columns in the table. The IR that the RFI is linked to shall be included as one of the column attributes. RFI responses shall also be reported on in each row.

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

[FUA-239] It shall be possible display the RFI responses grouped by RFIs in a Table View.

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

[FUA-240] It shall be possible to export the content of the Table View to a file in XML format.

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

4.1.10.6 Relationships View

[FUA-241] The IRM Application shall use the Relationship View Component with all its features as defined in chapter 2.

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

[FUA-242] The IRM Application shall be able to display an ICP with its PIRs, SIRs, EEIs and indicators in the Relationship View. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.

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

[FUA-243] The IRM Application shall be able to display RFIs, RFI responses and EEIs in the Relationship View. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.

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

[FUA-244] It shall be possible to use Degree Centrality filtering to filter out all RFIs with more than a specified number of RFI responses (e.g. to show only unanswered RFIs in the Relationship View), and to filter out RFIs with less than a specified number of RFI responses.

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

[FUA-245] Items selected in Relationship View shall be displayed/ previewed in the IRM Application.

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

4.1.10.7 Gantt Views

[FUA-246] The IRM Application Gant View shall be implemented using, or including, the Gant View Component with all its features as defined in chapter 2.

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

[FUA-247] It shall be possible to visualize the selected set of IRs in a Gantt View grouped by IR hierarchy (PIR/SIR/EEI) where also linked Indicators at all levels in the IR hierarchy is visualized.

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

[FUA-747] It shall be possible to delete an IR in an IR hierarchy and have also all child IRs of the IR deleted (e.g. by deleting a PIR, all SIRs linked to that PIR shall be deleted, and all EEIs linked to these SIRs are also deleted), pending that the child IRs are not linked to any other superior IRs (e.g. EEIs can be typically reused in different SIRs that may be subordinate to different PIRs).

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

[FUA-248] It shall be possible to visualize the selected set of IRs in the Gantt View grouped by multiple ICPs.

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

[FUA-249] It shall be possible when visualizing the selected IRs in the Gantt View to also present information on the IRs' associated BSOs and Targets.

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

[FUA-250] It shall be possible within the timeline part of the Gantt View to display IR time-based attributes (e.g. Latest Report Time and LTIOV as milestone symbols).

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

[FUA-251] The Gantt View shall show the RFIs (and RFI responses) grouped by IRs (when the RFI is linked to an IR) and where the IR hierarchy (PIR/SIR/EEI) is also shown/depicted. RFIs with no IR association shall be grouped under a "no IR" group. RFI responses shall be grouped under their respective RFIs in the Gantt View.

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

[FUA-252] It shall be possible within the timeline part of the Gantt View to display status value changes as annotated events/ milestones.

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

4.1.10.8 GeoView

[FUA-253] The IRM Application shall integrate with and control the GeoView component as described in chapter 2.

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

[FUA-254] The IRM Application shall be able to show PIRs, SIRs, EEI, indicators, and RFIs in GeoView where status values of the IRs and RFIs can be used to select how they are rendered (options to include symbols vs shapes and colour coding).

E.g. using colours based on the RFIs status values (SUBMITTED, RESUBMITTED, FULFILLED or STOPPED)

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

[FUA-255] The IRM Application shall display geographical areas of interests, BSOs, Targets, and Products linked to IRs and/ or RFIs in GeoView.

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

[FUA-256] Items selected in GeoView shall be displayed/ previewed in the IRM Application.

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

4.1.10.9 Chart Views (statistical analysis)

[FUA-257] The IRM Application Chart View shall use the Chart View Component with all its features as defined in chapter 2.

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

[FUA-258] From the set of RFIs identified through search and filtering operations it shall be possible to plot Number of RFIs (in the set) by Status values, and by Organization, as bar charts and pie charts.

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

[FUA-259] From the set of RFIs identified through search and filtering operations it shall be possible to plot Number of RFI Responses (in the set) by Status, and by Organization, as bar charts and pie charts.

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

[FUA-260] It shall be possible to turn developed charts into named templates to be reused again and again to reproduce statistical diagrams with the same layout for other sets of RFIs.

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

4.1.10.10 Document View

[FUA-261] The IRM Application Document View shall be able to collect all information about an RFI (including all ForAction information and RFI responses) and present the information in a readable form. It shall be possible to export this RFI document view to a PDF file.

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

4.1.11 Collection Requirement (CR) Management (CRM) Application

[66] In Phase 1 the CRM Application is expected to interface directly with the STANAG 4559/AEDP-19 services. For that reason the normal submit for approval, approve, and

publish INTEL-FS workflow is not expected in Phase 1. This will be implemented in Phase 3 when the new I2BE API is available.

[67] Phase 1 will only deliver interim CR functionality based on the INTEL-FS Spiral 1 ISR Synch Mechanism, and fulfilment of User Stories will first be achieved in Phase 2 and Phase 3.

4.1.11.1 Basic CR functionalities using STANAG 4559 services

[FUA-283] The CRM Application shall enable the user to create ISR Requests (i.e. a CR with addressee information) and submit these to the STANAG 4559/AEDP-19 workflow services.

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

[FUA-284] The CRM Application shall enable the user to link ISR Requests to resulting exploitation products using the STANAG 4559/AEDP-19 workflow services.

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

[FUA-285] The CRM Application shall enable the user to view the status of ISR Requests using the STANAG 4559/AEDP-19 workflow services.

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

4.1.12 Collection Operations Management (COM) Application

[69] The COM Application will be implemented in Phase 2 and Phase 3.

4.2 Phase 2 – New user interfaces

[70] In anticipation that the I2BE backend services are not available at a time that when the Contractor has completed Phase 1, the work Phase 2 will continue evolving the INTEL-FS2 User Interfaces by implementing new UI functionality against mock backends.

4.2.1 Dashboard Application

[73] No feature changes for the Dashboard Application is expected in Phase 2.

4.2.2 Product Management Application

[74] No feature changes for the Product Management Application is expected in Phase 2.

4.2.3 Battlespace Object (BSO) Management Application

[75] No feature changes for the BSO Management Application is expected in Phase 2.

4.2.4 Targets Application (new implementation)

[76] The Targets Application will be implemented in Phase 3.

4.2.5 Intelligence Situation Application

[77] No feature changes for the Intelligence Situation Application is expected in Phase 2.

4.2.6 BM JIPOE Application (using mock backend)

[78] The BM JIPOE Application will include all the functionality of the Intelligence Situation Application, and the BMF JIPOE functionality may be implemented as an integrated part of

the Intelligence Situation Application or as a separate application that includes all of the features from the Intelligence Situation Application.

[79] The initial BM JIPOE Application user interface functionality will be implemented against mock backend as it is assumed that the I2BE API is not ready at the start-up of this work.

4.2.6.1 UI functionalities supporting user stories

[FUA-286] The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 42]: As an Authorized User I want to create/ update a multi-criteria decision analysis (MCDA) comparison framework so that I can rank the different OPFOR COAs (e.g. as most likely and most dangerous).

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

4.2.6.2 Dynamic Intelligence Report (DIR) editor and message publisher

[80] From [APP11D-DIR]: The DIR (Dynamic Intelligence Report) is used for the dissemination of TBM (Theatre Ballistic Missile) threat data updates.

[FUA-288] The BM JIPOE Application shall provide a tool or editor that enable the user to create Dynamic Intelligence Reports with the information content as specified in [APP11D-DIR]. The DIR, as an [APP11D-DIR] XML message, shall be posted onto the SOA & IdM Platform.

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

4.2.7 Search Application

[81] No feature changes for the Search Application is expected in Phase 2.

4.2.8 Analysis Application

[82] No feature changes for the Analysis Application is expected in Phase 2.

4.2.9 ISR Organization Management Application

[83] No feature changes for the ISR Organization Management Application is expected in Phase 2.

4.2.10 IRM Application (using mock backend)

[84] The IRM Application's user interface functionality will in Phase 2 be augmented by using a mock backend.

4.2.10.1 UI functionalities supporting user stories

[FUA-291] The IRM Application shall implement functionalities to fulfil the acceptance criteria of [US 68]: As an Authorized User I want to attach an effect/ task verb to the RFI so that I can specify what is required from the tasked unit and subsequently support the MOE analysis post completion.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

4.2.10.2 GeoView (enhanced)

[FUA-292] When using geometric shapes in the GeoView then it shall be possible, from a palette of different shapes, to select shapes to be used for RFIs with different effects/ tasks verb.

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

4.2.10.3 Chart Views (enhanced)

[FUA-293] From the set of RFIs identified through search and filtering operations it shall in the Chart View be possible to plot Number of RFIs (in the set) by Status values, and by effect/ task verb, by degree of effectiveness, etc. as bar charts and pie charts.

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

4.2.11 CRM Application (using mock backend)

[86] The purpose of augmenting the CRM Application's user interface functionality in Phase 2 against a mock backend is to focus on (and gain more time to) developing good user experience (UX) for the more elaborate and complex features of the CR Management Application. Implementation of the full UI functionality for the CR Management Application will be done in Phase 3.

4.2.11.1 UI functionalities supporting user stories

[FUA-294] The CRM Application shall implement functionalities to fulfil the acceptance criteria of [US 74]: As an Authorized User I want to create a prioritization scheme so all CRs can be ordered in terms of priority ranking based on a prescribed criteria and weighting.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-295] The CRM Application shall implement functionalities to fulfil the acceptance criteria of [US 75]: As an Authorized User I want to create a CR so it can be prioritised and assigned for collection and exploitation.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

4.2.11.2 IIE View/ Entry Panel

[FUA-297] The CRM Application shall implement data entry forms (using the IIE View/ Entry Panel as defined in chapter 2) that enables the user to enter/ update all attributes of a CR and related CR workflow information (For Action, For Information, etc.) as defined by [INTEL-FS2-InformationModel].

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

4.2.12 COM Application (using mock backend)

[87] The initial COM Application user interface functionality will be implemented against mock backend as it is assumed that the I2BE API is not ready at the start-up of this work.

4.2.12.1 UI functionalities supporting user stories

[FUA-298] The COM Application shall implement functionalities to fulfil the acceptance criteria of [US 82]: As an Authorized User I want to create/ update a collection or exploitation task so the ISR systems under my command receives clear tasking.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

4.2.12.2 IIE View/ Entry Panel

[FUA-300] The COM Application shall implement data entry forms (using the IIE View/ Entry Panel as defined in chapter 2) that enables the user to enter/ update all attributes of a Collection and Exploitation Plan (CXP) as defined by [INTEL-FS2-InformationModel].

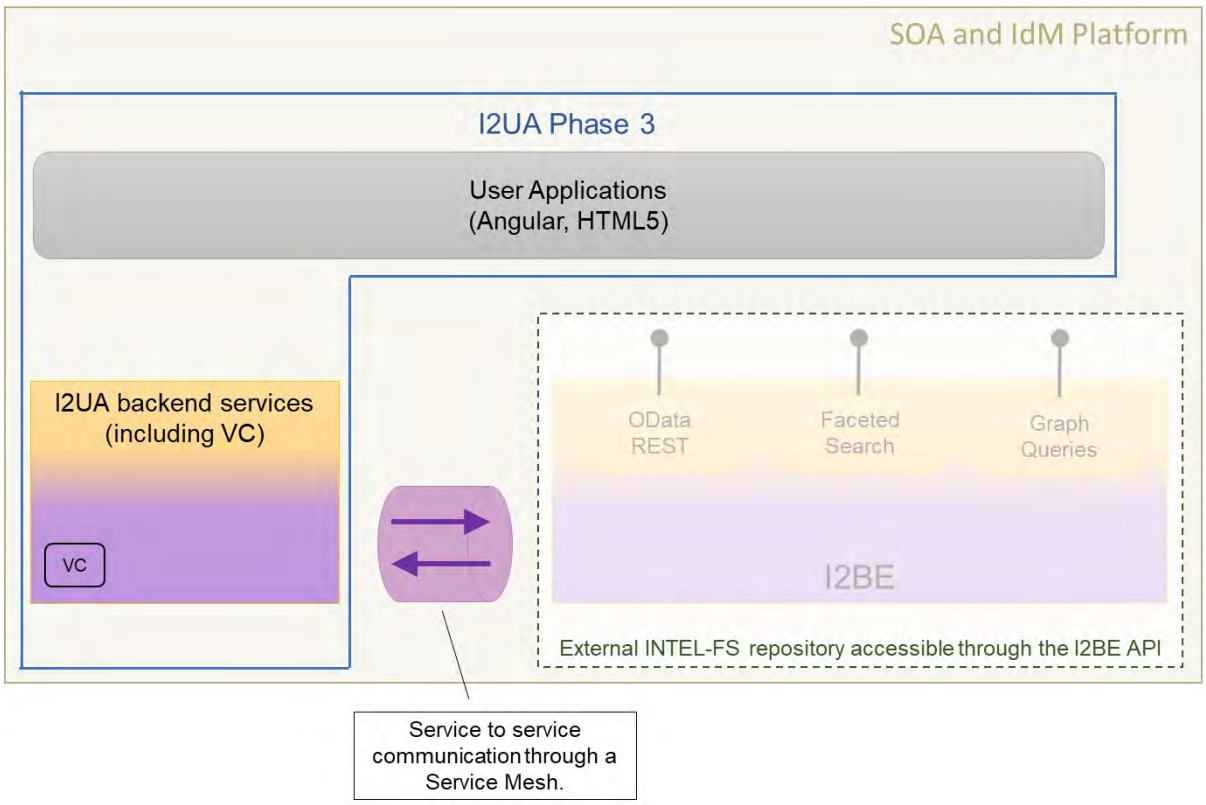
Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

4.3 Phase 3 – Full integration with new backend API

[88] In phase 3, the I2UA will stop using the legacy INTEL-FS Spiral 1 data repository and switch over to accessing an externally provided intelligence repository. The new, and externally provided data repository, will be accessible through an application programming interface (API), see figure below. The externally provided data repository is referred to as INTEL-FS2 Backend (I2BE).

[89] The I2UA and I2BE will be hosted on the same SOA and IdM platform and whenever the I2UA backend needs to communicate with the I2BE this will be done through a Service Mesh capability provided by the SOA & IdM Platform (see [SOA-IdM]).

Figure 4-8 Phase 3 - I2UA integrated with external repository over I2BE API



[90] The I2BE API will, as shown in in the figure above, include services for faceted search and graph queries I addition to a OData REST interface to all IIEs.

4.3.1 Dashboard Application (new backend)

4.3.1.1 UI functionalities supporting user stories

[FUA-301] The Dashboard Application shall implement functionalities to fulfil the acceptance criteria of [US 12]: As an Authorized User I want to configure INTEL-FS2 so that I receive e-mail notifications (in my normal email tool; i.e. Microsoft Outlook) when new data that I am interested in is entered to INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-302] The Dashboard Application shall implement functionalities to fulfil the acceptance criteria of [US 14]: As an Authorized User I want to configure INTEL-FS2 so that I receive notifications to my Dashboard Application when new data that I am interested in is entered to INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

4.3.1.2 UI integrated with new backend (no regression)

[FUA-303] The I2UA with Dashboard Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented

functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

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

4.3.1.3 Messaging with I2BE

[93] The I2BE System Administrator will at times publish notification message (e.g. for planned outages). The I2BE Services may also submit notification messages of interest to the I2UA

[FUA-304] The I2UA with Dashboard Application shall implement Service Mesh service-to-service messaging with the I2BE. I.e. I2UA server-side services shall be able to send and receive messages from the I2BE.

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

[FUA-305] The I2UA shall when receiving such notification messages from the I2BE push the notifications (when relevant) to the appropriate users so that the messages appear in their application user interface the messages (e.g. using WebSocket) and appear on the Dashboard.

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

[FUA-306] The I2UA shall place a visual indication of a received notification in all of I2UA user applications (not only in the Dashboard Application), and make the details of the notification available on the Dashboard Application.

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

[FUA-307] It shall be possible to create and/or update (i.e. subscribe to) notifications from saved and named searches and queries such that any new results from such searches or queries will be sent as a notification to the user. It shall also be possible to remove/ delete previously defined notification subscriptions.

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

[FUA-308] It shall be possible to associate notifications with user-defined categories so that the notifications in its Table View can be grouped by the categories, and collapse/ expand notification categories to control what is being displayed on the screen.

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

4.3.2 Products Management Application (new backend)

4.3.2.1 UI integrated with new backend (no regression)

[FUA-309] The I2UA with Products Management Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

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

4.3.2.2 Video Player

[95] To play videos the I2UA will consume a video conditioning service hosted by the I2BE that will synchronously stream the video and the video metadata in different channels

[96] Web-client source code that implements the video player can be provided as PFI to the Contractor

[FUA-310] The Products Management Application shall be able to play STANAG 4609 videos and support playing, pausing, timeline scrubbing forward and backward in the video to position the video at a new start point for the video playback.

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

[FUA-311] The Products Management Application shall when playing STANAG 4609 videos display, and dynamically update, metadata received in the video stream. The metadata that shall be displayed and dynamically updated shall as a minimum include (if included in the video stream) the metadata listed in the table below.

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

Table 4-8 Video metadata to be displayed

1	Security classification of the video
2	Sensor platform identification
3	Latest timestamp received
4	Latest geographical coordinates for the video footprint
5	Latest geographical position of the sensor platform

[FUA-312] The Products Management Application shall when playing STANAG 4609 videos synchronously display the video frame footprint (ground coverage area) and the video sensor platform in GeoView dynamically updating the footprint and sensor position.

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

4.3.3 Battlespace Object (BSO) Management Application (new backend)

4.3.3.1 UI functionalities supporting user stories

[FUA-313] The BSO Management Application shall implement functionalities to fulfil the acceptance criteria of [US 20]: As an Authorized User I want to be able to link to EOB data and associated electronic warfare derived TECHINT so that a complete understanding across all components of an opposing force (OPFOR) ORBAT can be obtained.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

4.3.3.2 UI integrated with new backend (no regression)

[FUA-314] The I2UA with BSO Management Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented

functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

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

4.3.3.3 UI extended with support for BM BSO extensions

[FUA-315] All user interfaces of the BSO Management Application shall be updated/ enhanced so support management of BSOs and BSRs on all BM-related BSOs and BSRs as defined [INTEL-FS2-InformationModel] (e.g. BM equipment, BM equipment types (BM TECHINT), BM historical firing events (HFE), BM units, BM locations, etc.)

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

[FUA-316] It shall be possible to link BM ORBAT holdings with BM TECHINT data as in accordance with [INTEL-FS2-InformationModel].

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

[FUA-317] Relevant user interfaces of the BSO Management Application shall be updated/ enhanced so support viewing of BSOs and BSRs on all electronic order of battle (EOB) related BSOs and BSRs as defined [INTEL-FS2-InformationModel].

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

4.3.3.4 EOB equipment and EOB-associated equipment types functionalities

[FUA-318] The BSO Management Application integrated search function shall be enhanced to support searching for EOB equipment and EOB-associated equipment types.

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

[FUA-319] The BSO Management Application filtering functionality shall be enhanced to support filtering on an attributes of EOB equipment and EOB-associated equipment types as defined in [INTEL-FS2-InformationModel].

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

4.3.4 Targets Application

[97] The different target lists are created and maintained by the NJTS system, and are dynamically made available to the I2UA through the new INTEL-FS2 (I2BE) backend through the I2BE API

4.3.4.1 UI functionalities supporting user stories

[FUA-320] The Targets Application shall implement functionalities to fulfil the acceptance criteria of [US 30]: As an Authorized User I want to view targets from various types of target lists superimposed on a map so that I improve my situational awareness of BSOs relevant to me.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-321] The Targets Application shall implement functionalities to fulfil the acceptance criteria of [US 31]: As an Authorized User I want to view targeting attributes of the individual targets/ BSOs from the various target lists so that I improve my situational awareness of targets/ BSOs relevant to me.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-322] The Targets Application shall implement functionalities to fulfil the acceptance criteria of [US 32]: As an Authorized User I want to improve and enhance information on targets/ BSOs so that I can provide support to targeting.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-324] The Targets Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

4.3.4.2 Integrated search and basic actions on search results

[FUA-326] The Targets Application shall include an integrated search function allowing the user to identify target lists that can subsequently be viewed.

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

[FUA-327] The integrated search function shall be able to find information associated with targets in the target list like BSOs, battle damage assessment (BDA) reports, collection requirements (CR), and ISR Systems tasked to the linked CR.

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

[FUA-328] From the search results it shall be possible (for an authorized user) to perform the actions as defined in the table below.

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

Table 4-9 Targets Application integrated search and search results actions

Search result	Supported actions
BSOs	Single and multi-select items and add to, or remove from, a Candidate Target List or a No-strike List

4.3.4.3 Application Data Set (ADS) management functionalities

[FUA-329] It shall be possible to filter the set of targets to be viewed on specific target lists, Basic Encyclopaedia (BE) Number, target identifier, etc. and hide filtered-out targets (and target lists), and dynamically update the information/ content in the different target views.

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

4.3.4.4 IIE View/ Entry Panel

[FUA-829] The Targets Application shall include an IIE View/ Entry Panel as defined in chapter 2 to display and edit IIEs managed by the application.

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

4.3.4.5 Table Views

[FUA-330] The Targets Application shall use the Table View Component with all its features as defined in chapter 2.

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

[FUA-331] It shall be possible to view a set of targets in a Table View where each row represents a target, and the target attribute values are shown across multiple columns in the table. The Target List that the target is linked to shall be included as a column attribute.

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

4.3.4.6 Relationships View

[FUA-332] The Targets Application shall use the Relationship View Component with all its features as defined in chapter 2.

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

[FUA-333] The Targets Application shall have functionality for selecting a particular target list and have all targets on that list displayed in a Relationship View. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.

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

[FUA-334] The Targets Application shall have functionality for selecting a No-strike List and have all BSOs on that list displayed in a Relationship View. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.

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

[FUA-335] The Targets Application shall have functionality for selecting a Candidate Target List and have all BSOs on that list displayed in a Relationship View. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.

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

[FUA-336] Items selected in Relationship View shall be displayed/ previewed in the Targets Application.

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

4.3.4.7 GeoView

[FUA-337] The Targets Application shall integrate with and control the GeoView component as described in chapter 2.

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

[FUA-338] The Targets Application shall have functionality for selecting a particular target list and have all targets on that list displayed and highlighted in GeoView.

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

[FUA-339] The Targets Application shall have functionality for selecting a No-strike List and have all BSOs on that list displayed and highlighted in GeoView.

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

[FUA-340] The Targets Application shall have functionality for selecting a Candidate Target List and have all BSOs on that list displayed and highlighted in GeoView.

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

[FUA-341] Items selected in GeoView shall be displayed/ previewed in the Targets Application.

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

4.3.5 Intelligence Situation Application (new backend)

4.3.5.1 UI integrated with new backend (no regression)

[FUA-342] The I2UA with Intelligence Situation Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

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

4.3.6 BM JIPOE Application (new backend)

4.3.6.1 UI functionalities supporting user stories

[FUA-343] The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 36]: As an Authorized User I want to create/ update areas, so that I can confine/ focus my operating environment (OE) analysis.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-344] The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 37]: As an Authorized User I want to create/ update a

named collection for the OE, so that I can establish a grouping of the information for the collaborative JIPOE process.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-345] The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 38]: As an Authorized User I want to organize information items in overlays to support multiple analyses of the OE.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-346] The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 39]: As an Authorized User I want to exploit a multitude of overlays so that I can evaluate the OE.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-347] The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 40]: As an Authorized User I want to create/ update actors (e.g. Nations of Concern), so that I can include actor analysis into the JIPOE process.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-348] The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 41]: As an Authorized User I want to view the actor information in different views to support my analysis of the actor.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-349] The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 43]: As an Authorized User I want to be able to create/ update and define OPFOR BM COAs so that these can subsequently be used for OPFOR BM COA comparisons and OPFOR BM COA rankings.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-350] The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 44]: As an Authorized User I want to be able to compare OPFOR BM COAs so these can be ranked in importance (e.g. most likely OPFOR BM COA and most dangerous OPFOR BM COA).

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-351] The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 45]: As an Authorized User I want to assess OPFOR BM COA predictions against actual observations to subsequently improve my OPFOR BM COA predictions.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-352] The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 46]: As an Authorized User I want to use new

information that can be extracted from HFEs to update my understanding of the opposing BM force.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-353] The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 47]: As an Authorized User I want to fill my intelligence gaps to support the BM JIPOE process.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-355] The BM JIPOE Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

4.3.6.2 UI integrated with new backend (no regression)

[FUA-356] The I2UA with the BM JIPOE Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

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

4.3.6.3 Create and/ or update functionalities

[FUA-358] The BM JIPOE Application shall when creating BSRs always link these to a COA.

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

[99] Note: By creating BSRs in the context of COAs these status report are to be considered predictions and not real observations.

4.3.6.4 Integrated search and basic actions on search results

[FUA-359] The BM JIPOE Application shall include an integrated search function allowing the user to identify Operation Environment Evaluations (OE), Actors Evaluations, Courses of Action (COA), Areas at Risk (AAR), all BSO types, products, PIRs, SIRs, EEIs, RFIs, CR, BM OPFOR Comparison Records, etc.

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

[FUA-360] From the search results it shall be possible (for an authorized user) to perform the actions as defined in the table below.

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

Table 4-10 BM JIPOE Application integrated search and search results actions

Search result	Supported actions

area of intelligence interest (AOII), area of interest (AOI), area of intelligence responsibility (AOIR), BM OPFOR ORBAT, BM operation areas (BMOA), named area of interest (NAI), indicators, CRs, named collections, overlays, actors, threat analysis, OPFOR COA assessment criteria, OPFOR BM COA, asset lists, BSRs, BM OPFOR Comparison Records	Single and multi-select items and tag them as soft-deleted
IIEs managed within the application	Single and multi-select items and un-delete them
IIEs managed within the application	Single and multi-select items and hard-delete (purge) them Note: Very few, if any, users shall have this privilege
IIEs managed within the application in Draft workflow state	Single and multi-select items and submit approval request for them
IIEs managed within the application in a workflow state of awaiting approval	Single and multi-select items and approve them, or approve and directly publish them
IIEs managed within the application in a workflow state of awaiting to be published	Single and multi-select items and publish them
IIEs managed within the application in a workflow state of having been rejected approval (i.e. still in Draft status)	Select a rejected entity, obtain rejection reason, open the entity for further editing
IIEs managed within the application	Single and multi-select items and change a metadata attribute for the entire set in one operation (e.g. setting security classification or releasability for the entire set in one operation)

4.3.6.5 Application Data Set (ADS)

[FUA-361] It shall be possible to perform multiple, consecutive queries to add data to the ADS. I.e. the user can chose whether to use the result of the new query to augment or replace the content of the application data set. When a new query is adding to the content of the data set, any duplicate IIEs from the multiple queries shall be resolved. Any change to the data set shall be reflected in all the application views.

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

[FUA-362] It shall be possible search for an actor and expand all the information that is linked to the actor and add the actor and its linked information added to a BM JIPOE data set.

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

[FUA-363] It shall be possible to search for all HFEs associated with a particular BMOA (or with multiple BMOAs) and add to a BM JIPOE data set.

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

[FUA-364] It shall be possible to apply a geographical coverage area filter to filter out information from the BM JIPOE data set, and dynamically update the data set views.

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

[FUA-365] It shall be possible to filter the BM JIPOE data set based on the linkage to a set of user-specified nodes and update the data set views. E.g. the user can select some BMOAs and reduce the data set to IIEs that is linked to the selected BMOAs, the user can select some assets and reduce the data set to IIEs linked to those assets, the user can select Areas of Intelligence Interest (AII) and Areas of Intelligence Responsibility (AIR) and reduce the data set to IIEs linked to those AIIs and AIRs, etc.

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

[FUA-366] It shall be possible to filter the BM JIPOE data set based on IIE types, IIE attributes and associations to other IIEs (i.e. using graph-oriented queries) and remove/ hide "unwanted" IIEs and dynamically update the data set views.

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

[FUA-367] It shall be possible to filter the BM JIPOE data set based on a time window (e.g. using a time slider UI widget) and remove/ hide IIEs falling outside the of the active time window and dynamically update the data set views. It shall be possible to dynamically shrink, expand, and shift the time window in time (backwards and forwards in time).

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

[FUA-368] The BM JIPOE Application shall be able to define data sets for multi-criteria decision analysis (MCDA) comparisons.

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

4.3.6.6 Application-supported assessments

[FUA-867] The BM JIPOE Application shall be able to calculate associations between an OPFOR BM HFE and BMOAs by comparing the smallest reported Estimated Launch Point error ellipse, the reported or correlated BM Type and the correlated Trajectory Type with BMOAs, expected BM Types and expected Trajectory Types.

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

[FUA-868] The BM JIPOE Application shall calculate associations between an OPFOR BM HFEs and Assets based on the smallest reported Predicted Impact Point error ellipse and Asset areas or locations.

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

[FUA-369] The BM JIPOE Application shall be able to calculate a total score for BM OPFOR targeting likelihood for each military and non-military asset type, and store the score values for the assets.

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

4.3.6.7 IIE View/ Entry Panel

[FUA-869] The BM JIPOE Application shall include an IIE View/ Entry Panel as defined in chapter 2 to display and edit IIEs managed by the application.

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

4.3.6.8 Table Views

[FUA-370] The BM JIPOE Application shall use the Table View Component with all its features as defined in chapter 2.

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

[FUA-371] It shall be possible view and edit all common metadata attributes for IIEs in the ADS in a Table View.

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

[FUA-372] It shall be possible load Asset Lists into a Table View.

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

[FUA-872] It shall be possible to load AARs into a Table View.

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

[FUA-873] It shall be possible to load a BM OPFOR COA Comparison Record into a Table View.

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

[FUA-373] It shall be possible to compare, the observed operational tempo for a BMOA with the expected operational tempo in a Table View.

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

[FUA-374] It shall be possible to present threats to assets in a Table View where each row represent an asset, and each column identify a threat (i.e. a red BSO) to that asset.

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

4.3.6.9 Relationship Views

[FUA-375] The BM JIPOE Application shall be able to render the entire BM JIPOE Data set in a Relationship View where this view is implemented using the Relationship View Component with all its features as defined in chapter 2.

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

[FUA-376] Items selected in Relationship View shall be displayed/ previewed in the BM JIPOE Application.

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

4.3.6.10 GeoView

[FUA-377] The BM JIPOE Application shall integrate with and control the GeoView component as described in chapter 2.

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

[FUA-378] The BM JIPOE Application shall be able to visualize the entire ADS including all parts of the COAs (e.g. AARs, BMOAs, etc.) in GeoView.

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

[FUA-379] The BM JIPOE Application shall be able to identify HFEs that are not associated with any BMOAs and highlight these in GeoView.

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

[FUA-380] The BM JIPOE Application shall be able to identify HFEs that have a different BM type to what is expected for the associated BMOA and highlight these in GeoView.

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

[FUA-880] The BM JIPOE Application shall highlight OPFOR BM HFEs which have a different Trajectory Type to what is expected for the BM Type when they are displayed.

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

[FUA-881] The BM JIPOE Application shall display all OPFOR BM HFEs in the ADS in the GeoView highlighting events which do not associate with at least one asset type in the expected OPFOR BM Targeting Strategy.

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

[FUA-381] The BM JIPOE Application shall be able to draw multiple parameterized range rings for BSOs (launchers) in the BM JIPOE data set (pulling the parameters for the rings from BSO TECHINT).

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

[FUA-382] The BM JIPOE Application shall be able to load asset lists from files and display the assets in GeoView.

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

[FUA-383] It shall be possible to select one or many of the geo-referenced entities in the BM JIPOE data set in the GeoView and calculate the intersection with all defined range rings in the INTEL-FS data set using the I2BE API, and subsequently render such range rings in the GeoView (i.e. to visualize threats) and present the intersection calculations in a Table View (see [FUA-374]).

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

[FUA-883] It shall be possible to create an overlay from the launcher positions and identified threatened assets from the intersect calculation above (see [FUA-383]), and it shall be possible to update this overlay with the result of re-calculation of the threat (e.g. to reflect the consequences of movement of launchers and/ or assets).

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

[FUA-884] It shall be possible to visualize a BM OPFOR COA Comparison Record in GeoView. This visualization shall include the BMOAs, assets, and HFEs associated with the BM OPFOR COA Comparison Record.

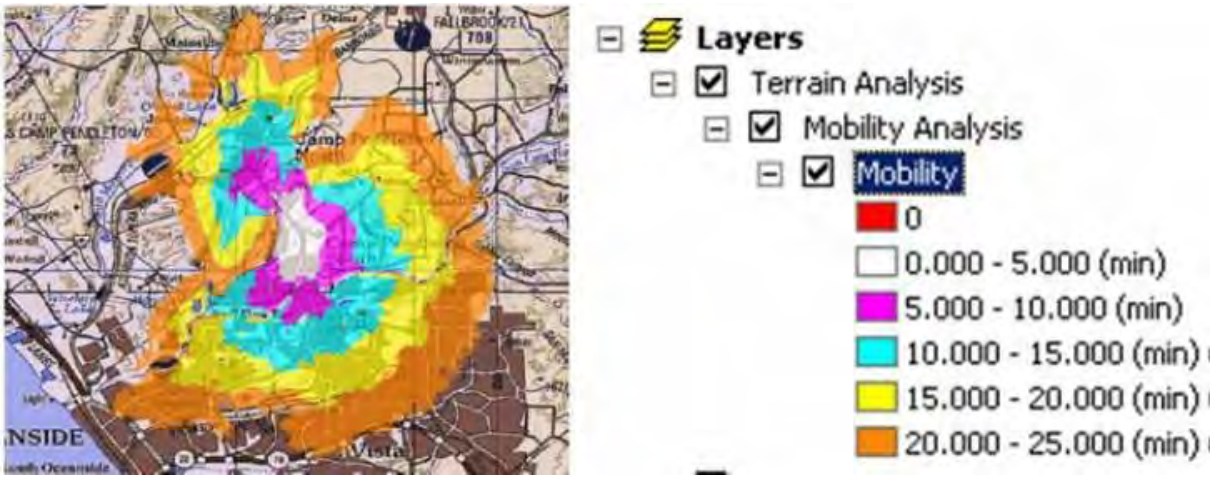
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.3.6.11 Terrain and mobility analysis visualization

[100] The development of Ballistic Missile Operating areas (BMOA) is a key aspect of OPFOR BM COA development. In areas where there are major terrain features, such as large lakes, mountain ranges etc., such features may constrain/ refine the BMOAs.

[101] Mobility Analysis is a variant of the Terrain Analysis and will most likely involves similar calculations, but taking into account the relocation speed of the vehicle. The difference is that while the Terrain Analysis focus on where a BM Unit can travel (typically within a BMOA), the focus of the Mobility Analysis is to detect how far a BM unit can travel as a function of time. An example of a visualization of a Terrain and Mobility Analysis is shown in the figure below.

Figure 4-9 Example of Terrain and Mobility Analysis Visualization



[FUA-384] The BM JIPOE Application shall through the I2BE Terrain Analysis API obtain one or several overlays that depicts where BM Units can reach and operate from. The I2BE Terrain Analysis API will be implemented as an Open Geospatial Consortium (OGC) Web Processing Service (WPS) and is expected to require the input parameters as defined in the table below. The BM JIPOE Application shall be able to provide all the parameters when calling the backend Terrain Analysis service.

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

Table 4-11 Expected parameters for the I2BE Terrain Analysis API

Input Parameter	**Remarks**
Coverage area	Geographical area defined by a BMOA to constrain the analysis
Vehicle weights, heights, and widths	Maximum vehicle weights, heights, and widths from BM TECHINT to be matched against road network constraints (e.g. bridges, tunnels, small roads, etc.)
Vehicle turning radius	
Vehicle off-road ability/ Land use	This should include information on type of terrain where the vehicles can go off-road (e.g. sand, snow, wetland, etc.)
Maximum off-road distance	E.g. measured in kilometers
Slope limitations (degrees)	Maximum slope the vehicles can travel from BM TECHINT to be matched against road network data and terrain elevation data (in case the vehicles can go off-road)

[FUA-385] The BM JIPOE Application shall through the I2BE Mobility Analysis API that obtain one or several overlays that depicts how far the BM Units can reach for a set of time intervals The I2BE Mobility Analysis API will be implemented as an OGC Web Processing Service (WPS) and is expected to require the input parameters as defined in the table below. The BM JIPOE Application shall be

able to provide all the parameters when calling the backend Mobility Analysis service.

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

Table 4-12 Parameters for Mobility Analysis function

Input Parameter	Remarks
Start position	Geographical location from which the BM Unit will start the movement
Time increments	In unit and extent (e.g. in 5 hour increments)
Vehicle relocation speed on roads	Average/ expected road speed of vehicle from BM TECHINT
Vehicle relocation speed off roads	Average/ expected off-road speed
Vehicle weights, heights, and widths	Maximum vehicle weights, heights, and widths from BM TECHINT to be matched against road network constraints (e.g. bridges, tunnels, small roads, etc.)
Vehicle turning radius	
Vehicle off-road ability/ Land use	This should include information on type of terrain where the vehicles can go off-road (e.g. sand, snow, wetland, etc.)
Maximum off-road distance	E.g. measured in kilometers
Slope limitations (degrees)	Maximum slope the vehicles can travel from BM TECHINT to be matched against road network data and terrain elevation data (in case the vehicles can go off-road)

4.3.6.12 Chart Views (statistical analysis)

[FUA-386] The BM JIPOE Application Chart View shall use the Chart View Component with all its features as defined in chapter 2.

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

[FUA-387] The BM JIPOE Application Chart View shall display summary graph of filtered HFE in the application data set.

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

[FUA-388] The BM JIPOE Application shall be able to display HFEs in the application data set as bar chart against time.

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

[FUA-389] The BM JIPOE Application shall calculate the average number of BM launches per 24 hours for each BMOA and present in an appropriate Chart View (e.g. using bar charts).

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

[FUA-889] The BM JIPOE Application shall calculate the average salvo size for each BMOA in the ADS using the specified Salvo Time-out.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-890] The BM JIPOE Application shall calculate the average salvo duration for each BMOA in the ADS using the specified Salvo Time-out.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-891] The BM JIPOE Application shall from the Chart View launch/ salvo calculations store the calculated BM Operational Tempo for each BMOA in the ADS.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.3.6.13 Multi-Criteria Decision Analysis (MCDA) View

[FUA-892] The BM JIPOE Application shall implement a MCDA View where the MCDA criteria sets can be defined, updated, and saved.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-893] The MCDA View shall have support for showing both the MCDA criteria and all OPFOR BM COAs to be analysed in a panel, and shall enable the user to make changes to the MCDA criteria and directly see the results on the ranking of the OPFOR BM COAs in the different ratings (most dangerous, most likely).
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-894] It shall be possible for the user to override the automatically calculated rankings from the MCDA criteria (most dangerous, most likely) and manually set rankings of the OPFORM BM COAs.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-895] It shall be possible to store the final MCDA rankings (automatically generated and/ or manually adjusted) of OPFOR BM COAs through the I2BE API.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.3.6.14 OPFOR BM COA (Observed vs Expected) Comparison View

[FUA-896] The BM JIPOE Application shall implement a view tailored for comparing observed versus expected OPFOR BM COA where information from BSO status reports are compared with the expected/ predicted OPFOR BM COA activities, and where the comparison results can be organized, annotated, and stored (and retrieved) through the I2BE API (i.e. BM OPFOR Comparison Records can be created, updated, and deleted). Annotations can be made both at the individual comparisons, and as a summary annotation on the Comparison Record (i.e. as an overall compliance assessment/ summary of all the comparisons in the record).
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-897] The OPFOR BM COA Comparison View shall for each BMOAs within the OPFOR BM COA calculate the observed operational tempo and visualize a comparison with the expected operational tempo for the BMOA, and it shall be possible to annotate and store the comparison result (differences) as part of a comparison record (see [InformationModel]) linked to the OPFOR BM COA.

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

[FUA-898] The OPFOR BM COA Comparison View shall for each BMOAs within the OPFOR BM COA retrieve observed BM types and visualize a comparison with the expected BM types for the BMOA, and it shall be possible to annotate and store the comparison result (differences) as part of a comparison record linked to the OPFOR BM COA.

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

[FUA-899] The OPFOR BM COA Comparison View shall for each BMOAs within the OPFOR BM COA retrieve observed BM trajectory types and visualize a comparison with the expected BM trajectory types for the BMOA, and it shall be possible to annotate and store the comparison result (differences) as part of a comparison record linked to the OPFOR BM COA.

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

[FUA-900] The OPFOR BM COA Comparison View shall for each OPFOR BM Force within the OPFOR BM COA retrieve new intelligence (new BSO status reports) on the OPFOR BM Force available warhead types and visualize a comparison with the expected warhead types for the OPFOR BM Force, and it shall be possible to annotate and store the comparison result (differences) as part of a comparison record linked to the OPFOR BM COA.

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

[FUA-901] The OPFOR BM COA Comparison View shall for each OPFOR BM Force within the OPFOR BM COA retrieve observed warhead types employed by an OPFOR BM Force and visualize a comparison with the expected warhead types for the OPFOR BM Force, and it shall be possible to annotate and store the comparison result (differences) as part of a comparison record linked to the OPFOR BM COA.

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

[FUA-902] It shall be possible from within the OPFOR BM COA Comparison View to associate a set of OPFOR BM HFEs (within the ADS) with an OPFOR BM COA Comparison Record.

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

[FUA-903] The OPFOR BM COA Comparison View shall for each OPFOR BM Targeting Strategy associated with the OPFOR BM COA compare the expected BM targeting strategy against observed activity, and it shall be possible to annotate

and store the comparison result (differences) as part of a comparison record linked to the OPFOR BM COA.

[FUA-904] The OPFOR BM Comparison View shall be able to display a time-sorted list of OPFOR BM COA Comparison Records based on the period of validity for each expected OPFOR BM COA.

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

4.3.6.15 Document Views

[FUA-390] It shall be possible to view the operating environment evaluation in a customizable and human readable document format and to save/ export this document as a PDF file.

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

[FUA-391] It shall be possible to view the actor analysis in a customizable and human readable document format and to save/ export this document as a PDF file.

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

[FUA-392] It shall be possible to view the BM OPFOR COA in a customizable and human readable document format and to save/ export this document as a PDF file.

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

4.3.6.16 Animation

[FUA-393] It shall be possible to dynamically animate the visualization of the ADS in GeoView by dragging a time "handle" in the time slider tool.

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

4.3.7 Search Application (new backend)

4.3.7.1 UI functionalities supporting user stories

[103] Note: The search engine for the faceted search will be implemented in the new backend (I2BE)

[FUA-394] The Search Application shall implement functionalities to fulfil the acceptance criteria of [US 50]: As an Authorized User I want to be able to look for information using faceted search techniques so that I can narrow down search results by applying multiple filters based on faceted classification of the items.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

4.3.7.2 UI integrated with new backend (no regression)

[FUA-395] The I2UA with Search Application shall be fully integrated with new I2BE backend. There shall be no regression from previously implemented functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API. This includes verifying that the combined search can search also against the

new IIE types introduced in this phase, and that the faceted search also has support for previewing and exporting of search results.

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

4.3.7.3 Search results functionalities

[FUA-396] The Search Application shall by default filter out BSRs that are linked to COAs (i.e. these COA-linked BSRs shall normally not be included in the result set). The user shall be able to override this default filtering so that COA-linked BSRs are also reported in the result set, but in this case these BSRs shall be visually distinguishable from the normal BSRs (to alert the user that these are not real observations).

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

[FUA-397] The Search Application shall be able to use the I2BE provided search clustering functionality (exposed through the I2BE search API) to present search results grouped into categories.

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

4.3.8 Analysis Application (new backend)

4.3.8.1 UI functionalities supporting user stories

[FUA-398] The Analysis Application shall implement functionalities to fulfil the acceptance criteria of [US 49]: As an Authorized User I want to have tool support to find connection path between entities so that I can investigate if a connection between the entities exist.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

4.3.8.2 UI integrated with new backend (no regression)

[FUA-399] The I2UA with Analysis Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

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

4.3.8.3 Advanced graph query builder

[FUA-400] The Analysis Application shall be augmented with a visual graph query builder that takes full advantage of the graph query support in the I2BE API and the relational nature of the [INTEL-FS2-InformationModel].

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

[FUA-401] The Analysis Application shall transform geographical area constraints defined using INTEL-FS2 geographical areas (e.g. NAI, BMOA, etc.) into a geospatial representation supported by the query language exposed through the I2BE API.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.3.8.4 Centralities analysis

[FUA-402] Within the Analysis Data Set (ADS) it shall be possible to select IIE types and relationship types suitable for centrality calculations, select centrality types, and calculate the centralities for the selected IIEs and relationships. Note: Degree, Closeness, Betweenness, and Eigenvector Centrality calculations will be supported by the I2BE API.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-403] It shall, when using geometric shapes nodes in the Relationship View, and in the GeoView, be possible, from a centralities palette, to specify a centrality type and sizing parameters (minimum and maximum size) to be used for rendering the size of IIEs (nodes) such the size of the rendered shapes correlates with their centrality values.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-404] It shall be possible to view the results of the centrality calculations in a table with the different centrality types reported in different columns and where the table rows represents the IIEs. The Centrality Table shall be sortable (ascending and descending) for each one of the centrality columns.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-405] It shall be possible to select an IIE from the Centrality Table and have that IIE highlighted in the ADS views.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.3.9 ISR Organization Management Application (new backend)

4.3.9.1 UI functionalities supporting user stories

[FUA-406] The ISR Organization Management Application shall implement functionalities to fulfil the acceptance criteria of [US-63]: As an Authorized User I want to have the operation, ISR ORBAT, ISR units, and ISR systems approved and published so that this information becomes known/ available at all ONs.
Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

4.3.9.2 UI integrated with new backend (no regression)

[FUA-407] The ISR Organization Management Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

This means that the usage of the STANAG 4559 services as implemented in Phase 1 shall be stopped. Instead the ISR Organization Management Application shall consume the new I2BE OData REST API for accessing ISR ORBATs, Units, ISR Systems, etc.

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

4.3.10 IRM Application (new backend)

4.3.10.1 UI integrated with new backend (no regression)

[FUA-409] The I2UA with IRM Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

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

4.3.11 CRM Application (new backend)

4.3.11.1 UI functionalities supporting user stories

[FUA-410] The CRM Application shall implement functionalities fulfil [US 76]: As an Authorized User I want to update the status of a CR to control the workflow of the CR.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-411] The CRM Application shall implement functionalities fulfil [US 77]: As an Authorized User I want to track the status of CRs as they go through the tasking, collection, processing, exploitation, and dissemination (TCPED) process so I can understand whether they will be supported or not.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-412] The CRM Application shall implement functionalities fulfil [US 78]: As an Authorized User I want to process CRs into actions so that they ultimately result in collection activities.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-413] The CRM Application shall implement functionalities fulfil [US 79]: As an Authorized User I want to be able to export a set of CRs, a CRL and a CTL so this information can be used outside of INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-417] The CRM Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

4.3.11.2 UI integrated with new backend (no regression)

[FUA-418] The I2UA with the CRM Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

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

4.3.11.3 Integrated search and basic actions on search results

[FUA-420] The CRM Application shall include an integrated search function allowing the user to identify Intelligence Requirements (IR), BSOs that can subsequently be used for creating CRs.

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

[FUA-421] The CRM Application's integrated search function shall support searching for and identifying Operational Activities, CRLs, CTLs, NAIs, Products and BSOs etc. so that the CRs can be linked to IIEs of such types.

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

[FUA-422] The CRM Application's integrated search function shall support searching for CRs (including draft CRs) to be viewed in Table View, GeoView, and Gantt View. Searching for specific CRs based on CR serial number shall be supported.

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

[FUA-423] From the search results it shall be possible (for an authorized user) to perform the actions as defined in the table below.

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

Table 4-13 CRM Application integrated search and search results actions

Search result	Supported actions
CRs	Single and multi-select items and tag them as soft-deleted
Soft-deleted CRs	Single and multi-select items and un-delete them
CRs	Single and multi-select items and hard-delete (purge) them Note: Very few, if any, users shall have this privilege
CRs in Draft workflow state	Single and multi-select items and submit approval request for them
CRs in a workflow state of awaiting approval	Single and multi-select items and approve them, or approve and directly publish them
CRs in a workflow state of awaiting to be published	Single and multi-select items and publish them
CRs in a workflow state of having been rejected approval (i.e. still in Draft status)	Select a rejected entity, obtain rejection reason, open the entity for further editing

CRs	Single and multi-select items and change a metadata attribute for the entire set in one operation (e.g. setting security classification or releasability for the entire set in one operation)

4.3.11.4 Application Data Set (ADS)

[FUA-424] It shall be possible to filter the set of CRs on specific CRLs and CTLs.

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

[FUA-425] It shall be possible to filter the set of CRs on operation or named collection, IRs, Originator, actionees (For Action), CR Status, Priority, Basic Encyclopaedia (BE) Number, Target ID, Category code, degree of effectiveness, etc. and hide filtered-out CRs, and dynamically update all the CR views.

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

[FUA-426] It shall be possible to apply a geographical coverage area filter to filter out information from the set of CRs, and dynamically update all the CR views.

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

[FUA-427] It shall be possible to filter the set of CRs based on a time window (e.g. using a time slider UI widget) and remove/ hide CRs falling outside the of the active time window (using Last Report Date and LTIOV attributes) and dynamically update all the CR views. It shall be possible to dynamically shrink, expand, and shift the time window in time (backwards and forwards in time).

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

[FUA-428] It shall be possible to save search + filter settings as named user-specific filters for the CR Management Application to be able to recreate the set of CRs.

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

4.3.11.5 Table Views

[FUA-429] The CRM Application shall use the Table View Component with all its features as defined in chapter 2.

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

[FUA-430] It shall be possible to view a set of CRs in a Table View where each row represents a CR, and the CR attribute values are shown across multiple columns in the table. The operation or named collection, the Unit (in case a CR is assigned to more than one Unit then the Units shall be delimited within the same column), the IR, the CR priority, the CR Status, etc. shall all be included as column attributes.

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

[FUA-431] It shall be possible to select between a set of standard and predefined layouts of the Table View (the purpose of this is to allow the user to quickly organize the

Table View for the task at hand; e.g. there might be a particular layout for the export to CSV files, etc.)

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

[FUA-432] It shall be possible to edit CRs in the Table View. The editing functionality shall include the possibility of dragging one or many CRs from one group to another group (e.g. to reassign CRs from one Unit to another Unit).

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

[FUA-433] It shall be possible to export the set of CRs as a "bag of CRs", as a CRL, and as a CTL, in an XML format.

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

4.3.11.6 Relationship View

[FUA-434] The CRM Application shall use the Relationship View Component with all its features as defined in chapter 2.

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

[FUA-435] The CRM Application shall be able to display CRs, PIRs, SIRs, EEIs, collection and exploitation tasks, and products in the Relationship View. The user can expand the information in the Relationship View by selecting individual IIEs and bring into the view all IIEs (of any type) linked to the selected IIEs.

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

[FUA-436] Items selected in Relationship View shall be displayed/ previewed in the CR Management Application.

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

4.3.11.7 Gantt Views

[FUA-437] The CRM Application Gant View shall be implemented using, or including, the Gant View Component with all its features as defined in chapter 2.

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

[FUA-438] It shall be possible to visualize the selected set of CRs grouped by IRs (when the CR is linked to an IR) and where the IR hierarchy (PIR/SIR/EEI) is also shown/ depicted. CRs with no IR association shall be grouped under a "no IR" group.

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

[FUA-439] It shall be possible to visualize the selected set of CRs grouped by CRLs and CTLs.

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

[FUA-440] It shall be possible when visualizing the selected CRs to display information on the CRs' associated BSOs and Targets, and assigned Units (in particular status updates from multiple Units on the same CR in case a CR is allocated to multiple Units).

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

[FUA-441] It shall be possible within the timeline part of the Gantt View to display CR time-based attributes (Latest Report Time and Latest Time of Information Value) as milestones/ events.

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

[FUA-442] It shall be possible within the timeline part of the Gantt View to display status value changes as annotated events/ milestones.

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

4.3.11.8 GeoView

[FUA-443] The CRM Application shall integrate with and control the GeoView component as described in chapter 2.

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

[FUA-444] The CRM Application shall be able to show CRs and associated geographical areas in GeoView where status values, and effects/ tasks verb, of the CRs can be used to select how the CRs are rendered (options to include symbols vs shapes and colour coding).

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

[FUA-445] The CRM Application shall, for CRs in the CR set with multiple locations in it, command GeoView to depict a link between the CR with all its locations.

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

[FUA-446] The CRM Application shall show BSOs and Targets linked to CRs in the selected CR set in GeoView.

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

[FUA-447] Items selected in GeoView shall be displayed/ previewed in the CR Management Application.

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

4.3.11.9 Chart Views (statistical analysis)

[FUA-448] The CRM Application Chart View shall use the Chart View Component with all its features as defined in chapter 2.

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

[FUA-449] From the set of CRs identified through search and filtering operations it shall be possible to plot Number of CRs (in the set) by Status values, by effects/ tasks verb, by degree of effectiveness, degree of effectiveness vs ad hoc and dynamic tasking, CR status vs CR Priority, by Organization etc. as bar charts and pie charts.

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

[FUA-450] It shall be possible to turn developed charts into named templates to be reused again and again to reproduce statistical diagrams with the same layout for other sets of CRs.

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

4.3.12 COM Application

4.3.12.1 UI functionalities supporting user stories

[FUA-451] The COM Application shall implement functionalities to fulfil the acceptance criteria of [US 83]: As an Authorized User I want to update the status of tasks to control the workflow of the tasks.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-452] The COM Application shall implement functionalities to fulfil the acceptance criteria of [US 84]: As an Authorized User I want to track the status of tasks so I can understand whether they will be supported or not.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-453] The COM Application shall implement functionalities to fulfil the acceptance criteria of [US 85]: As an Authorized User I want to create and manage several CXPs to support a CM battle rhythm so that individual collection and exploitation tasks can be viewed in accordance with the defined CXPs.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-454] The COM Application shall implement functionalities to fulfil the acceptance criteria of [US 86]: As an Authorized User I want to be able to export a set of tasks and CXPs so this information can be used outside of INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-455] The COM Application shall implement functionalities to fulfil the acceptance criteria of [US 87]: As an Authorized User I want to manage finalized CXPs to provide clear tasking of ISR Systems.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

[FUA-457] The COM Application shall implement functionalities to fulfil the acceptance criteria of [US 89]: As an Authorized User I want to be able to access a help function that can provide me with information on how to use INTEL-FS2.

Verification: Demonstration (see User Story acceptance criteria)
Est. Cost[€]: Contractor to provide cost estimate

4.3.12.2 UI integrated with new backend (no regression)

[FUA-458] The I2UA with the COM Application shall be fully integrated with the new I2BE backend. There shall be no regression from previously implemented functionalities, and the application user interface shall be adapted to fully support the [INTEL-FS2-InformationModel] as exposed through the I2BE API.

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

4.3.12.3 Integrated search and basic actions on search results

[FUA-459] The COM Application shall include an integrated search function allowing the user to identify Collection Requirements (CR) that can subsequently be used for creating collection and exploitation tasks.

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

[FUA-460] The Collection & Exploitation Planning Application's integrated search function shall support searching for and identifying Operational Activities, CTLs, CXPs, NAIs, Products and BSOs etc. so that the tasks can be linked to IIEs of such types.

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

[FUA-461] The Collection & Exploitation Planning Application's integrated search function shall support searching for tasks (including draft tasks) and CRs to be viewed in Table View, GeoView, and Gantt View. Searching for specific tasks based on task serial number shall be supported.

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

[FUA-462] From the search results it shall be possible (for an authorized user) to perform the actions as defined in the table below.

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

Table 4-14 COM Application integrated search and search results actions

Search result	Supported actions
Tasks, CXPs	Single and multi-select items and tag them as soft-deleted
Soft-deleted Tasks, CXPs	Single and multi-select items and un-delete them
Tasks, CXPs	Single and multi-select items and hard-delete (purge) them Note: Very few, if any, users shall have this privilege
Tasks, CXPs in Draft workflow state	Single and multi-select items and submit approval request for them
Tasks, CXPs in a workflow state	Single and multi-select items and approve them, or approve

of awaiting approval	and directly publish them
Tasks, CXPs in a workflow state of awaiting to be published	Single and multi-select items and publish them
Tasks, CXPs in a workflow state of having been rejected approval (i.e. still in Draft status)	Select a rejected entity, obtain rejection reason, open the entity for further editing
Tasks, CXPs	Single and multi-select items and change a metadata attribute for the entire set in one operation (e.g. setting security classification or releasability for the entire set in one operation)

4.3.12.4 Application Data Set (ADS)

[FUA-463] It shall be possible to filter the set of tasks and CRs on specific CTLs and CXPs (by name and creator).

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

[FUA-464] It shall be possible to filter the set of tasks and CRs on operation or named collection, IRs (in particular EEIs), tasking Unit, ISR System, ISR System operational/ capacity/ processing status, task creation time, task status values, products required, etc. and hide filtered-out tasks, and dynamically update all Views.

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

[FUA-465] It shall be possible to apply a geographical coverage area filter to filter out information from the set of tasks and CRs, and dynamically update all Views.

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

[FUA-466] It shall be possible to filter the set of tasks based on a time window (e.g. using a time slider UI widget) and remove/ hide tasks falling outside the of the active time window (using task interval and collection time intervals) and dynamically update all the task views. It shall be possible to dynamically shrink, expand, and shift the time window in time (backwards and forwards in time).

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

[FUA-467] It shall be possible to save search + filter settings as named user-specific filters for the Collection & Exploitation Planning Application to be able to recreate the set of tasks.

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

4.3.12.5 Table Views

[108] The tasks that are managed within the COM Application are based on CRs and access to CRs from within the application will be required.

[109] The COM Application will need to manage multiple Table Views (for CRs and for Tasks)

[FUA-468] The COM Application shall use the Table View Component with all its features as defined in chapter 2.

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

[FUA-469] It shall be possible to work with CRs in a Table view, to select one or many CRs in the Table View and generate tasks from them (e.g. by dragging and dropping into the Task Table View). The new tasks shall be added to the task set and those shall how up in another Table View for tasks, in GeoView, and in the Gantt View.

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

[FUA-470] It shall be possible to view a set of tasks in a Table View where each row represents a task, and the task attribute values are shown across multiple columns in the table. The operation or named collection, the ISR System, the CR, the CXP that the task is linked to, the task timing data, etc. shall all be included as column attributes.

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

[FUA-471] It shall be possible to edit tasks directly in a Table View.

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

[FUA-472] It shall be possible edit tasks in the table by dragging one or many tasks from one group to another group (this functionality could be used to reassign tasks from one ISR System to another ISR System).

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

[FUA-473] It shall be possible to select between a set of standard and predefined layouts of the Table View (the purpose of this is to allow the user to quickly organize the Table View for the task at hand; e.g. there might be a particular layout for the export to CSV files, etc.)

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

[FUA-474] It shall be possible to export the set of tasks in a Table View as a "bag of tasks", and/ or as a CXP, in an XML format.

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

4.3.12.6 Gantt Views

[FUA-475] The COM Application Gant View shall be implemented using, or including, the Gant View Component with all its features as defined in chapter 2.

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

[FUA-476] It shall be possible to visualize the selected set of tasks grouped by CXPs with ISR Systems as second tier sub-group.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-477] It shall be possible within the timeline part of the Gantt View to display task time-based attributes (Task Interval and Collection Time Interval).
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-478] It shall be possible within the timeline part of the Gantt View to display status value changes as annotated events/ milestones.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-479] It shall be possible within the timeline part of the Gantt View to visualize the individual ISR Systems availability, capability, capacity, and operational status (e.g. indicate timeframes where the ISR System is fully tasked and time frames where it has spare capacity).
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-480] It shall be possible to edit tasks directly in the Gant View.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-481] Using the visual indication of when ISR Systems are overloaded vs having spare capacity (see [FUA-479]) it shall be possible to reallocate tasks by dragging and dropping tasks from one ISR System to another ISR System. The visual indication of availability/ capacity status for the ISR Systems shall be dynamically updated as tasks are reassigned.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

4.3.12.7 GeoView

[FUA-482] The COM Application shall integrate with and control the GeoView component as described in chapter 2.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-483] The COM Application shall be able to show geographical areas, CRs, and collection and exploitation tasks in GeoView.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-484] The COM Application shall be able to use different shapes and colours to visually distinguish tasks with different status values GeoView.
Verification: Demonstration
Est. Cost[€]: Contractor to provide cost estimate

[FUA-485] The COM Application shall also be able to use different shapes and colours to visually distinguish tasks based on the required product types (SAR, EO, IR, etc.) in GeoView.

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

[FUA-486] The COM Application shall be able to obtain graphical representation of the Air Tasking Order (ATO) from the NCOP system (see [NCOP-IDC]) and display the ATO in GeoView.

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

[FUA-487] It shall be possible to select one or many CRs in the GeoView and generate tasks from them. The new tasks shall be added to the task set and show up in the GeoView, Task Table View, and Gant View.

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

4.3.12.8 Chart Views (statistical analysis)

[FUA-489] The COM Application Chart View shall use the Chart View Component with all its features as defined in chapter 2.

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

[FUA-490] From the set of tasks identified through search and filtering operations it shall be possible to plot Number of tasks (in the set) by statuses, by Unit, by ISR System, etc. as bar charts and pie charts.

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

[FUA-491] It shall be possible to turn developed charts into named templates to be reused again and again to reproduce statistical diagrams with the same layout for other sets of tasks.

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

5 Non-functional Requirements (NFR)

[110] NFR quality requirements is defined in accordance with ISO-25010 standard, and definitions in this chapter are based on ISO/IEC 25010:2011(E) - System and software quality models.

[111] For monitoring of quality characteristics, the definitions in the table below will be used:

Table 5-1 Definitions used for monitoring NFR quality characteristics

Error (or Fault):	A design or source code or hardware flaw or malfunction that causes a Failure of one or more Configuration Items. A mistake made by a person or a faulty Process that affects a CI is also an Error (human Error). For this System, Human Error is generally not taken into consideration in measuring the quality Performance
Fault:	see Error
Failure:	Loss of ability to Operate to Specification, or to deliver the required output. The term Failure may be used when referring to Services, Processes, Activities, or Configuration Items
Critical Failure:	it is a failure that causes an immediate cessation of the ability to perform the required function/service
Incident:	An unplanned interruption to a service or reduction in the quality of a service
Problem:	A cause of one or more Incidents. The cause is not usually known at the time the Incident happens

[112] Note: The NFRs (as qualities) are not priced separately; the cost of achieving these qualities will have to be costed as part of the I2UA applications' functional requirements [FUA-xx].

5.1 Functional Suitability

[113] ISO 25010: This characteristic represents the degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions.

[NFR-1] Location accuracy shall be better than 1 meter (i.e., sub-meter accuracy) for translation of values (UTM, Latitude/Longitudes, others).

Verification: Demonstration and Analysis

5.2 Performance Requirements

[114] ISO 25010: This characteristic represents the performance relative to the amount of resources used under stated conditions.

5.2.1 Response Times

[115] ISO 25010: Time Behaviour is the degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements.

[NFR-2] The time from restarting until all services is restored and fully operational again shall be less than 5 minutes for at least 99.5% of the Operational Time

Verification: Demonstration and Analysis

[NFR-3] Any search or query operation against a repository containing 1 trillion entities shall return results within 3 seconds for at least 99.5% of the Operational Time

Verification: Demonstration and Analysis

5.2.2 Capacity

[116] ISO 25010: Capacity. Degree to which the maximum limits of a product or system parameter meet requirements.

[117] Capacity parameters can include the number of items that can be stored, the number of concurrent users, the communication bandwidth, throughput of transactions, and size of database.

[NFR-4] The user applications and services shall be able to handle search and/ or query results consisting of a trillion of search hits, without any critical failure for at least 99.5% of its Operational time.

Verification: Analysis

[NFR-5] The applications and services shall be able to serve 2000 concurrent users/ connections, without any critical failure for at least 99.5% of its Operational time.

Verification: Demonstration and Analysis

5.3 Compatibility

[118] ISO 25010: Compatibility. Degree to which a product, system or component can exchange information with other products, systems or components, and/or perform its required functions, while sharing the same hardware or software environment.

5.3.1 Co-existence

[119] ISO 25010: Co-existence. Degree to which a product can perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product.

[NFR-6] The implemented applications and services shall be capable of operating within the NS and MS WAN environment (including servers, network, services and workstations) in the presence of the latest approved NATO Security Settings (target version to be provided by the Purchaser during the Design Stage), without any critical failure for 99.5% of its operational time.

Verification: Demonstration

5.3.2 Interoperability Requirements

[NFR-7] The I2UA shall be fully interoperable with the new INTEL-FS Spiral 2 backend (I2BE) through the I2BE's application programming interfaces (API) in 99.5% of the time without any failure. This means that the I2UA shall be able to handle safe (non-breaking) changes to the backend API without any impacts to the existing interoperability with the I2BE (for safe changes see section 5 in [OData-4.0]).

Verification: Test

5.4 Usability/ Learnability

[120] ISO 25010: Usability: Degree to which a product or system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.

[121] ISO 25010: Learnability. Degree to which a product or system can be used by specified users to achieve specified goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use.

[122] In order to measure Learnability, the Contractor will prepare a set of Learnability Tasks tailored for the user functionality to be learned that will be reviewed for approval by Purchaser prior to conducting the learnability verification.

[123] The Learnability Tasks will be performed by a maximum of 50 Purchaser's designated users, and the learnability verification will be monitored by Purchaser appointed evaluators.

[124] Each of the Learnability Tasks should individually typically not take more than 10 minutes to be executed and should include usage of the online help/ training modules.

[NFR-8] A minimum of 80% of all the Learnability Tasks shall be learned by at least 80% of the designated users within the time allocated for the Learnability Tasks (test).

Verification: Demonstration

5.5 Reliability

[125] ISO 25010: Reliability. Degree to which a system, product or component performs specified functions under specified conditions for a specified period of time.

[126] MTBF (mean time between failures) is defined as the mean time between two consecutive failures.

[127] MTBCF (mean time between critical failures) is defined as the mean time between two consecutive CRITICAL failures.

5.5.1 Availability

[128] ISO 25010: Availability. Degree to which a system, product or component is operational and accessible when required for use.

[129] Inherent Availability (Intrinsic) assumes ideal support (i.e., unlimited spares, no delays, etc.); only design related Failures are considered.

[130] Mission Inherent Availability (Intrinsic) assumes ideal support (i.e., unlimited spares, no delays, etc.); only design related CRITICAL Failures are considered

[NFR-9] The Inherent Availability shall be better than 99.5%

Verification: Analysis (using MTBF data)

[NFR-10] The Mission Inherent Availability shall be better than 99.97%.

Verification: Analysis (using MTBCF data)

5.5.2 Fault Tolerance and Recoverability

[131] Fault Tolerance is the property that enables a system to continue operating properly in the event of the failure of some of its components. A fault-tolerant design enables a system to continue its intended operation, possibly at a reduced level, rather than failing completely when some part of the system fails.

[132] Graceful Degradation is the ability of a computer, machine, electronic system or network to maintain limited functionality even when a portion of it has been destroyed or rendered inoperative (either by a fault or deliberately).

[133] Based on the principle of gracefully degradation the following recovery time have been defined:

Table 5-2 Recovery Time by Failure Criticality

Failure Type	Recovery Time
Failure	4 hours

Critical Failure	10 minutes

[134] ISO 25010: Fault Tolerance. Degree to which a system, product or component operates as intended despite the presence of hardware or software faults.

[135] ISO 25010: Recoverability. Degree to which, in the Event of an interruption or a Failure, a product or system can recover the data directly affected and re-establish the desired state of the system.

[NFR-11] For 99% of the possible Failures in any service, the service shall be recovered or be replaced by an alternative service, in no more than the amount of Recovery Time defined in the table above, without loss of data.

Verification: Test and Analysis

5.6 Security

[136] ISO 25010: Degree to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization.

[137] ISO 27001 (Information Security): Information security is all about protecting and preserving information. It's all about protecting and preserving the confidentiality, integrity, authenticity, availability, and reliability of information.

[138] Security, within the context of Information Technology (IT), is defined as the capability of the software product to protect information and data so that unauthorised persons or systems cannot read or modify them and such that authorised persons or systems are not denied access to them.

[139] I2UA will operate in the "System High" mode of operation (see [AC/35-D/2004-REV3] for definitions of Security Modes of Operation). That is, all individuals with access to the system are cleared to the highest classification of the information stored, processed or transmitted within the system, but not all individuals with access to the system have a common need to know for the information stored, processed or transmitted within the system.

[NFR-12] The applications and services shall implement relevant security techniques to protect against any security vulnerabilities as identified by Open Web Application Security Project (OWASP), see [OWASP], so that no such security vulnerabilities occurs for 99.5% of its Operational time.

Verification: Test

5.7 Maintainability

[140] ISO 25010: This characteristic represents the degree of effectiveness and efficiency with which a product or system can be modified to improve it, correct it or adapt it to changes in environment, and in requirements.

[141] The MTTR to be considered is the mean time needed to restore services after a failure in the operative condition, excluding administrative and logistics delay times.

[142] The MaxTTR to be considered is the maximum time needed to restore services in the operative condition, excluding administrative and logistics delay times.

Table 5-3 Maintainability by Failure Criticality

Failure Type	**MTTR**	**MaxTTR**
Critical Failure	1 hours	4 hours
Failure	2 hours	8 hours

[NFR-13] On the hypothesis of an operational time of 24/7/365 (24 hours per day, 7 days a week, 365 days per year), the MTTR and MaxTTR shall not exceed the time

limits defined in the table above for each single maintenance action for 99.5% of its Operational Time.

Verification: Test and Analysis

[NFR-14] The applications and services shall be able to isolate any occurring Faults/Errors and provide error diagnostics reports that identifies the Error/Fault for 90% of its Operational Time.

Verification: Analysis and Inspection

[NFR-15] The developed source code shall exhibit a Technical Debt Ratio (TDR) lower than 5% when calculated using [SonarQube] in its default setting for TDR calculations.

Verification: Inspection

[NFR-16] Automated regression tests and Continuous Integration shall ensure that for 99% of the times the applications and services are modified, and a release candidate produced, the change does not adversely affected existing functionalities/ features.

Verification: Demonstration and Inspection

5.8 Portability, Installability, and Replaceability

[143] ISO 25010: Portability. Degree of effectiveness and efficiency with which a system, product or component can be transferred from one hardware, software or other operational or usage environment to another.

[144] ISO 25010: Installability. Degree of effectiveness and efficiency with which a product or system can be successfully installed and/or uninstalled in a specified environment.

[145] ISO 25010: Replaceability. Degree to which a product can replace another specified software product for the same purpose in the same environment.

[NFR-17] It shall be possible to run fully automated installation and/ or uninstallation of the applications and services for 99.5% of the times.

Verification: Demonstration

[NFR-18] It shall be possible to install replace a previous release with a new release in a fully automated way without loss of any user data and configuration settings in 99.5% of the times.

Verification: Demonstration

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

INTEL-FS SPIRAL 2 - USER APPLICATIONS (I2UA)

BOOK II - PART IV - USD

USER STORY DOCUMENT (USD)

Version 1.0

21/12/2020

TABLE OF CONTENTS

INDEX OF FIGURES

INDEX OF TABLES

Document Revision History

Date	Version	Changes
21 Dec 2020	1.0	IFB package release version

1 Introduction

[1] This document will, from a user's perspective, describe requirements for the Intelligence Functional Services (INTEL-FS) Spiral 2 capability (hereafter referred to as INTEL-FS2) through a set of user stories.

[2] The user stories describe how INTEL-FS2 will support the users in performing their activities.

1.1 Conventions

[3] The user stories are numbered as [US n] where n is a unique user story number (e.g. [US 42]).

[4] Each user story is accompanied by acceptance criteria. The acceptance criteria are numbered as [AC n-m] where n is the number for the associated user story and m is a unique criterion number within the criteria (e.g. [AC 42-3]).

[5] Narrative text is numbered as [number] (e.g. [21]).

1.2 Background

[6] INTEL-FS2 will provide a capability for requesting, collating, visualizing, and analysing intelligence data in support of NATO Operations. This specifically means that INTEL-FS2 will be used for:

(1) Identification of intelligence gaps;

(2) Submitting requests for information (RFI) and/ or collection and exploitation of information that will help answer intelligence gaps;

(3) Manage collected information and intelligence;

(4) Supporting the user to analyse information;

(5) Sharing actionable intelligence.

[7] INTEL-FS2 users are managed in accordance with NATO organisation's standard operating procedures. This means each user will be registered as a member of an organizational node (ON).

[8] The ON concept is used to manage the sharing of intelligence with other INTEL-FS2 users with the following behaviour:

(1) An intelligence information entity (IIE) product created by a user within an ON is initially only visible within the ON.

(2) Through an approval process the user can get the IIE published, and once the IIE has been published it will be visible for users at other ONs (pending they have the appropriate access rights).

[9] INTEL-FS2 users may have access to several data sources that will contain data, information and intelligence for different purposes. Typically they may have access to one operational data source and several exercise and training data sources, but may access only one data source for a given purpose, either operational or training/exercise, at any one time.

1.3 User role – the Authorized User

[10] The user stories in this document describes how users will interact with INTEL-FS2. All user stories are written from the perspective of an Authorized User. In this context "authorized" means that the user has a particular role (e.g. as Intel creator, Intel manager, intelligence requirements management (IRM) creator, IRM manager, collection

manager, ON administrator, etc.) that will enable the user to perform the task as described by the user story.

[11] An initial (but non-exhaustive) set of access control (authorization) rules for users based on roles and other attributes are provided in chapter 3.

2 User stories

2.1 User management

[12] INTEL-FS2 will integrate with, and make use of, the Bi-Strategic Command Automated Information System (Bi-SC AIS) common identity management (IdM) services, which will provide tooling for user account management.

2.1.1 Policies management

2.1.1.1 Define policies for privilege management

[US 1] As an Authorized User I want to define the policies to be used by the INTEL-FS2 policy decision point (PDP) so users can be given the correct access privileges.

[AC 1-1] The Authorized User can establish the set of claims-based policies to be used by the INTEL-FS2 PDP.

2.1.2 User accounts managements

2.1.2.1 Create user accounts and set initial claims

[US 2] As an Authorized User I want to create user accounts so that the new users can get access to INTEL-FS2.

[AC 2-1] The Authorized User can create a new user account and define all relevant details for the user. Note: the Authorized User does not have to add any user attributes (metadata) that is managed in the NATO Enterprise Directory Service (NEDS) as this information will be automatically pre-populated (if relevant)

[AC 2-2] The Authorized User can use information from a received user account request to create a new user account, or modify the information from the user account request and then create the new user account.

[AC 2-3] The Authorized User can reject a user account request and provide a rationale for the rejection.

[AC 2-4] The Authorized User can assign a number of claims to the user account that will be used by the PDP to control the user's access privileges.

[AC 2-5] The Authorized User can grant the user access to several data repositories (operational, training, and exercises repositories) so that the user can switch between data repositories.

[AC 2-6] The Authorized User can for one particular user assign claims that differs across the different data repositories (e.g. users like trainers may have manager and administrator role claims on a training data repository, but only Reader Role claim on an operational data repository).

2.1.2.2 Manage user accounts

[US 3] As an Authorized User I want be able to modify user accounts so that I can keep the user accounts and their privileges current.

[AC 3-1] The Authorized User can add new claims/ privilege attributes to a single user account

[AC 3-2] The Authorized User can multi-select a group of users and change, or add new, claims/ privilege attributes to the selected group of users in one operation. Attributes that can be changed through such multi-edit operations includes: Parent organisation, Rotation, Organisation, Section, Command, Account enabled/ disabled, Group affiliations, Account soft-deletion, etc.

[AC 3-3] The Authorized User can delete claims from the user account.

[AC 3-4] The Authorized User can multi-select a group of users and delete claims from the selected group of users in one operation.

[AC 3-5] An Authorized User can identify a single user, or a list of users, and remove (i.e. soft delete) the user account(s).

[AC 3-6] An Authorized User can identify a single user, or a list of users, and disable/ enable the user account(s).

2.1.3 User configuration setting

2.1.3.1 Defining default user configuration settings

[US 4] As an Authorized User I want to define default user configuration settings to establish a baseline configuration so that the users will have a baseline to start from, or return to.

[AC 4-1] The Authorized User can define a set of predefined and named global search/ filter settings and make these available to all users (enterprise wide), or to a group of users based on user roles/ claims.

[AC 4-2] The Authorized User can define a set of predefined and named analytical queries and make these available to all users (enterprise wide), or to a group of users based on user roles/ claims.

[AC 4-3] The Authorized User can administer the metadata values to set defaults for metadata fields for data entry panels.

2.1.3.2 Hide/ unhide domain values

[US 5] As an Authorized User I want to be able to control which domain values that are available at an ON so that only relevant information is presented to the users.

[AC 5-1] The Authorized User can hide individual domain values.

[AC 5-2] The Authorized User can identify hidden domain values and unhide them.

2.1.4 Communication with users

2.1.4.1 Sending E-Mail to users

[US 6] As an Authorized User I want to be able to send email to users so that I can provide them with information relevant to their usage of INTEL-FS2 (e.g. planned outages due to maintenance, changes to the user's account settings, etc.).

[AC 6-1] The Authorized User can view a list of all registered INTEL-FS2 users (across all ONs).

[AC 6-2] The Authorized User can organize the list of users into categories or smart folders based on ONs and user roles/ claims.

[AC 6-3] The Authorized User can create email-groups (aliases) based on the categories or smart folders with users.

[AC 6-4] The Authorized User can activate an email composition tool (Microsoft Outlook) with the distribution list prefilled with mail addresses from the categories or smart folders of users.

2.1.4.2 Manage role-based notifications

[US 7] As an Authorized User I want to be able to manage a set of standard role-based notifications so that users with specific roles can be automatically informed of any change of interest to the role.

[AC 7-1] The Authorized User can create a role-based notification by selecting a named saved search and by identifying the users who shall receive that notification. The identification of the users to receive the notification shall be based on their role and ON.

[AC 7-2] The Authorized User can assign a category to the notification (to be used when viewing notifications).

[AC 7-3] The Authorized User can refine, update, or delete role-based notifications.

2.2 Dashboard

[14] The Dashboard will be the "landing zone"/ "home screen" for the user; i.e. the page the user is presented with when logged on to INTEL-FS2.

2.2.1 Displaying information

2.2.1.1 View latest updates on IIEs (of interest)

[US 8] As an Authorized User I want to see, and have dynamically updated, information on the latest updates to IIEs of interest to me on my Dashboard so that I obtain this information without having to manually search for it.

[AC 8-1] The Authorized User can see a dynamically updating Table View showing the latest IIEs (filtered by the user configuration) created/ updated within INTEL-FS2 the last 24 hours (as default setting) in a descending order (latest update at the top). Each entry in the table displays IIE attributes including type, title, source/ producer, date-time field for when the IIE was updated, etc.

[AC 8-2] The Authorized User can select any of the items in the table and see all the items' metadata and view the item attachments (e.g. reports are viewed in a report a Portable Document Format (PDF) viewer, an image in an image viewer, a video in a video player, etc.) and all its attachments.

[AC 8-3] The Authorized User can in case of an update to a BSO, select the BSO in the table and view it in a Relationship View. The user can then expand from the BSO in the Relationship View and see the BSOs relationships with other BSOs and further expand from these related BSOs.

[AC 8-4] The Authorized User can sort the information in the Table View by column attributes.

[AC 8-5] The Authorized User can select any IIE from the Table View and open it for editing.

2.2.1.2 View notifications

[US 9] As an Authorized User I want to see my notifications on my Dashboard so that I can dynamically see updates to these as they are generated.

[AC 9-1] The Authorized User can view a list of all his notifications being dynamically updated in a tabular format in the Notification View/ Panel.

[AC 9-2] The Authorized User can sort the list of notification on time and on category.

[AC 9-3] The Authorized User can organize the notifications in smart folders.

[AC 9-4] The Authorized User can mark one or many notifications (through multi-select) as "read" and remove/ hide these.

[AC 9-5] The Authorized User can filter the list of notifications on categories and on read status.

2.2.1.3 View and update Favourites/ Links

[US 10] As an Authorized User I want to access (read, create, update, or delete) favourites/ links from my Dashboard so that I can quickly retrieve resources of relevance to my tasking.

[AC 10-1] The Authorized User can from a dedicated area in the Dashboard access a set of links to resources available on the network where the resources can be local to INTEL-FS2 or external to INTEL-FS2 (e.g. in the Enterprise Document Management System (EDMS)).

[AC 10-2] The Authorized User can access own links (created by the user) and global links.

[AC 10-3] The Authorized User can create, update, and delete own links.

[AC 10-4] The Authorized User, pending appropriate access privileges, can create, update, and delete global links (i.e. links that show up on all users' Dashboard).

2.2.2 Managing configuration settings

2.2.2.1 Managing view of latest IIEs

[US 11] As an Authorized User I want to customize the information to be shown in the Table View for the latest updated IIEs so that the information shown there is of relevance to me.

[AC 11-1] The Authorized User can choose to use a configuration for the IIE Table View from a set of pre-defined configurations that includes configurations for "standard users" and for "managers" where the latter category will also show IIEs submitted for approval.

[AC 11-2] The Authorized User can customize a chosen configuration.

[AC 11-3] The Authorized User can define or update an advanced search query + filter to tailor/ constrain the information to be displayed in the Table View for the latest updated IIEs.

2.2.2.2 Managing E-mail notifications

[US 12] As an Authorized User I want to configure INTEL-FS2 so that I receive e-mail notifications (in my normal email tool; i.e. Microsoft Outlook) when new data that I am interested in is entered to INTEL-FS2.

[AC 12-1] The Authorized User can select a saved search and create an email subscription on this saved search.

[AC 12-2] The Authorized User can view all his email subscriptions, select one or several, and remove/ delete the subscription(s).

[AC 12-3] The Authorized User can specify the reporting frequency for when the email notification will be sent where the options shall include MINUTELY, HOURLY, DAILY, and WEEKLY.

[AC 12-4] The Authorized User receives email notifications according to specified reporting frequency when there are new data matching the saved search.

[AC 12-5] The Authorized User, for which single sign-on (SSO) works, can "click" the link in the received email and automatically be logged-on to INTEL-FS2 which will show the search result page for the executed "notification search".

2.2.2.3 Managing Dashboard notifications

[US 14] As an Authorized User I want to configure INTEL-FS2 so that I receive notifications to my Dashboard Application when new data that I am interested in is entered to INTEL-FS2.

[AC 14-1] The Authorized User can select a saved search and create a Dashboard notification subscription on this saved search.

[AC 14-2] The Authorized User can view all his/ her Dashboard notification subscriptions, select one or several, and remove/ delete the subscription(s).

[AC 14-3] The Authorized User can see search results from his subscribed searches appearing in the Dashboard Notification View/ Panel.

2.3 Products management

[15] Products can be single source, multiple source or fully fused products. Common product types are daily update briefs, imagery and geospatial Intelligence (GEOINT) reports, intelligence reports (INTREP), spot reports (SPOTREP), incident reports (INCREP), various SIGINT reports, open source reports, and human intelligence (HUMINT) reports.

[16] There are three different ways of creating products in INTEL-FS: By completing empty forms (creating a new product), by using templates, and by importing files.

[17] Templates are used to pre-fill as much metadata as possible for similar products that are created/ uploaded on a regular basis. Common examples include daily and weekly intelligence summaries (INTSUM), daily update briefs and regular imagery reports covering the same areas of interest (AOI).

[18] There are two types of templates that the users can use when creating products: Personal (private) templates managed by the users, and predefined (public) templates managed by ON administrator.

2.3.1 Creating and managing products

2.3.1.1 Create/ update products

[US 15] As an Authorized User I want to create/ update products, so that I can share intelligence and information with other users.

[AC 15-1] The Authorized User can activate a user interface specifically designed for uploading of a product.

[AC 15-2] The Authorized User can (and must) specify the location of the product file.

[AC 15-3] The Authorized User can add multiple related files.

[AC 15-4] The Authorized User can add and edit product metadata attributes.

[AC 15-5] The Authorized User can link the product to an intelligence requirement (IR).

[AC 15-6] The Authorized User can link the product to a BSO through a BSO report (BSR).

[AC 15-7] The Authorized User can link the product to a RFI.

[AC 15-8] The Authorized User can link the product to a CR.

[AC 15-9] The Authorized User can link the product to a collection and exploitation plan (CXP) task.

[AC 15-10] The Authorized User can link the product to geographical areas (e.g. named area of interest (NAI)).

[AC 15-11] The Authorized User can save the product in a workflow state in a draft status.

[AC 15-12] The Authorized User can modify a product in any workflow state.

[AC 15-13] The Authorized User can multi-select many products and efficiently (with a minimum number of user keyboard entries) modify metadata attributes for all the selected products.

[AC 15-14] The Authorized User can modify a product that had been previously submitted for approval, but then rejected (the user can use rejection comments to guide the modification).

[AC 15-15] The Authorized User can submit a product into the approval workflow process where it will be approved and published, or rejected (with rejection comments).

2.3.1.2 Create products from templates

[US 16] As an Authorized User I want to be able to use templates when creating products, so that I can automatically prefill repeatable metadata for products that I create on a regular basis.

[AC 16-1] The Authorized User can create templates, prefill the metadata entry forms with metadata values that will be reused (recurring across all the products to be created using the template), and save the template as a named template.

[AC 16-2] The Authorized User can activate a user interface for uploading of a product, select "New" and specify the appropriate named template for the product to be created.

[AC 16-3] The Authorized User can change and delete named templates.

[AC 16-4] INTEL-FS2 will provide the user with the same functionality as described in [US 15] to create new products from forms that are partly prefilled from the templates.

2.3.1.3 Create products for ingest during training exercises

[19] INTEL-FS2 will be used for training exercises. A special case to be supported with special features is when INTEL-FS2 will participate as one of several systems in support of ballistic missile (BM) system-of-system training exercises.

[20] The BM training exercises will be orchestrated using the Joint Exercise Management Module (JEMM) system.

[21] For INTEL-FS2 to interact with the JEMM system, INTEL-FS2 needs to be able to export IIE products in a format that can be hosted in the JEMM system (e.g. the IIE packaged up in an INTEL-FS2 import format and then subsequently wrapped in a JEMM “envelope”). During an exercise the JEMM system will provided these IIEs at discrete scenario events to the INTEL-FS2 system, which will then create these received IIEs as new products in the INTEL-FS2 repository.

[US 17] As an Authorized User I want to create products with associations to other IIEs of different types and export these so that these products can be used for automated ingestion during training exercises.

[AC 17-1] The Authorized User can create an exportable product in support of training exercise.

[AC 17-2] The Authorized User can attach a document to the training exercise product, and link it to other IIEs of different IIE types.

[AC 17-3] The Authorized User can export the products to the file system so that files can be copied to, or shared with, the JEMM system.

2.4 BSO management

[22] A BSO is a structured IIE uniquely identifying an object in the battlespace (with or without location). BSOs support maintaining structured information on the following entities of intelligence interest: Equipment, events (including improvised explosive device (IED) incidents), organisations, persons, places and units. All BSOs are entities and as such can exist with or without relationships to other BSO entities.

[23] A BSR is a structured, time-dependent status report on the BSO (see Figure 2-1). A BSO has one or more BSRs representing the observed history (time series) of the BSO.

Figure 2-1 BSO and BSR

[24] A BSO can be linked with one or many other BSOs where those other linked BSOs can be of any type.

[25] Together, a Person BSO, its BSRs and its relationships to other BSOs, support the maintenance of intelligence on an individual. This includes a description of the physical characteristics and of the private and professional attributes of an individual.

[26] Collectively, an organisation BSO, its BSRs and its relationships to other BSOs, support the maintenance of intelligence on an organisation such as an industrial company, non-governmental organisation (NGO), a social, terrorist or criminal grouping. An organisation is divisible into component sub-organisations. Note: Military organisations are managed as unit BSOs.

[27] Along with its BSRs and its relationships to other BSOs, a unit BSO supports the maintenance of intelligence on individual units and groupings of military units. Such groupings are typically (but not necessarily) hierarchical and can infer a chain of command. Examples of units include company, brigade, air wing, ship, fleet or flotilla.

[28] Combined, an equipment BSO and its BSRs, equipment type and its relationships to other BSOs, support the need to maintain intelligence on individual versions and groups of equipment of specified equipment type(s).

[29] Equipment types maintain technical intelligence (TECHINT) on military/ civilian equipment (note the equipment types include BM TECHINT). Equipment type supports reporting through the time series BSR mechanism but it is not considered a true BSO. It represents the type of one or more equipment BSO instances; collectively equipment type data are encyclopaedic.

[30] Together an event BSO, its BSRs and its relationships to other BSOs collectively support the maintenance of intelligence on events in the battlespace such as high-interest operations, attacks, demonstrations, celebrations, meetings, elections, significant exercises, natural disasters etc. BM historical firing events (HFE) are managed within the INTEL-FS2 repository as event BSOs.

[31] Along with its BSRs and relationships to other BSOs, a place BSO supports the maintenance of intelligence on places, installations and facilities. These include: Airfields

or landing sites, naval bases, industrial facilities (factories), religious buildings (churches, mosques), criminal locations (drug labs, known sites of criminal activities), political and government buildings, etc.

2.4.1 Creating and managing BSOs/ BSRs

2.4.1.1 Create/ update a BSO and/ or BSR

[US 18] As an Authorized User I want to create or update a BSO or a BSR so that this new intelligence can be used in analysis and shared with other users.

[AC 18-1] The Authorized User can create BSOs of type persons, units (including BM force units), organizations, events (including HFEs), places (including BM locations/ BMOAs), Equipment (including BM Equipment), and Equipment Types (including BM TECHINT).

[AC 18-2] The Authorized User can create a BSO from a BSO template (i.e. where most of the BSO attributes is prefilled from the template). The Authorized User can save relevant information of a BSO as a named BSO template that can be used at a later point to create new BSOs where a new BSO is partly prefilled from the saved template. The Authorized User can manage a set of such named templates (i.e. templates can be copied, updated, and deleted).

[AC 18-3] The Authorized User can create an in-memory copy a BSO and create a new BSO from the copied BSO (not including the name of the original BSO to avoid duplicates). When copying a BSO all information for the BSO (including its relationships) shall be copied with the exception of the status reports, which shall not be copied (the new BSO will be a copy of the last 'ASAT approved status report).

[AC 18-4] The Authorized User can link a BSO, through a BSR, to a geographic area (typically to a NAI, but linking to other geographic area types shall be possible).

[AC 18-5] The Authorized User can add an attachment directly to a BSO (e.g. a picture of a person for a Person BSO and use that as a thumbnail for the BSO) as well as adding attachments to BSRs.

[AC 18-6] The Authorized User can for a unit BSO assign equipment to the unit within the BSO's attributes (i.e. not as relationships) by specifying type, quantity (i.e. equipment holdings) and other values as unit equipment lines

[AC 18-7] The Authorized User can for a place BSO (e.g. an airfield) assign equipment to the place within the BSO's attributes (i.e. not as relationships) by specifying type, quantity (i.e. equipment holdings) and other values as place equipment lines and place aircraft equipment lines.

[AC 18-8] The Authorized User can for event, organisation and person BSOs assign equipment within the BSO's attributes (i.e. not as relationships) by specifying type, quantity (i.e. equipment holdings) and other values as generic equipment lines.

[AC 18-9] The Authorized User can create a link from the new BSR to one or more existing associated product(s) by locating the relevant product and adding the link between the BSR being edited and the product.

[AC 18-10] The Authorized User can create a link from the new BSR to an RFI, an RFI Response, a Collection Requirement (CR) and other IRM elements such as PIR's, SIR's and EEI's. This linkage shall be bi-directionally navigable from both the BSR to the IRM/CM IIE and from the IRM/CM IIE to the BSR; further the set of IRM/ CM links across the BSRs of a root BSO shall be visible on the root BSO.

[AC 18-11] The Authorized User can create relationships to other existing approved and published BSOs and describe the nature of the relationships.

[AC 18-12] The Authorized User can change the status of the BSR from CONTRIBUTING to ASSESSED (and vice versa).

[AC 18-13] The Authorized User can move a BSR from one BSO to another BSO (e.g. when a BSR has been incorrectly assigned to the wrong unit BSO). The newly moved BSR will also need to be approved, even if it had previously been approved under the original BSO.

[AC 18-14] The Authorized User can save a BSO as a named BSO template.

[AC 18-15] The Authorized User can submit the new or updated BSOs, BSRs, and relationships, into the approval workflow process (where they will be approved and published, or rejected).

2.4.1.2 Create/ update reporting on IED Incidents

[32] INTEL-FS2 will support the management of IED incidents as a special kind of event BSO that can be reported on (i.e. adding BSRs to the IED incidents).

[33] An IED incident includes technical and forensic information.

[34] Multiple IED Incidents can be associated with a given BSO event.

[US 19] As an Authorized User I want to manage reporting on IED incidents in order to build a complete picture of adversary IED activities in the area of intelligence interest (AOII) and thereby contribute to the counter-IED (C-IED) mission.

[AC 19-1] The Authorized User can create and update IED datatypes to include IED incident, equipment line, main charge, enhancement, power source, container, switch and initiator.

[AC 19-2] The Authorised User can associate IED Incidents with BSO Events.

[AC 19-3] The Authorised User can navigate between BSO Events and associated IED Incidents in both directions.

[AC 19-4] The Authorized User can submit the new or updated IED datatypes and relationships, into the approval workflow process (where they will be approved and published, or rejected).

2.4.1.3 Electronic order of battle (EOB) and associated TECHINT

[35] INTEL-FS2 will contain EOB and emitter TECHINT data in support of intelligence functions.

[36] EOB derived types such as emitter equipment, installations, facilities, emitter equipment types (TECHINT) and platforms behave as their underlying BSO types. I.e. they can be searched for; they can be linked to other BSOs as a part of an order of battle (ORBAT); they can have BSRs; they can be part of an intelligence situation; they can be shown on link chart diagrams; etc.

[37] INTEL-FS2 is not the authoritative source of emitter TECHINT data. From the INTEL-FS2 perspective, this data is encyclopaedic in nature and is not to be updated within INTEL-FS2 (i.e. these IIEs are "read-only").

[US 20] As an Authorized User I want to be able to link BSOs to EOB data and associated electronic warfare derived TECHINT so that a complete understanding across all components of an opposing force (OPFOR) ORBAT can be obtained

[AC 20-1] The Authorized User can search for EOB and associated TECHINT data expressed in the form of the appropriate BSOs (e.g. a RADAR emitter is a type derived from BSO equipment and the associated RADAR emitter TECHINT is a derived type of equipment type) and create relationship to other BSO types.

2.4.1.4 Creating/ updating BSOs and relationships using the Relationship View

[US 21] As an Authorized User I want to use the Relationship View for creating/ updating BSOs and relationships between BSOs and other IIEs as this is a highly efficient way of managing BSOs and their relationships.

[AC 21-1] The Authorized User can identify a set of BSOs and other non-BSO IIEs and add them to the Relationship View.

[AC 21-2] The Authorized User can from within the Relationship View create a new BSO "in place" (e.g. through activating BSO entry form from a "right-click" context menu).

[AC 21-3] The Authorized User can establish relationships between the set of BSOs by drawing new relationships between BSOs and adding the required data to describe the nature of the relationships.

[AC 21-4] The Authorized User can establish relationships between BSOs and other non-BSO IIEs.

[AC 21-5] The Authorized User can modify the nature of a relationship by graphically selecting the relationship and modifying the data that is describing the nature of the relationship.

[AC 21-6] The Authorized User can delete relationships.

[AC 21-7] The Authorized User can view/ inspect the nature of the relationships (e.g. using dashed line for tentative relationships and solid lines for confirmed relationships).

[AC 21-8] The Authorized User can view/ inspect the workflow state of BSOs and IIEs in the Relationship View (through workflow annotations on symbols and icons).

[AC 21-9] The Authorized User can chose between different visualization layouts including organizational chart (organogram) hierarchal layout (useful for visualizing units and subordinate units).

[AC 21-10] The Authorized User can submit the new or updated BSOs, BSRs, and relationships, into the approval workflow process (where they will be approved and published, or rejected) or in case of having additional privileges, directly from the Relationship View approve and publish the new/ changed IIEs.

2.4.1.5 Creating/ updating BSO relationships using the Map View

[US 22] As an Authorized User I want to use the Map View for creating/ relationships between BSOs and other IIEs.

[AC 22-1] The Authorized User can identify a set of BSOs and other non-BSO IIEs and add them to the Map View.

[AC 22-2] The Authorized User can graphically create/ update links between BSOs and non-BSOs in the Map View (e.g. link HFEs to BM operating areas (BMOA)).

[AC 22-3] The Authorized User can submit the new or updated relationships into the approval workflow process (where they will be approved and published, or rejected) or in case of having additional privileges, directly from the view approve and publish the new/ changed relationships.

2.4.1.6 Extract reports for collation to editable scratch panel and to PDF viewer

[US 23] As an Authorized User I want to have the report to be collated imported into an editable scratch panel and the original and formatted report available in a PDF viewer so that I can start executing the collation work.

[AC 23-1] The Authorized User can identify and select a report for collation and get the text from the report extracted as plain text into an editable scratch panel.

[AC 23-2] The Authorized User can switch between viewing the report as raw text and in its original formatting in a PDF view, and can also view all related files of the report in a PDF view.

[AC 23-3] The Authorized User can use a multitude of colours to highlight the text in the scratch panel (Note: This highlighting is only used as a temporary work-step to aid the collation work).

[AC 23-4] The Authorized User can add white space between sentences to divide the extracted text into paragraphs.

[AC 23-5] The Authorized User can add additional plain text into the text in the scratch panel (typically before a paragraph).

[AC 23-6] The Authorized User can copy text from the scratch panel to the clipboard, and from the clipboard paste the text into BSO/ BSR entry forms in 8-bit Unicode Transformation Format (UTF-8).

[AC 23-7] The Authorized User can temporarily save the text in the scratch panel while persisting also the edits and highlighting done to the text and link the saved scratch text to the report being collated, so that if the collation is interrupted the collation work can be picked up (in a later session) from where it was left off.

2.4.1.7 Creating BSOs and BSRs from report extracted to a scratch panel

[US 24] As an Authorized User I want to use the report extracted to a scratch panel as the source for my collation work so that I can efficiently identify BSOs and copy/ paste text into BSRs.

[AC 24-1] The Authorized User can, within the extracted report text, detect existing BSOs that are visually marked up and which includes a hyperlink to the details of the existing BSOs. The mark-up being used will be visibly distinguishable from other text highlighting used.

[AC 24-2] The Authorized User can verify that a found BSO is the correct one by viewing all its details: That means having the ability to view all the reports (BSRs) with their essential metadata (including creation time, update time, ASAT time), the BSRs and their attachments, and the change history for the selected BSO.

[AC 24-3] The Authorized User can in the case when an entity/ token in the text matches multiple BSOs visually identify that this is the case in the marked-up text, and can through the user interface inspect the multiple BSO candidates and select the correct BSO for the collation.

[AC 24-4] The Authorized User can select a marked-up BSO in the text and bring the BSO up in an edit panel to create a new BSR. The Authorized User can copy text from the scratch panel and paste that text (in UTF-8 format) into BSR entry forms to populate the new BSR.

[AC 24-5] The Authorized User can manually identify and mark-up new/ unknown BSOs in the report text in the scratch panel and create new BSOs.

[AC 24-6] The Authorized User can when choose whether to create a new BSR (i.e. provide all the details from scratch), or to start from a prepopulated BSR based previous BSR data.

[AC 24-7] The Authorized User can select one or more BSOs from the text and display them in the Relationship View, and subsequently create relationships between these BSO.

[AC 24-8] The Authorized User can also bring other existing BSOs (that are not mentioned in the report text) into the Relationship View to create relationships to BSOs found in the report text.

[AC 24-9] The Authorized User can create a link from a new BSR to the source report being collated.

[AC 24-10] The Authorized User can, during the collation of the report, track the new BSOs/ BSRs in a separate "collation tracking panel".

[AC 24-11] The Authorized User can select a BSO in the "collation tracking panel" and have the BSO highlighted in the text in the scratch panel, and have the details of the selected BSO and the associated newly created BSR (i.e. from the current collation) presented on the screen.

[AC 24-12] The Authorized User can submit the new or updated BSOs, BSRs, and relationships, into the approval workflow process (where they will be approved and published, or rejected) or in case of having additional privileges, directly approve and publish them.

2.4.1.8 Investigating and resolving BSO duplication

[US 25] As an Authorized User I want to be able to compare BSOs to detect if they are duplicates so that I can subsequently merge the BSOs (and their reports) into a single BSO.

[AC 25-1] The Authorized User can view the BSOs suspected of being duplicates in a comparison tool (similar to file comparison tools) where the tool is visually indicating the difference between the BSOs.

[AC 25-2] The Authorized User can use the BSO comparison tool as a merge tool and combine two or more BSOs into a single merged BSO.

[AC 25-3] The Authorized User can, for each metadata attribute, select which BSO to pick the attribute value for the merged BSO.

[AC 25-4] The Authorized User can choose all BSO metadata attributes from one particular BSO for the new merged BSO in one operation.

[AC 25-5] The Authorized User can inspect the new merged BSO and verify that it contains all information from the duplicate BSOs (i.e. all relationships/ links, and all BSRs) have been successfully copied into the new BSO.

[AC 25-6] The Authorized User can commit the merge changes to the INTEL-FS2 repository.

2.4.2 Collation task management

2.4.2.1 Managing own collation tasks list

[US 26] As an Authorized User I want to have my collation tasks organized in a task list so that I can better plan my collation work.

[AC 26-1] The Authorized User can view a list of reports that has been allocated to him/ her to collate.

[AC 26-2] The Authorized User can for reports that has related files associated with it, see these related files listed with the reports (e.g. the report entry in the list can be expanded to show a list of related files associated with the report).

[AC 26-3] The Authorized User can see a "global list" of all collation tasks for all users and the current status of these tasks.

[AC 26-4] The Authorized User can select a collation task allocated to another user and take responsibility for the collation task (i.e. reallocate the task to himself/ herself).

[AC 26-5] The Authorized User can identify reports that have not been collated and are unallocated, and allocate the report as a collation task for himself/ herself.

[AC 26-6] The Authorized User can through actions process the collation of a report into different collation states (Unallocated, Allocated, Started, Aborted, Completed, NoInformationValue, and ReviewedNotCollated).

2.4.2.2 Manage collation tasking

[US 27] As an Authorized User I want to manage the collation tasking so that I can plan, prioritize, and track the progress of the collation work.

[AC 27-1] The Authorized User can identify all reports that needs to be collated.

[AC 27-2] The Authorized User can create tasks and allocate reports for collation to individual users.

[AC 27-3] The Authorized User can assign priorities to the individual collation tasks.

[AC 27-4] The Authorized User can change the priority of collation tasks.

[AC 27-5] The Authorized User can reallocate a collation task to another user.

[AC 27-6] The Authorized User can delete/ remove a collation task (e.g. set the collation status to ReviewedNotCollated).

[AC 27-7] The Authorized User can revert the status of a collated report (i.e. a report marked as Completed, Aborted, NoInformationValue, or ReviewedNotCollated) back to the Allocated state (e.g. in case more collation work is required for the specific report) and allocate the report to a user for further collation.

2.4.3 OPFOR ORBAT management

[38] INTEL-FS2 supports the data lifecycle management of OPFOR ORBATs. OPFOR ORBAT entities are IIEs and, as such, can be persisted, discovered, navigated, searched and queried.

[39] An OPFOR ORBAT is an intelligence assessment of identity, strength, command structure, position, composition and disposition of the personnel, units and equipment holdings of an opposing force - or a particular subset thereof (EOB, BM ORBAT, etc.)

[40] OPFOR ORBAT entities have a name; have an interval of validity in time and can be associated with concepts of operation (CONOPS) and/ or tactics, techniques and procedures (TTPs).

2.4.3.1 Create or update OPFOR ORBAT

[US 28] As an Authorized User I want to create or update an OPFOR ORBAT in order to model a real world ORBAT so that this can be persisted, used in analysis and shared with other users.

[AC 28-1] The Authorized User can activate a user interface specifically designed for managing OPFOR ORBATs.

[AC 28-2] The Authorized User can create a new ORBAT from scratch, or as a clone of an existing ORBAT including all of its internal structure.

[AC 28-3] The Authorised User can populate or update an OPFOR ORBAT with BSOs (units, persons, equipment, and equipment types) and the necessary BSO relationships amongst these BSOs.

[AC 28-4] The Authorized User can assign equipment holdings (as Equipment Types) to Units within an OPFOR ORBAT without specifying the geographic location of the Unit

[AC 28-5] The Authorised User can populate or update an OPFOR ORBAT with multiple OPFOR CONOPS and TTPs.

[AC 28-6] The Authorized User can link unit BSOs in the ORBAT to multiple OPFOR CONOPS and TTPs.

[AC 28-7] The Authorized User can submit the new or updated OPFOR ORBAT into the approval workflow process (where it will be approved and published, or rejected).

2.4.3.2 Inspect OPFOR ORBAT

[US 29] As an Authorized User I want to inspect the OPFOR ORBAT in order to track changes, understand and analyse the ORBAT.

[AC 29-1] The Authorized User can visualize the OPFOR ORBAT an organogram in a Relationship View.

[AC 29-2] The Authorized User can visually detect that the ORBAT viewed in the Relationship View has received an update (e.g. a change made by a different user) and refresh the Relationship View so that it visualizes the update.

[AC 29-3] The Authorized User can visualize OPFOR ORBAT elements as a geographic laydown in a Map View.

[AC 29-4] The Authorized User can visually detect that the ORBAT viewed in the Map View has received an update and refresh the Map View so that it visualizes the update.

[AC 29-5] The Authorized User can obtain the OPFOR ORBAT as a PDF document and view it in a PDF viewer.

[AC 29-6] The Authorized User can visualize the OPFOR ORBAT in a tabular form (Table View) and in the tabular form have access to key ORBAT information (like CONOPS and TTPs).

[AC 29-7] The Authorized User can command the calculation of the total holdings of a specific equipment type for an OPFOR ORBAT element (and subordinates) and have the result presented on the screen.

[AC 29-8] The Authorized User can identify and view changes to the OPFOR ORBAT over time.

[AC 29-9] The Authorized User can detect if units and holdings with the same identity is incorrectly duplicated across ORBAT elements.

2.5 Support to targeting

2.5.1 Viewing and augmenting target information

[41] A targeting entity is within INTEL-FS represented as a BSO with additional targeting designations (Target, Candidate Target or No-Strike Entity) and targeting properties. A targeting BSO can be enriched with additional information (e.g. images, status, location) to enable intelligence support to targeting.

[42] A Joint Targeting List (JTL) is a mission-specific list of possible targets that can be nominated as targets in support of accomplishing the mission.

[43] A Restricted Target List and a No-strike List contain battlespace objects (e.g. chemical plants, nuclear plants etc.) that cannot be immediately nominated in support of accomplishing the mission. No-strike entities cannot be nominated and restricted targets have to undergo the process of requesting the restriction lifted in support of accomplishing the mission.

[44] A Target Nomination List (TNL) contains targets nominated for engagement by the individual headquarter (HQ). A new TNL is established for each day during a mission.

[45] A Joint Prioritised Target List (JPTL) contains the full set of targets approved to be engaged in support of achieving the mission.

[46] A Prioritised Target List (PTL) contains the subset of targets from the JPTL to be engaged by a component command.

2.5.1.1 Viewing target lists on a map

[US 30] As an Authorized User I want to view targets from various types of target lists superimposed on a map so that I improve my situational awareness of BSOs relevant to me.

[AC 30-1] The Authorized User can view the JTL targets in a separate layer superimposed on a map.

[AC 30-2] The Authorized User can view the BSOs from Restricted Target Lists and No-strike Lists in a separate layer superimposed on a map.

[AC 30-3] The Authorized User can view the targets from the TNLs for the different HQs in separate layers superimposed on a map.

[AC 30-4] The Authorized User can view the targets from the JPTL in a separate layer superimposed on a map.

[AC 30-5] The Authorized User can view the targets from the PTLs for the different component commands in separate layers superimposed on a map.

[AC 30-6] The Authorized User can view Candidate Targets in a separate layer on a map.

[AC 30-7] The Authorized User can individually enable/ disable (or hide/ unhide) each of the different target list layers.

[AC 30-8] The Authorized User can use colours (selected from a colour palette) to define different colours for BSOs based on their targeting property by defining different colours for Targets, Restricted Targets, and No-strike BSOs.

2.5.1.2 Viewing details of individual targets

[US 31] As an Authorized User I want to view targeting properties of the individual targets/ BSOs from the various targeting lists so that I improve my situational awareness of targets/ BSOs relevant to me.

[AC 31-1] The Authorized User can select any of the available target lists and bring them into Table Views with details on the individual targets (BSO data and target folder data).

[AC 31-2] The Authorized User can combine several target lists into one single Table View, and within that Table View clearly identify a BSO as a Target, Candidate Target or No-Strike Entity.

[AC 31-3] The Authorized User can from Table Views for each target access and inspect all details of the BSOs (including their BSRs and attachments) and all target attributes from the target folder (except weaponeering solutions and collateral damage estimates (CDE)).

[AC 31-4] The Authorized User can for any target, identify and view all products and reports (such as battle damage assessment (BDA) reports) associated with the target.

2.5.1.3 Providing intelligence support to targeting

[US 32] As an Authorized User I want to improve and enhance information on targets/ BSOs so that I can provide support to targeting.

[AC 32-1] The Authorized User can select a set of BSOs and mark those as Candidate Targets.

[AC 32-2] The Authorized User can select a set of BSOs mark those as Candidate No-strike BSOs.

2.6 Geographic features/ areas management

[47] INTEL-FS2 will has support for a variety of geographic features, including:

(1) AOO - area of operations
(2) AOIR - area of intelligence responsibility
(3) AOI - area of interest
(4) AOII - area of intelligence interest
(5) NAI - named area of interest
(6) TAI - target area of interest

[48] The term geographic area will be used below to encompass any type of geographic areas as listed above.

2.6.1 Manage geographic features/ areas

2.6.1.1 Create/ update geographic areas

[US 33] As an Authorized User I want to create and update geographic areas so that these can be referenced in multiple use cases within INTEL-FS2 (e.g. Intelligence Requirements Management and Collections Requirements Management).

[AC 33-1] The Authorized User can create/ update a geographic area by directly defining it from a map where the supported area types as a minimum includes points, circles, rectangles, and polygons.

[AC 33-2] The Authorized User can create/ update a geographic area by entering geographical coordinates where the supported area types as a minimum includes points, circles, and rectangles.

[AC 33-3] The Authorized User can enter the area coordinates in multiple geographic reference systems 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, etc.

[AC 33-4] The Authorized User can create a geographic area by import from eXtensible Markup Language (XML), Keyhole Markup Language (KML) and NATO Vector Graphics (NVG) files.

[AC 33-5] The Authorized User can visualize and edit a geographical area on a map.

[AC 33-6] The Authorized User can link a geographical area to an operation and/ or a named collection.

[AC 33-7] The Authorized User can add notes/ comments to the geographical area.

[AC 33-8] The Authorized User can delete an existing geographical area.

[AC 33-9] The Authorized User can submit new or updated geographic areas into the approval workflow process (where they will be approved and published, or rejected).

2.7 Intelligence Situation management

2.7.1 Creating and managing IIEs for the Intelligence Situation

2.7.1.1 Create/ load overlays

[US 34] As an Authorized User I want to create/ load overlays so that I can study the Intelligence Situation.

[AC 34-1] The Authorized User can create/ load overlays in a Map View.

[AC 34-2] The Authorized User can search for any IIE with a geospatial location, have them associated with an overlay, and subsequently rendered in the Map View as icons, or NATO Joint Military Symbology (APP-6) symbols as appropriate.

[AC 34-3] The Authorized User can create annotations that can include text and a wide variety of vectorised features to include lines of bearing, ellipses and radii and associate the annotations with the overlay.

[AC 34-4] The Authorized User can import (and visualize) externally provided georeferenced data in KML or NVG format, or imported through Open Geospatial Consortium (OGC) services (e.g. through the Web Map Service[1] (WMS)) and associate this externally provided data with the overlay.

[AC 34-5] The Authorized User can add instructions guiding the rendering of the overlay (e.g. that the externally provided NVG data is drawn first (in the background), followed by annotations, followed by rendering IIEs, etc.)

[AC 34-6] The Authorized User can save overlays as named overlays.

[AC 34-7] The Authorized User can submit a named overlay into the approval workflow process where it will be approved and published, or rejected (with rejection comments).

[1] The WMS service is foreseen as the interface to be used to import weather data from the NAMIS system

2.7.1.2 Expose a named overlay as the Intelligence Situation

[US 35] As an Authorized User I want to expose a named overlay as the Intelligence Situation so that it becomes available at all Organizational Nodes (ON) and can be shared with other applications such as NATO Common Operating Picture (NCOP).

[AC 35-1] The Authorized User can locate an approved and published named overlay

[AC 35-2] The Authorized User can expose the named overlay as the Intelligence Situation so that it can be subscribed to by other applications as a container with references to "live" IIEs (i.e. the external applications can stay up to date with changes to the IIEs in Intelligence Situation)

2.8 BM joint intelligence preparation of the operational environment (JIPOE)

[49] Joint intelligence preparation of the operating environment (JIPOE) is the intelligence process and analytical methodology used to produce intelligence assessments, estimates, and other intelligence products in support of the commander's decision-making and operations planning process.

2.8.1 Evaluating the operating environment (OE)

2.8.1.1 Create/ update areas

[US 36] As an Authorized User I want to create/ update areas, so that I can confine/ focus my operating environment (OE) analysis.

[AC 36-1] The Authorized User can create/ update area of intelligence interest (AOII).

[AC 36-2] The Authorized User can create/ update area of interest (AOI).

[AC 36-3] The Authorized User can create/ update Areas At Risk (AAR)

[AC 36-4] The Authorized User can link the AOI to the AOII.

[AC 36-5] The Authorized User can create/ update multiple named ballistic missile operating areas (BMOA).

[AC 36-6] The Authorized User can link BMOAs to an AOI.

[AC 36-7] The Authorized User can link a BMOA to one or many OPFOR BM ORBAT entities (i.e. other BSOs).

[AC 36-8] The Authorized User can link PIRs to an AOI.

[AC 36-9] The Authorized User can submit the new or updated areas (AOII, AOI, and BMOA) and links to/ from these areas into the approval workflow process (where they will be approved and published, or rejected).

2.8.1.2 Create/ update a named collection for the OE

[US 37] As an Authorized User I want to create/ update a named collection for the OE, so that I can establish a grouping of the information for the collaborative JIPOE process.

[AC 37-1] The Authorized User can create/ update a named collection for the JIPOE processing.

[AC 37-2] The Authorized User can include IIEs of any type in the named collection.

[AC 37-3] The Authorized User can submit the new or updated named collection into the approval workflow process (where it will be approved and published, or rejected).

2.8.1.3 Create/ update overlay for the OE

[US 38] As an Authorized User I want to organize information items in overlays to support multiple analyses of the OE.

[AC 38-1] The Authorized User can create a named overlay for an OE.

[AC 38-2] The Authorized User can link the overlay to a named collection.

[AC 38-3] The Authorized User can create an overlay using textual and graphical annotations to depict obstacles restricting military movement (note this overlay is often referred to as the MCOO = modified combined obstacle overlay).

[AC 38-4] The Authorized User can create an overlay using textual and graphical annotations for civil considerations.

[AC 38-5] The Authorized User can create an overlay using textual and graphical annotations for depicting statistical weather information, and for adding weather effects matrix as attachment to the overlay.

[AC 38-6] The Authorized User can assign parametrized service endpoints to weather service in a dynamic weather overlay (this means that the weather situation is dynamically updated in this overlay).

[AC 38-7] The Authorized User can submit the new or updated overlays into the approval workflow process (where they will be approved and published, or rejected.

2.8.1.4 Visualize/ evaluate the OE

[US 39] As an Authorized User I want to exploit a multitude of overlays so that I can evaluate the OE.

[AC 39-1] The Authorized User can identify overlays of relevance to the analysis of the OE and display them in the Map View.

[AC 39-2] The Authorized User can view and filter different types of terrain ("land use") (e.g. primary roads, secondary roads, minor roads, urban areas, rural areas, agricultural land, grassland, forest, open water, wetland, tundra, snow/ice etc.) in separate map layers

[AC 39-3] The Authorized User can run multiple terrain analysis and have the result visualized in Map View. The Authorized User can use information from these terrain analysis to update the MCOO.

[AC 39-4] The Authorized User can import updated weather information (forecasted weather visibility, wind, precipitation, cloud cover, temperature, and humidity etc.) and have the result visualized in Map View. The Authorized User can do this by rerunning the weather update services call.

[AC 39-5] The Authorized User can import chemical, biological, radiological and nuclear (CBRN) hazard areas into the Map View. The Authorized User can use the CBRN information to update the MCOO.

[AC 39-6] The Authorized User can create/ update annotations (as text and/ or graphics) as an overlay and link to the OE named collection.

[AC 39-7] The Authorized User can export the full depiction of the OE in the Map View Evaluation to KML and NVG files.

2.8.2 Evaluating actors in OE

[50] Note: Network analysis of the actors in the OE is captured under the analysis user stories in section 2.10 Analysis.

2.8.2.1 Create/ update actors

[US 40] As an Authorized User I want to create/ update actors (e.g. Nations of Concern), so that I can include actor analysis into the JIPOE process.

[AC 40-1] The Authorized User can activate a user interface designed for managing actors.

[AC 40-2] The Authorized User can create, updated, and delete actors.

[AC 40-3] The Authorized User can create/ update a BM Nation of Concern as an actor.

[AC 40-4] The Authorized User can add and/ or edit metadata attributes for the actor.

[AC 40-5] The Authorized User can add attachments to the actor, e.g. a PMESII[3] analysis.

[AC 40-6] The Authorized User can attach/ link the actor to CONOPS and TTP.

[AC 40-7] The Authorized User can link the actor to BM locations (i.e. place BSOs).

[AC 40-8] The Authorized User can link the actor to possible targets for BM attacks (through different lists of assets).

[AC 40-9] The Authorized User can visualize assets, BM locations, and range rings in a Map View.

[AC 40-10] The Authorized User can create and attach a threat analysis to the actor.

[AC 40-11] The Authorized User can link the actor to an OPFOR ORBAT.

[AC 40-12] The Authorized User can link the actor to a named collection.

[AC 40-13] The Authorized User can create an overlay for the actor and all information entities linked with the actor.

[AC 40-14] The Authorized User can submit the new or updated actor information into the approval workflow process (where it will be approved and published, or rejected).

[3] Political, Military, Economic, Social, Information, and Infrastructure

2.8.2.2 View and analyse actor information

[US 41] As an Authorized User I want to view the actor information in different views to support my analysis of the actor.

[AC 41-1] The Authorized User can select an actor, and have the actor and all information linked to the actor visualized in a Map View.

[AC 41-2] The Authorized User can select an actor, and have the actor and all information linked to the actor visualized in a Relationship View.

[AC 41-3] The Authorized User can select the assets that are identified as the actor's possible targets from the Map View and/ or the Relationship View and have them presented in an editable Table View.

[AC 41-4] The Authorized User can annotate the assets (the potential OPFOR BM targets) in the Table View by adding information on the individual targets where this additional information is persisted within INTEL-FS2.

[AC 41-5] The Authorized User can view the asset annotation information also in the Map View and Relationship View (e.g. in a dialog appearing when hovering over the asset).

[AC 41-6] The Authorized User can view BM launch positions and range rings based on BM TECHINT data in the Map View.

[AC 41-7] The Authorized User can study the BM OFOR ORBAT associated with the actor in a Relationship View.

[AC 41-8] The Authorized User can export the full depiction of the actor analysis in the Map View to KML and NVG files.

[AC 41-9] The Authorized User can export the full depiction of the actor analysis in the Relationship View to a Portable Network Graphics (PNG) file.

[AC 41-10] The Authorized User can retrieve a summary of the actor's BM capabilities (holdings) into a Table View.

[AC 41-11] The Authorized User can select a document view of the actor analysis, have all the information on the actor transformed into an actor analysis report and read it as a document.

2.8.3 Determining OPFOR BM courses of action (COA)

2.8.3.1 Establishing OPFOR COA comparison framework

[US 42] As an Authorized User I want to create/ update a multi-criteria decision analysis (MCDA) comparison framework so that I can rank the different OPFOR COAs (e.g. as most likely and most dangerous).

[AC 42-1] The Authorized User can create and update multiple sets of configurable OPFOR COA assessment criteria (see examples in left-hand column in Table 2-1) with a value range for each criterion (e.g. 0..100, or LOW, MEDIUM, HIGH, etc.). Different criteria set can be used for different OPFOR COA comparisons (e.g. a different set could be used for ranking most likely OPFOR COAs than for ranking most dangerous OPFOR COA).

[AC 42-2] The Authorized User can define evaluation criteria with weights for each such evaluation criterion (see example of evaluation criteria and their weights in Table 2-1).

[AC 42-3] The Authorized User can name and save OPFOR COA assessment criteria with associated evaluation criteria and weights.

[AC 42-4] The Authorized User can submit OPFOR COA assessment criteria with weights into the approval workflow process (where they will be approved and published, or rejected).

Table 2-1 Example of a MCDA OPFOR COA rating table

		Weights			
		Suitability	Feasibility	Acceptability	...
		0.6	0.9	0.2	...
COA Assessment Criteria	Adversary Likely Objective	MED	LOW	LOW	
	Assessed Expected End State	LOW	HIGH	LOW	
	Adversary Level of Risk	HIGH	MED	MED	
	Past Activity	...	...	...	
	Targeting Strategy	...	...	...	
	Warhead types and expected use of WMD	...	...	...	
	Operational Tempo	...	...	...	
	Areas at Risk from Adversary BM capabilities	...	...	...	
	Named Areas of Interest (includes BMOAs)	...	...	...	
	Assessed TTPs to coordinate attacks	...	...	...	
	Associated Indicators and Warnings	...	...	...	

2.8.3.2 Creating, updating and defining COAs

[US 43] As an Authorized User I want to be able to create/ update and define OPFOR BM COAs so that these can subsequently be used for OPFOR BM COA comparisons and OPFOR BM COA rankings.

[AC 43-1] The Authorized User can create/ update multiple OPFOR BM COAs.

[AC 43-2] The Authorized User can delete an OPFOR BM COA.

[AC 43-3] The Authorized User can link OPFOR BM COAs to named collections.

[AC 43-4] The Authorized User can add and edit OPFOR BM COA metadata attributes, and all sub-components/ parts of the COA.

[AC 43-5] The Authorized User can associate the OPFOR BM COA with BMOAs, and BM ORBAT (and thus indirectly with BM forces, BM locations, BM equipment), BM events, and areas at risk (AAR).

[AC 43-6] The Authorized User can associate an OPFOR BM COA with the OPFOR COAs.

[AC 43-7] The Authorized User can create and attach ranking lists of friendly and neutral assets and areas in order of OPFOR BM targeting likelihood to an OPFOR BM COA.

[AC 43-8] The Authorized User can add attachments to an OPFOR BM COA (e.g. a situation matrix that delineates the phasing, groupings and sequencing of numerous activities).

[AC 43-9] The Authorized User can move BM launch positions around in the Map View and re-calculate and re-visualize the range rings.

[AC 43-10] The Authorized User can run multiple mobility analysis and have the result visualized in Map View. The Authorized User can do this by rerunning the analysis from a mobility analysis overlay.

[AC 43-11] The Authorized User can add "prediction" status reports to the OPFOR BM COA (e.g. status reports on BMOAs, BSO status reports on BM forces, BM locations, BM equipment, BM events, etc.)

[AC 43-12] The Authorized User can create annotation overlays in the Map View and link to the OPFOR BM COA. The Authorize User can use a palette of drawing/ annotation tools that supports

drawing of polylines, polygons, arrow lines, ellipses, and rectangles in different colours and line thickness and where areas (polygon areas, ellipses, and rectangles) can be filled in selectable colours and transparency, and that supports adding text annotations in different fonts, font sizes and font colours.

[AC 43-13] The Authorized User can export an OPFOR BM COA to KML and NVG files.

[AC 43-14] The Authorized User can collaborate with other Authorized Users on OPFOR BM COAs.

[AC 43-15] The Authorized User can work privately on a branch of the main OPFOR BM COA without affecting the main version.

[AC 43-16] The Authorized User can submit the OPFOR BM COA information into the approval workflow process (where it will be approved and published, or rejected).

2.8.3.3 Comparing and ranking OPFOR BM COAs

[US 44] As an Authorized User I want to be able to compare OPFOR BM COAs so these can be ranked in importance (e.g. most likely OPFOR BM COA and most dangerous OPFOR BM COA).

[AC 44-1] The Authorized User can select a set of OPFOR BM COAs for comparison.

[AC 44-2] The Authorized User can view all the selected OPFOR BM COAs in a Table View

[AC 44-3] The Authorized User can add values to the OPFOR BM COA assessment criteria sets against the defined evaluation set.

[AC 44-4] The Authorized User can see the automatically calculated OPFOR BM COA assessment ranking values in the Table View (e.g. ranking for most likely and ranking for most dangerous).

[AC 44-5] The Authorized User an adjust the weights and scores in the OPFOR BM COA assessment criteria and see the effect on the OPFOR BM COA assessment ranking values for the different Figure of Merits (typically mist likely and most dangerous).

[AC 44-6] The Authorized User can sort the OPFOR BM COAs in ascending and descending order for each of the ranking lists (e.g. sort the Table View on the most likely OPFOR BM COA ranking).

[AC 44-7] The Authorized User can export a COA comparison analysis to a document in Microsoft Excel format.

[AC 44-8] The Authorized User can export a COA comparison analysis to a document in Microsoft Word format and in PDF format where the document includes the comparison table, the ranking lists, and details on the top ranked OPFOR BM COAs (including graphical depiction of these OPFOR BM COAs).

[AC 44-9] The Authorized User can persist the OPFOR BM COA comparison analysis as attachments to the named collection for the JIPOE process.

2.8.4 Monitoring OPFOR BM COAs

[51] Monitoring OPFOR BM Activity aims to identify the OPFOR BM COA that has been chosen by the opposing BM force. It uses all available intelligence information to assess key attributes such as the active BMOAs, threat types employed, and BM targeting strategy, to determine if the observed behaviour is compliant with the expected OPFOR BM COA or other alternative OPFOR BM COAs.

2.8.4.1 Assessing OPFOR BM COA predictions against actual observations

[US 45] As an Authorized User I want to assess OPFOR BM COA predictions against actual observations to subsequently improve my OPFOR BM COA predictions.

[AC 45-1] The Authorized User can view observed activity (e.g. unit movements, events including HFEs, etc.) and other IIEs of relevance (based on temporal and coverage attributes) in a Map View.

[AC 45-2] The Authorized User can view observed activity of relevance for comparison with OPFOR BM COA predictions in a Relationship View.

[AC 45-3] The Authorized Users can identify and select an OPFOR BM COA and visualize in the Map View and in a Relationship View.

[AC 45-4] The Authorized User can inspect by stepping through, and/ or animate (over time), historical changes made to an OPFOR BM COA in the Map View and compare it with the observed activity.

[AC 45-5] The Authorized User can inspect, and/ or animate (over time), historical changes made to an OPFOR BM COA in the Relationship View and compare it with the observed activity.

[AC 45-6] The Authorized User can update information on the OPFOR BM COA (e.g. adding new prediction BSO status reports).

[AC 45-7] The Authorized User can record an assessment (as free text) of observed activity compliancy with one or several OPFOR BM COAs and tag the COAs as compliant or non-compliant.

2.8.4.2 Analyzing HFEs

[US 46] As an Authorized User I want to use new information that can be extracted from HFEs to update my understanding of the opposing BM force.

[AC 46-1] The Authorized User can visually distinguish HFEs in the Map View between those that have been linked with a BMOA and those that have not yet been linked to a BMOA.

[AC 46-2] The Authorized User can, in the Map View, for HFEs not yet linked with BMOAs see suggested (i.e. automatically calculated) associations between the HFEs and BMOAs that are visually distinct from confirmed associations. The Authorized User can select one or many of the suggested HFE to BMOA links and confirm them.

[AC 46-3] The Authorized User can manually link HFEs with BMOAs and/ or BM forces.

[AC 46-4] The Authorized User can update a BMOA based on HFE information.

[AC 46-5] The Authorized User can create a new BMOA from information in one or several HFEs.

[AC 46-6] The Authorized User can visually detect and inspect mismatches between reported HFE trajectory types (LOFTED, DEPRESSED, MINIMUM ENERGY, SHAPED or CUT THRUST) from what is expected from the assumed BM type (associated with the BMOA and/ or BM force).

[AC 46-7] The Authorized User can view and compare details of observed HFEs to BM TECHINT warhead types information.

[AC 46-8] The Authorized User can create and submit new BSO status reports to update the information on the opposing BM force and / or on BM TECHINT.

[AC 46-9] The Authorized User can view the average number of BM launches per 24 hours for each BMOA in a Chart view.

[AC 46-10] The Authorized User can view the average salvo size and duration for each BMOA in a Chart View

[AC 46-11] The Authorized User compare the number of BM launches, the salvo size and salvo duration with the operational tempo information for the different OPFOR BM COAs.

[AC 46-12] The Authorized User can update the operational tempo information for the OPFOR BM COAs.

2.8.4.3 Acting on intelligence gaps

[US 47] As an Authorized User I want to fill my intelligence gaps to support the BM JIPOE process.

[AC 47-1] The Authorized User can create/ update NAIs.

[AC 47-2] The Authorized User can view PIR, SIR, EEIs, and indicators in a Map View.

[AC 47-3] The Authorized User can create new, or update existing indicators.

[AC 47-4] The Authorized User can identify, select, and view collection requirements (CR) in the Map View where the CRs with different statuses are visually disguisable (e.g. using colour coding).

[AC 47-5] The Authorized User can identify, select and view collection (and exploitation) tasks in the Map View where the tasks with different statuses are visually disguisable (e.g. using colour coding).

[AC 47-6] The Authorized User can create/ update CRs, and link CRs to BMOAs.

2.9 Searching for intelligence

2.9.1 Searching

2.9.1.1 Combine free-text search with metadata search

[US 48] As an Authorized User I want to combine free-text search with specific metadata search so that I can narrow down the search result set.

[AC 48-1] The Authorized User can search for all types of Information in the INTEL-FS2 repository.

[AC 48-2] The Authorized User can search for "inner objects" so that it can also search over BSRs.

[AC 48-3] The Authorized User can search for IIEs in different workflow states.

[AC 48-4] The Authorized User can search for and find soft-deleted IIEs and the soft-deleted IIEs shall be visually distinguishable in the result list (e.g. using different font colour).

[AC 48-5] The Authorized User can conduct a full text search across all IIEs and their attachments.

[AC 48-6] The Authorized User can express search criteria using logical operators, such as 'AND', 'OR' and 'NOT'; and to combine search criteria with 'AND', 'OR', 'NOT', and parenthesis.

[AC 48-7] The Authorized User can use wildcard symbols in queries.

[AC 48-8] The Authorized User can search for exact phrase(s) and to conduct fuzzy searches.

[AC 48-9] The Authorized User can apply proximity filters using the "NEAR" operator.

[AC 48-10] The Authorized User is able to define geographical coverage area filters using a map.

[AC 48-11] Authorized User can refine results based on multiple filter criteria by using the full INTEL-FS2 metadata set (e.g. using geographic coverage area, time, source (producer or publisher), document type, classification, releasability, and one or more BSO type, etc.) and "re-run" the search.

[AC 48-12] The Authorized User can sort the list of search results by date-time values and by producer/ source.

[AC 48-13] The Authorized User can see text-matches to the free text search as highlighted text in the search result list.

[AC 48-14] The Authorized User can select/ load a predefined/ saved search (see section 2.9.1.2) and execute that search, or modify this search before executing it.

[AC 48-15] The Authorized User can select one, many, or all search hits and link to an operation or a named collection.

[AC 48-16] The Authorized User can for search hits of IIEs awaiting approval select one, many, or all, and approve, or approve and publish the IIEs.

2.9.1.2 Save the combined search as a named search

[US 49] As an Authorized User I want to save the combined search so that this specific combined search can be repeated and subscribed to.

[AC 49-1] The Authorized User can save combination of free-text search and metadata search as a named search.

[AC 49-2] The Authorized User can publish named searches as global named searches for other users to use.

2.9.1.3 Faceted search (browsing)

[US 50] As an Authorized User I want to be able to look for information using faceted search techniques so that I can narrow down search results by applying multiple filters based on faceted classification of the items.

[AC 50-1] The Authorized User can use a facetted search techniques to narrow down search results by applying multiple filters based on faceted classification of the all types of Information in the INTEL-FS2 repository.

[AC 50-2] The Authorized User can do a facet-based drill-down-refinement of the search result on hierarchical domain values (e.g. category and sub-category).

2.9.1.4 Preview IIEs from the search-results

[US 51] As an Authorized User I want to preview IIEs and their attachments and related files so that I can precisely identify and select existing data, information and intelligence.

[AC 51-1] The Authorized User can from the search results preview IIE metadata.

[AC 51-2] The Authorized User can preview IIE attachments and related files of type: PDF files, Microsoft Word documents, Microsoft PowerPoint presentations, and Microsoft Excel files.

[AC 51-3] The Authorized User can preview image attachments including NATO Standardization Agreement (STANAG) 4545 images and images in other common formats like JPEG, PNG, GIF, TIFF, etc.

[AC 51-4] The Authorized User can zoom in/out and pan within a preview of an image.

[AC 51-5] The Authorized User can select video attachments and play, pause, stop, move forward, and move backward in the video.

[AC 51-6] The Authorized User can select a BSO in the search result and have an accumulation of all the attachments to its BSRs listed in a table and from this table the Authorized User can access and view the individual attachments.

[AC 51-7] The Authorized User can from the preview of one IIE navigate to (and preview) linked IIEs and recursively to other linked IIEs (that is then previewed) while maintaining the trace back to the original IIE.

2.9.1.5 Export search results

[US 52] As an Authorized User I want to export search results to support further analysis of the selected information to be done externally to INTEL-FS2.

[AC 52-1] The Authorized User can select single, multiple, or all search results and export all the metadata for the selected results to a comma-separated values (CSV) file.

[AC 52-2] The Authorized User can select single, multiple, or all search results and export all the metadata for the selected results to an XML file in accordance with a Purchaser approved XML schema.

2.10 Analysis

2.10.1 Relationships analysis

2.10.1.1 Querying and analysing information

[US 53] As an Authorized User I want to be able to build advanced queries so that I can perform analysis to obtain answers to intelligence questions.

[AC 53-1] The Authorized User is provided with a visual Query Builder enabling user to use logical operators (AND, OR, NOT, etc.), wildcards, string matches and to group logical statements.

[AC 53-2] The Authorized User can construct rich/ elaborate queries into the INTEL-FS2 "graph oriented data" like BSO and BSO relationships and other linked IIEs of different IIE types.

[AC 53-3] The Authorized User can select geospatial area constraints, to be used to build the query in the Query Builder, from the Map View (as ellipses, rectangles, and polygons).

[AC 53-4] The Authorized User can use geographical areas defined in INTEL-FS (e.g. NAI, BMOA, etc.) in the query being built in the Query Builder (e.g. Select Equipment="BM-Launchers" within Area="BMOA-xyz").

[AC 53-5] The Authorized User can view the query result where the results can be sorted (ascending and descending) on different IIE attributes including date-timestamps, source, producer, etc.

[AC 53-6] The Authorized User can inspect query results with geospatial locations rendered as georeferenced symbols, icons, or thumbnails with relationships in a Map View.

[AC 53-7] The Authorized User can inspect the query result in a Relationship View where the Relationship View is visualizing the identified IIEs (nodes) and the node-relationships used in the query to identify the links between the IIEs.

[AC 53-8] The Authorized User can select any of IIEs and their relationships/ links in the Map View and/ or the Relationship View and inspect the full details of the selected object.

2.10.1.2 Saving, rerunning and managing query-based analysis

[US 54] As an Authorized User I want to save the results of a query-based analysis so that I can revisit the results at a later time, repeat the analysis, and share the analysis.

[AC 54-1] The Authorized User can save queries and result refinements done in the Relationship View (expanding object relationships and applying filter settings) as a named query-based analysis.

[AC 54-2] The Authorized User can include additional analysis information with the saved query-based analysis to document the analysis. It shall be possible to attach a text segment and one or several pictures (e.g. screenshots from the relationship view and map view) to provide context for the analysis.

[AC 54-3] The Authorized User can select a saved query-based analysis and rerun the analysis (re-run the query and revisit the results in Table View, Relationship View, and Map View).

[AC 54-4] The Authorized User can save the re-run of the analysis under another name.

[AC 54-5] The Authorized User can select a saved query-based analysis and rename it and/ or delete it.

[AC 54-6] The Authorized User can share the saved query-based analysis with other user so they can load it and run the same analysis.

2.10.1.3 Export for further analysis in Analyst Notebook (ANB)

[US 55] As an Authorized User I want to perform additional link analysis in ANB on the query-based analysis data set so that I exploit the full functionality of ANB to enhance my analysis.

[AC 55-1] The Authorized User can export the query-based analysis data set to an XML file.

[AC 55-2] The Authorized User can import the exported analysis data set into ANB for further analysis.

2.10.1.4 Find connection path

[US 56] As an Authorized User I want to have tool support to find connection path between entities so that I can investigate if a connection between the entities exist.

[AC 56-1] The Authorized User can select two BSOs, have them plotted in the Relationship View, and automatically identify the connection path(s) between them (if it exists) depicted (showing all relationships and in-between/ conduit BSOs).

2.10.2 Event-based Analysis

2.10.2.1 Pattern of life Analysis

[52] Pattern of life analysis is a method for detecting and understanding subject's (or many subjects') habits.

[US 57] As an Authorized User I want to perform pattern of life analysis on events so that I can understand historical activity.

[AC 57-1] The Authorized User can find/ identify, filter and establish an analysis data set consisting of the identified IIEs (with suitable temporal marking) for pattern of life analysis.

[AC 57-2] The Authorized User can plot the time-based information in views suitable for pattern of life analysis.

2.11 ISR organization management

[53] To facilitate intelligence, surveillance and reconnaissance (ISR) functions (like collection requirement management and collection and exploitation planning and tasking) INTEL-FS2 needs to maintain information of ISR capabilities. This is done by maintain information of ISR units with ISR system and command relationships between the ISR units.

2.11.1 Operations and named collections

[54] Named collection can support Focussed Collection Activity (FCA), Community of Interest (COI), Functional Production Areas (FPA), and other collaborations.

[55] The Named Collections can be hierarchical and can be used for access control.

2.11.1.1 Create, update, or delete an operation and/ or named collection

[US 58] As an Authorized User I want to create, update, and delete an operation and/ or a named collection so it can be used as mechanism for INTEL-FS2 to support multiple ongoing operations.

[AC 58-1] The Authorized User can create, update or delete an operation and/ or named collection.

[AC 58-2] The Authorized User can link an operation and/ or named collection to a geographic area/ feature.

[AC 58-3] The Authorized User can manage more than ten operations, each with their own ISR ORBAT.

2.11.2 ISR ORBAT

2.11.2.1 Create, update, or delete units and ISR systems, their capabilities, capacities, availabilities and status

[US 59] As an Authorized User I want to create, update and delete ISR units and/or ISR systems so that the ISR unit/ ISR system can be tasked appropriately.

[AC 59-1] The Authorized User can create, update, or delete ISR units.

[AC 59-2] The Authorized User can create, update, or delete ISR systems.

[AC 59-3] The Authorized User can set/ update availability status and location for ISR units and ISR systems.

2.11.2.2 Create and/ or update the ISR ORBAT

[US 61] As an Authorize User I want to create/ update an ISR ORBAT so Collection Requirements (CR) and collection and exploitation tasks can be distributed to the appropriate ISR units and ISR systems.

[AC 61-1] The Authorized User can activate a user interface specifically designed for management of the ISR ORBATs.

[AC 61-2] The Authorized User can add or update all attributes for the ISR ORBAT including giving the ISR ORBAT a name.

[AC 61-3] The Authorized User can link the ISR ORBAT to one operation or one named collection.

[AC 61-4] The Authorized User can copy an ISR ORBAT (this will automatically create copies of the entire organization relationships), edit, and link the copied ISR ORBAT and copied relationships to another operation or another named collection.

[AC 61-5] The Authorized User can create/ update the command hierarchy by direct manipulation of ISR unit symbols in a hierarchical visualization of the ISR ORBAT. The view will also show ISR units that have not yet been assigned to the command hierarchy (i.e. ISR units that have yet no superior or subordinate ISR unit).

[AC 61-6] The Authorized User can reuse an ISR system in many ISR ORBATs. I.e. one ISR system can be assigned to different ISR ORBATs.

[AC 61-7] The Authorized User can choose to create a flat ISR ORBAT instead of an hierarchical ORBAT (in a flat ISR ORBAT the ISR units can task adjacently where a hierarchical ISR ORBAT will only allow requests/tasks to be sent/received from direct higher or lower commands).

[AC 61-8] The Authorized User can re-allocate the assignment of a ISR system from one ISR unit to another (e.g. moving the ISR system from one ISR unit to another within a hierarchy visualization of the ISR ORBAT).

2.11.2.3 Visualize ISR ORBAT

[US 62] As an Authorized User I want to view the details of the ISR ORBAT for my situational awareness.

[AC 62-1] The Authorized User can view the ISR ORBAT rendered as an organogram where subordinate trees can be collapsed or expanded. The degree of expanding the subordinate nodes goes all the way to show assigned ISR system. In the case of a flat ISR ORBAT the Authorized User can view the ISR ORBAT in another suitable layout (e.g. circular layout).

[AC 62-2] The Authorized User can view all details of the ISR ORBAT in Table Views.

2.11.3 Adapting to INTEL-FS2 approval and publish workflow

2.11.3.1 Request approval, approve, and publish

[US 63] As an Authorized User I want to have the operation, ISR ORBAT, ISR units, and ISR systems approved and published so that this information becomes known/ available at all ONs.

[AC 63-1] The Authorized User can submit a new or changed operation into the approval workflow process where it will be approved and published, or rejected (with rejection comments).

[AC 63-2] The Authorized User can submit a new or changed ISR ORBAT into the approval workflow process where it will be approved and published, or rejected (with rejection comments).

[AC 63-3] The Authorized User can submit a new or changed ISR unit into the approval workflow process where it will be approved and published, or rejected (with rejection comments).

[AC 63-4] The Authorized User can submit a new or changed ISR system into the approval workflow process where it will be approved and published, or rejected (with rejection comments).

2.12 Intelligence requirements management (IRM)

2.12.1 Managing PIRs, SIRs, EEIs, and indicators

2.12.1.1 Create and update prioritized intelligence requirements (PIR), specific intelligence requirements (SIR), and essential elements of information (EEI) and indicators

[US 64] As an Authorized User I want to be able to create and update PIRs, SIRs, EEIs, and Indicators to guide/ direct the intelligence collection process.

[AC 64-1] The Authorized User can create/ update PIRs, SIRs, EEIs, and indicators.

[AC 64-2] The Authorized User can link one or many SIRs to a PIR.

[AC 64-3] The Authorized User can link one or many EEIs to a SIR.

[AC 64-4] The Authorized User can from an EEI link to one or many indicators.

[AC 64-5] The Authorized User can link an EEI to multiple NAIs.

[AC 64-6] The Authorized User can link multiple EEIs to a single NAI.

[AC 64-7] The Authorised User can link PIRs, SIRs, EEI, and indicators to products, RFIs, RFI Responses, and BSOs.

[AC 64-8] The Authorized User can remove links from PIRs, SIRs, EEI, and indicators.

[AC 64-9] The Authorized User can make a copy of an existing PIRs, SIRs, EEI, or indicators and use as a pre-filled starting point for creating a new one.

[AC 64-10] The Authorized User can deprecate a PIR or a SIR and adding a new PIR/ SIR with a "supersedes" association between the new version and the deprecated version.

[AC 64-11] The Authorized User can submit the new or updated PIRs, SIRs, EEIs, and indicators into the approval workflow process (where they will be approved and published, or rejected).

2.12.1.2 View/ track status of PIRs, SIRs, EEIs, and indicators

[US 65] As an Authorized User I want to track the status of PIRs, SIRs, EEIs and indicators so I can understand whether they are being addressed or not.

[AC 65-1] The Authorized User is able to identify PIRs, SIRs, EEIs and indicators of interest though searching and filtering.

[AC 65-2] The Authorized User can visualize PIRs, SIRs, EEIs and indicators in a Map View where other linked IIE types with a geospatial location are also depicted (e.g. CRs, RFIs, RFI response, etc.)

[AC 65-3] The Authorized User can visualize PIRs, SIRs, EEIs and indicators in a Relationship View that include all linked IIEs of other types (e.g. products, BSOs, RFIs, RFI responses, etc.)

[AC 65-4] The Authorized User can visualize ICPs, PIRs, SIRs, EEIs and indicators and all their attributes in in a Table View.

[AC 65-5] The Authorized User can view the ICPs with the PIRs, SIRs, EEIs and indicators in a Gantt View organized hierarchically (PIRs - SIRs - EEIs).

2.12.2 Managing Intelligence Collection Plans (ICP)

2.12.2.1 Create, update, or delete an Intelligence Collection Plan (ICP)

[US 66] As an Authorized User I want to create/ update an Intelligence Collection Plan (ICP) so I can capture all related PIRs, SIRs, EEIs, and indicators relevant to an operation.

[AC 66-1] The Authorized User can create/ update many named ICPs.

[AC 66-2] The Authorized User can delete an ICP.

[AC 66-3] The Authorized User can associate the ICP with existing PIRs for the organization (and then automatically establish a full PIR-SIR-EEI hierarchy in the ICP).

[AC 66-4] The Authorized User can submit the new or updated ICP into the approval workflow process (where they will be approved and published, or rejected).

2.13 Request for Information (RFI) management

2.13.1 Submitting RFIs

2.13.1.1 Create/ update an RFI

[US 67] As an Authorized User I want to create/ update an RFI so that I can formulate a question to be answered by a higher, lower, adjacent command, or by a nation to address my intelligence gap.

[AC 67-1] The Authorized User can create a draft RFI from scratch.

[AC 67-2] The Authorized User can create a draft RFI from an EEI, which will then be prefilled with the EEI information.

[AC 67-3] The Authorized User can add relevant information to the draft RFI (e.g. "latest time information is of value" (LTIOV), location data, product information group details, etc.)

[AC 67-4] The Authorized User can link the draft RFI to an EEI.

[AC 67-5] The Authorized User can link the draft RFI to an NAI, a product, and/or a BSO.

[AC 67-6] The Authorized User can save the RFI in draft status and return to it for completion.

[AC 67-7] The Authorized User can select one or several draft RFIs and delete them.

[AC 67-8] The Authorized User can submit the draft RFI into the approval workflow process where it will be approved and published, or rejected (with rejection comments).

2.13.1.2 Attach an effect/ task verb to support RFI measure of effectiveness (MOE) analysis

[US 68] As an Authorized User I want to attach an effect/ task verb to the RFI so that I can specify what is required from the tasked unit and subsequently support the MOE analysis post completion.

[AC 68-1] The Authorized User can specify an effect/task verb from an enumerated list. As a minimum the list shall include: {EXPLOIT, FIND, FIX, ASSESS, COLLECT, CONFIRM, COORDINATE, CROSS-CUE, DETECT, IDENTIFY, INTERCEPT, LOCATE, MONITOR, RECOGNISE, TRACK}.

2.13.2 Managing RFIs

2.13.2.1 Forward an RFI to other organisations

[US 69] As an Authorized User I want to forward a RFI that cannot be answered within my own organization to a different organization so that the RFI can be answered.

[AC 69-1] The Authorized User upon a receipt of an RFI can forward the RFI to another organisation.

[AC 69-2] The Authorized User can look-up organizations and add another organization to "For Action" or to "For Information".

[AC 69-3] The Authorized User can record, within the RFI, the reason for why the RFI is forwarded.

2.13.2.2 Update the RFI

[US 70] As an Authorized User I want to update the status of an RFI to control the workflow of the RFI (e.g. to cancel RFIs that will no longer provide any value).

[AC 70-1] The Authorized User can locate an RFI by searching and filtering on RFI attributes.

[AC 70-2] The Authorized User responding to an RFI can set (update) RFI processing information through the ForActionStatus (e.g. set this status to COMPLETED).

[AC 70-3] The Authorized User owning the RFI can update the RFI request status (e.g. setting this status to FULFILLED).

[AC 70-4] The Authorized User can when changing the request status (e.g. setting it to FULFILLED) select the degree of effectiveness to: {NOT APPLICABLE (0%), PARTIALLY EFFECTIVE (0-40%), EFFECTIVE (40-80%), TOTALLY EFFECTIVE (80-100%), and the Authorized User can attach a free text message explaining the reason for the effectiveness rating.

2.13.2.3 View/ track status of RFIs

[US 71] As an Authorized User I want to be able to view the status of the RFIs to check that the RFIs are being actioned.

[AC 71-1] The Authorized User can view RFIs in a Table View that at a minimum includes creation date-time, request status, priority, and subject for each RFI.

[AC 71-2] The Authorized User can sort the RFI Table View on the different attributes.

[AC 71-3] The Authorized User can filter the RFI Table View to view only RFIs of interest.

[AC 71-4] The Authorized User can select a RFI and access all the details of the RFI.

[AC 71-5] The Authorized User can view selected RFIs in a Map View through the NAIs associated to the RFIs where the status of the RFIs is visually indicated.

[AC 71-6] The Authorized User can view selected RFIs in a Gantt View using the "Last Report Date" and LTIOV attributes.

[AC 71-7] The Authorized User can view selected RFIs by status, date, effects/ task verb etc. in a Chart View supporting different visualization options including pie chart, bar chart, etc. to perform measure of performance (MOP) and MOE analysis.

[AC 71-8] The Authorized User can export MOP and MOE analysis to a report file in a customizable formats (i.e. what information to include and how to present it).

2.13.2.4 Respond to RFI

[US 72] As an Authorized User I want to create/ update a response to the RFI so the RFI originator can receive the relevant intelligence to answer the intelligence gap.

[AC 72-1] The Authorized User can locate an RFI, and create/ update a response for the RFI, upload a product, and/ or include a link to an existing product in the response.

[AC 72-2] The Authorized User can chose to have an auto-generated nothing significant to report (NSTR) generated.

[AC 72-3] The Authorized User can set the RFI status (e.g. to COMPLETE), approve and publish the RFI response (the product is now linked to the RFI and available to the RFI originator).

2.13.2.5 Export RFI to PDF

[57] RFIs are normally staying within the INTEL-FS2 enterprise that includes nations. At times RFIs needs to be sent to nations through other means. Such RFIs will normally be sent from Supreme Headquarters Allied Powers Europe (SHAPE) to nations by email. By including an export to PDF function where the RFI is transformed to a readable format, the RFI can be shared outside of the INTEL-FS2 enterprise.

[US 73] As an Authorized User I want to transform RFI to a readable format (PDF) so that the RFI can be shared with users not having access to INTEL-FS2.

[AC 73-1] The Authorized User can transform all the details of an RFI into a readable document in PDF format.

2.14 Collection requirement (CR) management

[58] Note: This document will not make the distinction between Collection Requirement (CR) and ISR Requests as it is done in STANAG 4559. In an attempt at making the user stories easier to understand this document will describe Collection Requirement management using only the CR term where this CR term is to be understood also to encompass ISR requests.

2.14.1 Managing CRs

2.14.1.1 Create or update a prioritization scheme

[US 74] As an Authorized User I want to create a prioritization scheme so all CRs can be ordered in terms of priority ranking based on a prescribed criteria and weighting.

[AC 74-1] The Authorized User can create, or update, many prioritization scheme by specifying the criteria and weighting.

[AC 74-2] The Authorized User can define criteria per prioritization scheme (e.g. ISR priority, operational PIR priority, requestor priority, NAI priority, etc.)

[AC 74-3] The Authorized User can define a list of values within each priority criterion.

[AC 74-4] The Authorized User can add weighting values to each criterion (e.g. operational PIR priority 30%; ISR priority 30%; requestor priority 40%).

[AC 74-5] The Authorized User can link a prioritization scheme to an operation and/ or a named collection.

[AC 74-6] The Authorized User can delete a prioritization scheme

[AC 74-7] The Authorized User can submit a prioritization scheme into the approval workflow process where it will be approved and published, or rejected (with rejection comments).

2.14.1.2 Create a CR

[US 75] As an Authorized User I want to create a CR so it can be prioritised and assigned for collection and exploitation.

[AC 75-1] The Authorized User can create a draft CR from scratch.

[AC 75-2] The Authorized User can copy a previous CR and use as a new draft CR.

[AC 75-3] The Authorized User can import a CR from a file in a structured file format.

[AC 75-4] The Authorized User can create a draft CR from an EEI where the CR will be prefilled with applicable information from the EEI.

[AC 75-5] The Authorized User can create a draft CR from a BSO, and the draft CR will then be auto-populated with BSO details (e.g. title, geographic location, BE number, etc.)

[AC 75-6] The Authorized User can create a draft CR from a NAI, and the draft CR will then be auto-populated with NAI information (e.g. title, geographic location, etc.)

[AC 75-7] The Authorized User can add relevant information (e.g. periodicity) to the draft CR.

[AC 75-8] The Authorized User can specify an effect/task verb from an enumerated list that includes {EXPLOIT, FIND, FIX, ASSESS, COLLECT, CONFIRM, COORDINATE, CROSS-CUE, DETECT, IDENTIFY, INTERCEPT, LOCATE, MONITOR, RECOGNISE, TRACK}.

[AC 75-9] The Authorized User can add geospatial locations individually or as a group to the draft CR.

[AC 75-10] The Authorized User can add supplementary information (e.g. CONOPS, target details - often PDF or MS PowerPoint documents) as attachments to the draft CR.

[AC 75-11] The Authorized User can associate the draft CR with an operation and/ or a named collection.

[AC 75-12] The Authorized User can link a CR to an EEI, to a BSO, and to an NAI.

[AC 75-13] The Authorized User can add multiple locations to a CR.

[AC 75-14] The Authorized User can set the CRs prioritization criteria from options defined in the prioritization scheme and have the priority automatically calculated, or manually set a priority.

[AC 75-15] The Authorized User can tag the CR with a problem set tag. Problem sets are a mechanism to group CRs together (e.g. locations of type airfields with the same EEI).

[AC 75-16] The Authorized User can specify the periodicity of the collection (e.g. how many times per month collection and exploitation is required).

[AC 75-17] The Authorized User can save the draft CR and return to it later for completion.

[AC 75-18] The Authorized User can delete draft CRs that hasn't been submitted for approval yet.

[AC 75-19] The Authorized User can submit the draft CR into the approval workflow process where it will be approved and published, or rejected (with rejection comments).

2.14.1.3 Update a CR

[US 76] As an Authorized User I want to update a CR to control the workflow of the CR and augment it with additional/ updated information.

[AC 76-1] The Authorized User can locate and change the status of the CR.

[AC 76-2] The Authorized User can view the results of collection activities for the CR, stop the CR, and rate the effectiveness on the results of the collection, and also attach a free text message explaining the reason for the effectiveness rating.

[AC 76-3] The Authorized User can change the CR's prioritization criteria from options defined in the prioritization scheme or override the CR's priority with a manual priority input.

[AC 76-4] The Authorized User can add/ remove geospatial locations to/ from a CR.

[AC 76-5] The Authorized User can link products to the CR.

[AC 76-6] The Authorized User can change the latest report date-time and LTIOV for CRs.

2.14.1.4 View/ track status of CRs

[US 77] As an Authorized User I want to track the status of CRs as they go through the tasking, collection, processing, exploitation, and dissemination (TCPED) process so I can understand whether they will be supported or not.

[AC 77-1] The Authorized User is able to identify CRs of interest though searching and filtering.

[AC 77-2] The Authorized User can view a set of selected CRs in a Table View where the CRs can be grouped by different types of criteria including problem set, geographic area, time/execution window, ISR units (the units the CR has been assigned to), etc.

[AC 77-3] The Authorized User can select a CR and access all the details of the CR including details on linked IIEs.

[AC 77-4] The Authorized User can view CRs that are assigned to multiple ISR units in a form that enables the Authorized User to see all the reporting from the all the different ISR units together (e.g. it shall be possible to easily see/ verify if all ISR units have set its activity status on the CR as "COMPLETED").

[AC 77-5] The Authorized User can view a set of CRs in a Map View where the status of the CRs is visually indicated.

[AC 77-6] The Authorized User can add layers of contextual information (e.g. own ISR units/ systems locations, weather information, etc.) to the Map View when viewing the CRs.

[AC 77-7] The Authorized User can select CR locations in a Map View to view details on the CR (e.g. ISR system tasked, expected collection time, effect tasked, etc.)

[AC 77-8] The Authorized User can view selected CRs by status, by status and date, effects/ task verb etc. in a chart view supporting different visualization options including pie chart, bar chart, etc. to perform MOP and MOE analysis.

[AC 77-9] The Authorized User can export MOP and MOE analysis to a report file in a customizable formats (i.e. what information to include and how to present it).

2.14.1.5 Process CRs into action

[US 78] As an Authorized User I want to process CRs into actions so that they ultimately result in collection activities.

[AC 78-1] The Authorized User can forward the CR for action to a single or multiple ISR units.

[AC 78-2] The Authorized User can forward the CR for information to single or multiple ISR units.

[AC 78-3] The Authorized User can reassign a CR for action from one ISR unit to one or several other ISR units.

[AC 78-4] The Authorized User can assign CRs to the draft CR Task List (CTL) by setting the ForAction status to ‘FOR_COORDINATION’.

[AC 78-5] The Authorized User can assign CRs to the finalized CTL by setting the ForAction status to ‘ASSIGNED’.

[AC 78-6] The Authorized User can organize CRs in table views and direct manipulate CRs in the tables to multi-edit ForAction status values of the CRs to efficiently establish the draft CTL, and to establish the final CTL (e.g. by drag and drop from lists of CRs to the draft CTL and/ or the final CTL).

[AC 78-7] The Authorized User can at any time assign a new/ emerging CR directly for action directly to an ISR Unit.

[AC 78-8] The Authorized User can re-assign CRs in the finalized CTL from on ISR unit to another for action.

[AC 78-9] The Authorized User can re-prioritize CRs in the finalized CTL.

[AC 78-10] The Authorized User can stop collection activity on a CR (by setting the ForAction status to ‘COMPLETED’).

[AC 78-11] The Authorized User can create a CR for a collection that has already taken place (as a dynamic collection request) with the purpose of creating an audit trail (e.g. the CR could be created with a CR status set to 'COMPLETED' and also the ForAction status set to ‘COMPLETED’).

[AC 78-12] The Authorized User can set a ForAction status to ‘FAILED’ to indicate that the CR cannot be supported.

2.14.1.6 Export lists of CRs

[US 79] As an Authorized User I want to be able to export a set of CRs, a CRL and a CTL so this information can be used outside of INTEL-FS2.

[AC 79-1] The Authorized User can export a set of CRs, a CRL and a CTL in a CSV format and in a XML format.

[AC 79-2] The Authorized User can specify which CR attributes, and the order of the attributes, to export to CSV files.

[AC 79-3] The Authorized User can apply a template to specify the export to CSV files.

[AC 79-4] The Authorized User can export a set of CRs, a CRL, and a CTL in NVG 2 format.

2.15 Collection operations management (COM)

[59] The collection and exploitation plan (CXP) provides detail of the collection and exploitation tasks assigned to specific ISR systems to meet the operation's, or named collection's, collection and exploitation requirements. The CXP is based upon CRs and direction from the JCMB articulated through the CTL.

[60] Note: A single CR can be assigned to multiple ISR units, and a CR assigned to an ISR unit can result in multiple tasks (multiple collection and multiple exploitation tasks).

2.15.1 Managing collection and/ or exploitation tasks

2.15.1.1 Create/ update a task

[US 82] As an Authorized User I want to create/ update a collection or exploitation task so the ISR systems under my command receives clear tasking.

[AC 82-1] The Authorized User can filter CRs (typically on the final CTL) to identify and select a CR assigned to an ISR unit and convert into collection and/ or exploitation tasks.

[AC 82-2] The Authorized User can create a draft task from a selected assigned CR where relevant details from the CR and its ISR unit assignment is used to auto-populate the task.

[AC 82-3] The Authorized User can create multiple draft tasks from a single assigned CR.

[AC 82-4] The Authorized User can create a single draft task from a multiple assigned CRs (e.g. a long endurance ISR system can cover wide areas).

[AC 82-5] The Authorized User can, from a Map View, group/ select many CRs by sensor-product type (e.g. requirements for synthetic-aperture radar (SAR) imagery for multiple locations) and create a specific sensor-product-oriented tasks.

[AC 82-6] The Authorized User can create draft tasks from a set of assigned CRs selected in in a Table View and/ or in a Map View.

[AC 82-7] The Authorized User can assign one or many draft tasks to an ISR system.

[AC 82-8] The Authorized User can create a draft exploitation task and link it to an existing (approved) collection task.

[AC 82-9] The Authorized User can select one or several draft tasks and delete them.

[AC 82-10] The Authorized User can retrieve a saved draft tasks and continue editing the tasks.

[AC 82-11] The Authorized User can submit the draft task into the approval workflow process where it will be approved and published, or rejected (with rejection comments).

2.15.1.2 Update tasks

[US 83] As an Authorized User I want to update the status of tasks to control the workflow of the tasks.

[AC 83-1] The Authorized User can locate a task by searching and filtering on task attributes.

[AC 83-2] The Authorized User can move a task that has been auto-allocated to a particular CXP (based on the task timeframe) to a CXP for another timeframe.

[AC 83-3] The Authorized User can reassign a tasks from one ISR system to another ISR system.

[AC 83-4] The Authorized User can split a task by creating a new task with reference to the same CR and distribute the ISR system requirements across the two tasks.

[AC 83-5] The Authorized User (the "tasker") can change the status of a task at any time from PLANNED to CANCELLED, PAUSED or RESUMED.

[AC 83-6] The Authorized User (the "taskee") can update the status of a task from UNDEFINED to RECEIVED and subsequently, as the task is managed through the process, to ACKNOWLEDGED, ONGOING, ACCOMPLISHED, INFEASIBLE, INTERRUPTED OR FAILED.

[AC 83-7] The Authorized User can search for/ locate a Product and create a link between the task and the Product (and subsequently set the task status to ACCOMPLISHED to indicate that the tasked ISR System will do no more collection/ exploitation within the current tasking).

2.15.1.3 View/ Track status of tasks

[US 84] As an Authorized User I want to track the status of tasks so I can understand whether they will be supported or not.

[AC 84-1] The Authorized User is able to identify tasks of interest though searching and filtering (including filtering on operation or named collection, CXPs, tasking ISR unit, ISR system, time/execution window, geographic location, etc.)

[AC 84-2] The Authorized User can visualize tasks in a Map View where the sensor products required (e.g. EO imagery, infrared (IR) imagery, SAR imagery, full motion video (FMV), etc.) is depicted/ identified in separate map layer that can be activated/ de-activated.

[AC 84-3] The Authorized User can visualize BSOs/ targets in a layer in the same Map View as the tasks.

[AC 84-4] The Authorized User can add layers of contextual information (e.g. blue force (BLUEFOR) ORBAT locations, weather information, etc.) to the Map View when viewing the tasks.

[AC 84-5] The Authorized User can visualize collection progress in a Map View (e.g. for each collection task showing locations that has already been collected on within the task as greyed out).

[AC 84-6] The Authorized User can identify one or many CRs that has been assigned to his/ her Unit view all collection and exploitation tasks that the CRs has resulted in across the enterprise (i.e. tasks created in other ISR units are also shown in this view).

[AC 84-7] The Authorized User can simultaneously view tasks in different CXPs assigned to multiple ISR units, effectively obtaining an "enterprise CXP view".

[AC 84-8] The Authorized User can detect task changes in CXP views. I.e. if a task has been added to a finalized CXP this task shall be visually highlighted in the CXP view.

[AC 84-9] The Authorized User can view selected tasks by different statuses (e.g. {Number PLANNED, CANCELLED, PAUSED, RESUMED} and {UNDEFINED, RECEIVED, ACKNOWLEDGED, ONGOING, ACCOMPLISHED, INFEASIBLE, INTERRUPTED, FAILED}), by statuses and date, effects/ task verb, tasks with linked products, etc. in a Chart View supporting different visualization options including Pie Chart, Bar Chart, etc. to perform MOP and MOE analysis.

2.15.2 Managing CXPs

2.15.2.1 Create and manage CXPs

[US 85] As an Authorized User I want to create and manage several CXPs to support a CM battle rhythm so that individual collection and exploitation tasks can be viewed in accordance with the defined CXPs.

[AC 85-1] The Authorized User can create and name several CXPs (e.g. 'D+1', 'D+2', etc.)

[AC 85-2] The Authorized User can for each CXP define the timeframe, the operation or named collection, and the ISR unit.

[AC 85-3] The Authorized User can update the CXP attributes (name, timeframe, the operation or named collection, and the ISR unit).

[AC 85-4] The Authorized User can submit a CXP into the approval workflow process where it will be approved and published, or rejected (with rejection comments).

2.15.2.2 Export lists of tasks

[US 86] As an Authorized User I want to be able to export a set of tasks and CXPs so this information can be used outside of INTEL-FS2.

[AC 86-1] The Authorized User can export a set of tasks (e.g. tasks in a CXP) in a comma-separated-value (CSV) format and in an XML format.

[AC 86-2] The Authorized User can specify which task attributes, and the order of the attributes, to export to CSV files.

[AC 86-3] The Authorized User can apply a template to specify the export to CSV files.

[AC 86-4] The Authorized User can export a set of tasks (e.g. the tasks in a CXP) in NVG 2 format.

2.15.2.3 Manage finalised CXPs

[US 87] As an Authorized User I want to manage finalized CXPs to provide clear tasking of ISR Systems.

[AC 87-1] The Authorized User can declare a (draft) CXP as finalized, such that all tasks in the CXP is tagged with 'FINALIZED COORDINATION STATUS' (and the change is published and visible across the enterprise).

[AC 87-2] The Authorized User can make changes to a finalised CXP as an emerging CR are received; i.e. the Authorized User can create new tasks that are added to the CXP and make the CXP changes (the new tasks) visible across the enterprise.

2.16 Online help

[US 89] As an Authorized User I want to be able to access an online help function that can provide me with information on how to use INTEL-FS2.

[AC 89-1] The Authorized User can, from the user applications, access online help functions where the help function is contextual and relevant for the users' current activity.

[AC 89-2] The Authorized User can search through all available help information (not only the contextual information, see criterion above).

3 Access control - policy statements

[62] This chapter defines an initial, and non-exhaustive, set of access control policy statements for the different type of users that will be accessing INTEL-FS2. The purpose of including these policy statements is to provide additional information enabling the reader to better understand and identify the Authorized User in the user stories provided in chapter 2.

[63] The rules is written such that they should be translatable into eXtensible Access Control Markup Language (XACML) policy sets.

[64] Key INTEL-FS2 user roles (other roles will most likely be added) and “pseudo policy statements” for describing the resources the users having certain roles can access, and what access rights they will have, are listed in the Table 3-1 (note this list is of policy statements is not exhaustive).

Table 3-1 Attribute-based access control (ABAC)

User attributes	Resource	Actions	Rule
Role=ON Administrator	Report templates	Create/ Read/ Update/ Delete	ON Administrators can create, read, update, and delete report templates (that are local to the ON).
Role=Enterprise Administrator	Domain values	Create/ Read/ Update/ Delete	Enterprise Administrators can create, read, update, and delete domain values.
Role=ON Administrator	Domain values	Hide / Un-hide	ON Administrators can hide and un-hide domain values for individual ONs.
Role=ON Administrator	Gazetteers	Add/ delete	ON Administrators can add and delete gazetteers (that are local to the ON).
Role=ON Administrator	ABAC policy sets	Create/ Read/ Update/ Delete	System Administrator can create, read, update, and delete INTEL-FS2 ABAC Policy Sets.
Role=ON Administrator	User accounts	Create/ Read/ Update/ Delete	ON Administrators can create, read, update, and delete ON user accounts.
Role=ON Administrator	User claims	Assign / Revoke	ON Administrators can assign and revoke ABAC claims to local ON users.
Role=ON Administrator	User password	Reset	ON Administrators can reset passwords for users with no domain account.
Role=N/A (any user)	User account	Request	Any user can submit a request for a user account.
Role=N/A (any user)	Private favourites	Create/ Read/ Update/ delete	Any user can create, read, update, and delete own private favourites that will include saved searches, saved queries, etc.
Role=N/A (any user)	Private notifications	Create/ Read/ Update/ Delete	Any user can create, read, update, and delete private notification events.

Role=N/A (any user)	Private configuration	Create/ Read/ Update/ Delete	Any user can create, read, update, and delete private configuration settings that will include turning on/off notification alerting, etc.
Role=Collection Manager Department="xyz"	ISR ORBAT	Create/ Read/ Update/ Approve/ Publish	The Collection Manager of a specific Department can create, read, update, approve, and publish the ISR ORBAT.
Role=Collection Manager	Organizational Unit and ISR Systems	Create/ Read/ Update/ Delete/ Approve/ Publish	The Collection Manager can create, read, update, delete, approve, and publish Organizational Units and ISR Systems
Role=Collection Manager	ISR ORBAT	Create/ Read/ Update/ Approve/ Publish	The Collection Manager can create, read, update, approve, and publish the ISR ORBAT
Role=Collection Manager	ISR system to ISR unit Assignment	Create/ Read/ Update/ Delete/ Approve/ Publish	The Collection Manager can create, read, update, delete, approve, and publish ISR system to unit assignments.
Role=N/A (any user)	Full ISR ORBAT	Read	Any User can view all details of the ISR ORBAT including the command hierarchy and ISR system assignments.
Role=N/A (any user) RFI Requester=YES	Own RFIs	Create/ Read/ Update/ Post for Approval	Any user that is granted privilege as “RFI Requester” can create, read, update, and post for approval RFIs.
Role=IRM Manager	RFIs	Update/ Approve/ Publish/ Un-delete	An IRM Manager can update, approve, publish, and un-delete RFIs.
Role=N/A Collection Requester=YES	Own CRs	Create/ Read/ Update/ Post for Approval	Any user that is granted privilege as "Collection Requester” can create, read, update, and post for approval CRs.
Role=IRM Manager	CRs	Update/ Approve/ Publish/ Un-delete	An IRM Manager can update, approve, publish, and un-delete CRs
Role=N/A (any user)	IIEs with no distribution constraints	Read	Any User can search for and obtain any IIE as long as there is no distribution constraints on the IIE.
Role=N/A (any user) Department="xyz"	IIEs with limited distribution	Read	Any User in a specific department can search for and obtain IIEs associated with the specific limited distribution.
Role=Intel Creator	IIEs with no distribution constraints	Create/ Read/ Update/ Post for Approval	An Intel Creator can create, read, update, and post for approval IIEs (Products and BSOs/BSRs) that has no distribution constraints.

Role=N/A (any user) Department="xyz"	IIEs with limited distribution	Create/ Read/ Update/ Post for Approval	An Intel Creator can create, read, update, and post for approval IIEs (Products and BSOs/BSRs) that will have limited distribution defined by a department affiliation
Role=Intel Manager	IIEs with no distribution constraints	Create/ Read/ Update/ Soft-Delete/ Un-delete/ Approve/ Publish	An Intel Manager can create, read, update, soft-delete, un-delete, approve, and publish IIEs that has no distribution constraints.
Role=Intel Manager Department="xyz"	IIEs with limited distribution	Create/ Read/ Update/ Soft-Delete/ Un-delete/ Approve/ Publish	An Intel Manager can create, read, update, soft-delete, un-delete, approve, and publish IIEs that has limited distribution defined by a specific department affiliation
Role=Officer Conducting the Exercise (OCE)	Products	Create/ Read/ Update/ Delete/ Export to JEMM	An OCE can create, read, update, delete (hard delete), and export products to JEMM.

[65] Note: Roles/ claims and policies will be refined during the INTEL-FS2 acquisition project to include more precise and fine-grained access control that will include resources like the BM JIPOE products, OPFOR ORBAT, collection and exploitation tasks, etc.

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

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

STATEMENT OF WORK (SOW)

Version 1.0

21/12/2020

TABLE OF CONTENTS

INDEX OF FIGURES

INDEX OF TABLES

Document Revision History

Date	Version	Changes
21 Dec 2020	1.0	IFB package release version

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.

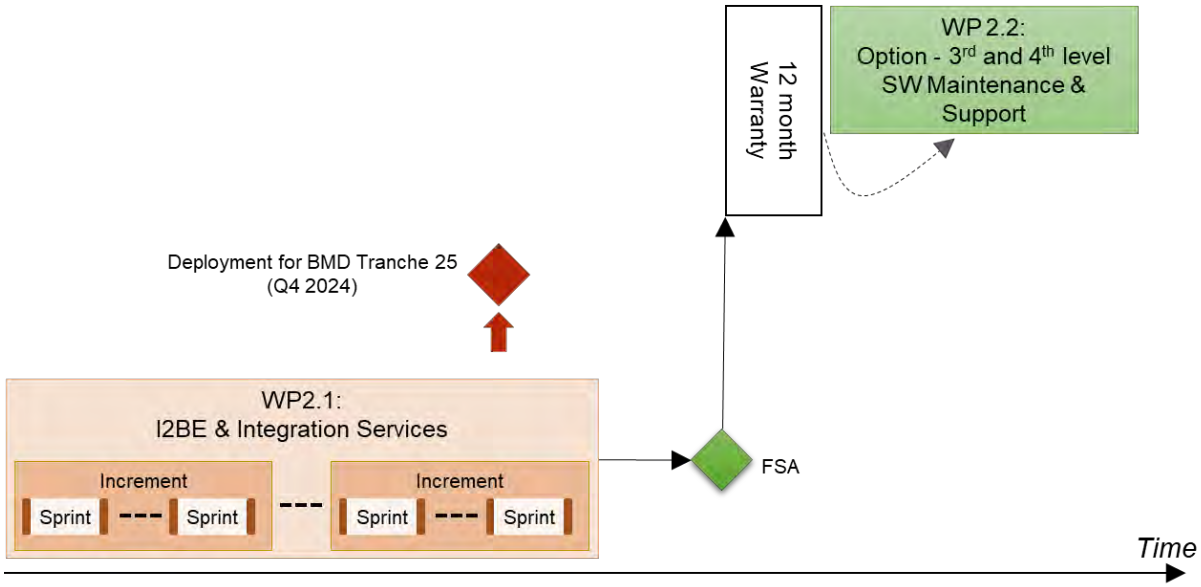
[7] The I2BE system requirements is defined in the Annex A to this SOW.

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) Integrating with the new backend solution into the new service-oriented architecture (SOA) as native hosted services;

(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.

[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, 2015]	NATO Communications and Information Agency - Agency Instruction 06.03.01, "Identification of Software Assets", 2015.

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), Version 1.0, XX/YY/2020, 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 and in the Contract General Provisions document. This section identifies additional security oriented requirements related to the execution of the Contractor's work.

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

2.2 Quality Assurance (QA) Requirements

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

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

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

2.2.1 Audits

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

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

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

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

2.3 Integrated Logistics Support (ILS) Requirements

2.3.1 General

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

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

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

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

2.3.2 Integrated Logistics Support Plan (ILSP)

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

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

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

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

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

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

(1) The Contractor’s Support organization, roles, responsibilities, processes and procedures (until FSA; during warranty and optional support period);
(2) Description of the system of interest (SOI) in scope of integrated support,

(3) Description of the integrated support concept, including the maintenance concept, warranty concept, customer support concept, service management & control concept including but not limited to the incident, problem management, release and deployment management, and configuration and change management;
(4) Description of the parties involved, their responsibilities for the various levels of support (with indication of start and end dates), interfaces, response times and POC details;
(5) Description and allocation of operation, SM&C and corrective and preventive maintenance tasks required to operate and maintain the system;
(6) Description of the Sustainability measures (obsolescence management, failure reporting, performance monitoring, reliability and availability assessment and reporting);
(7) Procedures to follow when any part of the system fails; response times for analyses and resolution by the Contractor;
(8) Comprehensive lists (as applicable) of all available software licenses (SWDL), support software tools, COTS documentation, technical documentation, training documentation and manuals;
(9) Description of services during optional Contractor Logistics Support (CLS) period.

[SOWG-85] The Contractor shall provide the latest ISSP as part of each release and finally before FSA milestone achievement.

2.3.3 Maintenance and support concept

2.3.3.1 Definitions

[50] Level of Support: Level of support indicates a specific extent of technical assistance in the total range of assistance that is provided by an information technology product to its customer. The Service management is divided in three different level of service, which interface each other, in order to activate the proper level of maintenance in accordance with the event (incident) happened on the system.

[51] Level of Maintenance: are various echelons at which maintenance tasks are performed on systems and equipment. The levels are distinguished by the relative sophistication of skills, facilities and equipment available at them. Thus, although typically associated with specific organisations and/or geographic locations, in their purest form, the individual maintenance levels denote differences in inherent complexity of maintenance capability.

[52] First Level Support Process: implements the Incident Management process in accordance with the ISO/IEC 20000 and Information Technology Infrastructure Library (ITIL) framework or equivalent; As part of the Incident Management, the Service Desk receives the issue from the user, puts it into a standard format (Trouble Ticket (TT)), performs an initial assessment and distributes it to the predefined actors to solve it

[53] Second Level Support Process: implements the Problem Management process in accordance with the ISO/IEC 20000 and ITIL framework or equivalent. The Problem Management process receives the TT from the Service Desk and performs the following tasks (not limited to):
(1) (Re-)evaluation of TT category, criticality and priority,
(2) Identification of the root cause of the issue (e.g. by issue replication testing),
(3) Identification of workarounds,

(4) Identification and initial planning of possible short, medium and long-term solutions (e.g. workarounds, patches, or new baseline or CI releases),
(5) Create Problem Analysis Report and Change Request incl. schedule of implementation, and synchronisation with the Baseline Maintenance process;
(6) Presentation of the Problem Analysis Report and Change Request to the Change Control Board (CCB) for approval,
(7) Monitor and Control the approved Change Request during implementation,
(8) Trigger 3rd Level Support and/or 3rd Level Maintenance process to implement the Change Request, in case the incident cannot be solved at 2nd level;
(9) Perform the post- Change Request implementation review.

[54] Third Level Support Process: implements the Deployment and Release Management process in accordance with the ISO/IEC 20000 and ITIL framework or equivalent. The Deployment and Release Management process receives the approved Change Request from the 2nd Level Support and performs the following tasks (not limited to):

a. Activating Level 3 maintenance when new solutions shall be developed;
b. Development of the solution (e.g. new CI Fix, Repair, Replacement, Patch, or Release);
c. Testing of the solution (e.g. Regression testing, issue/deficiency replication testing);
d. Update of baseline content and status;
e. Release of the solution (release unit/record);
f. Delivery and deployment of the solution.

[55] First Level of Maintenance: It is responsible for the very basic maintenance activities. It is responsible to activate the second level of maintenance when it is needed. It implements the initial preventive Maintenance procedures and any additional Service/Capability and/or site specific procedures that are defined in the corresponding O&M Manual. All 1st Level Maintenance procedures do not require specialised tools and/or specialised personnel.

[56] Second Level of Maintenance: It is responsible of isolation and resolution of system-level maintenance and management of deficiency reports and repair. It is responsible to activate the third level of maintenance when it is needed. It implements the initial preventive Maintenance procedures and any additional Service/Capability and/or site specific procedures that are defined in the corresponding Manual. All 2nd Level Maintenance procedures do not require specialised tools and/or specialised personnel.

[57] Third Level of Maintenance: It is responsible of any support that involves a change to the system baseline, such as software patches or new releases. It is responsible of specialised hardware repair, if applicable. Third level maintenance is activated by third level support and can be initiated either to define the solution to a problem (corrective maintenance) or to maintain up to date software configuration (adaptive maintenance following changes to the underpinning hardware, firmware and software environment) e.g. security patches, operating system upgrades, minor software configuration changes due to operational/interface needs. It implements the initial preventive Maintenance procedures and any additional Service/Capability and/ or site specific procedures that are defined in the corresponding Manual. 3rd Level Maintenance procedures can require specialised tools and/ or Personnel

[58] Fourth Level of Maintenance: It is the hardware vendor or the software original developer. It is activated from the 3rd level of maintenance only when it is needed.

2.3.3.2 General Requirements

[SOWG-86] The Contractor shall develop and maintain the Maintenance and Support Concept that defines the maintenance and support environment, constraints, locations, procedures, artefacts, roles and responsibilities (Responsible, Accountable, Consulted and Informed (RACI), organisation and personnel skills to maintain the Delivered baselines.

[SOWG-87] The Contractor shall design/deliver the system/elements and the Operation/Support/Maintenance documentation, training (when applicable), instructions, and resources (skills, tools/test equipment) in order to allow the Purchaser to fully operate the system, to perform Level 1, Level 2 and Level 3 Maintenance and Support from the first SW release.

[SOWG-88] Until FSA, the Contractor shall be responsible for the Level 2, Level 3 and Level 4 maintenance and support activities for the releases.

[SOWG-89] Starting from FSA and until the end of warranty period, all maintenance activities beyond Purchaser capabilities/skills (Level 3 and Level 4 maintenance) required to restore the System from a critical failure shall be carried on by the Contractor by dedicated on-site interventions and/or off-site resolutions.

[SOWG-90] The Contractor shall ensure the Maintenance and Support Concept refers to the functional and non-functional Requirements of the System.

[SOWG-91] The Contractor shall define the 2nd and 3rd Level Support process interfaces to the other processes, including the existing NCIA Service Desk (1st Level of Support) and various NATO locations, organisations.

[SOWG-92] The Contractor shall ensure the process interface definition includes the input and output information, its structure, the communication path (i.e., Points of Contact (POC)), the time constraints for sending and receiving information, and quality criteria to evaluate the integrity of the interface. This shall include the related ITIL Processes to be tailored and detailed for the purposes of Support Concept.

2.3.4 Design Influence

2.3.4.1 Reliability, Availability, and Maintainability (RAM) Requirements

[SOWG-93] The Contractor shall develop its RAM Programme and perform the analysis based on the RAM metrics and requirements outlined in the SRS.

[SOWG-94] The Contractor shall ensure the design of the system includes sufficient redundancy and other Reliability, Maintainability, Availability and Testability measures to ensure the RAM requirements in this Contract are achieved and attained at an optimal Total Cost of Ownership (TCO), minimising preventive maintenance, manpower requirement and usage of special-to-type tools and test equipment.

[SOWG-95] The RAM analysis shall clearly capture and display the RAM characteristics of each main component, aggregated up to the level of sub-system, and subsequently the entire system. System breakdown in line with the configuration item structure shall be used as reference to perform the analysis.

[SOWG-96] The RAM analysis shall include the reliability prediction based on the proposed design solution and created Reliability Block Diagrams (RBD), as well as the reliability allocation model to include to trigger the design changes

[SOWG-97] The RAM analysis shall include Failure Modes, Effects and Criticality Analysis (FMECA) in accordance with [MIL-STD-1629A].

[SOWG-98] The Contractor shall ensure that the first issue RAM analysis is performed and delivered for each increment, to include all relevant data to demonstrate compliance with the SRS and SOW requirements. Such data shall be documented in the Support Case as outlined below.

2.3.4.2 Logistics Support Analysis (LSA)

[SOWG-99] The Contractor shall conduct a Logistic Support Analysis (LSA) Process, tailored to support the specific scope of the System operation activities.

[SOWG-100] The Contractor's LSA analysis shall include, as a minimum:
(1) Task Analysis for identification of operational tasks, SM&C tasks, administration and maintenance tasks (corrective, preventive, adaptive)
(2) Planning and execution of the O&M Procedures Verification Test with references to the Master Test Plan.
(3) Total Cost of Ownership Analysis, which shall include the warranty cost and all the operational costs and all the maintenance cost for all the support and Maintenance levels for at least 5 years after FSA

[SOWG-101] The Contractor shall ensure that Operation tasks are identified through analysis of the functional and non-functional requirements of the new system taking into account mission scenarios and conditions under which the system will be operated.

[SOWG-102] The Contractor shall ensure that maintenance tasks are identified using the RAM data and results.

[SOWG-103] For each task in Task Analysis, the Contractor shall determine the properties and physical resources required to execute the task. For that purpose, each task shall be analysed to identify and capture:
(1) The support level to be assigned;
(2) Location/ facility involved;
(3) Personnel skills required;
(4) Roles;
(5) Task duration and frequency, reusing Mean Time Between Failures (MTBF) and Mean Time To Repair (MTTR) data available;

[SOWG-104] The Contractor shall ensure the data and results of the Task Analysis are used as input to the development of technical publications and the development of training material.

2.3.4.3 Support Case

[SOWG-105] The Contractor shall develop and maintain the necessary Support Cases in which all LSA and RAM activities shall be documented. The Support Case shall include:
(1) System description and breakdown down to lowest level of maintenance significant items and in accordance with the CI structure and identifications;

(2) All COTS equipment datasheets, clearly indicating the reliability and maintainability characteristics which will be used as input for LSA and RAM;
(3) Availability, Reliability, and Maintainability analysis modelling, calculations and results (complete set of RBDs, FMECA including a list of critical items);
(4) The complete data set of the Task Analysis, including listings of all operation tasks, administrative tasks, corrective maintenance tasks and preventive maintenance tasks;
(5) References to deliverable test plans and other relevant testing documentation for RAM requirements verification and validation;
(6) The results from the O&M Task Procedures Verification Test.

[SOWG-106] The Contractor's Support Case shall form a body of evidence, providing justification for all data used and sufficient credibility that all LSA and RAM requirements outlined in SOW and SRS have been met by providing credibility to the data used and the results achieved in all calculations and models.

[SOWG-107] The Contractor shall ensure that the Support Case is delivered before the completion of each increment in accordance with the scope, to include all relevant data to demonstrate compliance with the SRS and SOW requirements.

2.3.5 Training

2.3.5.1 Training Plan

[SOWG-108] The Contractor shall develop and provide a Training Plan that describes how the Training requirements outlined in this Contract will be met.

[SOWG-109] The Contractor shall describe in this plan the approach to training, milestones, organization and resource requirements, management structure, interrelationships and other tasks related for training development.

[SOWG-110] The Contractor shall develop and provide a Training Plan that describes the training documentation for each course including but not limited to the syllabuses, schedules, course prerequisites (both for attendees and physical resources), course descriptions and training materials, method of evaluations (if applicable) and instructors.

[SOWG-111] The Contractor's Training Plan shall describe the requirement to perform the training in a physical classroom at Purchaser locations, or requirements for performing the training in a virtual classroom as remote training sessions.

[SOWG-112] The Training Plan shall define training modules and/ or courses required to enable all initially assigned Purchaser personnel to maintain the system at Level 1, 2 and 3, see also [SOWG-229] in section 2.4.5.2.7.

2.3.5.2 Training Material

[SOWG-113] Each training course material shall be provided for Purchaser review minimum 8 weeks before the start of the training courses.

[SOWG-114] The Contractor shall generate the following Training Material:
(1) Training syllabus;
(2) Student manual;

(3) Instructor guide and material;
(4) Learning guide;
(5) Quick reference card.

[SOWG-115] The Contractor shall include, in the Training presentation materials, all slides/ information to be presented by the instructor during the course.

2.3.5.3 Training the Purchaser's O&M team

[SOWG-116] The Contractor shall provide all training modules and courses required to enable Purchaser's O&M personnel to maintain the system at Level 1, 2 and 3.

[SOWG-117] The training courses shall cover all aspects of the Maintenance and Administration Manual (MAM), see section 2.5.4.4.

[SOWG-118] The Contractor shall provide all the appropriate training documentation to support the Purchaser O&M personnel to test, operate and maintain the system.

[SOWG-119] The training of the Purchaser's O&M team shall be conducted one time before each release of new Contractor provided software to production. I.e. the Contractor shall deliver this type of training as many times as the Contractor delivered software is made ready for deployment to production.

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

2.3.6 Supply Support

2.3.6.1 System Inventory

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

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

[SOWG-123] Additionally, the Contractor shall provide a detailed Software Distribution List (SWDL), which shall detail comprehensively all CSCIs and associated software, firmware or feature/performance licenses provided under this Contract. The SWDL shall include, the following data elements:
(1) CSCI identification number;
(2) Nomenclature;
(3) Version number;
(4) License key (if applicable);
(5) License renewal date (if applicable);
(6) Warranty expiration date;
(7) Date of distribution.

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

2.3.6.2 Physical labelling (if applicable)

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

2.3.6.3 SW shipment (if applicable)

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

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

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

2.3.6.4 Customs

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

2.3.7 Warranty Requirements

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

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

[SOWG-131] The Contractor shall integrate the 3rd Level Maintenance and Support services within its warranty services, to be provided off-site from the Contractor's premises or on-site from the Purchaser premises, as required

due to the corrections in SW. If the on-site Level 3 support is requested by the Purchaser for additional technical support or due to the changes in SW environment without any reported SW deficiency, then the Contractor shall provide this on-site support up to 6 times a year without any additional cost to the Purchaser.

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

[SOWG-133] The Contractor shall ensure that the warranty conditions remain valid even if the software is relocated/ redeployed to an equivalent platform during the warranty period.

[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 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 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.

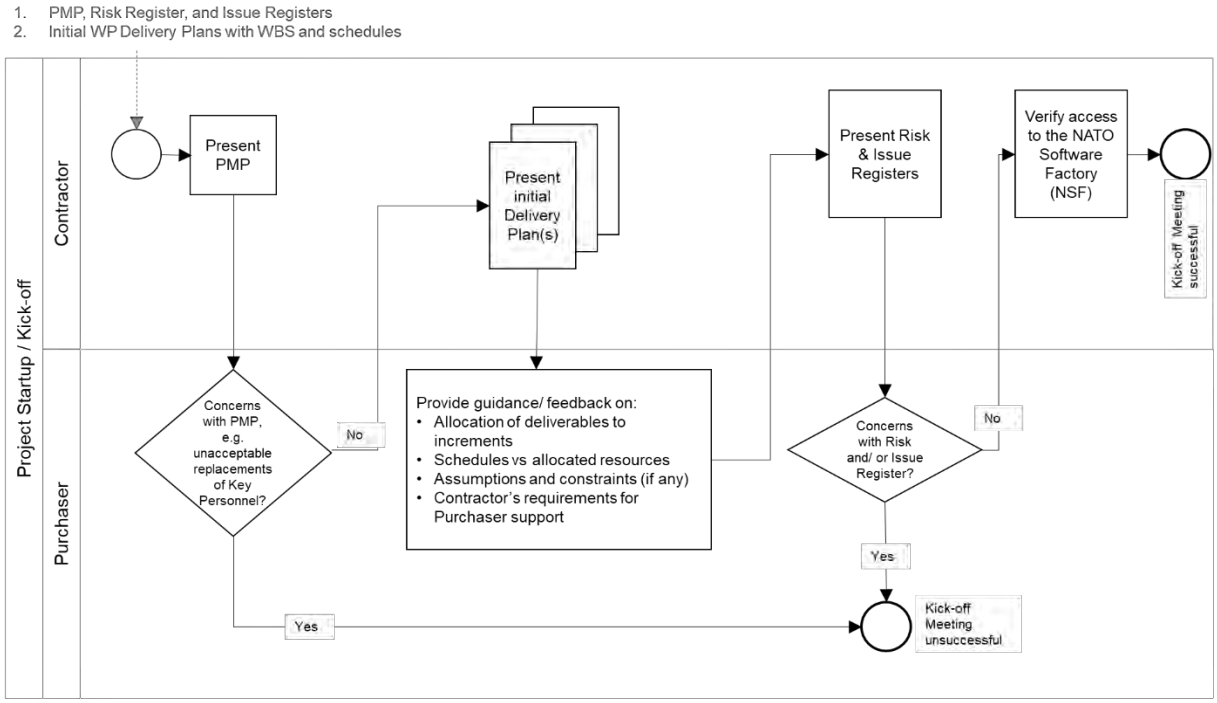
[65] The Purchaser will review the PMP for concerns (for instance unacceptable replacement of key personnel where the replacement personnel does not have the skill sets compliant with the requirements set forth in this SOW). If there are concerns with the PMP, then the Purchaser will not give the Contractor 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 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.

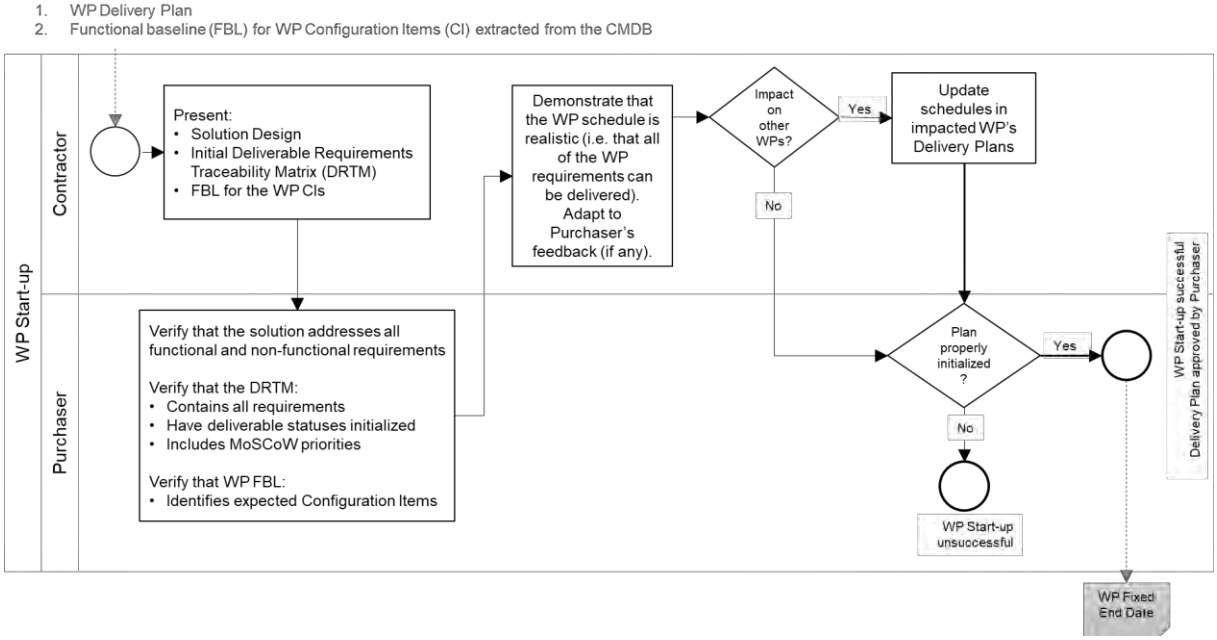
[SOWG-163] The Contractor shall at the meeting present the refined WP Delivery Plan. The presentation shall be:

(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

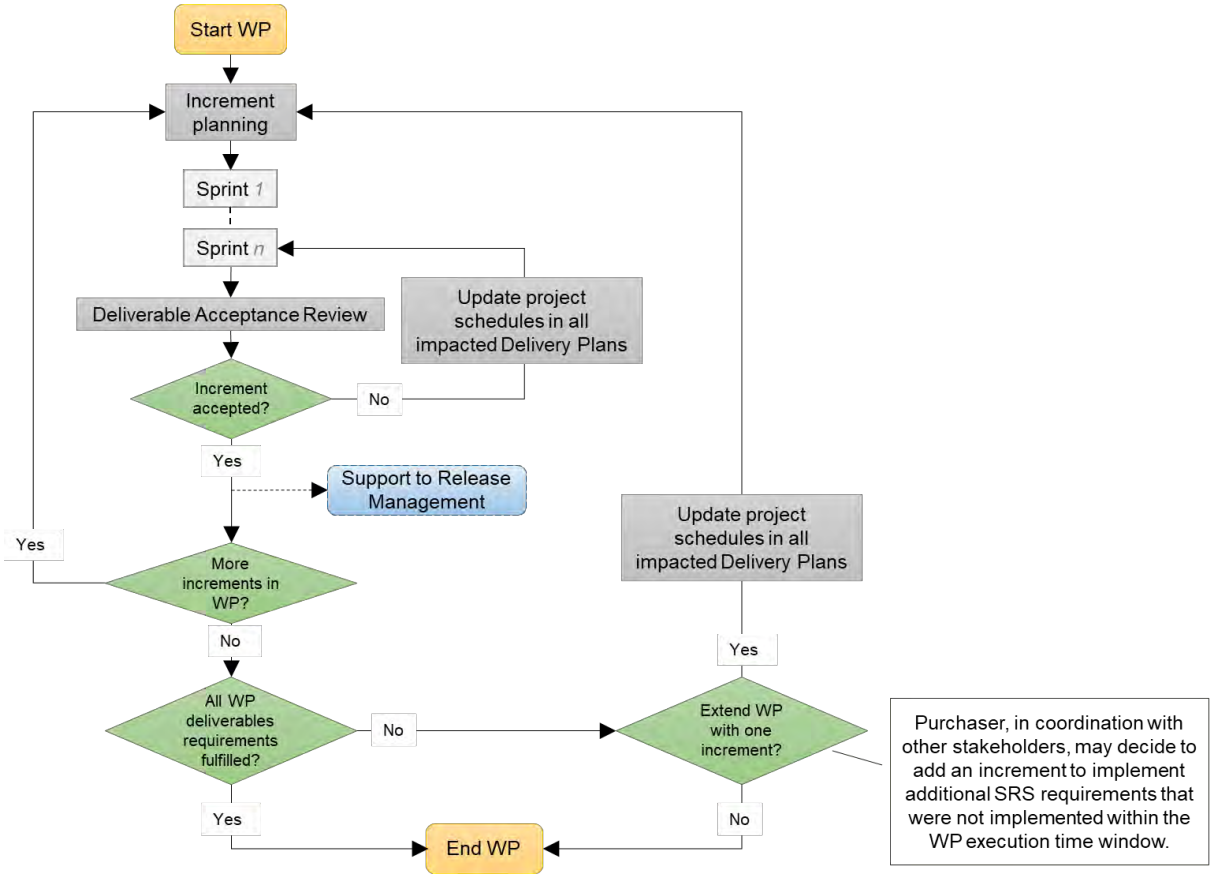
End-date, and whenever a potential schedule slippage is identified take corrective actions to prevent the schedule slippage.

[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 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 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);

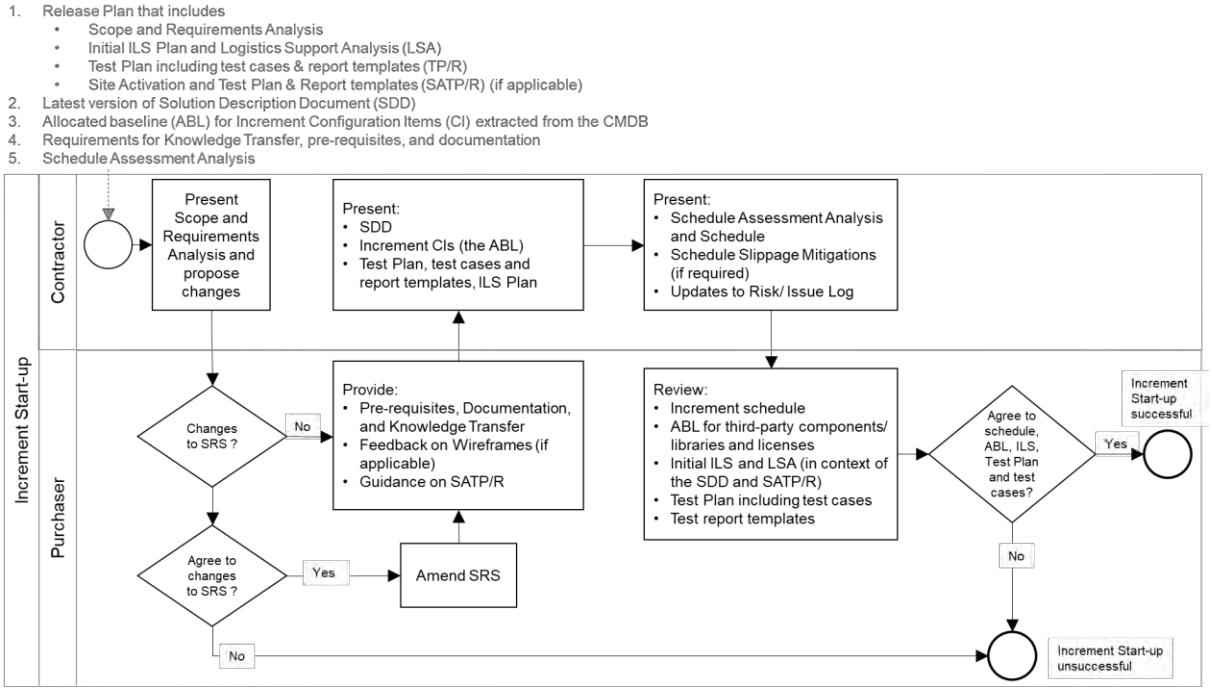
[1] A wireframe is expected to be a low fidelity sketch (sometimes literally a pen and paper sketch) of the UI. The wireframes must convey main features, functions and content of a user interface, without getting into the visual design

(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.

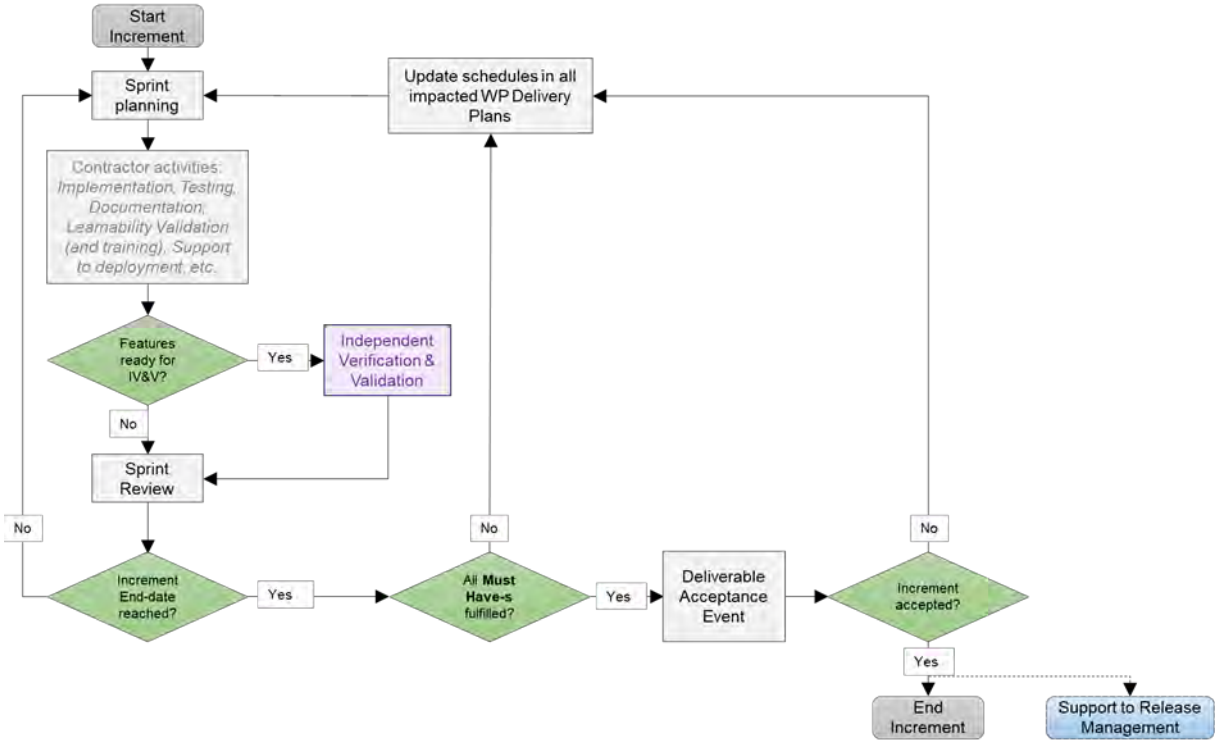
[81] In case the Contractor is not able to deliver all requirements at Must Have priority before the end of the increment, another sprint is added, and all project schedules are updated.

[82] Once the increment ends with all Must Have requirement fulfilled, a final Delivery Acceptance Review is conducted where the Deliverable Acceptance Report (DAR) (see section 2.5.4.7) will be used to formally record acceptance of the increment's deliverables. In case of the DAR being incomplete, or not providing sufficient proof

of a successful delivery, the delivery will not be approved and another sprint added to address the DAR deficiencies.

[83] Following a successful Delivery Acceptance Review, the Increment ends, and the Purchaser may decide to proceed with obtaining approvals for deployment to the production environment. With such an approval, the Purchaser will deploy the Increment's deliverables to the production environment. The Contractor will have to provide support to the Purchaser in the release management activities, see section 2.4.5.2.7.

Figure 2-5 Increment execution



[SOWG-175] The Contractor shall, in case the increment is extended with an additional sprint, update the WP Delivery Plans for all impacted WPs.

2.4.5.2.1 Sprints

[SOWG-176] The Contractor shall break up the execution of an increment into a sequence sprints where the duration of a sprint is no longer than 4 weeks.

[SOWG-177] The Contractor shall conduct a Sprint Planning Meeting and a Sprint Review Meeting and invite the Purchaser to take part in these meetings.

[SOWG-178] The Sprint Planning and Review meetings shall normally take place at the Contractor's premises, but can, upon Contractor's request be conducted at Purchaser's facilities.

[SOWG-179] The Contractor shall enable the Purchaser to participate remotely in Sprint Planning and Review meetings using video conferencing technology.

2.4.5.2.1.1 Sprint Planning

[SOWG-180] The Contractor shall after each Sprint Planning Meeting produce a Sprint Work Plan that shall be provided to the Purchaser.

[SOWG-181] The Sprint Work Plan shall include:
(1) A list of project implementation tasks (or user stories) with individual priorities;
(2) Tasks to implement bug-fixes in the case bugs has been discovered in software functionality previously delivered by the Contractor under this contract;
(3) Updated UI Wireframes (if applicable);
(4) Recorded request for specific Purchaser support during the sprint (e.g. support to testing, support to assessing User Interfaces, etc.)

[84] The Purchaser will participate in the Sprint Planning Meeting with Subject Matter Experts to support the Contractor's planning.

2.4.5.2.1.2 Sprint execution

[SOWG-182] The Contractor shall every day of the Sprint conduct a scrum meeting.

[SOWG-183] The Contractor shall facilitate participation of the Purchaser in the daily scrum meetings (e.g. by using the Microsoft Teams tool available through the NSF).

[SOWG-184] The Contractor shall each day of the sprint (typically at the end of the day) commit the implemented software changes to the Git repository in the NSF where the updated software shall pass the CI/ CD build tests.

2.4.5.2.1.3 Sprint Review Meeting

[SOWG-185] The Contractor shall at the Sprint Review meeting:
(1) Report the final status of planned tasks, and achievements and progress in the Sprint, to the Purchaser. Note: this report shall include an assessment from the Contractor on the outlook for being able to deliver all the requirements defined for the increment;
(2) Provide the Purchaser with a new, updated and working, version of the software being developed. I.e. the Contractor shall make sure that the a Sprint always concludes with new working software.

2.4.5.2.2 Contractor's Test Activities

2.4.5.2.2.1 Managing the increment Test Plan, test cases, and test reports

[SOWG-186] The Contractor shall maintain (i.e. improve and update if required) detailed test cases for how to perform tests that will produce the test report for the deliverable. I.e. there shall be detailed test cases enabling the production of the following reports:
(1) Software Quality Metrics Report (SQMR), see 2.5.4.3.4;
(2) Source Code Review Report (SCRR), see 2.5.4.3.5;
(3) Security Test Report (SecTR), see 2.5.4.3.6;
(4) Deliverable Functional and Performance Test Report (DFPTR), see 2.5.4.3.7;
(5) System Integration Test Report (SITR), see 2.5.4.3.8;
(6) Continuous Delivery Assessment Report (CDAR), see 2.5.4.3.9.

[SOWG-187] The Contractor shall, when executing automated tests make the output from the tests (i.e. test results) available in the NUnit report XML format.

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

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

2.4.5.2.2.2 Defect management process

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

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

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

Table 2-2 Definitions for defect categorization

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

Table 2-3 Classification of defects based on severity

Severity	Definition
Critical	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

Severity	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 UAT with the right personnel to be able to support the UAT event.

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.

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.

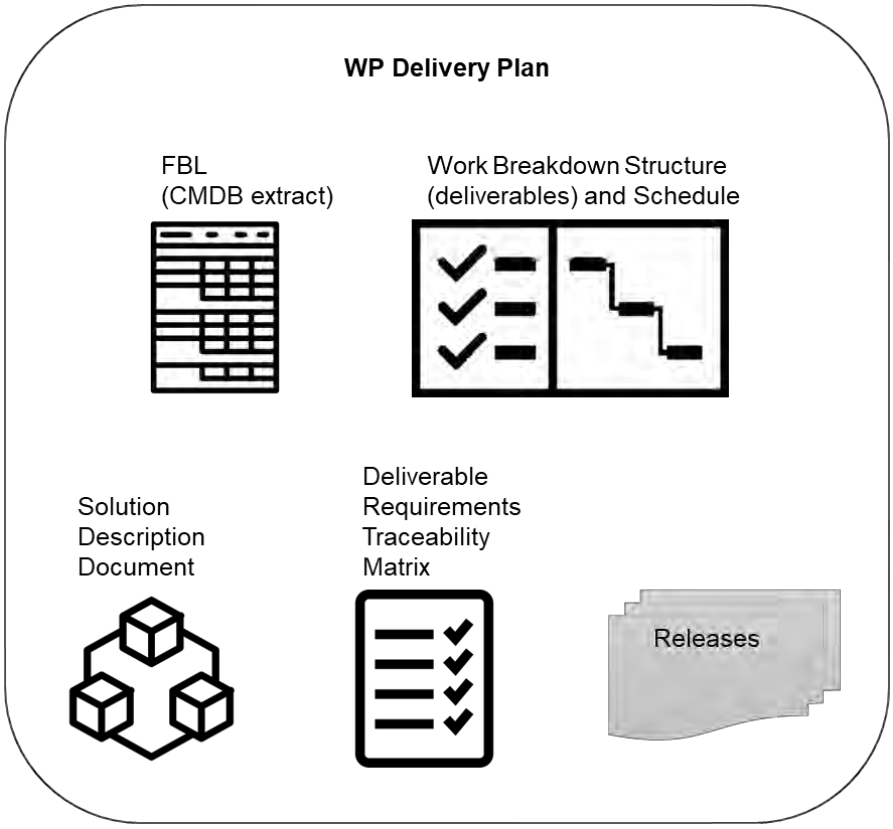
2.5.3 WP Delivery Plan

[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.

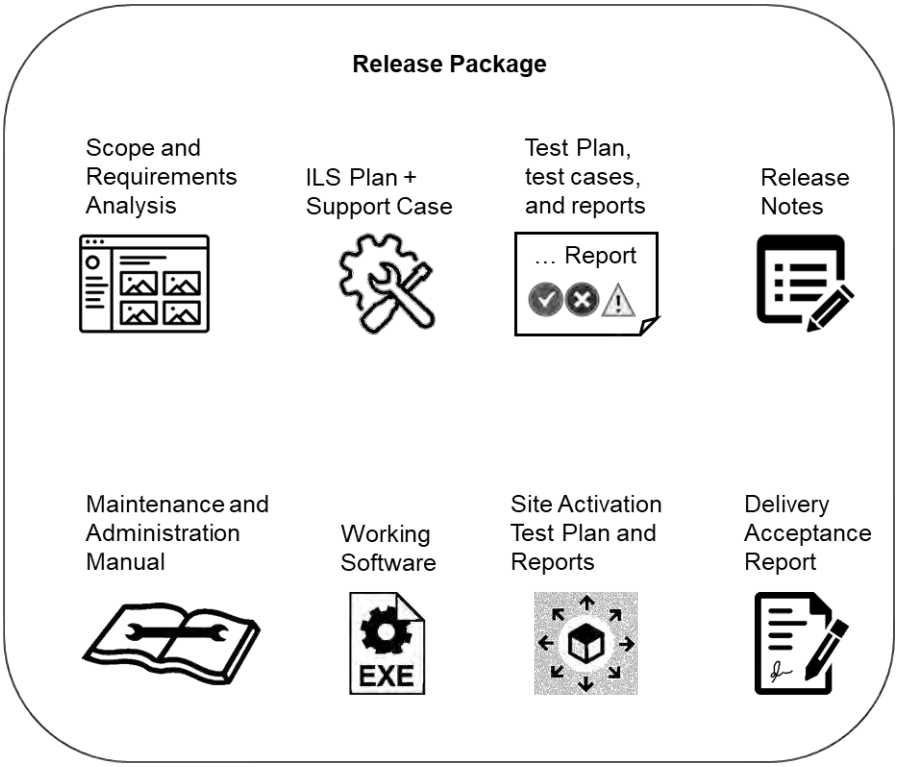
[SOWG-308] The DRTM shall be placed under configuration control throughout the period of performance the Contract.

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 the any API implemented as part of the deliverable is 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 1.0

21/12/2020

TABLE OF CONTENTS

INDEX OF FIGURES

INDEX OF TABLES

Document Revision History

Date	Version	Changes
21 Dec 2020	1.0	IFB package release version

1 Introduction

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

1.1 Scope

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

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

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

1.2 Conventions

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

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

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

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

1.3 Structure

[9] This SRS is structured as follows:

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

1.4 Applicable documents

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

Table 1-1 Applicable documents (Compliance Requirements)

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

1.5 Reference documents

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

Table 1-2 Reference documents - miscellaneous

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

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

Table 1-3 Reference documents – APP11D

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

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

1.6 Background – envisioned capability

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

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

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

(2) Meet all of the performance, scalability, capacity and other quality requirements as defined by the non-functional requirements of this SRS (meet the specified NFRs when accessing the data in a repository of trillions of entities);
(3) Provide a complete implementation of [OData 4] as an OData REST API that enables authorized clients to access all the Intelligence Information Entities (IIE) in the I2BE intelligence information platform. The complete set of IIEs can be seen in the Index of Intelligence Information Entities at the front of the [INTEL-FS2-IM];
(4) Implement a faceted search against the IIEs hosted in the I2BE that meets the specified response time requirements;
(5) Implement a graph-oriented query service against the IIEs in the I2BE that meets the specified NFRs;
(6) Be hosted upon, re-use and/ or integrate with the services provided by the Bi-Strategic Command Automated Information System (Bi-SC AIS) Service-Oriented Architecture (SOA) and Identity Management (IdM) Platform (see [SOA-IdM]), hereafter referred to as the SOA & IdM Platform;
(7) Through the SOA Platform Integration Services (see [SOA-IdM]) integrate INTEL-FS2 with the set of external systems defined in the Integration Services section of this SRS;
(8) Host a video conditioning service enabling Web-clients to play streaming video in STANAG 4609 format;
(9) Replicate IIEs (and their aggregations) asynchronously between multiple installations/ instances of the I2BE, and exchange IIEs between multiple I2BE instances through export and import (where the data can be air-gapped between different networks);
(10) Provide System Administration tools.

1.7 Initial Information Model

[14] The significant part of the Initial Information Model [INTEL-FS2-IM] is based on existing production systems (IRM, CM, BSO, Products, EOB, etc.) that these I2BE services will be replacing.

[15] Consistent with the vision of the best practice Domain Driven Design (DDD) it is expected that the model will evolve under implementation as any residual elaboration is realised. It is expected that this evolution will be limited to fine grained adjustment because the bulk of the Spiral 2 effort concerns itself with technology refresh, migration and ‘re-platforming’ (see [18]) of existing back end, full stack capabilities to the SOA & IdM Platform.

[16] Further leveraging DDD best practices, the Information Model will form the basis for the ‘Ubiquitous Language’ – INTEL-FS Spiral 2 ‘Universe of Discourse’. This domain language shall be the only language present in the application and it shall be reflected in all aspects including: the UX, the API, the business services, the analytic services, storage solutions, schema, events, business intelligence, query parameters, etc.

[17] The [INTEL-FS2-IM] shall remain authoritative for those aspects that it specifies; no part of the information model is reproduced here in order to prevent synchronization issues.

1.8 SOA & IdM Platform

[18] Of major importance to this back-end service implementation is the SOA & IdM Platform. A part of the work defined in this SRS concerns itself with the re-platforming of existing capabilities that are wrapped up in sub-optimal software architectures; tightly coupled; depend on obsolete technologies and impose high interest payments on the technical debt that they represent. Further, these legacy solutions incur a high total cost of ownership depending, as they do, on their many in-house variants of core services that are now available on/ in the SOA & IdM Platform.

[19] Leveraging the services provided by the SOA & IdM Platform frees up resources that can now be focussed solely on the services at the top of the stack - the Joint Intelligence Surveillance and Reconnaissance (JISR) COI-specific business services that compose the I2BE intelligence information platform specified herein.

2 General Backend Requirements

[20] This section defines a set of general requirements that are applicable to all of the I2BE services.

[21] Within this SRS, the I2BE services specifications will, when applicable, make references to these generic requirements.

[22] Costing is broken down according to the I2BE functional services and therefore the cost of implementing general requirements is to be incorporated into the cost of each delivered I2BE functional service.

2.1 General cross-cutting requirements

2.1.1 Auto-generating from the information model

[GBE-1] The I2BE API specifications shall, whenever feasible, be auto-generated as OData REST APIs from the information model as documented by [INTEL-FS2-IM].

Verification: Demonstration and Inspection

[GBE-2] The Information Model shall be maintained, on a service-by-service basis, throughout this contract.

Verification: Inspection

[GBE-3] Any deviation from these General Requirements shall require the approval of the purchaser prior to implementation.

Verification: Demonstration and Inspection

[GBE-4] The data access layer (DAL) shall be auto-generated from the information model as defined by [INTEL-FS2-IM].

Verification: Demonstration and Inspection

[GBE-5] All date-times shall clearly identify time values as Zulu and the date/time format shall be in accordance with ISO 8601.

Verification: Demonstration

[23] Note: The two requirements above separate the design of the API from the implementation of the API; both are deliverables,

2.1.2 Integrating into the SOA & IdM Platform

[24] The SOA & IdM Platform general requirements span all phases of the service lifecycle –a key service provided by the SOA & IdM Platform is Service Lifecycle Automation.

[25] Some high level treatment of the SOA & IdM Platform will necessarily be included here; for detailed, authoritative specification see [SOA-IdM].

[26] The SOA & IdM Platform provides services to three client/ consumer hosting models. These include:

(1) Non-Native Hosted Services: This is the preferred model for I2BE functional and Phase II services providing, as it does, maximum flexibility in the choice of underlying software and runtime whilst granting complete access to SOA & IdM Platform services (see below). Non-Native base images are provided to create runtime implementations that follow standard NATO technology stacks including: .Net Core Framework; Java Web Application Server; generic Web Application Server, etc.

(2) Native Hosted Services: These services leverage a pre-canned ‘base runtime’ and include extensions to support integration, mediation, edge and common business services. The edge, mediation and integration runtimes are the preferred model for the I2BE integration services.

(3) Externally hosted services and applications: these include some or more of legacy/ heritage systems; other systems that, for whatever reason, are not hosted on the SOA & IdM Platform; external integration partners and/ or federated systems that are not a part of the NATO IT estate; etc. INTEL-FS Spiral 2 will integrate with such systems external to the SOA & IdM Platform (see the set of Integration Services specified herein) via the Native Hosted Service implementation model and the appropriate SOA & IdM Platform services.

[27] The standard unit of software - deployable to the SOA & IdM Platform- is the container image. Container image lifecycles are managed by the SOA & IdM Platform Container Image Registry. Container images encapsulate all service dependencies except for service runtime parameterisation. Management of runtime parameterisation is solely the concern of the SOA & IdM Platform Configuration Server.

[28] Various pre-canned, curated, container base images are available from the SOA & IdM Platform with which JISR COI-specific services are to be developed.

[29] This SRS does not prescribe tooling related to the development phase of the build pipeline (e.g. the integrated development environment (IDE), test framework/ runner, continuous integration, build automation, etc.) The result of the development phase of the pipeline will go into staging where various pipeline stages mandated by the SOA & IdM Platform are applied. For example, the SOA & IdM Platform will apply security scanners to release candidate container images prior to these images being accepted in to the Container Image Registry.

[30] The SOA & IdM Platform will provide ‘Platform Services’ in support of Domain Specific Services such as the I2BE Phase I, Phase II and Integration Services specified herein.

[31] SOA & IdM Platform services include:

- Observability service: logging, metrics, audit, traces, customizable dashboards, alert management and notification rules, etc.
- Security services: Identity Management, Authentication, Single Sign On (SSO), Authorisation, Authoring (Policies, etc.), Credential Management, etc.
- Integration Services are based on the established Enterprise Integration Patterns (EIP) and include: Transport Normalisation, Encoding/ Decoding, Message composition/ aggregation/ de-aggregation etc., Message Routing, Publish and Subscribe, Mediation, etc.
- Platform Management Services manage, configure and operate the SOA & IdM Platform, its tenants and the services hosted on it.
- Message Oriented Middleware Services are provided by several of the SOA & IdM Platform’s foundational components including the Message Bus, Message Broker, Notification Broker, Notification Cache and Message Queue. Together, these components provide a number of services including asynchronous messaging, message queues, publish and subscribe, message streaming, brokerage etc.; these in support of both SOA & IdM Platform hosted service-to-service communications and SOA & IdM Platform hosted service-to-external service communications.
- Service Lifecycle Management: lifecycle automation, container registry, service configuration management, etc.

2.1.2.1 General SOA & IdM Platform Requirements

[GBE-6] All I2BE services (taken to mean the full set of Phase I, Phase II and integration services specified herein) shall be hosted upon the SOA & IdM Platform, and re-use and/ or integrate with the SOA & IdM Platform services.

Verification: Inspection

[GBE-7] All I2BE functional and integration service implementations shall derive from the SOA & IdM Platform provided, pre-canned service base images.

Verification: Inspection

[GBE-8] I2BE service implementations deriving from the SOA & IdM Platform provided, pre-canned service base images that include externally sourced dependencies must demonstrate complete image supply chain provenance for those dependencies.
Verification: Inspection

[GBE-9] All supporting service implementations that cannot derive from the SOA & IdM Platform provided, pre-canned service base images must demonstrate total base image and dependency supply chain provenance.
Verification: Inspection

[GBE-10] For all I2BE services, the build pipeline shall result in self-contained (all dependencies are included with the exception of runtime parameterisation) base images that target the SOA & IdM Platform Container Image Registry and are compatible with the SOA & IdM Platform Application Runtimes, see [SOA-IdM].
Verification: Inspection

[GBE-11] All I2BE services shall use the SOA & IdM Platform Configuration Server for the complete lifecycle management of their runtime parameterisation, see [SOA-IdM].
Verification: Inspection

[GBE-12] All I2BE services shall conform to the SOA & IdM Hosted Services Implementation Contract, see [SOA-IdM].
Verification: Inspection

[GBE-13] I2BE Functional and Phase II service implementations shall target the Non-Native Hosted implementation model and shall derive from one of the SOA & IdM Platform provided, NATO standard technology stack, base images.
Verification: Inspection

[GBE-14] I2BE Integration service implementations shall target the Native Hosted implementation model combined with the pre-canned Base Integration, Edge, Mediation and Integration Runtimes provided by the SOA & IdM Platform, see [SOA-IdM].
Verification: Inspection

[GBE-15] For those services and interfaces that are required, all I2BE Services shall conform to the respective standard and version specified in the Applicable Standards of the SOA & IdM Platform Interface Control Document (ICD) included in [SOA-IdM].
Verification: Inspection

[GBE-16] I2BE Services shall not implement or duplicate service, capability or functionality that is available from/ in the SOA & IdM Platform services.
Verification: Inspection

[GBE-17] I2BE service isolation: all aspects of an individual I2BE service runtime lifecycle (deploy, start, stop, update, retire, etc.) shall be functionally and non-functionally isolated from any of the other I2BE services.
Verification: Demonstration

[GBE-18] I2BE services shall work consistently with the quality of service characteristics facilitated by the SOA & IdM Platform including observability, elasticity/ scale-out, resilience, etc.
Verification: Demonstration

2.1.2.2 Eventing

[32] SOA & IdM Platform Messaging Services include two types of eventing services:

- SOA & IdM Platform Message Bus/ Broker –a highly scalable, fault-tolerant, distributed publish and subscribe messaging capability (realized via Apache Kafka)
- WS-Notification is realized as a wrapper over the SOA & IdM Platform Message Bus/ Broker. WS-Notification is an implementation of the 'NotificationBroker' and 'SubscriptionManager' interfaces of the OASIS WS-Notification standard referenced by the [SOA-IdM] in support of the NATO SIPs (also see [SOA-IdM]).

[GBE-19] Where I2BE services are required to fire events they shall do so using both event mechanisms supported by the SOA & IdM Platform (unless explicitly stated otherwise).

Verification: Demonstration

2.1.2.3 Security

[33] Collectively, the security services provided by the SOA & IdM Platform are referred to as Identity and Access Management (IAM) and in the [SOA-IdM] cover four broad areas:

- Authentication and Authorisation
- Identity Management
- Service and Application (delegated) Authentication
- Attribute Based Access Control.

[34] The security technologies, implementations and standards used with the SOA & IdM Platform include OAuth2, Open ID Connect (OIDC), WS-Security, SAML, XACML, etc.

[35] SOA & IdM Platform service security features cover both RESTful and SOAP based services.

2.1.2.3.1 Identity Management

[GBE-20] All I2BE services shall make use of the full lifecycle, identity management services provided by the SOA & IdM Platform.

Verification: Demonstration

2.1.2.3.2 Authentication

[GBE-21] All I2BE services shall make use of the authentication services provided by the SOA & IdM Platform.

Verification: Demonstration

2.1.2.3.3 Authorization, Access Control

[36] All I2BE services will require the extra access control decision fidelity enabled by the Attribute Based Access Control (ABAC) features of the SOA & IdM Platform. This fidelity is expressed in terms of the four types of attributes – Subjects, Resources, Actions and Environment:

- Policy attributes for the Subjects will include Identity, Organizational Node (ON), and Role (e.g. Administrator, Intel Creator, Intel Manager, etc.).
- Policy attributes for the Resources will be the IIE at category/ type granularity (e.g. ISR Product/Document, ISR Product/Image, ISR Product/ Report, BSO/ Person, BSO/ Unit, IR/PIR, IR/SIR, etc.), workflow state, confidentiality labels, etc.
- Policy Actions will include Create, Read, Update, Soft Delete, Hard Delete, Approve, Publish, and other workflow actions.
- Policy Environment will include data set (operational data repository, training data repository, exercise data repository, etc.), date-time, etc.

[37] An example of these attributes in policy decision logic might be: J2 Collator in KFOR (Subject) Publishing (Action) a classified battlespace event status report (Object type and Object property) from within the KFOR J2 Collation Cell at Threat Level X (Context).

[GBE-22] All I2BE services shall implement access control/ authorisation consistent with the security services, technologies and standards provided by the underlying SOA & IdM Platform Security Services.
Verification: Demonstration

[GBE-23] All I2BE services shall leverage the SOA & IdM Platform provided policy-based access control services through the implementation of a policy enforcement point (PEP) interacting with the SOA & IdM Platform Policy Decision Point (PDP).
Verification: Demonstration

[GBE-24] The I2BE Policy Enforcement Point shall (via the external SOA & IdM Platform provided PDP) use only externally defined and administered XACML policies. E.g. using a policy retrieval point (PRP) that uses policies from an external policy store administered by an external policy administration point (PAP).
Verification: Demonstration

[GBE-25] When invoked by other ABAC enabled services, services shall use relayed claims, or, in turn, relay claims when calling other ABAC enabled services.
Verification: Demonstration

[GBE-26] I2BE services shall not hard-code authorisation/ access control logic in any way other than through the PEP and PDP components of the ABAC architecture.
Verification: Demonstration and Inspection

2.1.2.4 Observability

[GBE-27] All I2BE Services shall, by fulfilling the SOA & IdM Platform Implementation Contract, make use of the SOA & IdM Platform observability interfaces and services to support central management, accessing and analysis of the I2BE logs and metrics through the SOA & IdM Platform tooling.
Verification: Demonstration and Inspection

[GBE-28] At a minimum, all activities/ actions/ queries of all I2BE service consumers (persons, integration partners, other services, etc.) shall be logged for auditing purposes (i.e. enabling full audit traceability of identifiable client activities/ actions). Note this includes all read actions on all IIEs; i.e. identification of which identity received the IIE, its version and at what time.
Verification: Inspection

[GBE-29] Information on any change made to the system, and all occurring faults and errors, shall be logged.
Verification: Demonstration and Inspection

[GBE-30] Change and fault/ error logs shall contain required information in order to provide the support staff with interpretable and comprehensive information about the cause and nature of the change or fault/ error.
Verification: Demonstration

2.1.3 Testability, test automation, continuous integration (CI) and continuous delivery (CD), and quality assurance (QA)

[GBE-31] The software shall be designed and structured for good testability. This includes usage of patterns such as, decoupling, test data generation and dependency injection to enable unit testing.
Verification: Inspection

[GBE-32] Test-automation, Continuous Integration (CI) and Continuous Delivery (CD) processes shall be implemented for all of the services and these process shall feed in to the SOA & IdM Platform pipeline stages for staging, security scanning, container signing, base image registration, etc..
Verification: Demonstration

[GBE-33] The Continuous Integration process shall include automated security tests, automated source code analysis including code coverage, security vulnerability analysis, and automatic smoke test/ build verification test (BVT).
Verification: Demonstration and Inspection

[GBE-34] Automated regression tests shall be delivered with all services (including all artefacts required to run the tests e.g. unit tests, test data, data generators, external test harnesses, etc.).
Verification: Inspection

[GBE-35] Hardcoding of, or embedding of, resources, configuration settings, or any other non-binary artefacts (URL, DNS, IP addresses, file path, drive letters, etc.) shall NOT be implemented/ used. (As already mentioned, all services shall use the SOA & IdM Platform Configuration Server for this type of data.)
Verification: Inspection

2.1.4 API supporting multiple geographic reference systems

[GBE-36] The I2BE APIs shall support input and output of geospatial data in multiple geographic reference systems. The supported geographic reference systems shall include Universal Transverse Mercator (UTM) grid system, Military Grid Reference System (MGRS), and World Geodetic System 1984 (WGS84) with latitude/ longitude options as degrees, minutes and seconds or degrees, minutes and decimal minutes.
Verification: Demonstration

2.1.5 Supporting multiple data sets

[GBE-37] The services shall, from a user's perspective, be seen to concurrently support multiple data sets (e.g. an operational data set, a training data set, an exercise data set, etc.) where there is no spill-over of data between the data sets.
Verification: Demonstration and Inspection

[GBE-38] The services shall whenever an IIE is created, tag the IIE with a label that associates it to the data set to which it belongs (e.g. OPERATIONAL, EXERCISE, TRAINING).
Verification: Demonstration and Inspection

[GBE-39] The services shall have support for fictitious security markings (e.g. marking an IIE as releasable to a fictitious country code).
Verification: Demonstration and Inspection

[GBE-40] The services shall, when operating in exercise or training mode, support the usage of fictitious Geospatial and Features and locations/ places (i.e. business validation rules shall accept such fictitious names as long as they are pre-defined in appropriate dictionaries).
Verification: Demonstration and Inspection

[GBE-41] The services shall, when operating in exercise or training mode, have support for using separate domain value tables (from the operational domain value tables) where the exercise/ training domain value tables can contain fictitious domain values.
Verification: Demonstration and Inspection

[GBE-42] Data lifecycle management shall be applicable to data sets such that individual data sets can be isolated; exported and imported; archived, backed up and restored; etc.
Verification: Demonstration and Inspection

2.1.6 Confidentiality metadata labelling

[GBE-43] The services shall implement the confidentiality metadata label specification defined by [ADatP-4774] (this is referenced on the base Entity in the [INTEL-FS2-IM].)
Verification: Inspection

[GBE-243] The services shall implement the metadata label binding specification defined by [ADatP-4778].
Verification: Inspection

2.1.7 Export of information

[GBE-44] The services shall when exporting any data – in any way - ensure that highest security classification and the most restricted releasability of the data is captured in the exported data. If the export is file based then the file name shall convey the file security classification and releasability. When exporting to a PDF file, the file security and releasability shall be inserted in the document header and footer on all pages.
Verification: Demonstration

2.1.8 User Interface (UI) cross-cutting requirements

[38] Note: The I2BE is expected to deliver user-facing application(s) only to support systems administration, operation, configuration, etc.; other (e.g. domain specific, functional) UI implementation is NOT expected.

2.1.8.1 Language

[GBE-45] Any user interface shall use "UK English" as the default language. This shall apply to all applications and supporting components, including all user interfaces (e.g. views, dialogs, help screens, tooltips, etc.), error/notification/warning messages and documentation.
Verification: Demonstration

2.1.8.2 User feedback

[GBE-46] Any user interface shall notify the user who has initiated an action that processing of the action has started and convey the sense of processing progress (by means of a progress indicator, dialog boxes).
Verification: Demonstration

[GBE-47] Any user interface control actions shall be simple and direct, whereas potentially destructive control actions shall require extended user attention such that they are not easily acted on (e.g., "are you sure" queries).
Verification: Demonstration

[GBE-48] Any user interface shall provide an Error Management capability, which is readily distinguishable from other displayed information (e.g. Pop-up Error Window).
Verification: Demonstration

[GBE-49] Any user interface shall provide the users with meaningful error messages and information about the actions they need to take in order to fix or at least to report the problem.
Verification: Demonstration

2.1.8.3 Data Entry Interactions

[GBE-50] Where the user is entering (or changing) data, the user interface shall detect invalid and missing entries. The invalid or missing entries shall be highlighted or marked so that the user can be quickly identify and correct them.
Verification: Demonstration

[GBE-51] In any user interface, during data entry, the ENTER key shall not trigger form submission. I.e. the user shall specifically click the “submit button” to submit the entered data.
Verification: Demonstration

[GBE-52] Any user interface shall provide prompts (i.e., allow cancellation or confirmation) when input or changes may be lost due to navigation or logging out.
Verification: Demonstration

2.1.9 Compliance with non-functional requirements (NFR)

[GBE-53] The I2BE services shall comply with the NFRs as defined in chapter 5, when the NFR is relevant for the individual service. In general, all NFRs are relevant for all services, with a few exceptions, like [NFR-12] that is mostly targeted for the I2BE to I2BE Synchronization Service.
Verification: See individual requirements

2.2 General IIE-Oriented Requirements

2.2.1 IIE data management through OData REST API

[39] The I2BE will expose the IIEs through an Open Data (OData) Protocol Version 4.01 Representational State Transfer (REST) architectural style Application Programming Interface (API). For information on OData see [OData 4]

[40] IIEs are the top level “root aggregates” in the Intelligence Information Model.

[GBE-54] The I2BE API shall implement OData Version 4.01 for all Intelligence Information Entities (including compliance with the [OData 4] URL ABNF).
Verification: Demonstration

[GBE-55] The I2BE API shall deliver versioned OData APIs.
Verification: Demonstration

[GBE-56] The services shall return a standard, programming language-agnostic, interface description which allows both humans and computers to discover and understand the capabilities of a service without requiring access to source code, additional documentation, or inspection of network traffic [OAS v3.0.1, 2017]. That means the services shall return the contract specifying the API interface compliant to [OAS 3.0.1, 2017] in both JSON (JavaScript Object Notation) and in YAML (Yet Another Mark-up Language) formats [OASIS Odata OAS 1.0, 2016]
Verification: Demonstration

[GBE-57] The services shall implement the OData Service Document Requests and Metadata Document Request.
Verification: Demonstration

[GBE-58] The services shall, for all APIs, (including non OData API) collect statistics on the API usage to log files. The statistics shall include metrics on the API latencies (response times), frequency of use (down to the granularity of the IIE type), the URI requested, the requester, the action, etc.
Verification: Demonstration

[GBE-59] The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement full entity lifecycle management (create, read,update, delete, etc.)
Verification: Demonstration

[GBE-60] The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement the full set of query operators and filters appropriate to the types of the IIE properties (numeric, string, datetime, enumeration, etc.)
Verification: Demonstration

[GBE-61] The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement extent management (paging, top, skip, etc.)
Verification: Demonstration

[GBE-62] The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement Partial GETs (OData $select)
Verification: Demonstration

[GBE-63] The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement partial updates (PATCH).
Verification: Demonstration

[GBE-64] The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement 'navigation properties' for entity relationships.
Verification: Demonstration

[GBE-65] The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], implement expansions (OData $expand).
Verification: Demonstration

[GBE-66] The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], provide optimistic concurrency (ETag).
Verification: Demonstration

[GBE-67] The I2BE services shall, consistent with the OData specification, for all IIEs defined in [INTEL-FS2-IM], provide batching of operations (functions and actions)/ queries.
Verification: Demonstration

[GBE-68] For all update operations, the I2BE services OData API implementation shall enforce the authorisation/ validation rules derived from the [INTEL-FS2-IM], and from the capability being re-platformed. I2BE services shall prevent create and update commands succeeding in case of validation error.
Verification: Demonstration

[GBE-69] The services shall mark the data being created such that exercise-related and training-related information are distinguishable from operational information (See IntelligenceDatasetType enumeration in the [INTEL-FS2-IM]).
Verification: Demonstration

[GBE-70] The I2BE services shall whenever an IIE through the OData API is created, updated, or deleted, publish an appropriate IIE event notification Create/ Update/ Delete/ etc. on/ through the SOA & IdM Platform for the IIE.
Verification: Demonstration

[GBE-71] Through an OData API, the services shall implement soft-deletion of any IIE (i.e. tagging the IIE as deleted).
Verification: Demonstration

[GBE-72] Through an OData API, the services shall implement un-deletion of any soft-deleted IIE.
Verification: Demonstration

[GBE-73] Through an OData API, the services shall support hard-deletion of any IIE (i.e. permanently remove the IIE).
Verification: Demonstration

[GBE-74] The OData API shall for all IIE actions, support individual action on a single IIE as well as applying the action on a list of IIEs (e.g. soft-deleting many IIEs in one operation).
Verification: Demonstration

2.2.2 IIE dissemination workflow management

[GBE-75] The services shall, through the OData API, implement searching for IIEs, of any IIE type, in any workflow status (see PublishedStatusType in [INTEL-FS2-IM]).
Verification: Demonstration

[GBE-76] The I2BE services shall, whenever an IIE is subjected to a dissemination workflow choreography-task, publish an appropriate IIE event notification; see the [INTEL-FS2-IM] NATO:JISR:Staff:Dissemination:DisseminationCT enumeration for these (e.g. PostForApproval, Approve, Reject, ApproveAndPublish, Publish).
Verification: Demonstration

[GBE-77] The services shall, through the OData API, implement operations for changing IIEs workflow state for any IIE type.
Verification: Demonstration

[GBE-78] The services shall, through the OData API, implement functionality for changing the workflow state for multiple IIEs in one operation (e.g. set all IIEs in a list to an Approved workflow state).
Verification: Demonstration

[GBE-79] The services shall, through the OData API, implement functionality for attaching comments to the workflow state (e.g. if an IIEs is set to rejected, a reason for the rejection can be attached to the IIE's workflow state).
Verification: Demonstration

[GBE-80] The services shall, whenever an IIE's PublishedStatusType is set to 'Published' make the IIE available at all organizational nodes (ON).
Verification: Demonstration

3 Functional service requirements (deliverable specific)

3.1 Backend services - Phase 1

[41] Through the implementation of the requirements defined in the sub-sections below an initial version of the new, 're-platformed' INTEL-FS backend will be established on the SOA & IdM Platform [SOA-IdM]. This new back-end will provide the same backend functionalities as the back-end of INTEL-FS Spiral 1. The main difference from INTEL-FS Spiral 1 is the adaptation to the SOA & IdM Platform, bringing much improved performance and scalability, and some additional functionality like the ORBAT management, the BM-augmented BSO management, and the blue ISR ORBAT management).

3.1.1 IIE to IIE Association Service

[42] The information to be managed by this service is derived from the NATO::JISR::Relationships class diagram in the [INTEL-FS2-IM].

3.1.1.1 API

[FBE-1] The IIE to IIE Association Service shall through the OData REST API support all IIE access actions on inter-service IIE relationships (for an authorized client).

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

[43] Note: IIE to IIE relationships are those associations which cross services. A relationship between a BSO IIE and a Product IIE is one example of an inter-service relationship. Relationships between IIEs within a service are managed by that service. An example of an intra-service relationship would be equipment holdings within the Battlespace service which relate Actors to Materiel.

[FBE-2] The IIE to IIE Association Service shall implement server-side functionality that enables the I2UA client though service's API to fulfil any acceptance criteria defined in [INTEL-FS2-UserStories] that describes management of associations between IIEs (this includes [US 15], [US 17], [US 18], [US 22], [US 33], [US 36], [US 38], [US 39], [US 40], [US 43], [US 47], [US 48], [US 53], [US 58], [US 61], [US 64], [US 65], [US 67], [US 72], [US 75], [US 76], [US 77], and [US 83]). This means that the IIE to IIE Association Service shall though a REST API enable clients to create and manage (update and delete) associations as defined in [INTEL-FS2-IM].

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

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

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

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

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

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

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

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

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

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

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

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

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

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

[FBE-9] The IIE to IIE Association Service API shall implement a function that checks associations to external information endpoints and report on the endpoints that are found not to be reachable.

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

3.1.2 Geospatial and Features Service

[45] The information to be managed by this service is identified in the [INTEL-FS2-IM] in the:

- NATO::JISR::Battlespace::Location package - contains the geometrical/ geospatial primitives over which geospatial queries can be expressed, including: Point, Line, Surface and Volume derived types.
- NATO::JISR::Battlespace::Feature package - contains definitions of higher level battlespace Features whose value is partly defined by underlying geometric/ geospatial primitives – for example: area of intelligence Interest (AOII); named area of interest (NAI); line of bearing (LOB): etc.

[46] Included here in the geospatial areas service is the requirement for support to general geospatial querying over the OData API consistent with what is included in the [OData 4] specification. This includes the following OData Geo functions: 'geo.distance', 'geo.intersects' and 'geo.length'.

[47] All IIEs are geospatially referenced (IIE->GeoEntities) and therefore all IIEs can parametrise a geospatial query combined with the aforementioned OData geo operators.

3.1.2.1 API

[FBE-10] The Geospatial and Features Service shall through the OData REST API support all IIE access actions on Features (for an authorized client).

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

[FBE-11] The Geospatial and Features Service shall implement over the OData REST API support for geospatial querying consistent with the OData specification for geospatial support.

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

[FBE-12] The Geospatial and Features Service shall implement general geospatial support at the IIE level. For example it should be possible to query for Units that are within a Named Area of Interest.

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

[FBE-13] Geospatial and Features Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 33] and [US 47] with backend-relevant acceptance criteria for geographic areas as defined in [INTEL-FS2-UserStories].

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

[FBE-14] The Geospatial and Features Service shall after a create, update or delete change to a geographical feature, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

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

[FBE-15] The Geospatial and Features Service API shall support uploading of one or many attachments to geographical feature.

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

3.1.3 Intel-FS Spiral 1 Geospatial and Features Migration Service

[48] The purpose of this service is to migrate Geospatial and Features from INTEL-FS Spiral 1 into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.3.1 Extract, transform, load geographical areas

[FBE-16] The INTEL-FS Spiral1 Geospatial and Features Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new geographic areas (features). It shall be possible through a configurable filter setting to filter the geographic areas that are extracted from INTEL-FS Spiral1.

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

[FBE-17] The INTEL-FS Spiral1 Geospatial and Features Migration Service shall transform the extracted geographic areas into a format that is compliant with the OData REST API implemented by the Geospatial and Features Service and load the transformed Geospatial and Features into the I2BE through the Geospatial and Features Service.

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

[FBE-18] The INTEL-FS Spiral1 Geospatial and Features Migration Service shall identify associations to other IIEs in the extracted geographic areas and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

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

[FBE-19] Using this ETL process, it shall be possible to migrate all geographic areas, without any data loss, from INTEL-FS Spiral 1 into the I2BE.

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

3.1.4 Products Management Service

[49] The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Staff::Product package.

3.1.4.1 API

[FBE-20] The Products Management Service shall through the OData REST API support all IIE access actions on products (for an authorized client).

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

[FBE-21] The Products Management Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 15], [US 16], and [US 17] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

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

[FBE-22] The Products Management Service shall after a create, update or delete change to a product, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

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

[FBE-23] The Products Management Service API shall support uploading of one or many attachments to a product in addition to the product file.

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

[FBE-24] The Products Management Service shall have support for management (create, read, update, and delete) of templates for creation of products. The template shall contain product metadata, but no product file.

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

[50] Note: The templates will be used by clients to prefill product metadata for recurring product types; e.g. daily update briefs

[FBE-25] The Products Management Service shall upon a client request return a template product metadata set where some text is dynamically set through usage of “tags” where the tags are replaced by actual values, as shown in the example below.

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

[51] Example of tags usage: For a DocumentProduct of type INTSUM, a template could use “tags” within the Title and Summary attributes as shown below. In this example %DATE% would be replaced with the current date, %ORGNODEPRODUCER% replaced by the ON the user behind the client request, and %UPLOADER% the name of the actual user.

- Title: %DATE% Daily INTSUM for TAAC-N by %ORGNODEPRODUCER%
- Summary: This is the Daily INTSUM produced for the TAAC-N AOR for %DATE%. Any follow up questions should be directed to %UPLOADER%

3.1.4.2 Transformation of files to PDF service

[FBE-26] The Products Management Service shall, upon a client request, convert a client-specified Microsoft Office file (MS Word or PowerPoint) or an image file (in common image formats) to a PDF file, and return the PDF file to the client.

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

[52] Note: INTEL-FS Spiral 1 the Aspose API is used for converting to PDF.

3.1.4.3 Automatic metadata extraction from files (support to product creation)

[FBE-27] The Product Management Service shall, upon a client request, processes document product files (in either PDF or MS Word format) to detect Keywords (mapping terms in the report to Keywords) and Locations, and return the found Keywords and Locations to the client.

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

[FBE-28] The rules for mapping terms in the report to Keywords shall be dynamically configurable. I.e. it shall be possible to update the mapping rule set and dictionaries, and activate the updates, without restarting the I2BE.

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

[FBE-29] The rule set for identifying Keywords and Locations shall be extendable and configurable through configurations (i.e. not requiring SW re-build).

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

[FBE-30] The Products Management Service shall, upon a client request, extract metadata attributes from a client-specified STANAG 4545 image file, map relevant metadata to INTEL-FS2 metadata attributes, and return the metadata mapping to the client.

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

[FBE-31] The Products Management Service shall, upon a client request, extract metadata attributes from a client-specified STANAG 4609 video file, map relevant metadata to INTEL-FS2 metadata attributes, and return the metadata mapping to the client.

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

3.1.5 Intel-FS Spiral 1 Products Migration Service

[53] The purpose of this service is to migrate products from INTEL-FS Spiral 1 into INTEL-FS Spiral 2 (i.e. the I2BE) through an extract, transform, load (ETL) process.

3.1.5.1 Extract, transform, load products

[FBE-32] The INTEL-FS Spiral1 Products Migration Service shall at regular intervals (where the interval frequency shall be configurable), poll the INTEL-FS Spiral1 for new products. It shall be possible through a configurable filter setting to filter the products that are extracted from INTEL-FS Spiral1.

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

[FBE-33] The INTEL-FS Spiral1 Products Migration Service shall transform the extracted products into a format that is compliant with the OData REST API implemented by the Products Management Service and load the transformed products into the I2BE through the Products Management Service.

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

[FBE-34] The INTEL-FS Spiral1 Products Migration Service shall identify associations to other IIEs in the extracted products and transform those associations into a format that is compliant with the OData REST API implemented by the IIE to IIE Association Service and load the transformed IIE associations into the I2BE through the IIE to IIE Association Service.

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

[FBE-35] Using this ETL process, it shall be possible to migrate all products, without any data loss, from INTEL-FS Spiral 1 into the I2BE.

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

3.1.6 Collation Tasking Management Service

[54] The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::STAFF::Collation package.

3.1.6.1 API

[FBE-36] The Collation Tasking Service shall through the OData REST API support all IIE access actions on collation tasking information (for an authorized client).

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

[FBE-37] The Collation Tasking Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 26] and [US 27] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

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

[FBE-38] The Collation Tasking Service shall after a create, update or delete change to a product post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

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

[FBE-39] The Collation Tasking Service shall maintain lists of collation status on document products (i.e. reports) as defined by the collation tasking choreography as defined in [INTEL-FS2-IM].

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

[FBE-40] The Collation Tasking Service shall enable clients to search for, filter, and retrieve lists of document products (reports) according to their collation status (e.g. to retrieve reports needing collation, reports assigned for collation, etc.). The filtering mechanism shall support filtering on collation status, assigned user, source of product, product creation/ modification time, etc.

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

[FBE-41] The Collation Tasking Service shall enable clients to specify rules for automatically identifying which ON that will be responsible for collating which products. The rules shall identify the ON responsible for a product collation based on product metadata including Keyword, producer, and title (e.g. using regular expression against the title to look for a certain clue).

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

[FBE-42] The Collation Tasking Service shall manage collation task assignments (i.e. which user is assigned to collate which product).

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

3.1.7 Battlespace Object (BSO) Management Service

[55] The information to be managed by this service is identified in the [INTEL-FS2-IM] in the NATO::JISR::Battlespace package and in the NATO::BMD::Battlespace package.

3.1.7.1 API

[FBE-43] The BSO Management Service shall through the OData REST API support all IIE access actions on BSO/ BSRs (for an authorized client).

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

[FBE-44] The BSO Management Service shall implement all the server-side functionality (i.e. anything not user-interface related) to fulfil the user stories [US 18] through [US 25] with backend-relevant acceptance criteria as defined in [INTEL-FS2-UserStories].

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

[FBE-45] The BSO Management Service shall after a create, update or delete change to a BSO/ BSR, post an event message to the SOA & IdM Platform as a notification that a change has occurred where the event message carry information on the type of IIE, identification of the changed IIE, and the type of change.

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

[FBE-46] The BSO Management Service API shall support uploading of one or many attachments to a BSO and/ or a BSR.

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

[FBE-47] The BSO Management Service shall, upon a client request, be able to move a BSR from one BSO to another BSO (to rectify situations where a BSR has been created for the wrong BSO).

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

[FBE-48] The BSO Management Service shall have support for management (create, read, update, and delete) of templates for creation of BSOs and BSRs.

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).