifies that the deliverable's functional and non-functional requirements (as defined in the SRS) are fulfilled.

[SOWG-330] The DFPTR shall include test results from a test environment mimicking the actual production environment. This means:
(1) Test results from the PBL release executing in a reference environment with all the same security constraints, compute resources, etc.;
(2) Test results from using real operational data in the same volume, size, and quality (or "flaws") as in the production environment.

[SOWG-331] The DFPTR shall include references to the SRS requirements being tested.

[SOWG-332] Each individual test record in the DFPTR shall include a unique identifier, a date for when the test was recorded, and an identification of the PBL being tested.

[SOWG-333] The DFPTR shall include regression testing as required and specifically report on, and record, the results of regression tests performed.

[SOWG-334] In case a feature has been discontinued and no regression tests has been performed for this feature, this shall be explicitly called out and recorded.

[SOWG-335] The DFPTR shall, in accordance with section 2.4.5.2.2.2, identify and describe defects found during testing.

2.5.4.3.8 System Integration Test Report (SITR)

[125] The purpose of this report is to record of testing interfaces used for communicating with external applications and services. Such tests could be done through usage of test harnesses executed as part of the build process (Continuous Integration), or by direct test with the external application and services, or by a combination of the two approaches.

[SOWG-336] The SITR shall be organized around the interfaces implemented in the PBL release.

[SOWG-337] The SITR shall record results of integration tests for each of the identified interfaces in the PBL release.

2.5.4.3.9 Continuous Delivery Assessment Report (CDAR)

[126] The purpose of the CDAR is to track the maturity and quality of the Continuous Integration & Continuous Delivery (CI/CD) processes implemented.

[SOWG-338] The CDAR shall describe in detail setup of the CI/CD pipeline to include details on:
(1) The steps in the pipeline;
(2) What tools are being used;
(3) What tests are being run.

[SOWG-339] The CDAR shall describe the main or high-level GitHub activities (Git flows, branches, commits, pull-requests, etc.) for the work of implementing the PBL release.

[SOWG-340] The CDAR shall include identified weaknesses in the current CI/CD setup and proposal for possible improvements to the CI/CD pipeline.

2.5.4.4 Maintenance and Administration Manual (MAM)

[SOWG-341] The Contractor shall develop, provide and maintain the System Maintenance and Administration Manual.

[SOWG-342] The Contractor shall detail all Scheduled and Unscheduled maintenance procedures and all Administration procedures in accordance with the Task Analysis.

[SOWG-343] The Contractor shall test and validate the procedures and resources described in the MAM and in original equipment manufacturer (OEM) manuals.

[SOWG-344] The Contractor’s MAM shall provide product breakdown list (with CIs), functional descriptions and specifications, screenshots from the software with the procedures required for: deployment, installation, configuration and settings, use of LOG files, security procedures, disaster recovery, backup/restore, BIT/condition monitoring, troubleshooting techniques, test remove/ replace.

[SOWG-345] The MAM shall describe in detail how to install a new baseline, including description on how to recover the old baseline if the new baseline installation must be aborted. If data migration is needed between baseline versions, the MAM shall describe how to migrate data form the previous baseline to the new baseline.

[SOWG-346] The Contractor's Maintenance Manual shall provide the description for the usage of all third-party applications needed to configure, manage and maintain the system.

[SOWG-347] The Contractor's Maintenance Manual shall define the in-depth, step-by-step procedure how to perform the 1st, 2nd and 3rd level corrective and preventive maintenance tasks and SM&C tasks.

[SOWG-348] The MAM shall include troubleshooting guidance with details on how to solve a full range of potential problems or on how to provide workarounds for potential problems.

[SOWG-349] The Contractor shall ensure that each and every procedure include as a minimum the following information:
(1) The support level to be assigned;
(2) Location/facility involved (if the operation is performed remotely, it has to be specified);
(3) Personnel skills required;
(4) Task duration and frequency (if applicable), reusing MTBF and MTTR data available;
(5) Manpower required;
(6) Tools, test equipment and special tools required (if any);
(7) The steps needed to perform the procedure.

2.5.4.4.1 OEM Manuals for COTS products

[SOWG-350] The Contractor shall provide original OEM manuals for all COTS software installed.

[SOWG-351] The Contractor shall be responsible to keep the COTS OEM manual under configuration control and to assure that all the COTS OEM Manuals will be always coherent with the operational configuration deployed.

2.5.4.5 Release Note

[SOWG-352] The Release Note shall identify and explain new features provided in the PBL release.

[SOWG-353] The Release Note shall identify all Configuration Items in the PBL release that has changed since the previous release.

[SOWG-354] The Release Notes shall, for the deliverables in the release, identify all known issues and limitations, and workarounds for these.

2.5.4.6 Site Activation Test Plan and Report (SATP/R)

[SOWG-355] The SATP/R shall describe how the deployment of the new PBL release to the site is tested and verified to be successful.

[SOWG-356] The SATP/R shall include tests that verifies that the PBL release is fully functional at the site which includes:
(1) Verifying that the users of the PBL release (if any) can correctly access it and its data;
(2) Verifying that PBL release's interfaces to external systems is properly configured and functional.

2.5.4.7 Deliverable Acceptance Report (DAR)

[127] The purpose of the DAR is to serve as a record of the Purchaser's formal acceptance of a PBL release and through the PBL the SRS requirements it fulfils

[SOWG-357] The DAR shall include a summary describing the PBL release, a sheet for the sign-off of the formal acceptance of the PBL, and then include the following reports as annexes:
(1) A Configuration Status Report for the PBL;
(2) ILSP with the Logistics Support Analysis;
(3) Software Quality Metrics Report;
(4) Source Code Review Report;
(5) Security Test Report;
(6) Deliverable Functional and Performance Test Report;
(7) System Integration Test Report;
(8) Maintenance and Administration Manual;
(9) Release Notes;
(10) Site Activation Test Plan/ Reports (if applicable).

[SOWG-358] The Contractor shall provide the DAR in a PDF format.

[128] The Purchaser will sign off the DAR pending that:
(1) All requirements with a Must Have priority for the defined deliverable(s) have been fulfilled;
(2) All relevant test reports have been provided and the tests are successful.

[SOWG-359] The Contractor shall place the Purchaser-approved DAR under configuration control.

3 Project-Specific Requirements

3.1 Contractor's Technical Personnel Qualifications

[129] This section specifies special skills for individuals of the Contractors project team that are deemed required for this project in particular. The skills for generic project management roles are defined in section 2.1.1.

3.1.1 Technical Lead

[SOWG-360] The Contractor shall designate a Technical Lead for the project; who shall lead the efforts in analysis, design, development, integration, and follow-on enhancement efforts of the Contractor.

[SOWG-361] The Contractor's Technical Lead shall meet the following qualifications:
(1) Have a master's degree in Computer Science, or related/ equivalent studies;
(2) Have seven years of experience in leading technical roles in projects similar to this project in technical scope;
(3) Have documented expert knowledge and experience in Angular application framework, OData REST API, OWASP, C# and .Net, Web-applications, JavaScript, SQL databases, Graph databases;
(4) Have documented knowledge and experience on Elasticsearch and Neo4j (both used with components of the INTEL-FS Spiral 1 software);
(5) Have documented knowledge and experience with social network analysis (SNA) and/ or link analysis, and preferably have experience with implementation of SNA Web and/ or link analysis applications (e.g. using the KeyLines software development kit (SDK), GoJS JavaScript/ TypeScript library, etc.)
(6) Have a NATO SΞCRET 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 SΞCRET clearance.

3.1.3 Test Director

[SOWG-364] The Contractor shall designate a Test Director for all test activities conducted under this Contract; who shall direct the test planning and test implementation/ execution.

[SOWG-365] The Contractor's Test Director shall meet the following qualifications:
(1) Have a bachelor's, or higher, degree in Computer Science, or related/ equivalent studies;

(2) Have seven years of experience working on SW intensive projects;
(3) Have documented expert knowledge and experience with automating testing and test reporting (e.g. using the NUnit framework, Jasmine, Gherkin test-scenarios, Selenium, etc.) for Azure DevOps;
(4) Have documented expert knowledge in automated security testing of Web-applications;
(5) Have documented knowledge and experience of Angular application framework, OData REST API, OWASP, JavaScript, and Typescript;
(6) Have a NATO SΞCRET clearance.

3.1.4 Software Developers

[SOWG-366] The Contractor shall designate a team of experienced User Interface Software Developers, who shall implement the INTEL-FS2 UA user interfaces.

[SOWG-367] The Contractor's User Interface Software Developers shall meet the following qualifications:
(1) Have a bachelor's, or higher, degree in Computer Science, or related/ equivalent studies;
(2) Have five years of documented expert knowledge and experience with software implementation of user interfaces in Web-Applications in particular in the latest versions of the Angular application framework;
(3) Have a UX design certification;
(4) Have documented experience of working with OData REST API;
(5) Have a NATO SΞCRET clearance.

3.2 Augmentation of SOW General Requirements

3.2.1 Additional requirements for deliverable acceptance

[SOWG-368] The Contractor shall be able to demonstrate that whenever any UI is auto-generated (e.g. UI for entering IIE attributes) then such auto-generated UI shall be generated from the [INTEL-FS2-InformationModel]. The Contractor shall for auto-generated UI be able to demonstrate that a change in [INTEL-FS2-InformationModel] is automatically processed to update the relevant UI.

[130] The purpose of the requirement above is to ensure that the UI is not auto-generated from aspects in the source code (as it is in INTEL-FS Spiral 1).

[SOWG-369] The Contractor shall instrument the delivered software source code with additional logging that provides diagnostics information in case of issues with use of any Purchaser provided software component as PFI (this is of particular importance for issue the usage of the PFI-provide map visualization component (VC)).

[SOWG-370] The Contractor shall for any requirements that cannot be fulfilled because of supposed issues in the usage of PFI software provide an analysis based on logged diagnostics information proving/ justifying that the root cause of not being able to meet the requirement is a defect in the PFI provided software. This analysis shall also include proof that the Contractor developed is complete and that once the issue in the PFI the requirement will be fulfilled without requiring any changes to the Contractor provided software.

3.2.2 Additional requirements for supporting release to production

[SOWG-371] The Contractor shall, starting immediately after the first release to production (see 2.4.5.2.7) until the Final System Acceptance (FSA), provide support to ensure that the software running in production fulfils its availability requirements. This support shall, for all releases to production include:
(1) 2nd level support by performing problem analysis to identify the cause of reported issues with the software in production;
(2) 3rd level support by implementing bug fixes to identified issues and to subsequently produce a new PBL Release;
(3) 4th level support by obtaining and including new versions of 3rd party components and libraries when this is required to resolve issues in production.

[SOWG-372] The Contractor shall, after FSA, in the Warranty period, continue to provide the 3rd level and 4th level support.

3.3 WP1.1 Upgrade UI, initial BMD OPFOR ORBAT Management, and new User Management – Phase 1

3.3.1 Deliverables

[131] Table 3-1 below show an extract of the SSS for WP 1.1 identifying the high-level CLIN numbers for the deliverables of the WP sorted by Purchaser-expected delivery increment (for further breakdown and details of deliverables, see the SSS spreadsheet).

Table 3-1 WP 1.1 SSS high-level CLIN numbers

CLIN	Description	Delivery at increment number
1.1	User Management Application	1
2.3	Battlespace Object (BSO) Management Application	1
2.2	Products Management Application	2
2.5	Intelligence Situation Application	3
2.7	Search Application	3
2.10	Intelligence Requirements Management (IRM) Application	4
2.8	Analysis Application	5
2.1	Dashboard Application	6
2.9	ISR Organization Management Application	6
2.11	Collection Requirement Management (CRM) Application	6

3.3.2 Additional Requirements for Site Activations

[132] Installation and activation of a release in the production environment will done by, or lead/ supervised by, the Purchaser with the support of the Contractor.

[SOWG-373] In addition to the regular support for deployment of every release to the production staging environment the Contractor shall for WP1.1 also provide support for up to 10 installations and site activations on actual servers in production.

[SOWG-374] The Contractor shall, if deemed required to achieve successful activation, provide the key personnel to be present in person at the installation and activation event.

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

[SOWG-375] The Contractor shall during WP1.1 be responsible for corrective maintenance of software produced by the Contractor.

[SOWG-376] The Contractor shall factor in the cost of the site installation and activation support, and for corrective maintenance of Contractor's developed software, into the cost of the software deliverables as defined in the SSS. I.e. the Contractor shall not expect any additional compensation for this support.

3.4 WP1.2 New user interfaces (using mock backends) – Phase 2

3.4.1 Deliverables

[134] Table 3-2 below show an extract of the SSS for WP 1.2 identifying the high-level CLIN numbers for the deliverables of the WP (for further breakdown and details of deliverables, see the SSS spreadsheet).

Table 3-2 WP 1.2 SSS high-level CLIN numbers and functionalities groupings

CLIN	Description	Delivery at increment number
3.6	BM JIPOE Application (using mock backend)	7
3.10	IRM Application (using mock backend)	7
3.11	CRM Application (using mock backend)	7
3.12	Collection Operations Management (COM) Application (using mock backend)	7

3.4.2 Additional Requirements for Site Activations

[135] Installation and activation of a release in the production environment will done by, or lead/ supervised by, the Purchaser with the support of the Contractor.

[136] In WP1.2 (Phase 2) the Contractor is not expected to deliver any new release to production as the work in this phase is to evolve the user interfaces against mock-backends.

[137] However, in case critical issues are identified in the software the Contractor delivered in WP1.1 requires new releases to production to fix the issue then the Contractor will have to support this.

[SOWG-377] The Contractor shall in Phase 2, when required provide installation and site activation support for any release to production that is required to address issues in the software delivered by the Contractor.

3.5 WP1.3 Full integration with new backend API – Phase 3

3.5.1 Deliverables

[138] Table 3-3 below show an extract of the SSS for WP 1.2 identifying the high-level CLIN numbers for the deliverables of the WP sorted by Purchaser-expected delivery

increment (for further breakdown and details of deliverables, see the SSS spreadsheet).

Table 3-3 WP 1.3 SSS high-level CLIN numbers

CLIN	Description	Delivery at increment number
4.2	Products Management Application (new backend)	8
4.3	Battlespace Object (BSO) Management Application (new backend)	8
4.7	Search Application (new backend)	8
4.8	Analysis Application (new backend)	9
4.9	ISR Organization Management Application (new backend)	9
4.10	IRM Application (new backend)	9
4.11	CRM Application (new backend)	9
4.1	Dashboard Application (new backend)	10
4.6	BM JIPOE Application (new backend)	10
4.5	Intelligence Situation Application (new backend)	10
4.4	Targets Application (new implementation)	11
4.12	COM Application	11

3.5.2 Additional Requirements for Site Activations

[139] Installation and activation of a release in the production environment will done by, or lead/ supervised by, the Purchaser with the support of the Contractor.

[SOWG-378] In addition to the regular support for deployment of every release to the production staging environment the Contractor shall for WP1.3 also provide support for up to 15 installations and site activations on actual servers in production.

[SOWG-379] The Contractor shall, if deemed required to achieve successful activation, provide the key personnel to be present in person at the installation and activation event.

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

[SOWG-380] The Contractor shall also during WP1.3 be responsible for corrective maintenance of software produced by the Contractor.

[SOWG-381] The Contractor shall factor in the cost of the site installation and activation support, and for corrective maintenance of Contractor's developed software, into the cost of the software deliverables as defined in the SSS. I.e. the Contractor shall not expect any additional compensation for this support.

3.6 WP 1.4 Optional 3rd and 4th Level Maintenance and Support

[141] This optional Work Package identifies a 3rd and 4th Level Maintenance and Support deliverable (see section 2.3.3.1) that can be exercised within the Contract for delivery after the Warranty period expires.

[SOWG-382] The Contractor shall provide one year of 3rd Level and 4th Level Maintenance and Support for the I2UA capability where this support includes:

(1) Support to NCI Agency's 2nd Level Support process with identification of the root cause of the issue (e.g. by issue replication testing);
(2) Implement the software corrections as identified in (1);
(3) Test the corrections in accordance with the testing activities as defined in section 2.4.5.2.2;
(4) Support the IV&V testing in accordance with section 2.4.5.2.4;
(5) Support the UAT testing in accordance with section 2.4.5.2.5;
(6) Define a new PBL in the CMDB and create a Release Note in accordance with section 2.5.4.5;
(7) Support the Deliverable Acceptance Review in accordance with section 2.4.5.2.6;
(8) Support the Release Management in accordance with section 2.4.5.2.7.

[SOWG-304] If the Purchaser activates the optional support package, the Contractor shall be fully compliant with section 2.3.7 Warranty Requirements and provide all the services described under aforementioned section without any additional cost.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INTEL-FS SPIRAL 2 - BACKEND SERVICES (I2BE)
BOOK II - PART IV - SOW

STATEMENT OF WORK (SOW)

Version 1.6

01/04/2021

TABLE OF CONTENTS

INDEX OF FIGURES

INDEX OF TABLES

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
01 Apr 2021	1.6	Clarified the acronym SM&C, the usage of test reporting output format, and the time of O&M team training.

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.

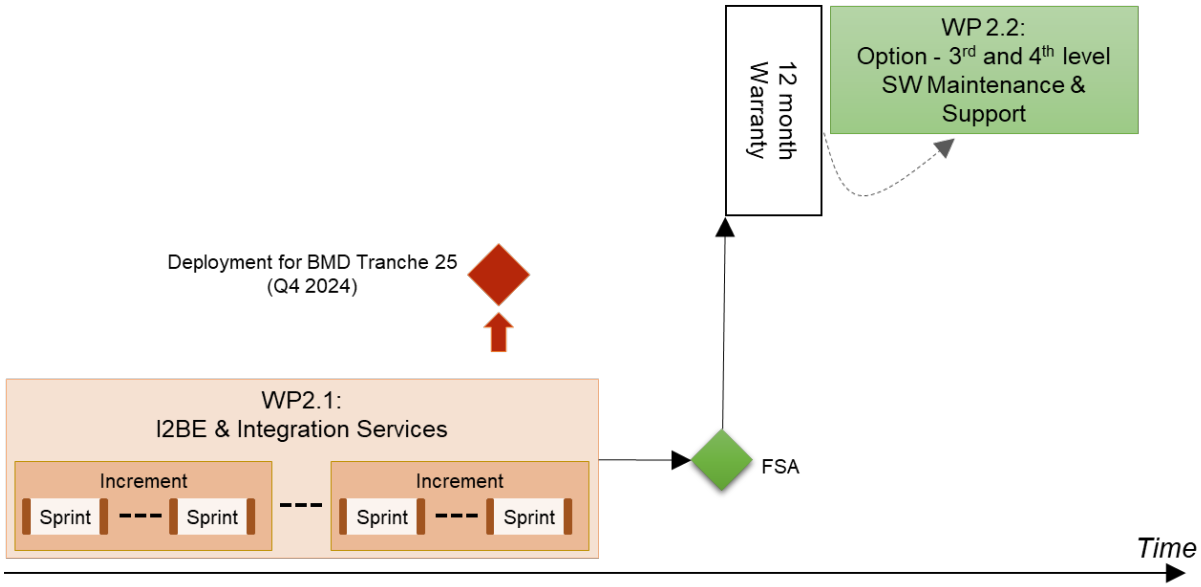
[7] The I2BE system requirements is defined in the Annex A to this SOW.

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 RΞSTRICTED (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 SΞCRET clearance.

2.1.1.2 Quality Assurance Manager

[SOWG-10] The Contractor shall designate a Quality Assurance Manager; who shall be responsible for all Quality Assurance Manager for activities under this Contract.

[SOWG-11] The Quality Assurance Manager shall report to a separate manager within the Contractor's organisation at a level equivalent to or higher than the Project Manager.

[SOWG-12] The Contractor's Quality Assurance Manager shall meet the following qualifications:
(1) Have a bachelor's, or higher, degree in Computer Science, or related/ equivalent studies;
(2) Have worked at least four years with quality control methods and tools;
(3) Have worked at least four years with supporting system development and test projects;
(4) Have a NATO SΞCRET clearance.

2.1.1.3 Configuration Manager

[SOWG-13] The Contractor shall designate a Configuration Manager, who shall be responsible for all configuration activities conducted under this Contract.

[SOWG-14] The Contractor's Configuration Manager shall meet the following qualifications:
(1) 3 years' experience as Configuration Manager in Projects of a similar nature, both in terms of the products to be delivered and the level of technicality;
(2) Have a NATO SΞCRET clearance.

2.1.1.4 Other Key Roles

[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, Service Management and Control (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 for each incremental deliverable. Normally this training will be conducted within four weeks after the Purchaser's deliverable acceptance (see section 2.5.4.7), but the Purchaser may decide to combine O&M team training of multiple increment deliverables and postpone an increment's O&M team training until such time that a combined O&M team training event can be conducted.

[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 RΞSTRICTED level.

[SOWG-148] The Contractor shall when feasible use existing NSF tooling (see list above) for managing the project engineering artefacts. The Contractor may propose additional tooling for managing engineering artefacts on the NSF for Purchaser's approval.

[SOWG-149] The Contractor shall organize the engineering artefacts in a structured and logical way that will enable the Purchaser to quickly find any artefacts based on context (e.g. work package, increment/ deliverable, etc.) and artefact type.

2.4.2 Meetings – General Requirements

[SOWG-150] Meetings and phone calls shall be conducted in English.

[SOWG-151] Unless otherwise specified, at least one week before all meetings required under this Contract, the Contractor shall send an invitation, including:
(1) Purpose;
(2) Agenda;
(3) List of participants;
(4) Date, hour, place, duration.

[SOWG-152] The Contractor shall record meeting minutes and provide the minutes to the Purchaser within 3 working days.

[SOWG-153] The Minutes shall include:
(1) Date, place, and time of the meeting;
(2) Purpose of the meeting;
(3) Name of participants;
(4) Approval of previous meeting's minutes and all resolutions
(5) Record of principle points discussed, actions taken, and decisions made;
(6) Copies of materials distributed at the meeting.

[SOWG-154] The minutes shall not be used as a mechanism to change the terms, conditions or specifications of the Contract nor as a vehicle to alter the design or configuration of equipment or systems. Such changes shall only be made by agreement, amendment or by authorized mechanisms as set forth in the Contract.

[SOWG-155] If meeting facilities at a Purchaser location are not available at the specified Purchaser location in the time frame required to support an in-person meeting, the Contractor shall:

(1) Reschedule the meeting to such time as meeting facilities are available at the Purchaser location, with no further adjustment to schedule or cost; or
(2) Provide suitable meeting facilities (e.g., hotel meeting facility) for the meeting/review at no additional cost to the Purchaser; or
(3) Arrange to host the meeting at the Contractor's facility. This facility shall be provided at no additional cost to the Purchaser.

2.4.3 Kick-Off Meeting

[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.

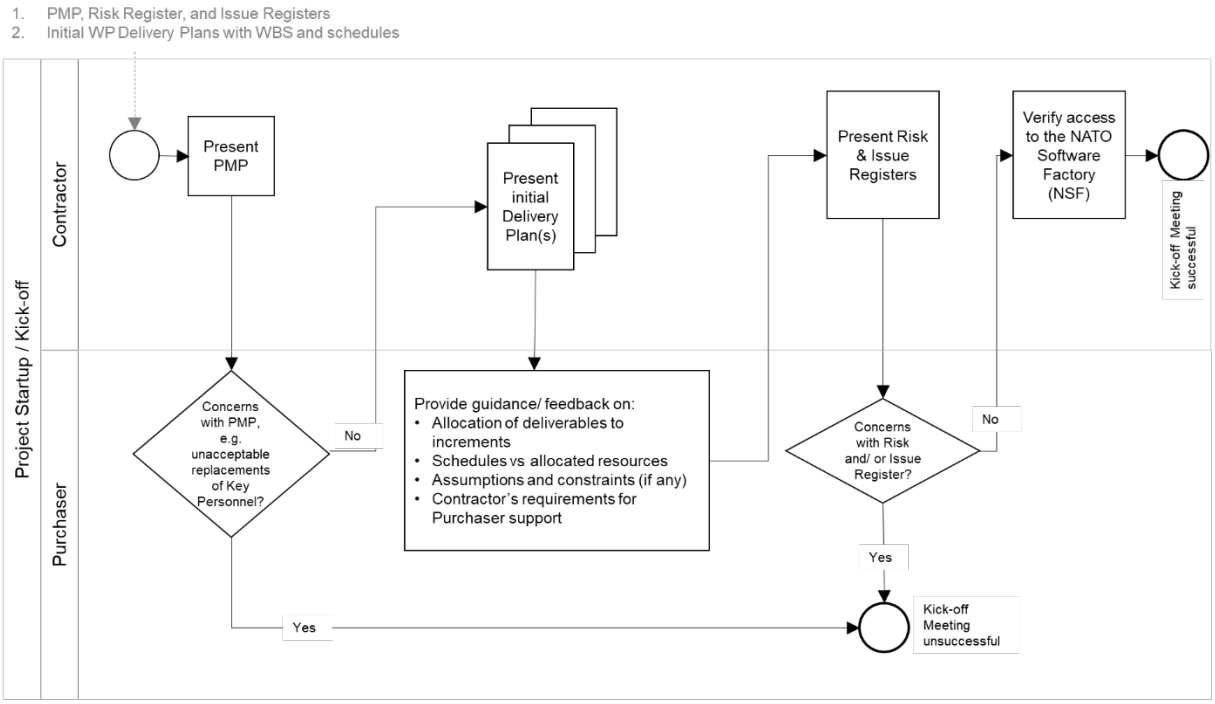
[66] The Purchaser will provide feedback to the Contractor on the WBS and schedule.

[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

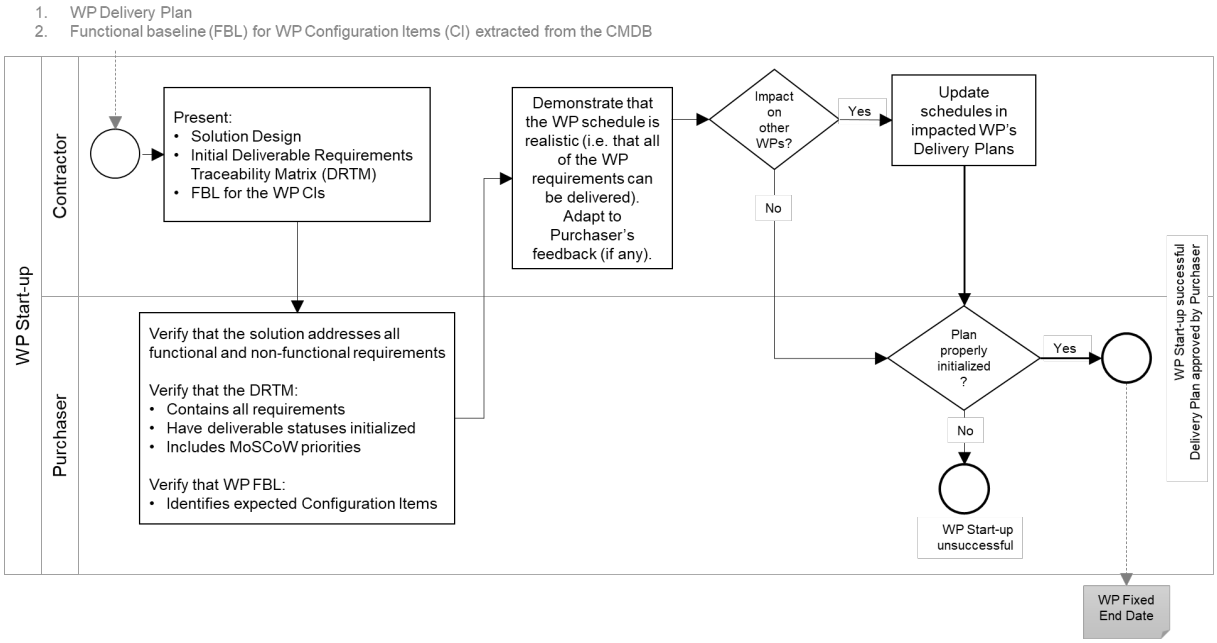
(a) Contain all WP requirements;
(b) Define delivery status for each requirement (NOT_STARTED);
(c) Specify initial MoSCoW priority for each requirement.

[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 choses to adapt the Delivery Plan to accommodate any Purchaser's recommendation and those changes have an impact of any other work packages, then the Contractor shall update all affected Delivery Plans.

Figure 2-2 WP Start-up Meeting



[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.

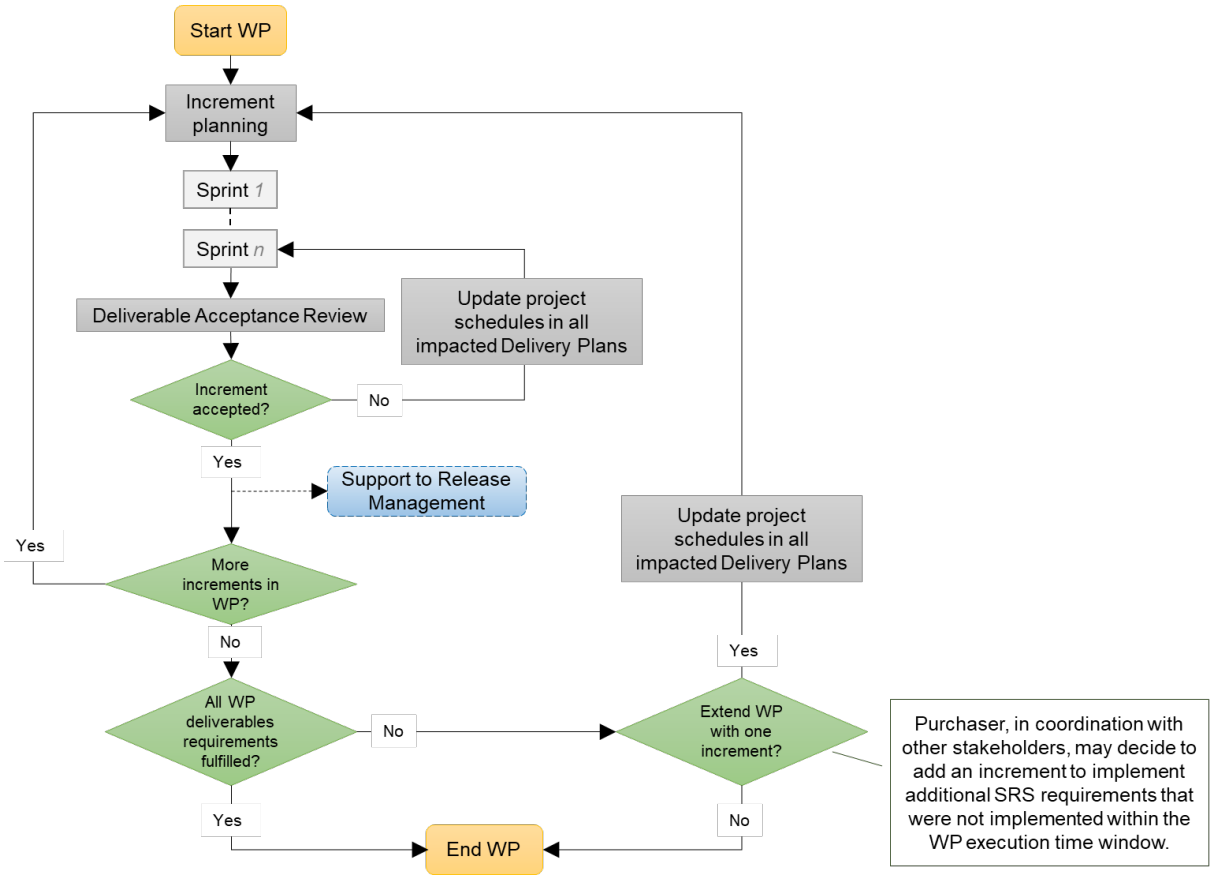
[SOWG-165] The Contractor shall be cognisant of the fixed WP End-date and throughout the WP track the progress of implemented deliverables against the fixed WP End-date, and whenever a potential schedule slippage is identified take corrective actions to prevent the schedule slippage.

[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 wireframes[1] for all user interfaces to be implemented;
(2) An Integrated Logistics Support (ILS) Plan (see section 2.5.4.2);
(3) A Test Plan including test cases and test report templates (see section 2.5.4.3);
(4) If applicable, Site Activation Test Plan and Report templates (see section 2.5.4.6);
(5) An extract of the CMDB, in the form of an Allocated Baseline (ABL) that is an enrichment of the FBL that now includes information on third-party components and libraries and their licence costs and/ or constraints.

[SOWG-171] The Contractor shall prior to the meeting provide the Purchaser with the latest version of the Solution Description Document (SDD) with content in accordance with section 2.5.3.2.

[SOWG-172] The Contractor shall prior to the meeting, with a minimum of one week notice to the Purchaser, state the need for:
(1) Prerequisites and required documentation;
(2) Purchaser provision of specific subject matter knowledge transfer.

[SOWG-173] The Contractor shall one week prior to the meeting provide the Contractor with a Schedule Assessment Analysis that:
(1) Report on accumulated schedule slippage over previous WP increments (if any) and the estimated impact on the on the WP Fixed End-date.
(2) Report on mitigations that will be implemented in the starting increment to reduce the schedule slippage with the goal of delivering the WP in accordance with the WP Delivery Plan schedule.

[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.

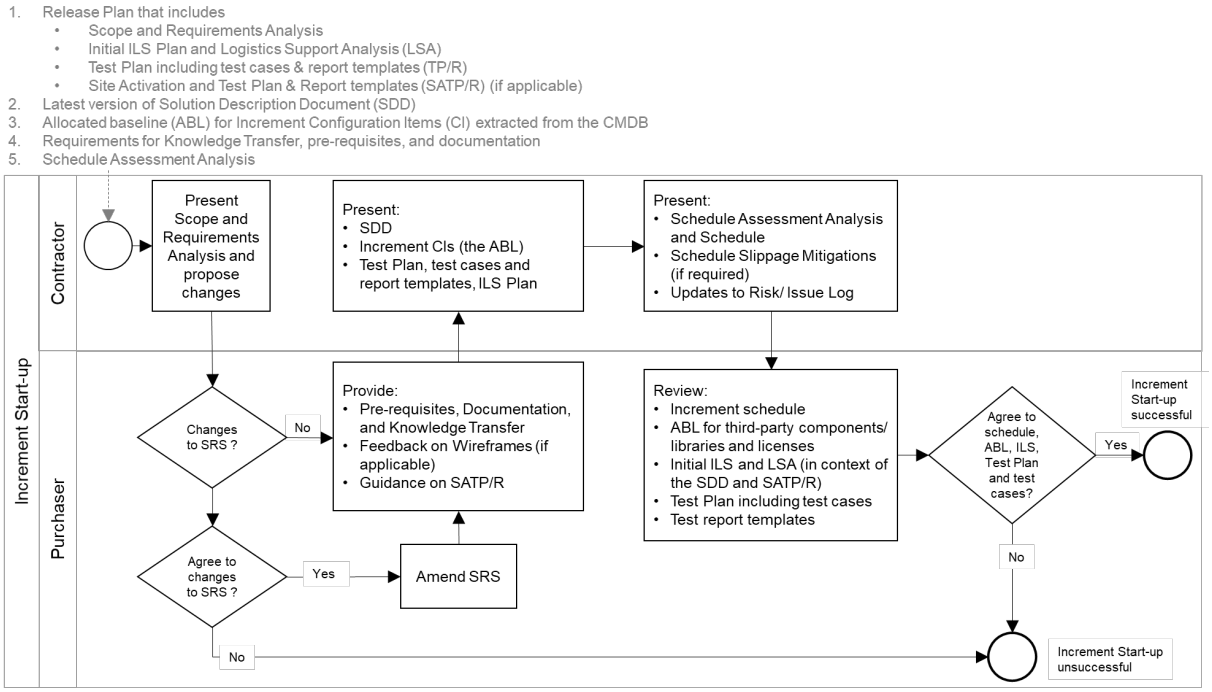
[77] The Purchaser will support the Contractor with:

(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



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;

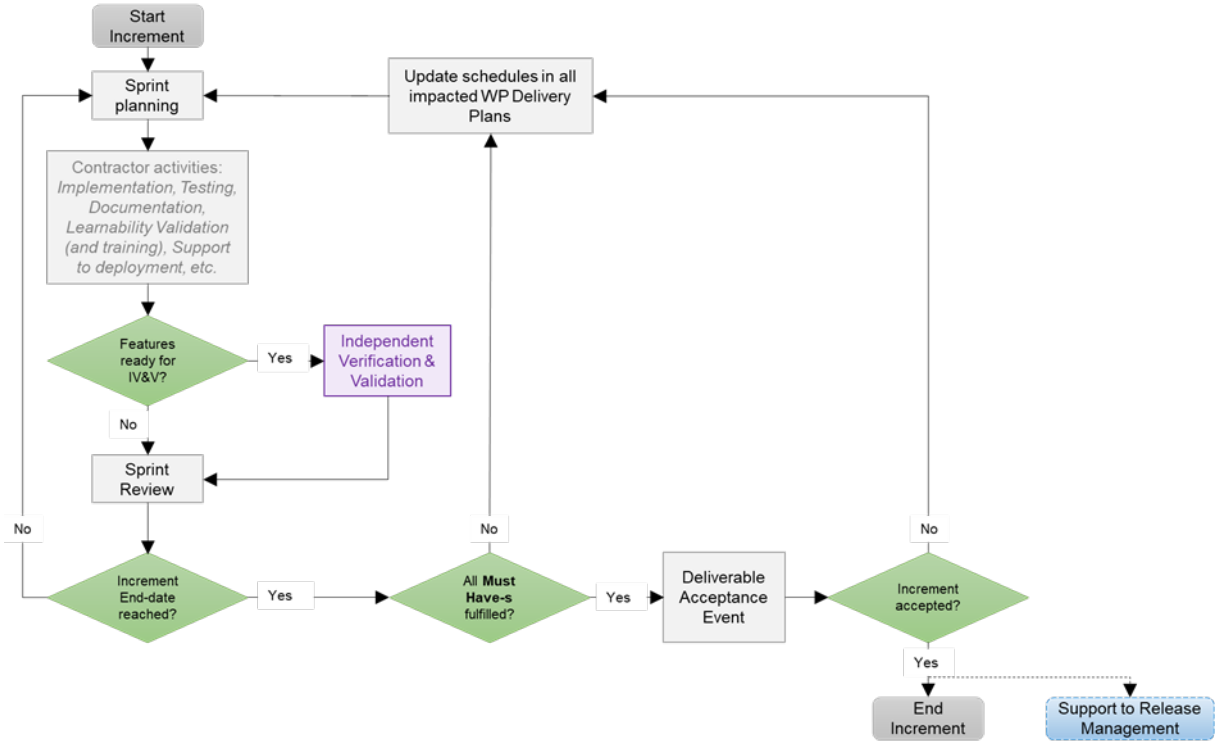
(3) Participating in ad hoc discussions on test results (e.g. in case IV&V identifies potential bugs);
(4) Supporting Purchaser in setting up additional installations on the NSF (the expectation here is that the SW is easily installable and that Purchaser's personnel will be able to do this without contractor 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 a format that can be automatically imported and used by Azure Devops and in the Jira tool with a Test Event Management plugin (e.g. using 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	The failure of testing of a requirement. The failure results in the termination of the complete system or one or more component of the system. The failure causes extensive corruption of data. The failed function is unusable and there is no acceptable alternative method to achieve the required results.
Major	A significant failure that causes severely impaired functions but does not prevent operational processing. Applies to conditions under which the complete system or one or more component of the system are partially inoperative, but are still usable by the users. A work around may be available, but it may require manual intervention. Examples: • Absence of expected modules/ object or Unit • Failure of business operational process that affects a large group of users • Complete failure of a module
Moderate	The failure does not result in the termination and all functions are available but causes the system to produce incorrect, incomplete or inconsistent results. When resources are available and budgeted, should be resolved.
Minor	The failure does not result in termination and does not damage the functioning of the system. The desired results can be easily obtained by working around the failure.
Cosmetic	The failure is related to the look and feel of the application, typos in a document or user interfaces (amongst others), and not part of the immediate usability or contractual requirements. The failure does not adversely affect the overall system operation.

Table 2-4 Priorities for defect classification

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

2.4.5.2.2.3 Software Quality Metrics Reporting

[SOWG-192] The Contractor shall, within the Contractor's continuous integration build pipeline, set up an automated software metrics analysis (e.g. using the NSF SonarQube) which shall provide the required software quality metrics for the Software Quality Metrics Report (SQMR) as defined in section 2.5.4.3.4.

[SOWG-193] The test coverage reported in the SQMR shall be higher than 80%.

[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.

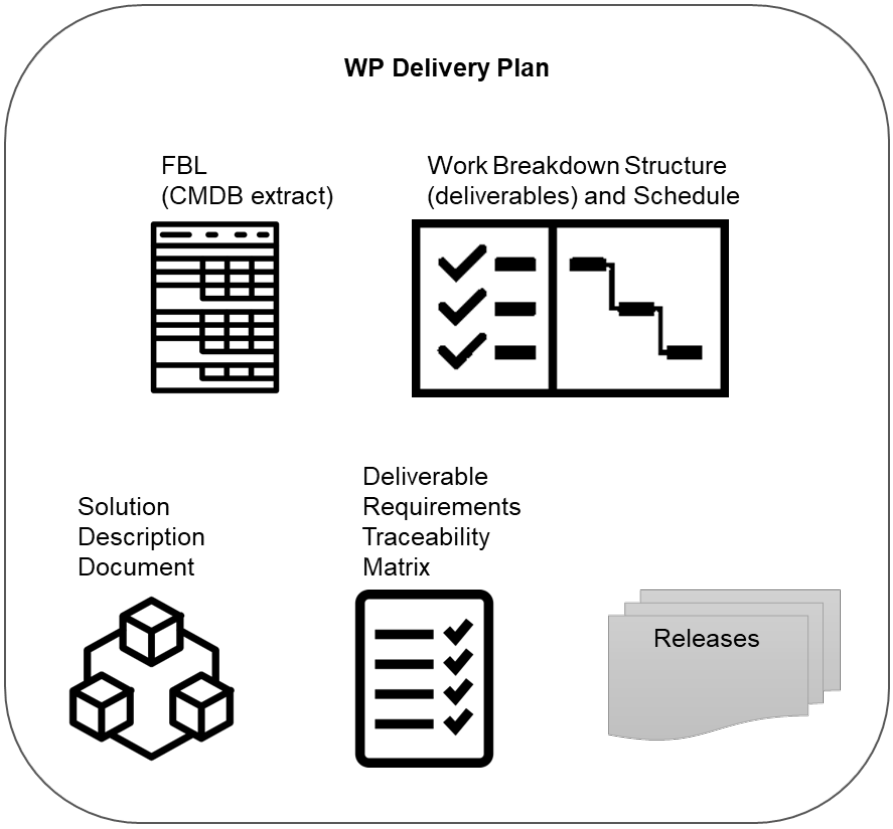
2.5.3 WP Delivery Plan

[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.

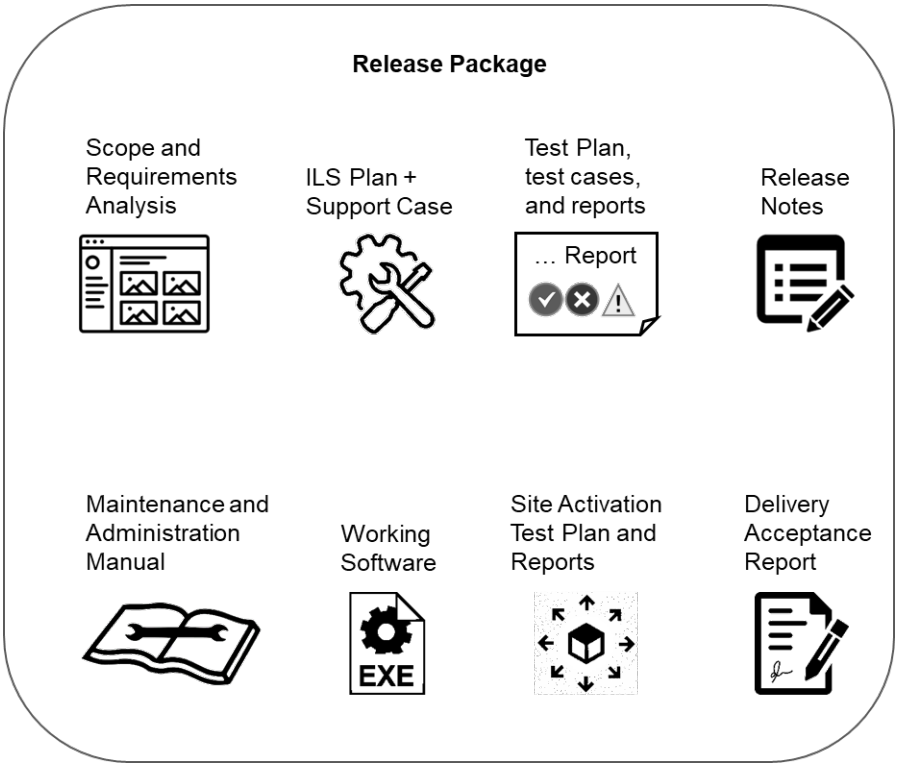
[SOWG-308] The DRTM shall be placed under configuration control throughout the period of performance the Contract.

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

INTEL-FS SPIRAL 2 - BACKEND SERVICES (I2BE)

BOOK II - PART IV - SRS

SYSTEM REQUIREMENT SPECIFICATION (SRS)

Version 1.4

31/03/2021

TABLE OF CONTENTS

INDEX OF FIGURES

INDEX OF TABLES

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.
31 Mar 2021	1.4	Clarified that performance requirements does not include authentication and authorization times

1 Introduction

[1] This System Requirements Specification (SRS) documents the system requirements for the backend services of the Intelligence Functional Services (INTEL-FS) Spiral 2, hereafter referred to as the I2BE.

1.1 Scope

[2] This SRS specifies Functional and Non-Functional system requirements for the I2BE. In fulfilling the functional and non-functional requirements defined in this SRS, the I2BE will also have to enable the INTEL-FS Spiral 2 user stories as defined in [INTEL-FS2-UserStories].

[3] The Functional Requirements of the I2BE specify the functions that will be implemented by this capability in order to deliver the services that the user applications of INTEL-FS Spiral 2 will consume. Note: the user applications of INTEL-FS Spiral 2, hereafter referred to as I2UA, will be delivered under a separate contract.

[4] The Non-Functional Requirements of the I2BE specify the standards, quality, performance, sizing and design constraints that shall be satisfied in the solution design and implementation.

1.2 Conventions

[5] Within this SRS, general functional requirements applicable to most or all services are numbered as [GBE-number], application-specific functional requirements are numbered as [FBE-number], non-functional requirements are numbered as [NFR-number], while narrative text is numbered as [number].

[6] Each functional requirement has associated with it a cost attribute. Prior to starting work,the Contractor will identify the cost of each single functional requirement. The Contractor will include the cost of implementing the general requirements and the cost of obtaining the qualities of the non-functional requirements into the implementation cost of the functional requirements. Hence, the general requirements and the non-functional requirements do not have an associated cost attribute.

[7] The term "including" is, throughout this SRS, never meant to be limiting - the list that follows is always non-exhaustive.

[8] References to applicable or reference information are in the text identified by an identifier within square brackets (e.g. [SOA-IdM]).

1.3 Structure

[9] This SRS is structured as follows:

- Chapter 1: The introduction to this document;
- Chapter 2: Specification of general requirements that generally applies across all deliverables;
- Chapter 3: Specification of the functional requirements for the I2BE backend services and System Administration Tools;
- Chapter 4: Specification of the functional requirements for the Integration Services;
- Chapter 5: Specification of the Non-functional Requirements for the I2BE services and the Integration Services.

1.4 Applicable documents

[10] Applicable documents provide details not explicitly set out through this SRS (other requirements, architecture, standards and specifications). The Contractor shall consider the applicable documents as requirements associated with this SRS.

Table 1-1 Applicable documents (Compliance Requirements)

[INTEL-FS2-IM]	CO-14873-INTELFS2, INTEL-FS SPIRAL 2 – Initial Information Model Book II - Part V, NCI Agency
[INTEL-FS2-UserStories]	CO-14873-INTELFS2, INTEL-FS SPIRAL 2 - USER APPLICATIONS (I2UA) BOOK II - PART IV – USER STORY DOCUMENT (USD), NCI Agency

1.5 Reference documents

[11] Reference documents are documents providing contextual information that is relevant to this project. They shall be used by the Contractor to support his activity.

Table 1-2 Reference documents - miscellaneous

[AC/35-D/2004-REV3]	Primary Directive on CIS Security, North Atlantic Council, 15 November 2013 (NATO Unclassified)
[ADatP-4774]	NATO STANDARD ADatP-4774, CONFIDENTIALITY METADATA LABEL SYNTAX, Edition A Version 1, December 2017
[ADatP-4778]	NATO STANDARD ADatP-4778, METADATA BINDING MECHANISM, Edition A Version 1, October 2018
[AEDP-17]	NATO Standard ISR Library Interface, AEDP-17 Edition A Version 1, March 2018
[AEDP-19]	NATO Standard ISR Workflow Architecture, AEDP-19 Edition A Version 1, March 2018
[AI 06.02.08]	Agency Instruction Instr Tech 06.02.08, Service interface profile for publish-subscribe services, 04-Feb-2015, NCI Agency, (NATO Unclassified)
[AI 06.02.10]	Agency Instruction Instr Tech 06.02.10, Service interface profile for a publish/subscribe notification consumer, 04-Feb-2015, NCI Agency, (NATO Unclassified)
[AI 06.02.11]	Agency Instruction Instr Tech 06.02.11, Service interface profile for a notification cache service, 04-Feb-2015, NCI Agency, (NATO Unclassified)
[AirC2IS ICD]	AIRC2IS_SDS_ANNEX_04_ICD , AIR COMMAND AND CONTROL INFORMATION SERVICES (AIRC2IS) INCREMENT 1 (INC1) BASELINE 4 (BL4) - INTERFACE CONTROL DOCUMENT (ICD), version 6.0, 4 July 2019
[IFS1-ICD]	F0057 62778135 558, Interface Control Document for the INTEL-FS Project, v1.3, 29 Aug 2016 (NATO UNCLASSIFIED)
[IPIWG]	Intelligence Project Implementation Working Group, IPIWG 4.0 R19 Schema: http://www.nato.int/namespace/ipiwg/4.0#
[MARIX]	Maritime C2 Information Exchange (MARIX) Specification (a RESTful protocol and a model for the exchange of maritime information in support of Maritime Situational Awareness and Command and Control), https://tide.act.nato.int/tidepedia/index.php/Maritime_C2_Information_Exchange_Specification
[NCSD-IPL-SDS]	NATO-CSD CO-14682-CSD, SYSTEM DESIGN SPECIFICATION (SDS) – CIPL, Version 1.1, 4/12/2019
[NCSD-IWS-SDS]	NATO-CSD CO-14682-CSD, SYSTEM DESIGN SPECIFICATION

	(SDS) – CIWS, Version 1.0, 12/11/2019
[NCIA SIP REST 06.02.07, 2015]	NCI AGENCY INSTRUCTION INSTR TECH 06.02.07 SERVICE INTERFACE PROFILE FOR REST MESSAGING, 04 February 2015.
[CEOB-EF]	NATO AEWP-01 DRAFT Common Electronic Order of Battle Exchange Format
[NIRIS-WS-ICD]	NIRIS WEB SERVICES ICD VERSION 1.3.1, May 2020, NCI Agency
[OAS v3.0.1, 2017]	OpenAPI-Specification v3.0.1 https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.1.md, 07 December 2017
[OASIS Odata OAS 1.0, 2016]	Organization for the Advancement of Structured Information Standards (OASIS) OData to OpenAPI Mapping Version 1.0, 15 December 2016
[OData 4]	Organization for the Advancement of Structured Information Standards (OASIS) Open Data Protocol (OData) Version 4.01 (23 April 2020), https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=odata
[OWASP]	Open Web Application Security Project (OWASP), https://www.owasp.org/index.php/Main_Page
[SOA-IdM]	CO-14176-SOA-IDM Service Oriented Architecture (SOA) and Identity Management (IdM) Platform – Wave 1, System Design Specification (SDS) and Interface Control Document (ICD), NCI Agency
[SonarQube]	SonarQube, https://www.sonarqube.org/
[NVG]	TIDE Transformational Baseline Version 4.0, NATO VECTOR GRAPHICS PROTOCOL, version 2.0.2, 22 May 2015

Table 1-3 Reference documents – APP11D

[APP11D-ACO]	APP-11(D)(1)/ F011, ACO (AIRSPACE CONTROL ORDER), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-AEW_MISREP]	APP-11(D)(1)/ F053, AEW_MISREP (AIRBORNE EARLY WARNING MISSION REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-AIRINTREP]	APP-11(D)(1)/ F001, AIRINTREP (AIR INTELLIGENCE REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-ATO]	APP-11(D)(1)/ F058, ATO (AIR TASKING ORDER), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-ASSESSREP]	APP-11(D)(1)/ J002, ASSESSREP (COMMANDERS ASSESSMENT REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-BOMBWARN]	APP-11(D)(1)/ A079, BOMBWARN (BOMB THREAT WARNING), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-CIINTREP]	APP-11(D)(1)/ J112, CIINTREP (COUNTER-INTELLIGENCE AND SECURITY REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-CIINTSUM]	APP-11(D)(1)/ J113, CIINTSUM (COUNTER-INTELLIGENCE AND SECURITY SUMMARY), Edition D Version 1, NATO UNCLASSIFIED

[APP11D-CISUPINTREP]	APP-11(D)(1)/ J115, CISUPINTREP (COUNTER-INTELLIGENCE AND SECURITY SUPPLEMENTARY REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-DIR]	APP-11(D)(1)/ J186, DIR (DYNAMIC INTELLIGENCE REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-ENSITREP]	APP-11(D)(1)/ A026, ENSITREP (ENEMY LAND FORCES SITUATION REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-EVENTREP]	APP-11(D)(1)/ J092, EVENTREP (EVENTS REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-FHOSTILEACT]	APP-11(D)(1)/ J009, FIRST HOSTILE ACT (FIRST HOSTILE ACT REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-INCREP]	APP-11(D)(1)/ A078, INCREP (INCIDENT REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-INCSPOTREP]	APP-11(D)(1)/ J006, INCSPOTREP (INCIDENT SPOT REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-INTREP]	APP-11(D)(1)/ J110, INTREP (INTELLIGENCE REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-INTSUM]	APP-11(D)(1)/ J111, INTSUM (INTELLIGENCE SUMMARY), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-MARINTREP]	APP-11(D)(1)/ J016, MARINTREP (MARITIME INTELLIGENCE REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-MARINTSUM]	APP-11(D)(1)/ J015, MARINTSUM (MARITIME INTELLIGENCE SUMMARY), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-MISREP]	APP-11(D)(1)/ F031, MISREP (MISSION REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-ORBATAIR]	APP-11(D)(1)/ F032, ORBATAIR (ORDER OF BATTLE - AIR FORCES)), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-ORBATLAND]	APP-11(D)(1)/ A032, ORBATLAND (ORDER OF BATTLE - LAND FORCES), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-OWNSITREP]	APP-11(D)(1)/ A031, OWNSITREP (OWN LAND FORCES SITUATION REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-PWINTERREP]	APP-11(D)(1)/ J080, PWINTERREP (PRISONER OF WAR INTERROGATION REPORT), Edition D Version 1, NATO UNCLASSIFIED
[APP11D-SUPINTREP]	APP-11(D)(1)/ J114, SUPINTREP (SUPPLEMENTARY INTELLIGENCE REPORT), Edition D Version 1, NATO UNCLASSIFIED

1.6 Background – envisioned capability

[12] With the I2BE NATO will acquire a set of backend services for managing intelligence data in support of the NATO Intelligence community and the Ballistic Missile Defence (BMD) community.

[13] The I2BE, as an intelligence information platform, will:

(1) Provide a complete application programming interface (API) that enables the INTEL-FS Spiral 2 User Applications (I2UA) to provide the users with the functionality defined by [INTEL-FS2-UserStories];

(2) Meet all of the performance, scalability, capacity and other quality requirements as defined by the non-functional requirements of this SRS;
(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 though service's API to fulfil any acceptance criteria defined in [INTEL-FS2-UserStories] that describes management of associations between IIEs (this includes [US 15], [US 17], [US 18], [US 22], [US 33], [US 36], [US 38], [US 39], [US 40], [US 43], [US 47], [US 48], [US 53], [US 58], [US 61], [US 64], [US 65], [US 67], [US 72], [US 75], [US 76], [US 77], and [US 83]). This means that the IIE to IIE Association Service shall though a REST API enable clients to create and manage (update and delete) associations as defined in [INTEL-FS2-IM].

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

[FBE-3] The IIE to IIE Association Service shall after a create, update or delete change to an association, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message identifies the changed association, and the type of change.

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

[FBE-4] The IIE to IIE Association Service API shall have support for creating associations from an IIE to a temporarily non-existing IIE (i.e. an IIE that has not yet been established in the I2BE, but that will be established).

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

[44] The reason for the requirement above it to handle situations where IIEs with associations to other IIEs are received before the associated IIE has been created. This could potentially happen if integration services extracting information from an external source where an association is defined, and the associated entity hasn't yet been retrieved and uploaded to the I2BE.

[FBE-5] The IIE to IIE Association Service API shall have support for creating associations to externally hosted information entities identified by an endpoint identifier (e.g. a URL) to the external entity.

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

[FBE-6] The IIE to IIE Association Service API shall for clients accessing dangling/ incomplete associations inform (indicate to) the client about the dangling endpoint(s).

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

[FBE-7] The IIE to IIE Association Service API shall implement a query function to find, and return to a requesting client, all IIEs that are associated to a specific IIE (as identified in the client request). The returned information shall provide all details on the individual associations.

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

[FBE-8] The IIE to IIE Association Service API shall implement a query function that returns a list of incomplete associations (i.e. containing a dangling endpoint).

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

[FBE-9] The IIE to IIE Association Service API shall implement a function that checks associations to external information endpoints and report on the endpoints that are found not to be reachable.

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

3.1.2 Geospatial and Features Service

[45] The information to be managed by this service is identified in the [INTEL-FS2-IM] in the:

- NATO::JISR::Battlespace::Location package - contains the geometrical/ geospatial primitives over which geospatial queries can be expressed, including: Point, Line, Surface and Volume derived types.
- NATO::JISR::Battlespace::Feature package - contains definitions of higher level battlespace Features whose value is partly defined by underlying geometric/ geospatial primitives – for example: area of intelligence Interest (AOII); named area of interest (NAI); line of bearing (LOB): etc.

[46] Included here in the geospatial areas service is the requirement for support to general geospatial querying over the OData API consistent with what is included in the [OData 4] specification. This includes the following OData Geo functions: 'geo.distance', 'geo.intersects' and 'geo.length'.

[47] All IIEs are geospatially referenced (IIE->GeoEntities) and therefore all IIEs can parametrise a geospatial query combined with the aforementioned OData geo operators.

3.1.2.1 API

[FBE-10] The Geospatial and Features Service shall through the OData REST API support all IIE access actions on Features (for an authorized client).

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

[FBE-11] The Geospatial and Features Service shall implement over the OData REST API support for geospatial querying consistent with the OData specification for geospatial support.

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

[FBE-12] The Geospatial and Features Service shall implement general geospatial support at the IIE level. For example it should be possible to query for Units that are within a Named Area of Interest.

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

[FBE-13] Geospatial and Features Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 33] and [US 47] with backend-relevant acceptance criteria for geographic areas as defined in [INTEL-FS2-UserStories].

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

[FBE-14] The Geospatial and Features Service shall after a create, update or delete change to a geographical feature, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

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

[FBE-15] The Geospatial and Features Service API shall support uploading of one or many attachments to geographical feature.

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

3.1.3 Intel-FS Spiral 1 Geospatial and Features Migration Service

[48] The purpose of this service is to migrate Geospatial and Features from INTEL-FS Spiral 1 into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.3.1 Extract, transform, load geographical areas

[FBE-16] The INTEL-FS Spiral1 Geospatial and Features Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new geographic areas (features). It shall be possible through a configurable filter setting to filter the geographic areas that are extracted from INTEL-FS Spiral1.

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

[FBE-17] The INTEL-FS Spiral1 Geospatial and Features Migration Service shall transform the extracted geographic areas into a format that is compliant with the OData REST API implemented by the Geospatial and Features Service and load the transformed Geospatial and Features into the I2BE through the Geospatial and Features Service.

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

[FBE-18] The INTEL-FS Spiral1 Geospatial and Features Migration Service shall identify associations to other IIEs in the extracted geographic areas and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

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

[FBE-19] Using this ETL process, it shall be possible to migrate all geographic areas, without any data loss, from INTEL-FS Spiral 1 into the I2BE.

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

3.1.4 Products Management Service

[49] The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::Product package.

3.1.4.1 API

[FBE-20] The Products Management Service shall through the OData REST API support all IIE access actions on products (for an authorized client).

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

[FBE-21] The Products Management Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 15], [US 16], and [US 17] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

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

[FBE-22] The Products Management Service shall after a create, update or delete change to a product, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

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

[FBE-23] The Products Management Service API shall support uploading of one or many attachments to a product in addition to the product file.

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

[FBE-24] The Products Management Service shall have support for management (create, read, update, and delete) of templates for creation of products. The template shall contain product metadata, but no product file.

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

[50] Note: The templates will be used by clients to prefill product metadata for recurring product types; e.g. daily update briefs

[FBE-25] The Products Management Service shall upon a client request return a template product metadata set where some text is dynamically set through usage of “tags” where the tags are replaced by actual values, as shown in the example below.

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

[51] Example of tags usage: For a DocumentProduct of type INTSUM, a template could use “tags” within the Title and Summary attributes as shown below. In this example %DATE% would be replaced with the current date, %ORGNODEPRODUCER% replaced by the ON the user behind the client request, and %UPLOADER% the name of the actual user.

- Title: %DATE% Daily INTSUM for TAAC-N by %ORGNODEPRODUCER%
- Summary: This is the Daily INTSUM produced for the TAAC-N AOR for %DATE%. Any follow up questions should be directed to %UPLOADER%

3.1.4.2 Transformation of files to PDF service

[FBE-26] The Products Management Service shall, upon a client request, convert a client-specified Microsoft Office file (MS Word or PowerPoint) or an image file (in common image formats) to a PDF file, and return the PDF file to the client.

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

[52] Note: INTEL-FS Spiral 1 the Aspose API is used for converting to PDF.

3.1.4.3 Automatic metadata extraction from files (support to product creation)

[FBE-27] The Product Management Service shall, upon a client request, processes document product files (in either PDF or MS Word format) to detect Keywords (mapping terms in the report to Keywords) and Locations, and return the found Keywords and Locations to the client.

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

[FBE-28] The rules for mapping terms in the report to Keywords shall be dynamically configurable. I.e. it shall be possible to update the mapping rule set and dictionaries, and activate the updates, without restarting the I2BE.

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

[FBE-29] The rule set for identifying Keywords and Locations shall be extendable and configurable through configurations (i.e. not requiring SW re-build).

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

[FBE-30] The Products Management Service shall, upon a client request, extract metadata attributes from a client-specified STANAG 4545 image file, map relevant metadata to INTEL-FS2 metadata attributes, and return the metadata mapping to the client.

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

[FBE-31] The Products Management Service shall, upon a client request, extract metadata attributes from a client-specified STANAG 4609 video file, map relevant metadata to INTEL-FS2 metadata attributes, and return the metadata mapping to the client.

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

3.1.5 Intel-FS Spiral 1 Products Migration Service

[53] The purpose of this service is to migrate products from INTEL-FS Spiral 1 into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.5.1 Extract, transform, load products

[FBE-32] The INTEL-FS Spiral1 Products Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new products. It shall be possible through a configurable filter setting to filter the products that are extracted from INTEL-FS Spiral1.

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

[FBE-33] The INTEL-FS Spiral1 Products Migration Service shall transform the extracted products into a format that is compliant with the OData REST API implemented by the Products Management Service and load the transformed products into the I2BE through the Products Management Service.

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

[FBE-34] The INTEL-FS Spiral1 Products Migration Service shall identify associations to other IIEs in the extracted products and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

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

[FBE-35] Using this ETL process, it shall be possible to migrate all products, without any data loss, from INTEL-FS Spiral 1 into the I2BE.

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

3.1.6 Collation Tasking Management Service

[54] The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::STAFF::Collation package.

3.1.6.1 API

[FBE-36] The Collation Tasking Service shall through the OData REST API support all IIE access actions on collation tasking information (for an authorized client).

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

[FBE-37] The Collation Tasking Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 26] and [US 27] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

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

[FBE-38] The Collation Tasking Service shall after a create, update or delete change to a product post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

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

[FBE-39] The Collation Tasking Service shall maintain lists of collation status on document products (i.e. reports) as defined by the collation tasking choreography as defined in [INTEL-FS2-IM].

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

[FBE-40] The Collation Tasking Service shall enable clients to search for, filter, and retrieve lists of document products (reports) according to their collation status (e.g. to retrieve reports needing collation, reports assigned for collation, etc.). The filtering mechanism shall support filtering on collation status, assigned user, source of product, product creation/ modification time, etc.

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

[FBE-41] The Collation Tasking Service shall enable clients to specify rules for automatically identifying which ON that will be responsible for collating which products. The rules shall identify the ON responsible for a product collation based on product metadata including Keyword, producer, and title (e.g. using regular expression against the title to look for a certain clue).

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

[FBE-42] The Collation Tasking Service shall manage collation task assignments (i.e. which user is assigned to collate which product).

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

3.1.7 Battlespace Object (BSO) Management Service

[55] The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Battlespace package.

3.1.7.1 API

[FBE-43] The BSO Management Service shall through the OData REST API support all IIE access actions on BSO/ BSRs (for an authorized client).

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

[FBE-44] The BSO Management Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 18] through [US 25] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

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

[FBE-45] The BSO Management Service shall after a create, update or delete change to a BSO/ BSR, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

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

[FBE-46] The BSO Management Service API shall support uploading of one or many attachments to a BSO and/ or a BSR.

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

[FBE-47] The BSO Management Service shall, upon a client request, be able to move a BSR from one BSO to another BSO (to rectify situations where a BSR has been created for the wrong BSO).

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

[FBE-48] The BSO Management Service shall have support for management (create, read, update, and delete) of templates for creation of BSOs and BSRs, and for creation of BSO relationships.

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

[56] Note: The templates will be used by clients to prefill BSO/ BSR metadata.

[FBE-49] The BSO Management Service shall, to support link analysis, manage associations to other IIEs at the BSO level in accordance with [INTEL-FS2-IM] (in addition to tracking associations at status report level).

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

[57] The purpose of the requirement above is to facilitate different types of link analysis; e.g. using both BSO data and document products.

3.1.7.2 Merging of BSOs

[FBE-50] The BSO Management Service shall implement a function in the REST API for merging of two or more BSOs into one consolidated BSO (consolidating BSO

attributes across the different BSOs) and aggregating all BSRs (with attachments) in a chronological order based on the ASAT time.

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

[FBE-51] The BSO Management Service shall move all associations that involved the original BSOs onto the new merged BSO.

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

[FBE-52] The BSO Management Service shall for client access requests through the REST API to a de-duplicated BSO (i.e. a BSO that can no longer be used) inform the client that the BSO has been replaced by the new BSO with the identification details of the new merged BSO (e.g. trough throwing an exception).

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

3.1.7.3 Identification of existing BSOs in document products

[FBE-53] The BSO Management Service shall maintain dynamically updated dictionaries of existing BSOs of type Persons, Organizations, Units, Events, Places, and Equipment. Note: Dynamically updated means that whenever BSOs are updated the dictionaries are automatically and immediately updated.

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

[FBE-54] The BSO Management Service shall, upon a client request, extract raw text from the file of a DocumentProduct and match it against dictionaries to identify existing BSOs of type Persons, Organizations, Units, Places, Events, and Equipment using a rule set that as a minimum includes the rules identified in the table below. The processed text shall be returned a marked-up format (e.g. XML) where each of the found BSOs are tagged with BSO identifying information (enabling client applications to display and retrieve information on the identified BSOs). The extracted text, shall to the maximum extent have the same structure of paragraphs as the original document report with clear and distinct separation between the paragraphs. A line-break in the original report shall not result in a new paragraph in the extracted text.

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

Table 3-1 Initial rule set for identifying existing BSOs

BSO Type	Identification Rules
Person	•Identify existing persons by Name (Note: The look-up shall be able to handle name abbreviations; e.g. it shall be able to identify “John F. Kennedy” as a person) •Identify existing person by previous Surname •Identify existing persons by Alternate Name (nickname)
Organization	•Identify existing organizations by their Name
Unit	•Identify existing units by their Name
Events	•Identify events from date/time-stamps matching existing event’s Start Date

Places	•Identify existing places/ locations by their Name •Identify existing places/ locations by their Basic Encyclopedia (BE) number
Equipment	•Identify existing vehicles from licence plate numbers •Identify existing aircrafts against tail numbers •Identify existing vessels against pennant numbers

[58] Note: A basic function for identifying and marking BSOs already exists with the INTEL-FS Spiral 1 software. This implementation is using Elasticsearch for identifying BSOs. In Spiral 2 this function will have to be extended to find additional BSO types.

[FBE-55] The rule set for identifying existing BSOs shall be extendable and configurable through configurations (i.e. not requiring SW re-build).

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

[FBE-56] The dictionary matching shall implement Fuzzy Search techniques (like Levenshtein, SoundEx, and Metaphone) to be able to identify existing BSOs that are differently spelled in the report texts.

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

[FBE-57] The dictionary matching shall implement the NEAR search-operator (e.g. this will allow a person to be found even if the raw text introduces a new/ unknown middle name for a person).

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

3.1.8 ORBAT Management Service

[59] The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::ORBAT package.

3.1.8.1 API

[FBE-58] The ORBAT Management Service shall through the OData REST API support all IIE access actions on ORBATs (for an authorized client) including Basic Intel ORBAT - NATO::JISR::Staff::ORBAT package, Ballistic Missile ORBAT - NATO::JISR::Staff::ORBAT::BMORBAT package, and Electromagnetic ORBAT: NATO::JISR::Staff::ORBAT::EOBORBAT package.

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

[FBE-59] The ORBAT Management Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 28] and [US 29] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

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

[FBE-60] The ORBAT Management Service API shall support uploading of one or many attachments to an ORBAT.

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

[FBE-61] The ORBAT Management Service shall after a create, update or delete change to a ORBAT, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

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

3.1.9 Intel-FS Spiral 1 BSO Migration Service

[60] The purpose of this service is to migrate BSO and BSR data from INTEL-FS Spiral 1 into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.9.1 Extract, transform, load BSO data

[FBE-62] The INTEL-FS Spiral1 BSO Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new BSO/ BSR data. It shall be possible through a configurable filter setting to filter the BSOs/ BSRs that are extracted from INTEL-FS Spiral1.

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

[FBE-63] The INTEL-FS Spiral1 BSO Migration Service shall transform the extracted BSO/ BSR data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.

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

[FBE-64] The INTEL-FS Spiral1 BSO Migration Service shall identify associations to other IIEs in the extracted BSO/ BSR data and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

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

[FBE-65] The INTEL-FS Spiral1 BSO Migration Service shall through inspection of the extracted BSO/ BSR data identify ORBATs and transform the ORBAT data into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed ORBATs into the I2BE through the ORBAT Management Service.

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

[FBE-66] Using this ETL process, it shall be possible to migrate all BSO data and all ORBAT information, without any data loss, from INTEL-FS Spiral 1 into the I2BE.

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

3.1.10 ISR Organization Service

[61] The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::IRMCM::Organisation package.

3.1.10.1 API

[FBE-67] The ISR Organization Service shall through the OData REST API support all IIE access actions on ISR organizations (for an authorized client).

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

[FBE-68] The ISR Organization Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 58] through [US 61] and [US 63] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

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

[FBE-69] The ISR Organization Service shall after a create, update or delete change to any ISR organization data, post an event message to the SOA Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

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

3.1.11 Targets Service

[62] The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::Target package.

3.1.11.1 API

[FBE-70] The Target Service shall through the OData REST API support all IIE access actions on target data (for an authorized client).

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

[FBE-71] The Target Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 30], [US 31] and [US 32] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

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

[FBE-72] The Target Service API shall support uploading of one or many attachments to the target-related IIEs.

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

[FBE-73] The Targets Service shall after a create, update or delete change to target data, post an event message to the SOA & IdM Platform as a notification that a change

has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

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

[FBE-74] The Targets Service shall manage Candidate No-strike BSOs (as per [INTEL-FS2-InformationMode] NATO::JISR::Staff::Target).

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

3.1.12 Intel-FS Spiral 1 Target Data Migration Service

[63] The purpose of this service is to migrate target data from INTEL-FS Spiral 1 into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.12.1 Extract, transform, load target areas

[FBE-75] The INTEL-FS Spiral1 Target Data Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new target data. It shall be possible through a configurable filter setting to filter the target data that are extracted from INTEL-FS Spiral1.

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

[FBE-76] The INTEL-FS Spiral1 Target Data Migration Service shall transform the extracted target data into a format that is compliant with the OData REST API implemented by the Target Service and load the transformed target data into the I2BE through the Target Service.

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

[FBE-77] The INTEL-FS Spiral1 Target Data Migration Service shall identify associations to other IIEs in the extracted target data and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

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

[FBE-78] Using this ETL process, it shall be possible to migrate all target information, without any data loss, from INTEL-FS Spiral 1 into the I2BE.

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

3.1.13 Overlays Service

[64] The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Metadata package.

3.1.13.1 API

[FBE-79] The Overlays Service shall through the OData REST API support all IIE access actions on overlays (for an authorized client).

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

[FBE-80] The Overlays Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 34] and [US 35] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

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

[FBE-81] The Overlays Service shall after a create, update or delete change to an overlay, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

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

3.1.14 Intel-FS Spiral 1 Overlays Migration Service

[65] The purpose of this service is to migrate overlays from INTEL-FS Spiral 1 into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.14.1 Extract, transform, load overlays

[FBE-82] The INTEL-FS Spiral1 Overlays Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new overlays. It shall be possible through a configurable filter setting to filter the overlays that are extracted from INTEL-FS Spiral1.

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

[FBE-83] The INTEL-FS Spiral1 Overlays Migration Service shall transform the extracted overlays into a format that is compliant with the OData REST API implemented by the Overlay Service and load the transformed overlays into the I2BE through the Overlay Service.

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

[FBE-84] The INTEL-FS Spiral1 Overlays Migration Service shall identify associations to other IIEs in the extracted overlays and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

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

[FBE-85] Using this ETL process, it shall be possible to migrate all overlays, without any data loss, from INTEL-FS Spiral 1 into the I2BE.

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

3.1.15 Intelligence Requirements (IR) Management (IRM) Service

[66] The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::IRMCM::IRM package.

3.1.15.1 API

[FBE-86] The IRM Service shall through the OData REST API support all IIE access actions on IRM data (for an authorized client).

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

[FBE-87] The IRM Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 47], and [US 64] through [US 72] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

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

[FBE-88] The IRM Service shall after a create, update or delete change to IRM data, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

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

[FBE-89] The IRM Service API shall enable clients to manage a distributed RFI process (through the underlying choreography tasking message mechanism) that includes starting and stopping a request, forwarding the request to other ONs for action (or for information), etc.

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

3.1.16 Intel-FS Spiral 1 IRM Data Migration Service

[67] The purpose of this service is to migrate IRM data from INTEL-FS Spiral 1 into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.16.1 Extract, transform, load IRM data

[FBE-90] The INTEL-FS Spiral1 IRM Data Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new IRM data. It shall be possible through a configurable filter setting to filter the target data that are extracted from INTEL-FS Spiral1.

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

[FBE-91] The INTEL-FS Spiral1 IRM Data Migration Service shall transform the extracted IRM data into a format that is compliant with the OData REST API implemented by the IRM Service and load the transformed IRM data into the I2BE through the IRM Service.

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

[68] Note: The transform will have to map between the INTEL-FS Spiral 1 RFI request-response protocol information (including its RFI forwarding mechanism) and the INTEL-FS Spiral 2 information structures needed for managing the RFI requesting process (i.e. choreography tasking message “ledger” as defined by the [INTEL-FS2-IM]).

[FBE-92] The INTEL-FS Spiral1 IRM Data Migration Service shall identify associations to other IIEs in the extracted target data and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

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

[FBE-93] Using this ETL process, it shall be possible to migrate all IRM information (i.e. ICPs, indicators, RFIs, and RFI Responses), without any data loss, from INTEL-FS Spiral 1 into the I2BE.

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

3.1.17 Search Service

3.1.17.1 API

[FBE-94] The Search Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 8], [US 48], [US 49], and [US 50] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

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

[FBE-95] The Search Service shall expose its functionalities though a REST API.

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

[FBE-96] The Search Service shall have support for saving and managing (create, read, update, delete, rename) search criteria as named searches. The named searches can be private to the client (security principal) or public (available to all users).

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

[FBE-97] The Search Service shall constrain the search result set to match the policy for the particular client’s (security principal) privileges (i.e. the client shall never receive search results that he/ she is not authorized to access).

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

3.1.17.2 Searchable data

[FBE-98] The Search Service shall support searching against all metadata attributes and on all IIE types.

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

[FBE-99] The Search Service shall index and support full-text searches against all products files, all IIE attachments of textual type and all IIE metadata including inner objects and BSO status reports and choreography task messages (CTM).

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

[FBE-100] The Search Service shall support searches against soft-deleted data and IIEs in different workflow state (see PublishedStatusType in [INTEL-FS2-IM]).

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

[FBE-101] The Search Service shall never return search results for hard-deleted IIEs (this may require search re-indexing whenever an IIE is hard-deleted).

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

3.1.17.3 Search engine

[FBE-102] The Search Service shall support matching against strings as exact matches, and as pattern matches (using wildcards and a “LIKE operator”).

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

[FBE-103] The Search Service shall support fuzzy matches (e.g. using the Levenshtein distance, and/ or the Soundex algorithm, and/ or Metaphone algorithm).

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

[FBE-104] The Search Service shall support the NEAR (proximity) operator with client specified maximum distance between search tokens.

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

[FBE-105] The Search Service shall support logical operators (‘AND’, ‘OR’, ‘NOT’ including grouping of logical expressions using parenthesis).

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

[FBE-106] The Search Service shall support numerical equality test, greater than and smaller than tests, and timestamp tests (earlier than, within time window, later than).

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

[FBE-107] The Search Service shall have support for geospatial searches.

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

[FBE-108] The Search Service shall support geospatial coverage queries with standard geospatial primitives and operators including testing for a point being inside or outside an area (ellipse, rectangle, polygon, etc.)

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

[FBE-109] The Search Service shall support client applications in implementing facetted search based on classifications derived from the [INTEL-FS2-IM].

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

[69] From https://en.wikipedia.org/wiki/Faceted_search: Faceted search is a technique which involves augmenting traditional search techniques with a faceted navigation system, allowing users to narrow down search results by applying multiple filters based on faceted classification of the items

[FBE-110] The Search Service shall implement document clustering based on content of attachment and IIE metadata. The Search Engine shall have support for grouping the search results into different categories.

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

[70] From https://en.wikipedia.org/wiki/Document_clustering: Document clustering (or text clustering) is the application of cluster analysis to textual documents. It has applications in automatic document organization, topic extraction and fast information retrieval or filtering.

[FBE-111] The Search Service shall have support for synonym searches using configurable synonym rules (preferably using search-time synonym analysis).

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

[71] Synonym analysis can be done at index-time or at search-time. Analysis at index time have performance advantages, but will require re-indexing whenever the synonym rules are changed, and that is why search-time synonym analysis is believed to be the preferred option.

[FBE-112] The Search Service shall have support for returning search results as metadata and also text-snippets where the search token was found where the search token is tagged (to enable the client application to highlight the token in context of the document fragment it was found).

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

3.1.18 Named Collections Service

3.1.18.1 API

[FBE-113] The Named Collections Service shall through the OData REST API enable clients to group IIEs together as named collections where such named collections can be created, updated, and deleted (as required by for instance the user story [US 58]).

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

[FBE-114] The Named Collections Service shall have support private named collections and shared public collections.

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

3.1.19 Notification Service

3.1.19.1 API

[FBE-115] The Notification Service shall implement server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 9], [US 12], and [US 14] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

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

[FBE-116] The Notification Service shall enable clients to register subscriptions in the form of a search criteria with the identification of the subscriber, a subscription channel/ queue on the SOA & IdM Platform, and a subscription identifier/ tag. The Notification Service shall dynamically detect when the search criteria is fulfilled, and send the search result on the specified subscription channel with the subscription identifier/ tag and the subscriber identification.

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

[FBE-117] The Notification Service shall enable clients to register subscriptions in the form of a search criteria with the identification of the subscriber, an email address, and a subscription identifier/ tag. The Notification Service shall dynamically detect when the search criteria is fulfilled, and send the search result by email to the specified recipient with the subscription identifier/ tag.

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

[FBE-118] The Notification Service shall enable clients to delete/ de-register subscriptions.

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

[FBE-119] The Notification Service shall include a broadcast message function enabling (authorized) clients to push broadcast messages to all clients of the I2BE.

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

[72] The broadcast function can be used by the i2BE System Administrator to inform users of planned outages etc.

3.2 Backend services - Phase 2

3.2.1 I2BE to I2BE Synchronization Service

[73] For availability and resilience reasons, it might be required to run multiple instances of the I2BE deployed to geographically dispersed data centres. In such scenarios, the multiple I2BE instances need to be synchronized so the same information/ content is available in all instances.

[74] The synchronization may take place over SATCOM links and in these cases the synchronization software needs to be able to handle TCP communication with high latency (long round-trip delay times).

[75] The synchronization between I2BE instances will also have to have support for air-gapped export/ import (for instance to move data between different network security domains).

3.2.1.1 General synchronization requirements

[FBE-120] The I2BE to I2BE Synchronization Service shall exchange data between I2BE instances so that each I2BE instance has the same replica.

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

[FBE-121] It shall be possible, through configuration settings, to filter the type of data to be synchronized between I2BE instances (by IIE type, releasability/ dissemination constraints, location and time of information, etc.) and it shall be possible to constrain product files and attachment files that can be synchronized (typically by defining a maximum file size).

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

[FBE-122] The I2BE to I2BE Synchronization Service shall implement checks preventing circular replication situations (avoiding using unnecessary bandwidth), and it shall prevent creating duplicate entries in the repositories.

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

[FBE-123] The I2BE to I2BE Synchronization Service shall log information about data transferred between I2BE instances enabling full audit trail of dissemination of I2BE data.

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

3.2.1.2 Direct synchronization

[FBE-124] The I2BE to I2BE Synchronization Service shall support different synchronization configurations including point-to-point, one-to many, many-to-one, many-to-many transfers.

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

[FBE-125] The synchronization service shall work over high-speed/ low-latency networks as well as over high latency SATCOM links where the latter may need special Transmission Control Protocol (TCP) tuning.

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

[FBE-126] The I2BE to I2BE Synchronization Service shall be able to handle cases where one of the I2BE instances is offline for a long period of time. The synchronization function shall identify the correct resume-point so that synchronicity can be achieved once the offline I2BE comes online. An example of a paused/ resumed synchronization could be when an I2BE instance is running on a ship with no network connection.

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

3.2.1.3 Air-gapped synchronization

[FBE-127] The I2BE to I2BE Synchronization Service shall support air-gapped import/ export through configurable export “drop point” and import “pull point”. The exporting I2BE shall in this case keep track of what has previously been exported to the receiving I2BE such that each incremental export only contains previously un-exported data.

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

[FBE-128] The data that is exchanged through the synchronization shall be wrapped in an “electronic envelope” that contains metadata on the data set to be synchronized. The envelop metadata attributes shall include the highest security classification and the most restrictive releasabilty constraint of the data within the data set.

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

3.2.2 Presentation-conditioning Service

3.2.2.1 API

[FBE-129] The Presentation-conditioning Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 51] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

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

[FBE-130] The Presentation-conditioning Service shall implement a function that - upon a client request - extracts the images and the associated metadata from STANAG 4545 files and return to the client the images in a browser-supported format (e.g. JPEG) and all the image metadata (in XML format). This functionality shall be available through a REST API.

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

[FBE-131] The Presentation-conditioning Service shall include (see Note below) a video conditioning service that implements Dynamic Adaptive Streaming over HTTP (DASH), i.e. MPEG-DASH (ISO/IEC 23009-1:2012) for streaming video and STANAG 4609 metadata to web browser client applications.

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

[76] Note: The software for this functionality will be provided as Purchaser Furnished Item (PFI) source code and the work will be to include and adapt this PFI to run within the Presentation-conditioning Service. The PFI source code could possible also be used in support of [FBE-31].

3.2.3 Data Analytics Service

3.2.3.1 API

[FBE-132] The Data Analytics Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 53], [US 54], [US

56] and [US 57] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

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

[FBE-133] The Data Analytics Service shall expose its functionalities though a REST API.

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

[FBE-134] The Data Analytics Service shall support common graph analytic functions by exposing a graph query language (preferably compliant with the emerging Graph Query Language (GQL) standard) through the REST API.

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

[FBE-135] The Data Analytics Service shall have support for saving and managing (create, read, update, delete, rename) graph query criteria as named queries. The named graph queries can be private to the client (security principal) or public (available to all users).

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

[FBE-136] The Data Analytics Service shall have support for saving and managing (create, read, update, delete, rename) specific analysis and the analysis results in containers file (e.g. zip file). The analysis file shall be able to store the queries and filters applied to the I2BE repository to define and constrain the data set to be used for the analysis, miscellaneous text segments/ reports (e.g. as Microsoft Word file) describing analysis findings, images/ screenshots, and other client requested files (e.g. layout information for analysis views). The analysis files shall be private to the client (security principal).

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

[FBE-137] The Data Analytics Service shall constrain the graph query result set to match the client's (security principal) privileges (e.g. the client shall never receive a graph query results that he/ she is not authorized for).

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

3.2.3.2 Data analytics

[FBE-138] The Data Analytics Service shall have support for synonym searches using configurable synonym rules.

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

[FBE-139] The Data Analytics Service shall include centrality function, for a specified set of nodes (IIEs), to support calculation of Betweeness Centrality, Closeness Centrality, Degree Centrality, and Eigenvector Centrality.

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

[FBE-140] The Data Analytics Service shall include a shortest path function that for two nodes (IIEs) calculate the shortest path between them.

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

[FBE-141] The Data Analytics Service shall include a nodes similarity function that compares a set of nodes based on the nodes they are connected to (i.e. two nodes are considered similar if they share many of the same neighbours).

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

[FBE-142] The Data Analytics Service shall include a function for generating geo-referenced heat maps in a common format (e.g. in KML). The heat maps generation shall be possible for any IIE type with temporal and spatial attributes. Two types of heat maps shall be supported: frequency-based and concentration-based.

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

[FBE-143] The Data Analytics Service shall have support for calculating intersections between one or many nodes and one or many Geospatial and Features and report whether nodes are inside or outside the specified areas. Supported area types shall include circles/ ellipse, rectangles, and polygons.

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

3.2.4 Collection Requirement (CR) Management (CRM) Service

[77] The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::IRMCM::CM:CRM package.

3.2.4.1 API

[FBE-144] The CRM Service shall through the OData REST API support all IIE access actions on CRM data (for an authorized client).

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

[FBE-145] The CRM Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 47], and [US 74] through [US 79] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

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

[FBE-146] The CRM Service shall after a create, update or delete change to CRM data, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

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

[FBE-147] The CRM Service API shall enable clients to manage a distributed CR requesting process (through the underlying choreography tasking message mechanism) that

includes submitting and stopping a request, forwarding the request to other ONs for action (or for information), etc.

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

3.2.4.2 Priority scheme calculation

[FBE-148] The CRM Service shall calculate the requirement ranking and scores for a set of CRs based on the chosen prioritization scheme. The ranking and score shall be available for clients through the OData client API.

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

3.2.4.3 Transformation of CRs to NVG

[FBE-149] The CRM Services shall, upon a client request, transform a set of client specified CRs, transform the set of CRs with all relevant attributes to the [NVG] format and return the transformed data as a [NVG] file to the client.

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

3.2.5 Collection Operations Management (COM) Service

[78] The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::IRMCM::CM:COM package.

3.2.5.1 API

[FBE-150] The COM Service shall through the OData REST API support all IIE access actions on COM data (for an authorized client).

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

[FBE-151] The COM Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 82] through [US 87] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

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

[FBE-152] The COM Service shall after a create, update or delete change to COM data, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

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

[FBE-153] The COM Service API shall enable clients to manage a distributed COM tasking process (through the underlying choreography tasking message mechanism).

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

3.2.6 JIPOE Service

[79] The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::JIPOE package and in the NATO::BMD::Staff::JIPOE package.

3.2.6.1 API

[FBE-154] The JIPOE Service shall through the OData REST API support all access actions on JIPOE-type IIEs (for an authorized client).

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

[FBE-155] The JIPOE Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US-36] through [US-46] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

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

[FBE-156] The JIPOE Service shall after a create, update or delete change to any JIPOE-type IIE, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

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

[FBE-157] The JIPOE services shall provide a service for creating and managing (update and delete) named multi-criteria comparison rule sets.

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

3.2.7 Terrain & Mobility Analysis Service

[80] Note: Within this section the Terrain & Mobility Analysis Service is, for readability, generally referred to simply as “the Service”.

3.2.7.1 Generating terrain & mobility analysis overlays

[FBE-158] The Terrain & Mobility Analysis Service shall implement a Terrain Analysis function that upon a client request generates one or several overlays that depicts the areas where BM Units can reach and from which BM Units can operate. The service shall use the input parameters as defined in the table below and matching against geographical data calculate the possible operational areas (e.g. by greying out the no-go areas).

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

Table 3-2 Parameters provided by client when requesting a Terrain Analysis

Input Parameter	Remarks
Coverage area	Geographical area defined by a BMOA to constrain the analysis
Vehicle weights, heights, and widths	Maximum vehicle weights, heights, and widths from BM TECHINT to be matched against road network constraints (e.g. bridges, tunnels, small roads, etc.)

Vehicle turning radius	
Vehicle off-road ability/ Land use	This should include information on type of terrain where the vehicles can go off-road (e.g. sand, snow, wetland, etc.)
Maximum off-road distance	E.g. measured in kilometers
Slope limitations (degrees)	Maximum slope the vehicles can travel from BM TECHINT to be matched against road network data and terrain elevation data (in case the vehicles can go off-road)

[81] A Mobility Analysis is a variant of the Terrain Analysis and will most likely involve similar calculations, but taking into account the relocation speed of the vehicle. The difference is that while the Terrain Analysis focus on where a BM Unit can travel (typically within a BMOA), the focus of the Mobility Analysis is to detect how far a BM unit can travel as a function of time.

[FBE-159] The Service shall implement a Mobility Analysis function that upon a client request generates one or several overlays that depicts how far the BM Units can reach for a set of time intervals (e.g. within 1 hour, within 1 day, within a week etc.) as illustrated in the figure below (in this example the ranges are in minutes). The function shall use the input parameters as defined in the table below and matching against geographical data calculate the mobility ranges. The coloured range areas shall only depict areas that is accessible by the vehicles from the starting position (e.g. if a bridge is not dimensioned to support the vehicles, the mobility analysis shall show that the vehicles cannot cross the bridge).

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

Figure 3-1 Terrain and Mobility analysis with ranges

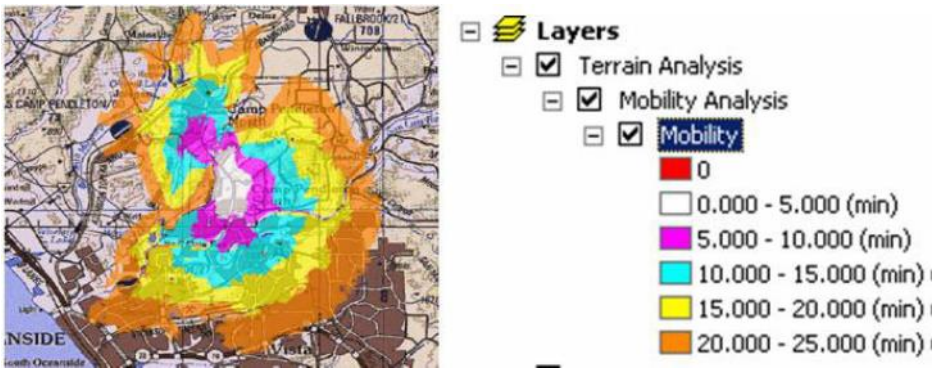

Table 3-3 Parameters provided by client when requesting a Mobility Analysis

Input Parameter	Remarks
Start position	Geographical location from which the BM Unit will start the movement
Time increments	In unit and extent (e.g. in 5 hour increments)
Vehicle relocation speed on roads	Average/ expected road speed of vehicle from BM TECHINT
Vehicle relocation speed off roads	Average/ expected off-road speed
Vehicle weights,	Maximum vehicle weights, heights, and widths from BM TECHINT

heights, and widths	to be matched against road network constraints (e.g. bridges, tunnels, small roads, etc.)
Vehicle off-road ability/ Land use	This should include information on type of terrain where the vehicles can go off-road (e.g. sand, snow, wetland, etc.)
Maximum off-road distance	E.g. measured in kilometers
Slope limitations (degrees)	Maximum slope the vehicles can travel from BM TECHINT to be matched against road network data and terrain elevation data (in case the vehicles can go off-road)

[FBE-160] The Service shall be implemented as OGC Web Processing Services (WPS).
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[82] Note: The Terrain Analysis WPS and the Mobility Analysis WPS should be implemented for being hosted within the NATO CoreGIS system

[FBE-161] The JIPOE services shall support collaboration on Courses of Action artefacts prior to these being approved and published.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

3.3 System Administration (SysAdm) tool

[83] For the operations and maintenance of the I2BE a System Administration (SysAdm) tool will be required.

[84] The SysAdm tool can include off-the-shelf and/ or customized applications with dedicated user interfaces for the administration tasks, and/ or include a number command line applications/ scripts.

[85] Note: In the current INTEL-FS Spiral 1, the usage of PowerShell scripts is often the preferred way to efficiently execute system administration/ maintenance tasks.

[GBE-81] The SysAdm tool shall be using English as language for all user interaction.
Verification: Demonstration

[GBE-82] The SysAdm tool shall comply with the NFRs as defined in the table below.
Verification: Demonstration

Table 3-4 Applicable NFRs (SysAdm tool)

Qualities	NFRs
Co-existence	[NFR-13]

3.3.1 Configurations and setup management functions

3.3.1.1 Manage data repositories

[FBE-162] The SysAdm tool shall enable an Authorized Administrator to create many data repositories where each repository is identified by a name (e.g., 'Exercise XYZ')).
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FBE-163] The SysAdm tool shall enable an Authorized Administrator to archive a data repository, be able to restore a previously archived data repository (without any data loss or data alteration), and be able to delete a data repository.

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

3.3.1.2 Manage organizational nodes (ON)

[FBE-164] The SysAdm tool shall enable an Authorized Administrator to create ONs and to configure the ON Zulu offset to ensure that timestamps are correctly captured at the ON.

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

[86] The Zulu Offset will be used as required to compute the correct Zulu time (i.e., Greenwich Mean Time) from local time settings and to display the correct local time (as required) computed from the Zulu times recorded in the data.

3.3.1.3 Manage report templates

[FBE-165] The SysAdm tool shall enable an Authorized Administrator to create and update report templates to provide users with templates for producing reports.

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

[FBE-166] The SysAdm tool shall enable an Authorized Administrator to create, update, delete, and name global search criteria that will be accessible to users to use for their searches.

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

3.3.1.4 Manage synonym rules

[FBE-167] The SysAdm tool shall enable an Authorized Administrator to update synonym rules used for searching and graph querying.

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

3.3.1.5 Manage gazetteers

[FBE-168] The SysAdm tool shall enable an Authorized Administrator to add or delete a gazetteer for an ON, and to specify the default gazetteer for the ON.

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

[FBE-169] The SysAdm tool shall enable an Authorized Administrator to create, edit and maintain gazetteer information, including maintaining gazetteer entries (i.e. Place Name, Country, Region, Sub-region, Location).

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

[FBE-170] The SysAdm tool shall enable an Authorized Administrator to import a gazetteer from a file.

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

[FBE-171] The SysAdm tool shall enable an Authorized Administrator to configure the I2BE to use gazetteer with fictitious nation data sets, including fictitious country names and fictitious country codes.

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

3.3.2 Domain-values management functions

[87] Note: The different ONs will have different needs for domain values and hence the domain value set is customized for each ON.

3.3.2.1 Create/ update domain values

[FBE-172] The SysAdm tool shall enable an Authorized Administrator to centrally manage domain tables and domain values for all ONs. This includes the ability to create new domain values, and configuring which domain values that shall be hidden/ unhidden for individual ONs. Note: The latter part shall ensure that the acceptance criteria of user story [US 5] is fulfilled.

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

[FBE-173] The SysAdm tool shall enable an Authorized Administrator to view all domain values in table views where the hidden/ unhidden state of each value for each of the ONs are displayed. The Authorized Administrator shall be able to sort and filter these table views, and be able to make changes to one or many values in the table in a single operation.

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

[FBE-174] The SysAdm tool shall enable an Authorized Administrator or Authorized Reference Data Manager to search for and filter domain values to ease the maintenance work (find and update).

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

3.3.2.2 Import/ export of domain values

[FBE-175] The SysAdm tool shall enable an Authorized Administrator to import domain values from files in a structured file format and export domain values to files in structured file formats.

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

3.3.2.3 Synchronization with Information Model

[FBE-176] The SysAdm tool shall have support for synchronizing updates to the domain tables and domain values with the Information Model (see [INTEL-FS2-IM]).

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

3.3.3 Content management functions

3.3.3.1 Import from files

[FBE-177] The SysAdm tool shall enable an Authorized Administrator to import an ORBAT (e.g. an ISR ORBAT) consisting of Actors and Assets/ Systems with subordination information from a set of comma separated files (CSV), XML or JSON, into a specified data set (Operational Exercise, Training, etc.). The tool shall allow the System Administrator to map columns in the files to the appropriate IIE attribute and automatically extract the BSOs representing Units, the Assets/ Systems, and extract the relationships between the BSOs. Ultimately, the tool shall allow the System Administrator to verify that there is no conflict with the information already in the I2BE data set and subsequently "bulk import" the entire ORBAT and associated Units and Assets/ Systems. In case the validation of the data prior to import finds issue with the data, then the issues shall be identified and reported to the System Administrator to enable corrective actions.

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

[FBE-178] The SysAdm tool shall enable an Authorized Administrator to import BSO data, including relationships between the BSOs, and all BSRs associated with the BSOs from files in a structured data format into a specified data set (Operational Exercise, Training, etc.) The tool shall allow the System Administrator to map elements in the files to the appropriate IIE attribute and automatically extract the BSOs, their BSRs, and the relationships between the BSOs. Ultimately, the tool shall allow the System Administrator to verify that there is no conflict with the information already in the I2BE data set and subsequently "bulk import" all the BSOs with BSRs and also BSO-BSO relationships. In case the validation of the data prior to import finds issue with the data, then the issues shall be identified and reported to the System Administrator to enable corrective actions.

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

[FBE-179] The SysAdm tool shall enable an Authorized Administrator to import Products from comma separated files (CSV), XML or JSON, into a specified data set (Operational Exercise, Training, etc.). The tool shall allow the System Administrator to map columns in the files to the appropriate IIE attribute and automatically extract the Product. Ultimately the tool shall allow the System Administrator to verify that there is no conflict with the information already in the I2BE data set and subsequently "bulk import" a potentially large set of Products where also the Product attachments are fetched and pushed into the I2BE data set. In case the validation of the data prior to import finds issue with the data, then the issues shall be identified and reported to the System Administrator to enable corrective actions.

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

[FBE-180] The SysAdm tool shall include an “undo function” that restores the data repository to the state before the bulk upload was executed (i.e. completely removes all the bulk-uploaded items).

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

3.3.3.2 Delete and undelete

[FBE-181] The SysAdm tool shall enable an Authorized Administrator to search and filter for soft-deleted entities, and then multi-select and hard-delete (permanently delete) such soft-deleted entities.

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

3.3.3.3 Backup & restore

[FBE-182] The SysAdm tool shall enable an Authorized Administrator to configure automatic backup of the entirety of an I2BE instance. It shall be possible to configure the frequency of and/ or time of day incremental backups and full backups.

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

[FBE-183] The SysAdm tool shall enable an Authorized Administrator to manually command an incremental backup, and to manually command a full backup.

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

[FBE-184] The SysAdm tool shall enable an Authorized Administrator to fully restore an I2BE instance from backups.

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

3.3.4 Diagnostics functions

3.3.4.1 Log files

[FBE-185] The SysAdm tool shall enable an Authorized Administrator to access log created by all I2BE produced Integration Services. (Note: This is particularly important for the audit trail checks of cross domain exchange between I2BE instances).

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

[FBE-186] The SysAdm tool shall enable the System Administrator to access and inspect/ analyse log data from all the I2BE services.

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

[FBE-187] The SysAdm tool shall enable an Authorized Administrator to configure the services logging functions (e.g. logging level, log file sizes, log file retention, etc.)

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

[FBE-188] The SysAdm tool shall enable an Authorized Administrator to archive log files from each of the I2BE services and I2BE provided Integration Services.

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

3.3.4.2 Usage and performance indicators statistics

[FBE-189] The SysAdm tool shall enable an Authorized Administrator to analyse the usage of the I2BE services OData API by accessing usage statistics; e.g. which part of the API is heavily used, which parts are not used much, usage peaks, average number of activation calls, historical trends, etc. The statistical numbers must be separable by access operations (Create, Read, Update, and Delete) and by ONs.

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

[FBE-190] The SysAdm tool shall enable an Authorized Administrator to analyse the performance of the individual I2BE services. In particular, statistical data measuring the I2BE compliance with the NFR response time requirements shall be available for analysis through the SysAdm tool.

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

[FBE-191] The SysAdm tool shall enable an Authorized Administrator to specify relevant performance thresholds/ criteria for the services. I.e. thresholds that triggers corrective actions through the Enterprise SMC.

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

3.3.4.3 Synchronization health check

[FBE-192] The SysAdm tool shall enable an Authorized Administrator to select any two I2BE instances and perform repository comparisons. It shall be possible check the entire repositories, and it shall be possible with more focussed comparisons limited by IIE type, time window, and other IIE filtering attributes. Any discrepancies in these checks shall be reported by the tool including the option to repair the discrepancy.

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

3.3.5 Notification function

3.3.5.1 Broadcasting notification messages

[FBE-193] The SysAdm tool shall enable an Authorized Administrator to write messages (intended to be read by users) and broadcast them using the I2BE Notification Service.

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

4 Integration Service Requirements

4.1 Integration services - I2BE destination

[88] The focus of the deliverables described in this section is to implement a number of dedicated Integration Services for bringing information into I2BE.

4.1.1 Central Card Catalogue (CCC) Import Service

[89] The CCC is the mechanism by which the BICES nations are sharing intelligence data. Basically the CCC is a File Transfer Protocol (FTP) server that is exchanging library cards in the [IPIWG] format where the library cards are describing the intelligence products.

4.1.1.1 Extract, transform, load products

[FBE-194] The CCC Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the CCC for new products (i.e. product metadata, product file, and other attachments). It shall be possible through a configurable filter setting to filter the products that are extracted from the CCC.

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

[FBE-195] The CCC Import Service shall transform the extracted product metadata into a format that is compliant with the OData REST API implemented by the Products Management Service and load the products (i.e. the metadata, the product file, and any attachments) into the I2BE through the Products Management Service.

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

[FBE-196] The CCC Import Service shall identify associations the extracted products are part of, collect additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

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

4.1.1.2 Extract, transform, load RFI data

[FBE-197] The CCC Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the CCC for new RFI data. It shall be possible through a configurable filter setting to filter the RFI data that are extracted from CCC.

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

[FBE-198] The CCC Import Service shall transform the extracted RFI data into a format that is compliant with the OData REST API implemented by the IRM Service and load the transformed RFI data into the I2BE through the IRM Service.

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

[FBE-199] The Import Service shall identify associations the extracted RFI data are part of, collect additional information on these associations, and transform those

associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

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

4.1.2 ETEE Import Service

[90] In support of exercises the Education Training Exercise and Evaluation (ETEE) will at scripted times in the exercise provide products to be ingested into INTEL-FS. The expected mechanism for INTEL-FS to receive messages with pre-canned (prepared in advance) products will be through the SOA & IdM Platform.

4.1.2.1 Extract, transform, load products from ETEE

[FBE-200] The ETEE Import Service shall when receiving a ETEE message (dedicated for INTEL-FS), transform (if required) the information in the message into a format that is compliant with the OData REST API implemented by the Products Management Service and load the transformed products into the I2BE through the Products Management Service.

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

4.1.3 NATO CSD IPL Import Service

[91] The NATO CSD ISR Product Library (IPL) will contain product type data of type documents/ reports, images, and video clips. The interfaces to the NATO CSD IPL are defined by [AEDP-17].

4.1.3.1 Extract, transform, load products

[FBE-201] The NATO CSD IPL Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the NATO CSD IPL for products or product updates that are not already in the I2BE. It shall be possible through a configurable filter setting to filter the products to be extracted from NATO CSD IPL. Note: in this context ‘product’ means the product metadata, product file, and all attachments (e.g. related files).

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

[FBE-202] The NATO CSD IPL Import Service shall transform the extracted product metadata into a format that is compliant with the OData REST API implemented by the Products Management Service and load the products (i.e. the metadata, the product file, and any attachments) into the I2BE through the Products Management Service.

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

[FBE-203] The NATO CSD IPL Import Service shall identify associations the extracted products are part of, collect additional information on these associations, and transform those associations into a format that is compliant with the OData REST

API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

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

4.1.4 NATO CSD Geospatial and Features Import Service

[92] The purpose of this service is to import Geospatial and Features from the NATO CSD into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

4.1.4.1 Extract, transform, load geographical areas

[93] The NATO CSD implements an OData REST API for accessing its entities. This API (called the JIEService) is described in appendix A.2.1.9 in [NCSD-IWS-SDS].

[FBE-204] The NATO CSD Geospatial and Features Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD Geospatial and Features Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.

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

[FBE-205] The NATO CSD Geospatial and Features Import Service shall be able to extract Geospatial and Features from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).

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

[FBE-206] The NATO CSD Geospatial and Features Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for changes to geographic areas of interest (GAOI) in the NATO CSD and upon detecting a GAOI changes, extract the Geospatial and Features from the NATO CSD.

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

[FBE-207] It shall be possible through a configurable filter setting, to filter the geographic areas that shall be extracted from NATO CSD. The service shall be able to detect Geospatial and Features updates originating from the I2BE and not import those (to prevent export-import loops).

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

[FBE-208] The NATO CSD Geospatial and Features Import Service shall transform the extracted geographic areas into a format that is compliant with the OData REST API implemented by the Geospatial and Features Service and load the transformed Geospatial and Features into the I2BE through the Geospatial and Features Service.

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

[FBE-209] The NATO CSD Geospatial and Features Service shall identify associations the extracted geographic areas are part of, extract additional information on these

associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

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

4.1.5 NATO CSD ISR Organizations Import Service

[94] The purpose of this service is to import ISR organization from the NATO CSD into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

4.1.5.1 Extract, transform, load ISR organizations

[95] The NATO CSD implements an OData REST API for accessing its entities. This API is described in appendix A.2.1.9 in [NCSD-IWS-SDS].

[FBE-210] The NATO CSD Organizations Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD Organizations Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.

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

[FBE-211] The NATO CSD ISR Organizations Import Service shall be able to extract ISR organization data from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).

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

[FBE-212] The NATO CSD ISR Organizations Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for changes to ISR organizations in the NATO CSD and upon detecting ISR organization changes, extract the ISR organization data from the NATO CSD.

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

[FBE-213] It shall be possible through a configurable filter setting, to filter the ISR organizations that shall be extracted from NATO CSD. The service shall be able to detect ISR organization data updates originating from the I2BE and not import that data (to prevent export-import loops).

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

[FBE-214] The NATO CSD ISR Organizations Import Service shall transform the extracted ISR organization data (with all its substructures including ORBAT, units, ISR systems, ISR asset status, command relationships, and locations) into a format that is compliant with the OData REST API implemented by the ISR Organizations Service and load the transformed ISR organization data into the I2BE through the ISR Organizations Service.

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

[FBE-215] The NATO CSD ISR Organizations Import Service shall identify associations the extracted ISR organization data are part of, extract additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

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

4.1.6 NATO CSD IRM Data Import Service

[96] The purpose of this service is to import IRM data from the NATO CSD into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

4.1.6.1 Extract, transform, load IRM data

[97] The NATO CSD implements an OData REST API for accessing its entities. This API is described in appendix A.2.1.9 in [NCSD-IWS-SDS].

[FBE-216] The NATO CSD IRM Data Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD IRM Data Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.

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

[FBE-217] The NATO CSD IRM Import Service shall be able to extract IRM data (ICP, RFIs, RFI choreography tasking information, and products associated with requirements and RFIs) from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).

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

[FBE-218] The NATO CSD IRM Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for all types of changes to IRM data in the NATO CSD and upon detecting IRM data changes, extract the IRM data from the NATO CSD.

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

[FBE-219] It shall be possible through a configurable filter setting, to filter the IRM data that shall be extracted from NATO CSD. The service shall be able to detect IRM data updates originating from the I2BE and not import that data (to prevent export-import loops).

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

[FBE-220] The NATO CSD IRM Import Service shall transform the extracted IRM data into a format that is compliant with the OData REST API implemented by the IRM Service and load the transformed IRM data into the I2BE through the IRM Service.

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

[FBE-221] The NATO CSD IRM Import Service shall identify associations the extracted IRM data are part of, extract additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

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

4.1.7 NATO CSD CRM Data Import Service

4.1.7.1 Extract, transform, load CRM data

[98] The NATO CSD implements an OData REST API for accessing its entities. This API is described in appendix A.2.1.9 in [NCSD-IWS-SDS].

[FBE-222] The NATO CSD CRM Data Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD CRM Data Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.

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

[FBE-223] The NATO CSD CRM Import Service shall be able to extract CRM data (CRs, ISR Requests, and ISR Request choreography tasking information) from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).

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

[FBE-224] The NATO CSD CRM Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for all types of changes to CRM data in the NATO CSD and upon detecting CRM data changes, extract the CRM data from the NATO CSD.

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

[FBE-225] It shall be possible through a configurable filter setting, to filter the CRM data that shall be extracted from NATO CSD. The service shall be able to detect CRM data updates originating from the I2BE and not import that data (to prevent export-import loops).

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

[FBE-226] The NATO CSD CRM Import Service shall transform the extracted CRM data into a format that is compliant with the OData REST API implemented by the CRM Service and load the transformed CRM data into the I2BE through the CRM Service.

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

[FBE-227] The NATO CSD CRM Import Service shall identify associations the extracted CRM data are part of, extract additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

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

4.1.8 NATO CSD COM Data Import Service

4.1.8.1 Extract, transform, load COM data

[99] The NATO CSD implements an OData REST API for accessing its entities. This API is described in appendix A.2.1.9 in [NCSD-IWS-SDS].

[FBE-228] The NATO CSD COM Data Import shall be configurable so that it can be connected to multiple NATO CSD servers where each NATO CSD server contains a specific data set representing either OPERATIONAL, EXERCISE, or TRAINING data. Through the ETL process the NATO CSD COM Data Import Service shall load the transformed NATO CSD data into the corresponding data set {OPERATIONAL, EXERCISE, or TRAINING} in the I2BE.

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

[FBE-229] The NATO CSD COM Import Service shall be able to extract COM data (CXPs, collection tasks, exploitation tasks, and the choreography tasking information) from the NATO CSD by polling the NATO CSD at regular intervals (where the interval frequency shall be configurable).

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

[FBE-230] The NATO CSD COM Import Service shall implement WS-Notification (see [AI 06.02.08] and [AI 06.02.10]) subscriptions for all types of changes to COM data in the NATO CSD and upon detecting COM data changes, extract the COM data from the NATO CSD.

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

[FBE-231] It shall be possible through a configurable filter setting, to filter the COM data that shall be extracted from NATO CSD. The service shall be able to detect COM data updates originating from the I2BE and not import that data (to prevent export-import loops).

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

[FBE-232] The NATO CSD COM Import Service shall transform the extracted COM data into a format that is compliant with the OData REST API implemented by the COM Service and load the transformed COM data into the I2BE through the COM Service.

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

[FBE-233] The NATO CSD COM Import Service shall identify associations the extracted COM data are part of, extract additional information on these associations, and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

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

4.1.9 APP11-D Reports Import Service

4.1.9.1 Extract, transform, load APP11-D reports

[FBE-234] The APP11-D Reports Import Service shall be able to receive/ obtain the set of ADatP-3 messages in APP11-D XML format defined in the table below as messages from the SOA & IdM Platform.

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

Table 4-1 ADatP-3 messages (in APP11-D XML format) to be received

Message	Description	XML message format definition
AEW_MISREP	Airborne Early Warning Mission Report	[APP11D-AEW_MISREP]
AIRINTREP	Air Intelligence Report	[APP11D-AIRINTREP]
ASSESSREP	Commanders Assessment Report	[APP11D-ASSESSREP]
BOMBWARN	Bomb Threat Warning	[APP11D-BOMBWARN]
CIINTREP	Counter-Intelligence and Security Report	[APP11D-CIINTREP]
CIINTSUM	Counter-Intelligence and Security Summary	[APP11D-CIINTSUM]
CISUPINTREP	Counter-Intelligence and Security Supplementary Report	[APP11D-CISUPINTREP]
ENSITREP	Enemy Land Forces Situation Report	[APP11D-ENSITREP]
EVENTREP	Events Report	[APP11D-EVENTREP]
FIRST_HOSTILE_ACT	First Hostile Act Report	[APP11D-FHOSTILEACT]
INCREP	Incident Report	[APP11D-INCREP]
INCSPOTREP	Incident Spot Report	[APP11D-INCSPOTREP]
INTREP	Intelligence Report	[APP11D-INTREP]
INTSUM	Intelligence Summary	[APP11D-INTSUM]
MARINTREP	Maritime Intelligence Report	[APP11D-MARINTREP]

MARINTSUM	Maritime Intelligence Summary	[APP11D-MARINTSUM]
MISREP	Mission Report	[APP11D-MISREP]
OWNSITREP	Own Land Forces Situation Report	[APP11D-OWNSITREP]
PWINTERREP	Prisoner of War Interrogation Report	[APP11D-PWINTERREP]
SUPINTREP	Supplementary Intelligence Report	[APP11D-SUPINTREP]

[100] As INTEL-FS will be one of the first NATO applications that will be hosted on the SOA & IdM Platform there most likely initially will not be any producers of ADatP-3 APP11-D report messages on the SOA & IdM Platform. To enable testing of the APP11-D Reports Import Services, it will be necessary to implement test functions that produces the ADatP-3 messages as defined in the table above.

[101] For each of the received APP11-D messages the service will transform the message into a readable report in a PDF file. To make these generated report documents intelligible the XML tags in the reports should be used as contextual labels in the report documents, e.g. <CountryCode>USA</CountryCode> in the message should be presented as “Country Code: USA”, etc. in the report PDF file.

4.1.9.1.1 AEW_MISREP

[FBE-235] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-AEW_MISREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-236] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-AEW_MISREP] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.2 AIRINTREP

[FBE-237] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-AIRINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-238] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-AIRINTREP] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.3 ASSESSREP

[FBE-239] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-ASSESSREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-240] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-ASSESSREP] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.4 BOMBWARN

[FBE-241] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-BOMBWARN] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-242] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-BOMBWARN] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.5 CIINTREP

[FBE-243] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-CIINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in

the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-244] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-CIINTREP] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.6 CIINTSUM

[FBE-245] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-CIINTSUM] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-246] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-CIINTSUM] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.7 CISUPINTREP

[FBE-247] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-CISUPINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-248] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-CISUPINTREP] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.8 DIR

[FBE-249] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-DIR] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant

with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-250] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-DIR] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.9 ENSITREP

[FBE-251] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-ENSITREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-252] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-ENSITREP] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.10 EVENTREP

[FBE-253] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-EVENTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-254] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-EVENTREP] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.11 FIRST_HOSTILE_ACT

[FBE-255] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-FHOSTILEACT] message into a readable PDF file, and also map/

transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-256] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-FHOSTILEACT] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.12 INCREP

[FBE-257] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-INCREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-258] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-INCREP] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.13 INCSPOTREP Transform and Re-publish Integration Service

[FBE-259] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-INCSPOTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-260] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-INCSPOTREP] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.14 INTREP

[FBE-261] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-INTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-262] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-INTREP] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.15 INTSUM

[FBE-263] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-INTSUM] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-264] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-INTSUM] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.16 MARINTREP

[FBE-265] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-MARINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-266] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-MARINTREP] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.17 MARINTSUM

[FBE-267] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-MARINTSUM] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-268] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-MARINTSUM] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.18 MISREP

[FBE-269] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-MISREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-270] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-MISREP] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.19 OWNSITREP

[FBE-271] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-OWNSITREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently

load the transformed message into the I2BE through the Products Management Service.

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

[FBE-272] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-OWNSITREP] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.20 PWINTERREP

[FBE-273] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-PWINTERREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-274] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-PWINTERREP] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.9.1.21 SUPINTREP

[FBE-275] The APP11-D Reports Import Service shall transform the received/ extracted [APP11D-SUPINTREP] message into a readable PDF file, and also map/ transform the message metadata, to the maximum extent feasible, into a format that is compliant with the OData REST API implemented by the Products Management Service for APP-11 type of products (see NATO::JISR::Staff::Product::APP-11 in the [INTEL-FS2-IM]), and subsequently load the transformed message into the I2BE through the Products Management Service.

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

[FBE-276] To support testing, the ADatP-3 Integration Services shall include a test function that fully populates [APP11D-SUPINTREP] messages and publish/ send them on the SOA & IdM Platform.

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

4.1.10 Air ORBAT Import Service

4.1.10.1 Extract, transform, load ORBATAIR

[FBE-277] The Air ORBAT Import Service shall when receiving a [APP11D-ORBATAIR] message on the SOA & IdM Platform, transform the message into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed Air ORBAT into the I2BE through the ORBAT Management Service.

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

[FBE-278] To support testing, the Air ORBAT Import Service shall also include a separate test function that fully populates and send [APP11D-ORBATAIR] messages on the SOA & IdM Platform.

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

4.1.11 Land ORBAT Import Service

4.1.11.1 Extract, transform, load ORBATLAND

[FBE-279] The Land ORBAT Import Service shall when receiving a [APP11D-ORBATLAND] message on the SOA & IdM Platform, transform the message into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed Land ORBAT into the I2BE through the ORBAT Management Service.

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

[FBE-280] To support testing, the Land ORBAT Import Service shall also include a separate test function that fully populates and send [APP11D-ORBATLAND] messages on the SOA & IdM Platform.

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

4.1.12 Maritime Task Organization Import Services

[102] Maritime C2 information is obtained through the Maritime C2 Information Exchange [MARIX] RESTful services.

[103] Note:

(1) The Maritime ORBAT is referred to as Task Organization.
(2) INTEL-FS2 will be the authoritative data source for the red ORBAT, but it will also need to import blue ORBAT data originating from C2 systems.

4.1.12.1 Extract, transform, load Maritime Task Organization

[FBE-281] The Maritime Task Organization Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the [MARIX] services for updates to the maritime task organization. It shall be possible through a configurable filter

setting to filter the maritime task organization data to be extracted through the [MARIX] services.

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

[FBE-282] The Maritime Task Organization Import Service shall transform the extracted maritime task organization data into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed maritime task organization data into the I2BE through the ORBAT Management Service.

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

4.1.13 NJTS Import Service

4.1.13.1 Extract, transform, load NJTS target data

[FBE-283] The NJTS Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the NJTS for new target data (including target lists and target folders with all their content). In the case that NJTS publishes event messages to the SOA & IdM Platform whenever there is a change to its target data, then the NJTS Import Service shall subscribe to the NJTS messages to obtain the target data and/ or to trigger the polling of the target data. It shall be possible through a configurable filter setting to filter the target data to be extracted from NJTS.

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

[104] The NJTS system does not currently exist. According to NATO acquisition plans, the NJTS system will be delivered in the same timeframe as INTEL-FS Spiral 2. The NJTS interface is currently unspecified, but is expected to be implemented with a RESTful API.

[FBE-284] The NJTS Import Service shall transform the extracted target data into a format that is compliant with the OData REST API implemented by the Target Service and load the transformed target data into the I2BE through the Target Service.

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

[FBE-285] The NJTS Import Service shall identify associations to other IIEs in the extracted target data and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

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

4.1.14 MIDB Import Service

[105] The Modernized Integrated Database (MIDB) contains different types of battlespace objects that after mediations will be imported into INTEL-FS2.

[106] Note: The MIDB interface to be used for this integration is not yet defined.

4.1.14.1 Extract, transform, load MIDB Unit and Equipment Holdings data

[FBE-286] The MIDB Import Service shall at regular intervals (where the interval frequency shall be configurable), or at discrete manually controlled points in time, poll the MIDB for new BSO data of type Units and Equipment Holdings. It shall be possible through a configurable filter setting to filter the BSO data to be extracted from MIDB (filtering options shall include timestamps, and location).

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

[FBE-287] The MIDB Import Service shall transform the extracted Unit and Equipment Holdings data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.

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

4.1.14.2 Extract, transform, load MIDB Places/ Facilities and Equipment Holdings

[FBE-288] The MIDB Import Service shall at regular intervals (where the interval frequency shall be configurable), or at discrete manually controlled points in time, poll the MIDB for new BSO data of type Places/Facilities and Equipment Holdings. It shall be possible through a configurable filter setting to filter the BSO data that are extracted from MIDB (filtering options shall include timestamps, and location).

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

[FBE-289] The MIDB Import Service shall transform the extracted Places/Facilities and Equipment Holdings data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.

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

4.1.14.3 Extract, transform, load MIDB Events

[FBE-290] The MIDB Import Service shall at regular intervals (where the interval frequency shall be configurable), or at discrete manually controlled points in time, poll the MIDB for new BSO data of type Event. It shall be possible through a configurable filter setting to filter the BSO data that are extracted from MIDB (filtering options shall include timestamps, and location).

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

[FBE-291] The MIDB Import Service shall transform the extracted Events data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.

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

4.1.14.4 Extract, transform, load MIDB Persons

[FBE-292] The MIDB Import Service shall at regular intervals (where the interval frequency shall be configurable), or at discrete manually controlled points in time, poll the MIDB for new BSO data of type Person. It shall be possible through a configurable filter setting to filter the BSO data that are extracted from MIDB (filtering options shall include timestamps, and location).

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

[FBE-293] The MIDB Import Service shall transform the extracted Persons data into a format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed BSOs/ BSRs into the I2BE through the BSO Management Service.

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

4.1.15 Asset Lists Import Service

4.1.15.1 Extract, transform, load asset lists

[FBE-294] The Asset Lists Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the AirC2IS Asset List Services (see [AirC2IS ICD]) for updates to the asset lists. It shall be possible through a configurable filter setting to filter the asset list data to be extracted from AirC2IS.

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

[FBE-295] The Asset Lists Import Service shall transform the extracted asset list data into a format that is compliant with the OData REST API implemented by the JIPOE Service and load the transformed maritime task organization data into the I2BE through the JIPOE Service.

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

4.1.16 Electronic Order of Battle (EOB) Import Service

[107] EOB and emitter TECHINT data is maintained by the NEDB-NG system. Information from NEDB-NG will be pulled at regular intervals and imported into INTEL-FS2 as encyclopaedic data (i.e. as “read-only” data).

[108] INTEL-FS will express EOB and emitter TECHINT data as specialised types of BSOs: Installations and facilities are specialisations of BSO places; electromagnetic emitters and platforms are specialisations of BSO equipment; electromagnetic parameters/ technical data (TECHINT) are specialisations of BSO equipment type

4.1.16.1 Extract, transform, load EOB data

[FBE-296] The EOB Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the NEDB-NG system (see [CEOB-EF]) for new EOB

data. It shall be possible through a configurable filter setting to filter the EOB data that are extracted from NEDB-NG.

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

[FBE-297] The EOB Import Service shall transform the extracted EOB data into a BSO and BSO status report format that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed EOB data into the I2BE through the BSO Management Service.

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

[FBE-298] The INTEL-FS Spiral1 BSO Migration Service shall through inspection of the extracted EOB data construct electronic ORBATs and transform the ORBAT data into a format that is compliant with the OData REST API implemented by the ORBAT Management Service and load the transformed electronic ORBAT into the I2BE through the ORBAT Management Service.

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

4.1.17 BM Firing Event Import Service

[109] The Networked Interoperable Real-time Information Services (NIRIS) Web Services enables clients to access tactical data that NIRIS has obtained from tactical data link. Included in the NIRIS Web Services is a RESTful Track Service (see chapter 5 in [NIRIS-WS-ICD]) that provides tracks in JSON format via the HTTP REST protocol. The RESTful Track Service includes a track filtering mechanism implemented in a RESTful Query Language (RSQL).

4.1.17.1 Extract, transform, load NIRIS missile track data

[FBE-299] The BM Firing Event Import Service shall at regular intervals (where the interval frequency shall be configurable), poll the NIRIS RESTful Track Service for missile launch tracks, missile in-flight tracks, and missile impact tracks. It shall be possible through a configurable filter setting to filter the missile track data to be extracted from NIRIS.

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

[FBE-300] The BM Firing Event Import Service shall combine missile launch track data, missile in-flight track data, and missile impact data, and transform this combined data into a historical firing event format (see NATO::BMD::Battlespace::Action::Event::HFE in the [INTEL-FS2-IM]) that is compliant with the OData REST API implemented by the BSO Management Service and load the transformed missile track data into the I2BE through the BSO Management Service.

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

4.2 Integration services – I2BE

[309] The focus of the deliverables described in this section is to implement a number of dedicated Integration Services for exporting/ sharing information produced within I2BE to external applications and services.

4.2.1 Central Card Catalogue (CCC) Export Service

4.2.1.1 Export of products to CCC

[FBE-301] The CCC Export Services shall detect new products and updates to existing products, and then read the product information through the Product Management Services OData REST API, transform the product information (that includes embedding product files) to the [IPIWG] format and post the information to the CCC.

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

[FBE-302] It shall be possible to specify and refine filters for which products to export from I2BE to the CCC. The filtering options shall include filtering on data set (operational, training, exercise, etc.), geographical coverage areas, temporal data, source/ publisher, and classification/ releaseability, etc.

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

4.2.1.2 Export of RFI data to CCC

[FBE-303] The CCC Export Services shall detect new RFIs and RFI responses, and updates to existing RFI and RFI responses, and then read the RFI and RFI responses information through the IRM Service OData REST API, transform the information (that includes embedding any attachments) to the [IPIWG] format and post the information to the CCC.

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

[FBE-304] It shall be possible to specify and refine filters for which RFIs and RFI responses to export from I2BE to the CCC. The filtering options shall include filtering on data set (operational, training, exercise, etc.), geographical coverage areas, temporal data, source/ publisher, and classification/ releaseability, etc.

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

4.2.2 NATO CSD Export Service

[110] The NATO Coalition Shared Data (CSD) contains two components that I2BE will export data to: the ISR Product Library (IPL) , and the ISR Workflow Service (IWS)

[111] The NATO CSD contains a third component, the ISR Streaming Service. The I2BE will not have any integration points with this service.

4.2.2.1 Export of products to NATO CSD IPL

[FBE-305] The NATO CSD Export Services shall detect new products and updates to existing products, and then read the product information through the Product Management Service OData REST API, transform the product information (that includes embedding product files and other attachments) into a format that is compliant with

the NATO CSD “IntelFS REST API” (see section 5.2.3.3 and appendix A.2.3 in [NCSD-IPL-SDS]), and upload the product to the NATO CSD IPL.

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

[FBE-306] It shall be possible to specify and refine filters for which products to export from I2BE to the NATO CSD IPL. The filtering options shall include filtering on data set (operational, training, exercise, etc.), geographical coverage areas, temporal data, source/ publisher, and classification/ releaseability, etc.

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

4.2.2.2 Export of IRM&CM workflow data to NATO CSD IWS

4.2.2.2.1 Export of geographical areas

[FBE-307] The NATO CSD Export Services shall detect new or updated Geospatial and Features where the change is originating in the I2BE. The service shall then read the Geospatial and Features through the Geospatial and Features Service OData REST API, transform the data into a format that is compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update Geospatial and Features in the NATO CSD IWS.

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

4.2.2.2.2 Export of ISR organization data

[FBE-308] The NATO CSD Export Services shall detect new or updated ISR organization data where the change is originating in the I2BE. The service shall then read the ISR organization data through the ISR Organization Service OData REST API, transform the data into a format that is compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update ISR organization data in the NATO CSD IWS.

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

4.2.2.2.3 Export of IRM data to NATO CSD IWS

[FBE-309] The NATO CSD Export Services shall detect new or updated IRM data where the change is originating in the I2BE. The service shall then read the IRM data through the IRM Service OData REST API, transform the data into a format that is compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update IRM data in the NATO CSD IWS.

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

4.2.2.2.4 Export of CRM data

[FBE-310] The NATO CSD Export Services shall detect new or updated CRM data where the change is originating in the I2BE. The service shall then read the CRM data through the CRM Service OData REST API, transform the data into a format that is

compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update CRM data in the NATO CSD IWS.

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

4.2.2.2.5 Export of COM data

[FBE-311] The NATO CSD Export Services shall detect new or updated COM data where the change is originating in the I2BE. The service shall then read the COM data through the COM Service OData REST API, transform the data into a format that is compliant with the NATO CSD JIEService (see [NCSD-IWS-SDS]) and create or update COM data in the NATO CSD IWS.

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

4.2.3 APP11-D Reports Export Service

4.2.3.1 Auto-generate AIRINTREP messages

[FBE-312] The APP11-D Report Export Services shall detect updates to airfield BSOs (i.e. BSOs of type 'Place') and then subsequently interrogate the airfield BSO (through the I2BE OData REST API) to check the airfields status reports to see if there is any change to the Aircraft Equipment Lines. If there are changes to the Aircraft Equipment Lines then a message in [APP11D-AIRINTREP] XML format shall be automatically generated from the airfield BSO data and published/ sent on the SOA & IdM Platform.

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

4.2.4 Emulated INTEL-FS Spiral 1 Web Services

[112] INTEL-FS Spiral 1 implements a number of Read-Only SOAP Web Services that enables external systems (e.g. TOPFAS and NCOP) to access its information.

[113] Through the implementation of INTEL-FS Spiral 1 WS Emulation Services the I2BE data will be made available through web services that mimics the legacy INTEL-FS Spiral 1 web services

4.2.4.1 INTEL-FS Increment 1 SOAP Web Services

[FBE-313] The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy I_INTEL-FS_SYSTEM_SERVICE (see table below) in accordance with [IFS1-ICD] as a façade for accessing the I2BE.

Verification: Demonstration, Integration with TOPFAS and NCOP
Est. Cost[€]: Contractor to provide cost estimate

Table 4-2 I_INTEL-FS_SYSTEM_SERVICE

Purpose	Methods
Enables the caller to access system objects or global values that can be used in the other services	GetAuthorisedOrganisationalNodeLogicalDatabaseCouples
	GetAuthorisedApplicationsTypes
	GetAuthorisedObjectTypes

[FBE-314] The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy I_INTEL-FS_DOMAINVALUE_SERVICE (see table below) in accordance with [IFS1-ICD] as a facade for accessing the I2BE.

Verification: Demonstration, Integration with TOPFAS and NCOP
Est. Cost[€]: Contractor to provide cost estimate

Table 4-3 I_INTEL-FS_DOMAINVALUE_SERVICE

Purpose	Methods
Enables the caller to access domain values definition and details	GetDomainValueTypes
	GetDomainValues
	GetDomainValueById

[FBE-315] The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy I_INTEL-FS_ENTITY_SERVICE (see table below) in accordance with [IFS1-ICD] as a facade for accessing the I2BE.

Verification: Demonstration, Integration with TOPFAS and NCOP
Est. Cost[€]: Contractor to provide cost estimate

Table 4-4 I_INTEL-FS_ENTITY_SERVICE

Purpose	Methods
Enables access to Intelligence Information Entities and their relationships.	Read
	GetLocation
	GetAttachments
	GetAttachmentsURL
	GetStatus
	GetAttachment
	GetAttachmentURL

[FBE-316] The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy I_INTEL-FS_ORBAT_SERVICE (see table below) in accordance with [IFS1-ICD] as a facade for accessing the I2BE.

Verification: Demonstration, Integration with TOPFAS and NCOP
Est. Cost[€]: Contractor to provide cost estimate

Table 4-5 I_INTEL-FS_ORBAT_SERVICE

Purpose	Methods
Enables provision of ORBAT information (i.e., identification, strength, command structure, and disposition of the staff, units, and equipment). Enables the requester to select the 'root' of the organisational hierarchy, the number of levels to be returned, and the type of command relationship (e.g., TACOM, TACON, OPCOM, OPCON, Co-ordinating authority) to be returned	GetSubordinateUnits
	GetSubordinatePersons
	GetSubordinateOrganisations
	GetSuperiorUnits
	GetSuperiorPersons
	GetSuperiorOrganisations

[FBE-317] The Emulated INTEL-FS Spiral 1 Web Services shall implement the legacy I_INTEL-FS_QUERY_SERVICE (see table below) in accordance with [IFS1-ICD] as a facade for accessing the I2BE.

Verification: Demonstration, Integration with TOPFAS and NCOP
Est. Cost[€]: Contractor to provide cost estimate

Table 4-6 I_INTEL-FS_QUERY_SERVICE

Purpose	Methods
Enables submission and provision of responses to queries to authorised users or systems. The queries can contain full text and structured constraints.	GetSearchTemplateFromApplication
	GetSearchTemplateFromType
	OpenSearch
	RelationshipSearch
	OwnedObjectSearch
	Query

5 Non-functional Requirements (NFR)

[114] NFR quality requirements is defined in accordance with ISO-25010 standard, and definitions in this section are based on ISO/IEC 25010:2011(E) - System and software quality models.

[115] For monitoring of quality characteristics, the definitions in the table below will be used:

Table 5-1 Definitions used for monitoring NFR quality characteristics

Error (or Fault)	A design or source code or hardware flaw or malfunction that causes a Failure of one or more Configuration Items. A mistake made by a person or a faulty Process that affects a CI is also an Error (human Error). For this System, Human Error is generally not taken into consideration in measuring the quality Performance
Fault:	see Error
Failure:	Loss of ability to Operate to Specification, or to deliver the required output. The term Failure may be used when referring to Services, Processes, Activities, or Configuration Items
Critical Failure:	it is a failure that causes an immediate cessation of the ability to perform the required function/service
Incident:	An unplanned interruption to a service or reduction in the quality of a service
Problem:	A cause of one or more Incidents. The cause is not usually known at the time the Incident happens

5.1 Functional Suitability

[116] ISO 25010: This characteristic represents the degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions.

[NFR-1] Location accuracy shall be better than 1 meter (i.e., sub-meter accuracy) for translation of values (UTM, Latitude/Longitudes, others).

Verification: Demonstration and Analysis

5.2 Performance Requirements

[117] ISO 25010: This characteristic represents the performance relative to the amount of resources used under stated conditions.

5.2.1 Response Times

[118] ISO 25010: Time Behaviour is the degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements.

[NFR-2] The time from restarting until all services is restored and fully operational again shall be less than 5 minutes for at least 99.5% of the Operational Time.

Verification: Demonstration and Analysis

[318] Note: All performance requirements below ([NFR-3] through [NFR-8]) are pure search and query response times. That means that it is assumed that authentication and authorization is in zero time.

[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 a 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