

- (2) A summary of the scope, with overview of main deliverables and services delivered, highlights and main achievements;
- (3) Key dates of project milestones and acceptance;
- (4) Invoicing log, including listing outstanding payments;
- (5) Outstanding CLINs delivered to be formally accepted;
- (6) Defect correction action plan and approach to maintenance and support services to be furnished until final system acceptance.

[SOW-303] The Contractor shall prepare and deliver a written report of the meeting in the form of meeting minutes that shall be reviewed and signed by the representatives of the Contractor and Purchaser respectively.

4.3.4.4 Maintenance and Support

[SOW-304] On passing partial system acceptance of the first Work Package until successfully achieving final system acceptance, the Contractor shall provide maintenance and in-service support for the first baseline release and any follow-on deployed baseline releases, service releases or patches in accordance with the provisions stipulated in Section 4.9.3.

4.3.4.5 Entry and Exit Criteria

[SOW-305] The Contractor shall comply with the following entry criteria for the transition phase:

- (1) The Contractor has concluded the previous phase successfully;
- (2) The Contractor has coordinated the provision of training at the Purchaser's facilities;
- (3) The Contractor has delivered and sent the invitation for the training to be delivered.

[SOW-306] The Contractor shall comply with the following exit criteria for a successful conclusion of the transition phase:

- (1) The Contractor has completed the deployment of multiple instances of the baseline releases on the NATO operational network and the instances are fully functional and operational;
- (2) The Contractor has completed the deployment of multiple instances of the baseline releases to the NCI Agency Support and Reference Environment, the reference and test beds, and the NCI Academy and the instances are fully functional and operational;
- (3) The Contractor has delivered deployment reports for each deployment;
- (4) The Contractor has resolved all critical and high severity defects discovered during this phase and provided updated baseline releases, as required;
- (5) The Contractor has delivered revisions of the system documentation artefacts including the installation and configuration manual, maintenance and administration manual, coherent with the baseline release that have been reviewed and accepted by the Purchaser;
- (6) The Contractor has delivered revisions of the programmer's manual, software design description, including interface control document, coherent with the baseline release that have been reviewed and accepted by the Purchaser;
- (7) The Contractor has completed the delivery of training;

- (8) The Contractor The Contractor has delivered training course evaluation reports of all training courses conducted during this phase;
- (9) The Contractor has incorporated feedback and lessons-learned in the training scenarios and training packages and has delivered an updated version;
- (10) The Contractor has delivered meeting reports of meetings held during this phase;
- (11) The Purchaser has verified completeness of the entire delivery of the baseline and has determined that it meets the requirements of the Contract;
- (12) The Purchaser comments/concerns regarding the defect correction action plan and approach to maintenance and in-service support to be provided until final system acceptance have been addressed;
- (13) The partial system acceptance meeting has been held and the submitted meeting minutes are accepted by Purchaser;
- (14) The partial system acceptance has been granted.

4.4 Closure Phase

[171] The objective of the closure phase is for the Purchaser to conduct the final validation of all deliverables, confirming complete hand-over, and verify that all contractual requirements (except warranty) have been met by the Contractor.

[172] Final system acceptance (FSA) will be granted when the Purchaser has verified completeness of the entire delivery and has determined that it meets the requirements of the Contract. Subsequently, on successful achievement of the final system acceptance, the warranty period will commence.

[SOW-307] The Contractor shall develop and deliver a final system acceptance report, which shall reference relevant CLINs and includes:

- (1) Traceability of delivered and deployed baselines and associated artefacts;
- (2) Traceability of any other artefact delivered;
- (3) Traceability of services delivered;
- (4) Updated deliverable requirements traceability matrix, including completions status;
- (5) Overview of outstanding non-critical defects with a correction action plan for addressing these defects under warranty.

4.4.1 Close-out Meeting

[SOW-308] The Contractor shall request final system acceptance in writing to the Purchaser, supported by a final system acceptance report and close-out meeting invitation.

[SOW-309] The Contractor's personnel shall meet with the Purchaser's project team and BMD Programme representatives for a close-out meeting. At the discretion of the Purchaser, meeting by video conference might be acceptable.

[SOW-310] During the close-out meeting, the Contractor shall include in its presentation:

- (1) An overview of the key dates of the contract, amendments and engineering change proposals;
- (2) A summary of the scope, with overview of main deliverables and services delivered, highlights and main achievements;
- (3) Key dates of project milestones and acceptance;

- (4) Invoicing log, including listing outstanding payments;
- (5) Outstanding CLINs delivered to be formally accepted;
- (6) Defect correction action plan and approach to maintenance and in-service support to be provided during the warranty period.

[SOW-311] The Contractor shall prepare and deliver a written report of the close-out meeting in the form of meeting minutes that shall be reviewed and signed by the representatives of the Contractor and Purchaser respectively.

4.4.2 Entry and Exit Criteria

[SOW-312] The Contractor shall comply with the following entry criteria for the closure phase:

- (1) The Contractor has concluded the previous phase successfully;
- (2) The Contractor has at least successfully passed one of the BMD Programme SoS validation EOTs;
- (3) The Contractor has verified and confirmed hand-over of all deliverables under this Contract;
- (4) The Contractor has delivered the final system acceptance report and is requesting final system acceptance;
- (5) The Contractor has delivered the Certificate of Conformity.

[SOW-313] The Contractor shall comply with the following exit criteria for a successful conclusion of the closure phase:

- (1) The Purchaser has assessed completeness of the entire delivery and has determined that it meets all requirements of the Contract (except warranty);
- (2) The Purchaser comments/concerns regarding the defect correction action plan and approach to maintenance and in-service support to be furnished during the warranty period have been addressed;
- (3) The close-out meeting has been held and the submitted meeting minutes are accepted by Purchaser;
- (4) The final system acceptance has been granted.

4.5 Training

4.5.1 General

[173] Accompanied with the deliveries of WP1 and WP2 of the, the Contractor will develop and provide training for users, support staff and trainers of the capabilities of new TOPFAS Application Suite baseline.

[174] Definitions:

- (a) **Face-to-face learning:** Students and instructor are physically present at the same training facilities, at the same time (synchronously);
- (b) **Live online learning:** Students and instructor are possibly in different geographical locations, and they connect to the same digital training environment at the same time (synchronously). Live online learning was previously known as Remote Delivery;
- (c) **Self-paced online learning:** Learning activity that is not led by an instructor where students access online learning materials, individually at a time of their own choosing (asynchronously) and from any geographical location. They spend as much time on the training activity as they choose or is required. Self-paced online learning can range from full modules of several hours of training time

- (eLearning) to 'micro-learning' that only covers a few minutes of focused instruction or performance support;
- (d) **Hybrid learning:** The instructor is physically present in one of the NCI Academy training facilities, together with a number of students. In addition, there are students in other locations who connect remotely to the same physical classroom, at the same time (synchronously);
 - (e) **Blended learning:** Multiple delivery types are used within the bounds of achieving the same course objectives, most commonly using self-paced online as a precursor to live online, MTT, or face-to-face;
 - (f) **eLearning:** Self-paced online learning, covering a complete or partial course;
 - (g) **Micro-learning:** Self-paced online learning that focuses on one or two learning objectives, and usually covers a few minutes of focused instruction or performance support;
 - (h) **Online tutorial:** Online manuals or online help. These are applications or system related documents and are not part of the training, but serve as reference material;
 - (i) **Training Needs Analysis (TNA):** a series of activities within the Global Programming – Development Methodology resulting in a set of education and training (E&T) solutions that satisfy a requirements package. This defines the objectives required to eliminate gaps and the necessary plans, which result in the delivery of E&T solutions. For Education and Individual Training (E&IT) solutions, this requires the application of the NATO Systems Approach to Training.
 - (j) **Course Control Documents (CCDs):** A set of documents used to define a NATO E&IT solution based on an E&IT requirement. Alternative formats include Programme of Instruction, Qualification Standard, Training Plan, Curriculum and Syllabus.
 - (k) **NCI Agency Learning Management System (LMS):** The Learning Management System managed by NCI Academy. The LMS is used to host the SCORM compliant eLearning content. The NCI Academy LMS is called JADL (Joint Advanced Distributed Learning) and it is based on ILIAS. The JADL server is located in Norfolk, United States.
 - (l) **NCI Academy Training Network (ATN):** The ATN facilitates face-to-face training on premises in the NCI Agency building Oeiras and Live Online training with students connecting from anywhere using unmanaged devices. The local network connects all the classrooms and labs in the NCI Academy, as well as a computing and storage infrastructure hosted in the Academy's server room to support in-house training, designated Training Landing Zone (TLZ). The local network and the TLZ are both part of the global training delivery capability of the NCI Academy, which is called ATN, also remotely accessible by students through a Virtual Desktop Infrastructure (VDI) gateway exposed to the Internet.
- [175] The Purchaser will provide access to the NCI Academy Training Network (ATN) and to the NCI Agency Learning Management System (LMS) at the NCI Academy.
- [176] For reference, the current training catalogue for the TOPFAS Application Suite comprises of the following training courses and webinars:
- (a) TOPFAS SAT Practitioner Course;
 - (b) TOPFAS SAT Train-The-Trainer Course;
 - (c) TOPFAS OPT Practitioner Course;
 - (d) TOPFAS OPT Train-The-Trainer Course;

- (e) TOPFAS CAT Practitioner Course;
- (f) TOPFAS CAT Train-The-Trainer Course;
- (g) TOPFAS OMT Practitioner Course;
- (h) TOPFAS Desktop Functional Manager Course;
- (i) TOPFAS Desktop System Administrator Course;
- (j) TOPFAS eFGMT Force Generator Practitioner Course;
- (k) TOPFAS eFGMT Functional Manager Course;
- (l) TOPFAS NCRS Practitioner Course;
- (m) TOPFAS RRT Force Readiness Manager Practitioner Course;
- (n) TOPFAS RRT Force Readiness Assessor Practitioner Course;
- (o) TOPFAS RRT Force Readiness Reporter Practitioner Course;
- (p) TOPFAS RRT System Administrator Course;
- (q) TOPFAS OCC E&F Tool Practitioner Course;
- (r) TOPFAS OCC E&F Tool Functional Manager and System Administrator and Course.

- [177] In addition, instruction videos exist, each focusing on a specific modules and functions of the TOPFAS Application Suite.
- [178] The existing training material, i.e. training packages and instruction videos, will be made available to the Contractor, but are to be revised fully and expanded with new courses to meet the Contract requirements, specifically in relation to the outcome of the Training Need Analysis, which is defined below.
- [SOW-314] The Contractor shall plan, execute and control the training process as defined in the NATO Bi-SC Education and Individual Training Directive (E&ITD) 075-007 [NATO-Bi-SC-DIR-075-007].
- [SOW-315] The Contractor shall perform Training Needs Analysis to justify all the training activities for the TOPFAS Application Suite.
- [SOW-316] The Contractor shall apply the NATO Systems Approach to Training as defined in [NATO-Bi-SC-DIR-075-007].
- [SOW-317] The Contractor shall perform all required analysis, design, development, implementation and evaluation tasks according to the guidance provided in [NATO-Bi-SC-DIR-075-007].
- [SOW-318] The Contractor shall be able to design, develop and perform the following training delivery methods:
- (1) Face-to-face learning;
 - (2) Live online learning;
 - (3) Self-paced online learning;
 - (4) Hybrid learning;
 - (5) Blended learning.
- [SOW-319] The Contractor shall provide training for users, support staff and trainers (train-the-trainer) through a combination of face-to-face, live online, self-paced online, hybrid or blended learning in accordance with the [NATO-Bi-SC-DIR-075-007], and TOPFAS Application Suite specific training requirements.
- [SOW-320] The Contractor shall demonstrate that all required personnel have been trained in accordance with the training plan.

- [SOW-321] The training courses shall utilise a combination of lecture and hands-on exercises to ensure students completing a course can perform to the level agreed to in the training plan. This shall include:
- (1) Development and delivery of training courses and training materials.
 - (2) Training of users, support staff and trainers on the capabilities;
- [SOW-322] The Contractor shall deliver training courses at Purchaser-specified facilities.
- [SOW-323] The Contractor shall furnish all facilities, services and equipment (including servers and workstations for students and teachers, network equipment, all required software, etc.) necessary to carry out the on-site training activities.
- [179] In case the Purchaser-specified facilities are furnished with Purchaser-owned (training) equipment, the Purchaser may decide to make the equipment available to the Contractor for the conduct of training courses.
- [SOW-324] In case training courses are to be provided on a Purchaser-identified training environment or other platform, the Contractor shall prepare, install and configure a training environment (including training databases, etc.) on the Purchaser-furnished equipment necessary to carry out the on-site training activities.
- [SOW-325] In case training courses are to be provided on a Purchaser-identified operational platform, there shall be no interference with operational activities.
- [SOW-326] The training courses shall cover for the various categories of roles based on the TNA or specific direction from the Purchaser.
- [SOW-327] The training activities shall be made available on the following platforms:
- (1) NCI Academy Learning Management System, Joint Advanced Distributed Learning (JADL) for self-paced online training;
 - (2) NCI Academy Physical Training Facilities for face-to-face training;
 - (3) NCI Academy Training Network (ATN) for live online training.

4.5.2 Training Need Analysis

- [SOW-328] The Contractor shall conduct Training Needs Analysis (TNA) in accordance with [NATO-Bi-SC-DIR-075-007] and in consultation with the Purchaser. The TNA tasks shall include as a minimum:
- (1) A Target Audience Analysis;
 - (2) A Task Analysis aligned to operations and maintenance task analysis [SOW-627] and [SOW-628];
 - (3) Development of performance and Learning objectives;
 - (4) Training Strategy proposal.
- [SOW-329] The Contractor shall base training process program and procedures on the results of the TNA.
- [SOW-330] The Contractor shall identify the required prerequisites for training participants, as part of the TNA.
- [SOW-331] The Contractor shall base the scope, delivery methods, and duration of training courses and materiel on the TNA.

4.5.2.1 Target Audience Analysis

- [SOW-332] The Contractor shall conduct a Target Audience Analysis in accordance with [NATO-Bi-SC-DIR-075-007] utilizing any information already determined by the Purchaser training staff and produce a summary population table.
- [SOW-333] The Contractor shall assess the current skills of operational staff that will use/operate the TOPFAS Application Suite and the importance and difficulty of tasks via discussions with Purchaser-identified experts.

4.5.2.2 Task Analysis

- [SOW-334] The Contractor shall exploit results of the operations and maintenance task analysis performed in the context of the maintenance and administration [SOW-627] and [SOW-628] to identify and list all user, maintenance and support tasks for each module of the TOPFAS Application Suite.
- [SOW-335] The Contractor shall conduct a Task Analysis in accordance with the [NATO-Bi-SC-DIR-075-007] to identify and list all user, maintenance and support tasks for each module of the TOPFAS Application Suite.
- [SOW-336] The Task Analysis shall include identified roles of users who will use the TOPFAS Application Suite to accomplish their tasks.
- [SOW-337] The Task Analysis shall include a Difficulty, Importance and Frequency (DIF) Analysis to determine the priority and training effort to be applied to the Performance Objectives (PO).
- [SOW-338] The DIF analysis shall identify the difficulty and importance of each major task to be performed by each category of roles and the frequency with which the task will be performed.
- [SOW-339] The Task Analysis shall include a Performance Gap Analysis to assess the gap between the current skills of the target audience and the tasks they will be expected to perform in the use and support of the TOPFAS Application Suite in order to determine which performance gaps can be addressed by training.

4.5.2.3 Performance Objectives

- [SOW-340] The Contractor shall develop Performance Objectives for those tasks for which trainable performance gaps have been determined and document them in accordance with Annex J of [NATO-Bi-SC-DIR-075-007].
- [SOW-341] The Contractor shall document the results of the task analysis in the Course Control Document II (CCD II) - Course Proposal in accordance with [NATO Bi-SC DIR 075-007], Chapter 5 and Annex L.

4.5.2.4 Instructional Analysis

- [SOW-342] The Contractor shall conduct an Instructional Analysis in accordance with [NATO-Bi-SC-DIR-075-007], Chapter 6 that includes but is not limited to, the following activities:
- (1) Identify the main teaching points associated with enabling elements by breaking out the skills and knowledge into sub-components in order to achieve the Performance Objectives identified;

- (2) Identify all components and sub-components of the tasks that make up the performance objective, including supporting skills and knowledge elements as well as other attributes, such as attitudes;
- (3) Identify the main points (the teaching points) associated with the supporting (enabling) elements.

[SOW-343] The contractor shall take all the Performance Objectives that require Education and Individual Training (E&IT) and create a list of Enabling/Learning Objectives (ELO) in accordance with [NATO-Bi-SC-DIR-075-007], Chapter 6 and Annex N.

4.5.2.5 Training Strategy Development

[SOW-344] The contractor shall define instructional strategies in accordance with the guidance provided in [NATO-Bi-SC-DIR-075-007], Chapter 6, by identifying and selecting:

- (1) Instructional methods such as demonstration-performance, case studies or lectures;
- (2) Instructional media (e.g. slides, diagrams, video recordings, models, simulators, real equipment);
- (3) Learning environment, e.g. face-to-face, live-online, or hybrid learning (combination of both).

[SOW-345] The contractor shall formulate a proposal for instructional strategy based on the selected instructional methods, media and the environment in accordance with [NATO-Bi-SC-DIR-075-007], Chapter 6.

[SOW-346] The contractor shall document the Course Control Document III (CCD III) - Programme of Classes in accordance with [NATO-Bi-SC-DIR 075-007], Chapter 5 and Annex R to define the training solution which shall include the ELO and provide the details supporting the overall instructional strategy including the final structure of the content, teaching points, the instructional method, the time allocated to complete the ELO and student assessment details.

4.5.2.6 Training Need Analysis Report

[SOW-347] The Contractor shall deliver a TNA report in accordance with [NATO-Bi-SC-DIR 075-007] that shall include the following:

- (1) A description of the TNA approach and activities;
- (2) An account of the Task Analysis performed;
- (3) The results of the Performance Gap Analysis, Task Analysis, DIF Analysis, Target Audience Analysis, and the Instructional Strategy Analysis;
- (4) The final list of Performance Objectives (POs);
- (5) The final list of Enabling/Learning Objectives (ELOs);
- (6) The list of Teaching Points developed for each of the Course Control Documents II and III as summaries of the proposed E&IT solutions.

4.5.3 Training Plan

[180] The Contractor should consider for planning, developing and delivering training that the maximum capacity of a classroom is 12 participants.

- [SOW-348] The Contractor shall deliver a Training Plan template, intended for documenting the Contractor's approach to training planning, development and delivery, detailing the milestones, training organization, personnel and training development activities, and describe how it intends to meet the training requirements of the Contract with direct mapping to the training process requirements defined above in reference to [NATO-Bi-SC-DIR-075-007].
- [SOW-349] Based on the TNA report results, the Contractor shall fully develop and maintain the Training Plan, to describe how the requirements for initial and follow-on training will be met.
- [SOW-350] The Training Plan shall describe in a coherent way how training will be developed, delivered, and maintained throughout the life of the capability.
- [SOW-351] The Training Plan shall describe any required knowledge transfer related to the maintenance of the training by the NCI Academy. These include technical maintenance of training related hardware, software licences, eLearning content update requirements, like software tools, source code availability, etc.
- [SOW-352] The Contractor's Training Plan shall include training design documentation using the Course Control Document (CCD) III – Programme of Classes template provided in [NATO-Bi-SC-DIR-075-007] Annex R-4.
- [SOW-353] The Training Plan shall describe the training documentation for each course including but not limited to the course plans, time schedules, and instructors in addition to CDD III.
- [SOW-354] The Training Plan shall define a modular approach to the training courses and training delivery with focus on user roles and responsibilities.
- [SOW-355] The Training Plan shall describe the quality management process for training in conformance with the Contractor's Quality Plan.
- [SOW-356] The Training Plan shall include a training development and delivery schedule, in relation to the overall Contract schedule.
- [SOW-357] The Contractor shall recommend in the training plan the delivery types of training (i.e. face-to-face, live online, self-paced online, hybrid or blended learning) and the rationale for those recommendations for each type of training (user, administrator, support staff, train-the-trainer, etc.).
- [SOW-358] The Training Plan shall describe how the delivery of training courses shall be planned and executed, including timely communication with the stakeholders (e.g. instructors, students, hosts, etc.) and securing adequate training resources, materiel and facilities.

4.5.4 Training Development

- [SOW-359] The Contractor shall develop distinct training modules and training courses for the complete TOPFAS Application Suite by fully revising and expanding the existing training courses, taking into account the results of the Training Need Analysis.
- [SOW-360] The Contractor shall develop distinct training modules and training courses that differentiate between the user roles of the TOPFAS Application Suite.

- [SOW-361] The Contractor shall develop new training courses and modules for the TOPFAS Request for Information app.
- [SOW-362] The Contractor shall develop new training courses and modules for TOPFAS Collaboration Apps and Services.
- [SOW-363] The Contractor shall develop new training courses and modules for TOPFAS Training and Exercise Management app.
- [SOW-364] The Contractor shall develop a new system administrator training course for TOPFAS eFGMT.
- [SOW-365] The Contractor shall develop a new system administrator training course for TOPFAS NCRS.
- [181] The aim of a transition course is aid existing TOPFAS users with the transition to the new incremental baseline release by providing them the knowledge and skills of changes and newly introduced functions.
- [SOW-366] The Contractor shall develop user transition training courses TOPFAS Application Suite.
- [SOW-367] The Contractor shall develop and deliver training materiel for each training module and training course, including:
- (1) Student Manual;
 - (2) Student Handouts;
 - (3) Instructor Guide;
 - (a) Course title and description;
 - (b) Course plans;
 - (c) Course presentations;
 - (d) Learning objectives;
 - (e) Instructional methodologies;
 - (f) Performance standards;
 - (g) In-class assignments or laboratories;
 - (h) Lesson exercises/quizzes/exams with answer sheets;
 - (i) Training system installation and configuration procedures;
 - (4) Training aids of all types including real equipment, references and job aids;
 - (5) Question database and sample tests;
 - (6) Training Certificate;
 - (7) Course evaluation feedback form;
 - (8) Self-paced online learning content (eLearning/micro-learning).
- [SOW-368] The Contractor shall develop and deliver a student manual for each training module and training course, with necessary information on all lesson objectives and contents, guidance for all learning activities and cross-references to assist the students in achieving the course objectives.
- [SOW-369] The student manual shall include concepts, functions and features presented in the course, including a full set of Microsoft PowerPoint presentations, to be used in lieu of the application, i.e. essential screenshots describing the features and demonstrating the usage and results, as well as exercises.

- [SOW-370] The student manual shall take into account results from the DIF analysis and shall enable students to perform their major tasks.
- [SOW-371] The instructor guide shall contain all necessary information to prepare and conduct lessons and to evaluate students, including exercises, quizzes, and examinations and their corresponding answer sheets, and shall also provide notes to instructors to assist in conducting the lecture or exercise.
- [SOW-372] The hand-outs are additional aids that supplement the student manuals when covering areas identified as difficult and/or particularly important. These shall cover alternative approaches and provide realistic examples of task execution.
- [SOW-373] The Contractor shall prepare and deliver operationally-realistic training scenarios, including workflows, databases, samples, practical exercises, etc. for use within training courses and training activities.
- [SOW-374] The training material shall include all the information required to conduct the courses and maintain the training material.
- [SOW-375] The training material shall follow an instructional methodology that links training objectives with course structure, instructional techniques, course content, and assessment tools.
- [SOW-376] The Contractor shall develop and deliver all the training material in the UK English language.
- [SOW-377] The Contractor shall deliver training courses in the English language.
- [SOW-378] Before put in use, the training materiel shall be submitted for review by the Purchaser, which may result in feedback for improvement. The Contractor shall implement the changes directed by the Purchaser and provide updated training materiel.
- [SOW-379] The Contractor shall develop and deliver a set of self-paced online learning modules in the form of eLearning and micro-learning as identified in the Training Plan to enable end users and self-service users to perform the tasks associated with their roles.
- [SOW-380] The eLearning/micro-learning shall complement the face-to-face training by defining and explaining the key concepts and terminology of the TOPFAS Application Suite, and by providing additional practice opportunities.
- [SOW-381] All eLearning training material shall be prepared in compliance with the Sharable Content Object Reference Model (SCORM) Edition 2004.
- [SOW-382] All eLearning material shall be suited for and delivered on the NCI Academy Learning Management System (JADL).
- [SOW-383] The Contractor shall ensure that the software used to produce the eLearning is included in the NATO AFPL.
- [SOW-384] The eLearning package shall allow modifications by the Purchaser to reflect changes in the training concept and/or content without any additional cost to the Purchaser.
- [SOW-385] The Contractor shall provide to Purchaser, all the eLearning assets including the SCORM packages, source code files, graphic and multimedia assets.

- [SOW-386] The eLearning package shall be user transparent, efficient and integrating the specific features for instructor and student without requiring special training in authoring systems technology or help from subject-matter experts.
- [SOW-387] The Contractor shall provide all the appropriate training documentation to support the Purchaser staff to perform the trainings using the Learning Management System (JADL).
- [SOW-388] The contractor shall provide performance support materiel (eLearning/micro-learning) to support users after the training during their work, with the following characteristics: bite-sized learning chunks designed to model or explain concrete tasks, ideally embedded in-application performance support, including a search function to make all performance supporting materials findable at the point of need.
- [SOW-389] The Contractor shall propose for Purchaser agreement a set of instruction videos to be developed, covering a range of functions and usage for each of the user roles identified.
- [SOW-390] After Purchaser agreement, the Contractor shall develop and deliver the set of instruction videos.
- [SOW-391] The Contractor shall integrate the instruction videos in the NCI Academy Learning Management System (JADL).
- [SOW-392] The Contractor shall integrate the training material/packages, eLearning material and instruction videos in the TOPFAS Help Centre.
- [SOW-393] The Contractor shall develop and deliver administrator training modules and training courses required to enable assigned Purchaser personnel to support and maintain the baseline release at second and third level. Note: These training modules and/or courses cover the system/site administrator roles and responsibilities.
- [SOW-394] The administrator training modules and training courses shall cover all aspects of the installation and configuration manual (Section 6.14), the maintenance and administration manual (Section 6.15) and standard operating procedures manual (Section 6.17).

4.5.5 Training Delivery

- [SOW-395] The Contractor shall plan, prepare and deliver the training modules and training courses in a physical classroom at Purchaser designated facilities.
- [SOW-396] The Contractor shall coordinate with Purchaser the requirements and availability of training facilities at the Purchaser's facilities no later than three months prior to the planned training.
- [SOW-397] The Contractor shall prepare and deliver the invitations for the training no later than two months prior to the planned training.
- [SOW-398] The Contractor shall provide each course participant with a printed copy of the student manual; other (student) materiel physical or electronically as required by the course.

4.5.6 Assessment and Evaluation

- [SOW-399] The Contractor shall conduct an assessment of the participants at the end of each course, score the participant's results and review the answers together with the participants.
- [SOW-400] The Contractor shall include a quiz in each eLearning to facilitate student self-assessment.
- [SOW-401] The Contractor shall propose assessment and evaluation methodology to the purchaser as part of the Training Plan.
- [SOW-402] The Contractor's Training Assessment methodology shall be based on [NATO-Bi-SC-DIR-075-007] Sections 7-6, 7-7 and NCI Academy Standard Operating Procedure [ASOP-07.01.25] NCI Academy Grading and Assessment for assessment approaches and instruments and include:
- (1) Examination methodologies and certification;
 - (2) Minimum score to achieve for successfully passing the course;
 - (3) A pass/fail policy, based on results of achievement tests
 - (4) Test/retest policies
 - (5) Course(s) to be done to get the certification for each role;
 - (6) Description of role's certification process.
- [SOW-403] The contractor shall develop an assessment plan structured according to the template provided in [NATO-Bi-SC-DIR-075-007], Table 6-2 that specifies how achievement of the POs will be assessed and how the student progress based on the assessment of the ELOs will be monitored.
- [SOW-404] The Contractor shall submit to the Purchaser a Training Course Evaluation Report following each training. The report shall contain the following:
- (1) Student attendance and performance record;
 - (2) Consolidated feedback from participants' feedback forms;
 - (3) Problems encountered (if any);
 - (4) Actions taken or recommended;
 - (5) Suggested follow-up actions.
- [SOW-405] The Contractor shall in consultation with the Purchaser, revise the training materiel for each course to reflect feedback and follow-up actions from the initial session of each course.
- [SOW-406] The Contractor shall ensure that each student is instructed at the end of each course (instructor-led or eLearning) to complete and return the course evaluation feedback form provided as part of the instructor-led training course or eLearning.
- [SOW-407] The Contractor shall deliver training certificates to each participant of each training course delivered, in accordance with NCI Academy Standard Operating Procedure [ASOP-07.01.25] NCI Academy Grading and Assessment. The certificates shall be delivered to the participants not later than two (2) weeks following the completion of the training. The students who carry out testing and achieve a 70% overall grading or higher on an NCI Academy course, shall be assessed as having achieved a "pass" and receive a Certificate of Qualification. Those students who achieve 69% or lower shall be classed as having "failed" and will have issued a Certificate of Attendance. In the remarks section comments there will be an explanation stating why the student did not achieve proficiency in

the subject area. If the course being taught has no formal testing, practical or theoretical, then a Certificate of Completion shall be issued at the end of the course.

4.5.7 Hand-over to the Purchaser

- [SOW-408] The Contractor shall conduct a detailed Handover – Takeover (HoTo) for trainers from NCI Agency Business Areas and the NCI Academy.
- [SOW-409] Accompanied with the deliveries of WP1 and WP2 of the new TOPFAS Application Suite baseline, the Contractor shall deliver the associated complete set of training materiel to the Purchaser.
- [SOW-410] As part of the hand-over process, the Contractor shall train the Purchaser trainers to allow Purchaser instructors to deliver all training courses.

4.5.8 Optional Additional Training Delivery

- [182] This section describes the requirements for additional Contractor furnished training delivery services for the TOPFAS Application Suite.
- [183] The Purchasers reserves the right to exercise this option one or multiple times at any time from Contract Award.
- [SOW-411] On purchaser request, the Contractor shall prepare and deliver additional training courses.

4.6 Deployable Equipment Kit

- [184] A deployable equipment kit will be used for workshops, testing, verification, training and when needed for other activities provided by the Contractor.
- [185] A deployable equipment kit is a separately networked (cabled) set of servers and laptops that can be deployed easily to Purchaser designated facilities as required to support Contractor activities. Note: the use of wireless network connectivity (Wi-Fi) is not possible due to security concerns.
- [186] Multiple activities can take place in parallel and the Contractor will have to assess the size and number of deployable equipment kits required. The maximum anticipated capacity per activity will be 20 participants.
- [SOW-412] The Contractor shall furnish one or more deployable equipment kits for workshops, testing, validation, training and other activities as required.
- [SOW-413] The Deployable Equipment Kit specifications shall meet or exceed the minimum TOPFAS Application Suite system specifications.
- [SOW-414] The Contractor shall be fully responsible for the configuration and maintenance of the deployable equipment kits throughout the performance period of the Contract.
- [SOW-415] The Contractor shall ensure that the equipment runs with up-to-date firmware, operating system updates and antivirus/malware software throughout the performance period of the Contract in order to reduce security vulnerabilities and exploitation of vulnerabilities.

- [SOW-416] The Contractor shall be full responsible for shipment to sites, transportation and deployment at the sites, and shipment from the sites, of the deployable equipment kits.
- [SOW-417] The Contractor shall be fully responsible for the administrative procedures, i.e. custom clearance, registration of equipment details prior to arrival, etc.
- [SOW-418] The Contractor shall incorporate significant time within its planning for administrative procedures, shipment and deployment, on-site (security) inspections, etc. of a deployable equipment kit.

4.7 Test, Verification, Validation and Assurance (TVVA)

- [187] The Purchaser's Independent Verification, Validation and Quality (IVVQ) Service Line will be conducting independent verification and validation of the throughout the period of performance of the Contract. The aim of the independent verification and validation activities will be the evaluation of Contractor performance and verification and validation of Contractor services and deliverables.
- [SOW-419] The Contractor shall support Purchaser IVVQ representatives in monitoring, inspecting, and assessing Contractor performance, services and deliverables, if needed at the Contractor's facilities. In particular:
- (1) The Contractor shall make itself available for answering questions and furnishing information related to the Contract;
 - (2) The Contractor shall allow the Purchaser IVVQ representatives to monitor, inspect, and assess on-going Contractor activities as well as any technical and quality processes;
 - (3) When requested, the Contractor shall make available any deliverable to the Purchaser IVVQ representatives, whether the deliverable is under development, draft or final.
- [SOW-420] The Contractor shall make available and transfer to the Purchaser IVVQ representatives all information deemed necessary to perform the TVVA activities, on his own initiative or on request by the Purchaser IVVQ representatives.
- [SOW-421] The Contractor's test manager shall work closely with the Purchaser IVVQ representatives throughout the execution of all test, verification and validation activities.

4.8 Support to BMD Programme

- [188] The requirements-owner of the BMD functional scope is the BMD Programme; the Contractor will provide support to the BMD Programme in order to enable the integration, testing and (system-of-system) verification, validation and acceptance of TOPFAS.
- [189] There will be several verification and validation activities conducted by the BMD Programme. The timetable for the provision of these support services will be communicated to the Contractor by the Purchaser with sufficient time notice.
- [190] The BMD Programme approach is based upon a tranche-based capability delivery methodology [TBCDM].

[SOW-422] The Contractor shall support BMD Programme in inspecting, integration, verification, validation and acceptance of all services and deliverables.

4.8.1 Tranche Gate Reviews

[SOW-423] The Contractor shall support the following tranche gate reviews for the BMD Tranches they are contributing to:

- (1) Development Commitment Gate (DVC) at the end of the initiation phase;
- (2) Transition Readiness Gate (TNR), at the end of the validation phase;
- (3) Operational Readiness Gate (OPR), at the end of the transition phase.

[191] These gates represent the milestones of the BMD Programme Tranche-Based Capability Delivery Methodology [TBCDM] where each review successively gives or denies approval to proceed to the next stage.

- (a) The Development Commitment Gate is the milestone that signifies the completion of the initiation phase, so that the works can enter the iterative development phase;
- (b) The Transition Readiness Gate is the milestone that signifies that the envisaged system functions have been implemented, integrated, validated, and verified against the agreed criteria, so that the works can enter the transition phase;
- (c) The Operational Readiness Gate is the milestone that signifies that the capabilities have been implemented successfully, so that capabilities can be declared operational.

[192] The Purchaser, taking into account the nature of iterative development process, will task the Contractor with expected support actions for these reviews with sufficient time notice.

[SOW-424] The initial Software Design Description (Section 6.11) and Deliverable Requirements Traceability Matrix (Section 6.10) are the primary artefact that the Contractor is expected to bring to a sufficiently mature state (barring possible amendments necessitated during iterative development) to enable the BMD Programme to successfully achieve the Development Commitment Gate.

[SOW-425] Following successful achievement of the user acceptance testing and the system integration testing, the results of IVVQ Testing (Section 4.3.3.3) will be key to enable the BMD Programme to successfully achieve the Transition Readiness Gate.

[SOW-426] Achieving the Partial System Acceptance (Section 4.3.4.3) will be key to enable the BMD Programme to successfully achieve the Operational Readiness Gate.

4.8.2 Support to System-of-System Verification and Validation

[193] In line with the tranche-based capability delivery methodology [TBCDM], the BMD Programme will be conducting system-of-system verification and validation events.

[194] The BMD Programme System of System verification and validation events are cyclic with firm timelines, which are depicted in Figure 4.5, Figure 4.6 and Figure 4.7 below.

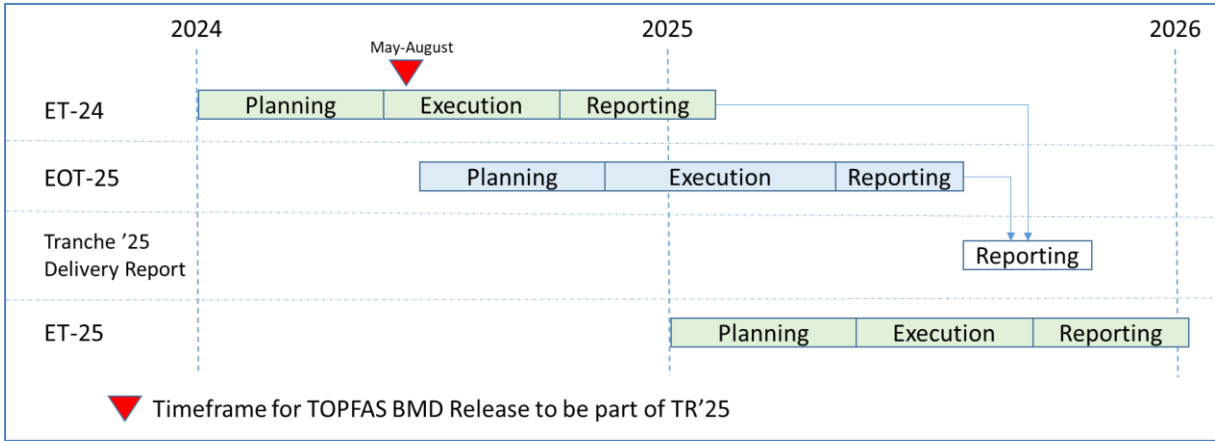


Figure 4.5 - BMD Programme System of System Verification and Validation 2024-2026

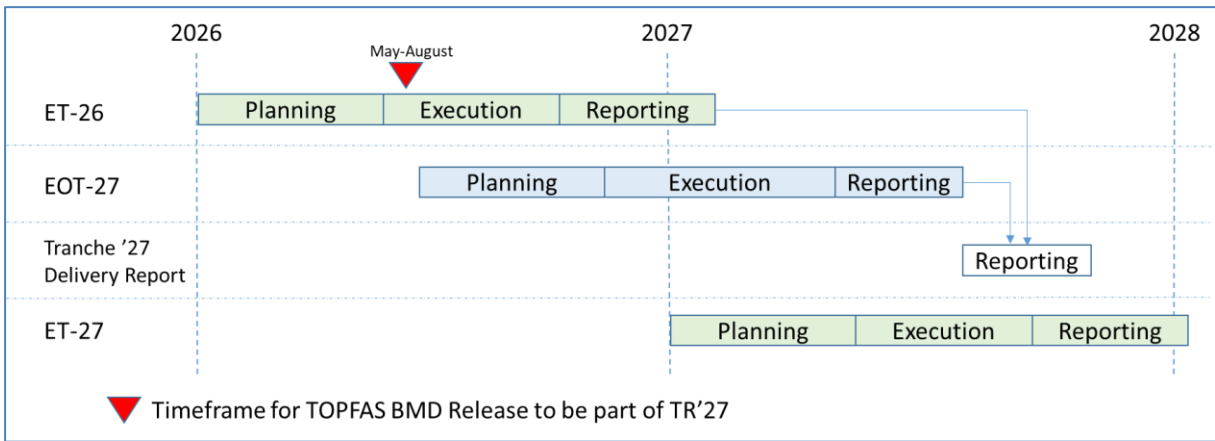


Figure 4.6 - BMD Programme System of System Verification and Validation 2026-2028

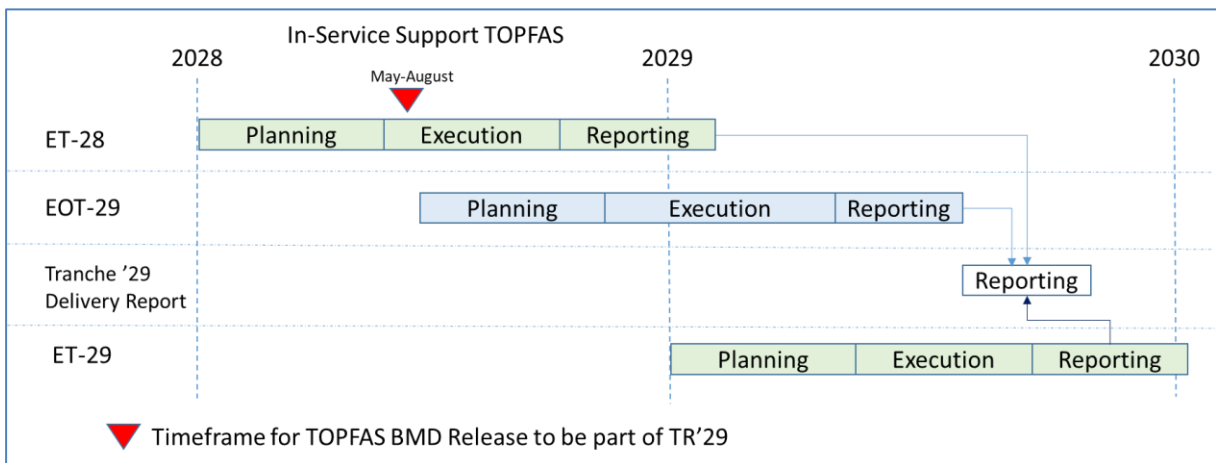


Figure 4.7 - BMD Programme System of System Verification and Validation 2028-2030

[SOW-427] The Contractor shall support annual BMD Ensemble Testing (ET) and two-yearly Ensemble Operator Testing (EOT) in the form of installation and configuration of the system and software applications in the BMD Integration Test Bed (ITB), operator support during data preparation, test scenario preparation, test execution, and test result analysis.

- [SOW-428] The Contractor shall align its support efforts with the BMD ET and EOT events, and if required deliver and deploy interim baseline releases in order for TOPFAS to be validated within these events.
- [SOW-429] The Contractor shall support BMD System of Systems Integration Testing for each delivery in the form of installation and configuration of the system and software applications, operator support during data preparation, test scenario preparation, test execution, and test result analysis.
- [SOW-430] The Contractor shall plan, organise, and conduct end-user training to the BMD Team with each release to the BMD Integration Testbed in preparation for the ET and EOT events. This training shall be included in Sub-CLIN 2.4 and will be in addition to the formal training courses to be provided during the transition phase (see section 4.3.4.2).
- [SOW-431] The Contractor shall support issue/defect review activities.
- [SOW-432] The Contractor shall plan, organise, and conduct on-site user training in advance of BMD System of Systems Integration Testing, ET and EOT.

4.8.3 Support to Site Integration Tests

- [SOW-433] The Contractor shall support the BMD Programme Site Integration Tests for each baseline delivery in the form of installation and configuration support, operator support during data preparation, test scenario preparation, test execution, and test result analysis.

4.8.4 Support to Capability Assessment and Validation Exercises

- [SOW-434] The Contractor shall support the capability assessment and validation exercises conducted by the operational community in the form of installation and configuration support, operator support during data preparation, exercise scenario preparation, exercise execution, and exercise result analysis.

4.8.5 Support to the BMD Scope Implementation Monitoring

- [SOW-435] The Contractor shall support the BMD Scope Implementation Monitoring (BSIM) by establishing and agreeing with the Purchaser the progress measurement baseline (PMB) for each work package prior to execution of the first development cycle, monitoring the progress of the value items development with the use of the DRTM and BSIM metrics, reporting the progress against the PMB with an assessment of the causes and remediation in case the BSIM metrics show deviation from the PMB.

4.9 Integrated Product Support

4.9.1 General

- [SOW-436] The Contractor shall establish an integrated product support (IPS) process, using the [ALP-10] or [AIA/ASD SX000i] specification as guidance, and perform Integrated product support throughout the period of performance of the Contract.

[SOW-437] The Contractor shall align delivery of all Integrated product support related deliverables and services with the incremental delivery approach of the Contract.

4.9.2 Integrated Product Support Plan

[SOW-438] The Contractor shall deliver an integrated product support plan (IPSP) compliant with Section 6.8, and document its integrated product support process tailored to the Contract, including activities and milestones to deliver integrated product support deliverables and services.

[SOW-439] The Contractor shall document the planned maintenance and support activities in the Integrated Product Support Plan, based on the definitions, concepts and requirement set forth in the Contract.

[195] The in-service support plan documents the schedule, organization and resources of support during the in-service phase (from the first baseline release until final system acceptance, during warranty and during the optional maintenance and support furnished post the warranty period), considering the maintenance and support definitions and concept.

[SOW-440] The Contractor shall deliver an in-service support plan (ISSP) as an annex to the integrated product support plan compliant with Section 6.8.1.

4.9.3 Maintenance and Support

4.9.3.1 Definitions

[196] The support concept is the set of activities and processes in charge of managing the various levels of support and to escalate the problem to the appropriate level in accordance with the defined responsibilities.

[197] It is based on the incident management process defined in ISO/IEC 20000, the Information Technology Infrastructure Library (ITIL) framework, software supportability concept of [ASD S3000L]/[ASD SX000i] or equivalent.

[198] Support Level: the extent of technical assistance provided for an information technology capability to its users. The service management is divided into three different levels of service, which interface each other to activate the proper level of support appropriate for the type of incident that occurred or the request that has been made in accordance with the event happened on the system.

[199] First Level Support: implements the incident management process in accordance with the 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 (incident or service\change request), performs an initial assessment and distributes it to the predefined actors to solve it.

[200] Second Level Support: implements the problem management process in accordance with the ITIL framework or equivalent. The problem management process receives the trouble tickets from the service desk and performs the following tasks (not limited to):

- (a) (Re-)evaluation of trouble ticket category, criticality and priority,
- (b) Identification of the root cause of the issue (e.g. by issue replication testing),
- (c) Identification of workarounds,

- (d) Identification and initial planning of possible short, medium and long-term solutions (e.g. workarounds, patches, or new baseline or configuration item releases),
 - (e) Create problem analysis report and change request including schedule of implementation, and synchronization with the baseline maintenance process;
 - (f) Presentation of the problem analysis report and change requests to the change control board (CCB) for approval,
 - (g) Monitor and control the approved change request during implementation,
 - (h) Trigger third level support and/or third level maintenance process to implement the change request, in case the incident cannot be solved at second level;
 - (i) Perform the post-change request implementation review.
- [201] Third Level Support: implements the deployment and release management process in accordance with the ITIL framework or equivalent. The deployment and release management process receives the approved change request from the second level support and performs the following tasks (not limited to):
- (a) Activating third level maintenance when new solutions shall be developed;
 - (b) Development of the solution (i.e. new configuration item fix, repair, replacement, patch, or release);
 - (c) Testing of the solution (i.e. issue/deficiency replication testing, regression testing);
 - (d) Update of baseline content and status;
 - (e) Submit the solution for independent verification and validation testing;
 - (f) Release of the solution;
 - (g) Delivery and deployment of the solution.
- [202] Maintenance Level: the echelon at which maintenance tasks are performed on an information technology capability. The levels are distinguished by the relative sophistication of skills, facilities and equipment available at them. Thus, although typically associated with specific organizations and/or geographic locations, in their purest form, the individual maintenance levels denote differences in inherent complexity of maintenance capability. For all maintenance levels is intended that:
- (a) All proactive maintenance tasks are defined in the maintenance and administration manual (Section 6.15) and scheduled in the maintenance plan.
 - (b) Reactive maintenance activities are triggered by reported incidents, or service/change requests.
- [203] First Level Maintenance: It is responsible for the very basic maintenance activities including the software failure recovery by simple diagnostics. It is responsible for activating 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 operations and maintenance manual. First level maintenance procedures do not require specialised tools and/or specialised personnel.
- [204] Second Level Maintenance: It is responsible for isolation and resolution of system-level maintenance and management of defect/bug reports and repair including the simple software customizations, software reloading/installation, execution of scripts, management of users/profiles usually performed by system administrators. 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. Second level maintenance procedures do not require specialised tools.

- [205] **Third Level Maintenance:** It is responsible for activities that involves a change to the system baseline, such as software patches or new releases including the bug recording and reporting, advanced troubleshooting and configuration changes with the changing environment. It is responsible for 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 baseline (adaptive maintenance) e.g. security patches, operating system upgrades, minor software configuration changes due to operational/interface needs and refactoring. It implements the initial preventive maintenance procedures and any additional procedures that are defined in the corresponding manual. Third level maintenance procedures often require specialised tools and/or Personnel such as software architects, programmers, advanced system administrators and specialists.
- [206] **Fourth Level Maintenance:** It is the responsibility of the software original developer under warranty and through separate agreements post warranty. It is activated from the third level of maintenance and covers, the four type of maintenance (corrective, adaptive, perfective and preventive maintenance) and change requests. It requires software maintenance, testing (both in simulated and emulated environments), patch creation, release and deployment services.

4.9.3.2 Maintenance and Support Concept

- [207] The NCI Agency's service support team for the TOPFAS Application Suite, or its mandated representatives or third parties, will be performing maintenance and support services in parallel with the Contractor (including source code changes)
- [SOW-441] The Contractor shall support and collaborate with the NCI Agency's service support and maintenance team or its mandated representatives or third parties.
- [SOW-442] The Contractor shall integrate any changes and modifications made by the NCI Agency's service support and maintenance team or its mandated representatives or third parties.
- [SOW-443] The Contractor shall deliver a maintenance and support concept, i.e. a collection of processes that are designed to ensure the operational efficiency of the operational baseline, including:
- (1) Processes and procedures;
 - (2) Maintenance and support tasks at all levels;
 - (3) Maintenance and support environment;
 - (4) Locations;
 - (5) Constraints;
 - (6) Organization and personnel skills;
 - (7) Roles and responsibilities (responsible, accountable, consulted and informed (RACI)).
- [SOW-444] The maintenance and support concept shall refer to applicable functional and non-functional requirements.
- [SOW-445] The maintenance and support concept shall define the second and third level support process interfaces to the other processes, including the existing NCI

Agency Service Desk (first level support) and various NATO sites and organizations.

- [SOW-446] The maintenance and support concept shall define the delivered baselines maintenance and support processes and flow amongst the various NATO facilities, organizations, groups, and people. This shall include the flow and interfaces between various maintenance and support levels.
- [SOW-447] On passing partial system acceptance of the first baseline until successfully achieving final system acceptance, the Contractor shall provide in-service support and maintenance services for the first TOPFAS Application Suite baseline and any follow-on deployed baselines. This support shall include:
- (1) Second and third level support;
 - (2) Third and fourth level maintenance, including implementation of fixes to defects and subsequently produce emergency patches and minor updates in between baseline releases to ensure that the operational baselines running in production fulfils its availability requirements.
- [SOW-448] The Contractor shall deliver the support and maintenance documentation artefacts, training, and resources in order to allow the Purchaser to fully operate the solution, to perform first, second and third level support and maintenance from partial system acceptance of the final baseline onwards.
- [SOW-449] Starting from partial system acceptance of the first baseline, until the end of the warranty period, all maintenance activities beyond Purchaser capabilities/skills (as per maintenance concept and Contractor delivered training and documentation) required to restore operational baselines from a critical failure shall be performed by Contractor provisioned dedicated on-site interventions and/or off-site resolutions.
- [SOW-450] The Contractor shall maintain and deliver renewed/extended licenses of the third-party software and components in accordance with Section 3.7 and ensure that these licenses cover the full period of performance.
- [SOW-451] The Contractor shall monitor the availability of third-party software and component upgrades and patches in accordance with the requirements stipulated in Section 3.7.
- [SOW-452] When the agreed by the Purchaser, the Contractor shall introduce and integrate upgrades and patches of all third-party software and components in accordance with the requirements stipulated in Section 3.7.
- [SOW-453] For any critical failure or defect that is beyond the capability of the Purchaser, the Contractor shall ensure system restoration within two (2) business days from the moment of Purchaser notification by providing workarounds; and within ten (10) days for critical defect fixing including the fault identification, software recoding, patch creation, software testing and release of the new patch release. Corrective baseline or patch releases shall be done quarterly for non-critical bugs.

4.9.4 Supply Support

4.9.4.1 System Inventory

- [SOW-454] The Contractor shall provide the Purchaser's Integrated Product Support (IPS) point of contact with an inventory and distribution list (IDL), in electronic Microsoft Excel format at least fourteen days before each baseline release.
- [SOW-455] The inventory and distribution list shall be site-specific (as required) with reference to relevant CLIN, and shall include all deliverables furnished under this Contract, as follows:
- (1) Date of distribution;
 - (2) All software artefacts, i.e. all software applications, components, tools, (if applicable), etc.;
 - (3) All hardware devices, if applicable;
 - (4) All licences, if applicable, including license key and renewal dates;
 - (5) All documentation artefacts, i.e. manuals, drawings, reports, etc.;
 - (6) All training packages.

4.9.5 Packaging, Handling, Storage, Transportation

- [SOW-456] The Contractor shall deliver all deliverables, including all spares and repaired goods, DDP Destination (Incoterms 2000) to the NATO destinations, at Contractor's expense. The Purchaser shall not be held liable for any storage, damage or any other charges involved in transportation prior to delivery at destination.
- [SOW-457] The Contractor shall be responsible for the availability of proper storage facilities and availability of material handling equipment that may be required for the shipment at the destination.
- [SOW-458] The Contractor shall liaise with the destination and coordinate availability of proper storage facilities and material handling equipment through the Purchaser's integrated product support officer.
- [SOW-459] In case classified items need to be transported, the Contractor shall adhere to the regulations concerning transportation of classified materials.
- [SOW-460] The Contractor shall be responsible for the transfer and delivery of installation packages of all software, firmware and modifications thereof provided under this Contract to the respective destination.
- [SOW-461] In case electronic storage media (CD/DVD, USB storage device, etc.) is used to deliver or transfer deliverables, then the Contractor shall physically label this media 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.
- [SOW-462] Fourteen days prior to the delivery of any shipment, the Contractor shall provide the Purchaser with a notice of shipment comprising the following details:
- (1) Shipment date;
 - (2) Purchaser contract number;
 - (3) CLIN;
 - (4) Consignor's and consignee's name and address;

- (5) Items description and quantity;
- (6) Number of 302 Forms used (if applicable).

4.9.5.1 Customs

- [SOW-463] The Contractor shall be responsible for customs clearance and/or export licences of all deliveries into their destination countries.
- [SOW-464] The Contractor's shall be responsible for taking into account the time needed at customs, including eventual delays in obtaining customs clearance, and arrange for timely ship. The Purchaser shall not be held responsible for delays incurred, even when utilising Purchaser provided Customs Form 302 (if applicable).

4.10 Warranty

- [SOW-465] The Contractor shall warrant that all deliverables and all services furnished under this Contract conform to the requirements and are free of any defect in code or workmanship for a period of one year starting at final system acceptance.
- [SOW-466] The Contractor shall integrate the provision of corrective maintenance within its warranty services.
- [SOW-467] When, at any time before the end of the warranty period, the Contractor becomes aware that a defect exists in any of the deliverables or services furnished under this Contract, the Contractor shall coordinate with the Purchaser and promptly correct the defect in accordance with the warranty provisions.
- [SOW-468] The Contractor shall correct all defects and deliver a corrective baseline release at the end of each quarter throughout the warranty period.
- [SOW-469] At the end of the warranty period, the Contractor shall deliver a final baseline release including the fixes for all the remaining defects.
- [SOW-470] In case of a critical defect, the Contractor shall deliver analysis of the defect to the Purchaser and deliver a workaround within maximum eight (8) business hours, and the fixed solution by means of a patch release within four (4) business days after the Contractor has become aware of the defect.
- [SOW-471] The Contractor shall integrate the provision of on-site service support within its warranty services to be provided off-site from the Contractor's facilities, or on-site at the Purchaser facilities as required in case the issue cannot be resolved remotely or to support warranty releases and deployment and hand-over thereof. In case on-site support provision at the Purchaser facilities is required, the Contractor's response time at Purchaser site shall be within two business days from the moment of Purchaser notification.
- [SOW-472] The Contractor shall warrant all third-party software and components used during the warranty period. If required, the Contractor shall renew/extend the third-party software and component licences to cover the full warranty period.
- [SOW-473] The Contractor shall monitor the availability of third-party software and component upgrades and patches in accordance with the requirements stipulated in Section 3.7.

- [SOW-474] When the agreed by the Purchaser, the Contractor shall introduce and integrate upgrades and patches of all third-party software and components in accordance with the requirements stipulated in Section 3.7.
- [SOW-475] The Contractor shall ensure that the warranty conditions remain valid even if the software is relocated/redeployed to an equivalent platform while under warranty.
- [SOW-476] The Contractor shall conduct testing and perform the configuration and change management processes for each patch and maintenance baseline release
- [SOW-477] The Contractor shall support the change request process for each patch and corrective baseline release.
- [SOW-478] The Contractor shall support the independent verification and validation testing in accordance with Section 4.3.3.3.
- [SOW-479] The Contractor shall support the BMD Programme in assessing the impact of issues, defects and identification and proposing workarounds and a fixed solution.
- [SOW-480] The Contractor shall detail all the warranty requirements in its in-service support plan, including the roles and responsibilities.
- [SOW-481] The Contractor shall provide a specific point of contact for all warranty and support requests.

5 Work Package 3: Optional Maintenance and Support

- [208] This optional work package describes the requirements for the continued annual Contractor furnished maintenance and support services to be exercised for up to five years post the final system acceptance.
- [209] The Purchaser reserves the right to unilateral exercise this option at any time from Contract Award until before the end of the Contract.
- [SOW-482] On exercising this optional work package, the Contractor shall provide one year of second and third level support and third and fourth level maintenance services (see Section 4.9.3) off-site from the Contractor's facilities where this support includes:
- (1) Support to NCI Agency's second and third level support process with identification of the root cause of the issue (i.e. problem identification and analysis);
 - (2) Correct all defects discovered and deliver a corrective maintenance baseline release every six months (corrective maintenance);
 - (3) In case of a critical defect, the Contractor shall deliver analysis of the defect to the Purchaser and deliver a workaround within maximum eight (8) business hours, and the fixed solution by means of a patch release within four (4) business days after the Contractor has become aware of the defect;
 - (4) At the end of the period of performance of the work package, deliver a final baseline including the fixes for all the remaining defects and agreed product backlog items;
 - (5) Provide modification of the software to keep it usable in a changed or changing environment (adaptive maintenance). This includes moving from one hardware platform to another, updating infrastructure software, insertion of other software components developed by third-parties and maintain interoperability with latest version and latest interface control documents of the external capabilities and services integrated or interfacing with the TOPFAS Application Suite;
 - (6) Detect latent faults, analysing patterns and discover potential vulnerable areas in the software and provide preventive fixes (preventive maintenance);
 - (7) Apply modification on software and improve performance or maintainability in an agreement with the Purchaser (perfective maintenance). This includes studies, enhancement, technology assessment and insertion, experimentation and data adaptation;
 - (8) Implement engineering change proposals and change requests, effort not used for adaptive and perfective maintenance shall be used to implement change proposals and change requests;
 - (9) Support to system integration testing in accordance with Section 4.3.3.1
 - (10) Support the user acceptance testing in accordance with Section 4.3.3.2.
 - (11) Support the BMD Programme in accordance with Section 4.8 and assessing the impact of issues, defects and identification and proposing workarounds and a fixed solution. The effort shall exclude the BMD Scope Implementation Monitoring (Section 4.8.5);

- (12) Conduct testing and perform the configuration and change management processes for each patch and maintenance baseline release;
- (13) Support the change request (CRQ) process for each patch and maintenance baseline release in accordance with Section 4.3.3.3;
- (14) Support the independent verification and testing in accordance with Section 4.3.3.3;
- (15) Support the release and transition process for each patch and maintenance baseline release.

- [SOW-483] The Contractor shall integrate the provision of on-site service support within its maintenance services to be provided off-site from the Contractor's facilities, or on-site at the Purchaser facilities as required in case the issue cannot be resolved remotely or to support warranty releases and deployment and hand-over thereof. In case on-site support provision at the Purchaser facilities is required, the Contractor's response time at Purchaser site shall be within two business days from the moment of Purchaser notification.
- [SOW-484] To enable the interfacing between TOPFAS and other capabilities and services, the Contractor shall provide support to Purchaser or its contractors responsible for implementing such interfaces with TOPFAS.
- [SOW-485] The Contractor shall maintain and deliver renewed/extended licenses of the third-party software and components in accordance with Section 3.7 and ensure that these licenses cover the full period of performance.
- [SOW-486] The Contractor shall monitor the availability of third-party software and component upgrades and patches in accordance with the requirements stipulated in Section 3.7.
- [SOW-487] When the agreed by the Purchaser, the Contractor shall introduce and integrate upgrades and patches of all third-party software and components in accordance with the requirements stipulated in Section 3.7.

6 Documentation Artefacts

[210] This section covers the requirements for documentation artefacts to be delivered.

[SOW-488] For documentation artefacts that have not been specified in further detail under this Contract, the Contractor shall deliver a template with outline of the relevant documentation artefact for Purchaser review and agreement prior to developing the documentation artefact.

[211] In case the Contractor deems necessary, and supported with proper justification, the Contractor may propose amendments to the outline and contents of documentation artefacts for Purchaser agreement.

6.1 Distribution

[SOW-489] The Contractor shall deliver all documentation artefacts in an electronic format, unless otherwise instructed, as follows:

- (1) Documentation artefacts intended for review by the Purchaser shall be delivered in an editable (i.e. Microsoft Office) format;
- (2) Final versions of documentation artefacts shall be delivered in Adobe PDF format with OCR (Object Character Recognition) capability, together with the editable source file.

[SOW-490] The Contractor shall distribute all documentation artefacts, unless otherwise instructed, as follows:

- (1) All documentation artefacts: to the Purchaser's project manager;
- (2) In case of technical documentation artefacts, i.e. design documentation, user stories, manuals, etc.: to the Purchaser's technical lead;
- (3) In case of contract documentation artefacts, including invoices, change requests, etc.: to the Purchaser's contracting officer, and if required by the Purchaser's contracting officer, an additional printed copy.

[SOW-491] The Contractor shall not include any statements limiting the rights to use or reproduce the documentation artefact delivered under this Contract. The Purchaser reserves the right to make additional copies of any documentation artefact delivered.

[SOW-492] The Contractor shall ensure that the Purchaser always has access to the latest version of any documentation artefact from the moment the documentation artefact comes into existence, i.e. use the NATO Software Factory for production and configuration management platform.

[SOW-493] The Contractor shall maintain the documentation artefacts and keep them current throughout the period of performance of the Contract.

[SOW-494] The Contractor shall place the documentation artefacts under configuration control throughout the period of performance of the Contract.

6.2 Review and Updates

[212] The Purchaser will, when reviewing documentation artefacts, provide comments and suggest changes to the Contractor within two weeks of receipt of the documentation

artefact. When the Purchaser requires more time to complete its review, the Purchaser will inform the Contractor.

- [213] The Purchaser will reserve the right to return without further review a documentation artefact that shows significant deficiencies.
- [SOW-495] All documentation artefacts shall be subject to Purchaser review and acceptance.
- [SOW-496] The Contractor shall not rely on the Purchaser review to fill in deficiencies or obtain missing Purchaser information.
- [SOW-497] In case the Contractor considers that the Purchaser's comments and suggestions require further clarification, the Contractor shall arrange for a meeting to the address the items of concern.
- [SOW-498] The Contractor shall submit revisions of documentation artefacts for review, addressing the Purchaser's comments and suggestions within two weeks after receipt of the Purchaser's feedback.
- [SOW-499] The Contractor shall submit revision documentation artefacts for review with each modification identified through the "track changes" feature or otherwise being marked as change.
- [SOW-500] In case there is a change to an already delivered artefact, the Contractor shall be responsible for updating all documentation artefacts pertaining to the specific delivered artefact where the documentation artefacts are affected by the change.

6.3 Standards and Conventions

- [SOW-501] The Contractor shall deliver all documentation artefacts compliant with the standards and conventions of the sections below. Third-party software and component documentation artefacts, such as a vendor-supplied user manual, are exempt from these requirements and shall be delivered in the original, unaltered, format.

6.3.1 File Format

- [214] The Purchaser's default software packages for managing documentation artefacts are:
- (a) Microsoft Office Professional 2016 or later;
 - (b) Microsoft Project 2010;
 - (c) Microsoft DocFX;
 - (d) Adobe PDF Reader;
 - (e) Microsoft Windows compatible Zip compression and packaging format.
- [SOW-502] Documentation artefacts shall be delivered in a file format that is compatible with the Purchaser's default software packages.
- [SOW-503] Documentation artefacts shall be delivered in a file format that is best suited for review and maintenance by the Purchaser. In general, the following guidelines apply:
- (1) Microsoft Word shall be used for text documents;
 - (2) Microsoft Excel shall be used for tabular or matrix data;
 - (3) Microsoft Project shall be used for schedule;
 - (4) Microsoft PowerPoint shall be used for briefings and presentations.

- [SOW-504] Documentation artefacts shall adhere to the following filename convention [NU|NR]_[Name]_[vX.Y]_[filename extension] and the elements used in the filename convention shall be as follows:
- (1) [NU|NR] is the classification of the file: NATO UNCLASSIFIED or NATO RESTRICTED. Note: Classified files shall not be stored within the NATO Software Factory;
 - (2) [Name] is the Contractor proposed, Purchaser agreed designation of the documentation artefact;
 - (3) [vX.Y] is the version number in the range (v0.1, v0.2,..., v0.9, v0.10, v0.11,...) for drafts submitted to the customer, and with vX.0 only for the final deliverables;
 - (4) [filename extension] is the standard filename extension. Note: large files or large file sets may be compressed using a standard zip-compatible format. In these cases, the ".zip" filename extension shall be used to indicate a compressed file format.
- [SOW-505] The source files of documentation artefacts shall be stored and managed without version number in the filename. Only submitted and final versions shall have a version number and shall be stored separately from their source files.

6.3.2 Language, Style and Formatting Conventions

- [SOW-506] Documentation artefacts shall be written in the UK English language.
- [SOW-507] Documentation artefacts shall be written using standard UK English abbreviations only and the use of non-common English acronyms shall be avoided.
- [SOW-508] The use of capitalization of words/terms within documentation artefacts beyond English spelling and grammar rules, shall be avoided.
- [SOW-509] Documentation artefacts shall be written using the following number, date and time conventions:
- (1) The convention to be used for numbers is for a comma to be the thousands separator and a period to be the decimal separator (e.g. 1,365,276.24);
 - (2) The convention to be used for dates (e.g. quoting dates of meetings) is in the order of day-month-year and not month-day-year;
 - (3) The convention to be used for times shall be 24-hour clock format.
- [SOW-510] Documentation artefacts shall be based on style templates, which shall be proposed by the Contractor and agreed by the Purchaser.
- [SOW-511] Documentation artefacts shall adhere to the same presentation style (cover pages, headers, footers, headings and paragraphs, font types and sizes, etc.).
- [SOW-512] The layout and make-up of documentation artefacts shall be suitable for electronic reading in PDF format.
- [SOW-513] The documentation artefact cover page (or equivalent cover slide or cover sheet) shall identify:
- (1) The document title, contract title, contract number, and originator;
 - (2) Configuration management information, version number, issue date and NCAGE, if applicable;
 - (3) The name and version number of the software it refers to, if applicable;

(4) Classification within headers and footers with the highest classification of information contained in the entire document.

[SOW-514] Documentation artefacts shall contain a table of contents. It shall be noted that depending on the type of artefact, a table of contents might not be required. The exclusion of a table of contents shall be agreed by the Purchaser prior to developing the documentation artefact.

[SOW-515] Documentation artefacts shall use sans-serif fonts (e.g. Calibri, Arial, Helvetica, etc.), and obey the following principles:

- (1) Headings shall be numbered and use bold font styles 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 font sizes smaller than Calibri 12 pt. (or equivalent size if another font is selected);
- (4) Any graphic material produced, including network diagrams, shall not use font sizes smaller than Calibri 10 (or equivalent size if another font is selected).
- (5) 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.

[SOW-516] Documentation artefacts developed in Microsoft Word shall be printable, if required, and therefore the page format shall be A4, printable in loose-leaf form.

[SOW-517] Where documentation artefacts contain many complex specialized or strongly domain oriented terminologies, these shall be defined in a glossary.

6.4 Project Management Plan

[SOW-518] The Project Management Plan (PMP) shall describe the project organization and identify key personnel in the project organization, their qualifications, and their responsibilities.

[SOW-519] The Project Management Plan shall describe all aspects of the project implementation, including the Contractor's project management approach, project control processes, used standards, and external relationships necessary to provide the deliverables.

[SOW-520] The Project Management Plan shall describe personnel assignments with specification of the personnel target capacity required at Effective Date of Contract. Note: Target capacity is to be understood as full-time equivalent (FTE) by role/function, for example x FTE full-stack software developer; it is not needed to identify Contractor personnel by name, except for key personnel.

[SOW-521] The Project Management Plan shall describe the Contractors' approach for the "ramp-up" period, meaning the time from Contract Award to Effective Date of Contract, required by the Contractor for starting up the project, e.g. establishing the project organization, bringing the project team at target capacity, and conduct knowledge build-up and preparations. The approach shall include justifications

and identify assumptions and constraints in order for the Purchaser to assess the feasibility of the approach within the proposed “ramp-up” period duration.

- [SOW-522] The Project Management Plan shall include an annex with the specifications and dimensions of the number of NATO Software Factory user accounts, the Microsoft Azure Cloud Services and additional products and services that are required by the Contractor throughout the period of performance of the Contract (see Section 3.6).
- [SOW-523] The Project Management Plan shall identify all major Contractor operating entities and any Subcontractors involved in the work and describe the portion of the overall effort and deliverables allocated to them.
- [SOW-524] The Project Management Plan shall describe how the various project management processes (quality management, configuration management, risk management, issue management, etc.) are integrated, either via a tool set and/or internal project management practices.
- [SOW-525] The Project Management Plan shall describe the Contractor’s and Subcontractors’ approach to security management, including personnel and facility security.
- [SOW-526] The Project Management Plan shall identify assumptions and constraints.
- [SOW-527] The Project Management Plan shall describe methodology used for cost and schedule estimation.
- [SOW-528] The Project Management Plan shall include a product breakdown structure (PBS) identifying all services and deliverables, with reference to the CLINs for traceability.
- [SOW-529] The Project Management Plan shall include a Project Master Schedule (see 6.4.1) as an annex.
- [SOW-530] The Project Management Plan shall define all major milestones and major activities, all expected Purchaser involvements and all expected purchaser furnished property and services and associated timelines.
- [SOW-531] The Project Management Plan shall be sufficiently detailed to ensure that the Purchaser is able to assess the Contractor plans, capabilities, and ability to satisfactorily implement the entire scope in conformance with the requirements of the Contract.
- [SOW-532] Each revision of the Project Management Plan shall be accompanied by a summary of the changes together with impact statement for Purchaser assessment.

6.4.1 Project Master Schedule

- [SOW-533] The Project Master Schedule shall define all major milestones and major activities, with reference to the element of the product breakdown structure, the breakdown and durations of each activity, and the Contract end date.
- [SOW-534] The Project Master Schedule shall specify a level-of-effort (LOE) in number of person-days for each of the activities/deliverables.

- [SOW-535] The Project Master Schedule shall identify the “ramp-up” period, meaning the time from Contract Award to Effective Date of Contract, required by the Contractor for starting up the project.
- [SOW-536] The Project Master Schedule shall include a Gantt chart where the start and finish dates of the work packages and phases are depicted, and it shall from this schedule be possible to identify the timeframe when a specific deliverable is planned to be delivered.
- [SOW-537] The Project Master Schedule shall include all major milestones, phases and activities within a work package, including:
- (1) Contract Award and EDC;
 - (2) Phase start and finish dates;
 - (3) All contract milestones, including product or sub-product delivery timelines ;
 - (4) All major milestones and activities;
 - (5) Other milestones and activities that requiring Purchaser and/or user involvement;
 - (6) All sprints, including planning and review meetings;
 - (7) All BMD Programme System of System validation activities.
- [SOW-538] The Project Master Schedule shall depict the sequence, start and finish dates, durations, and relationships among milestones and activities.

6.5 Risks, Actions, Issues, Decisions Register

- [SOW-539] The risks, actions, issues, decisions (RAID) register shall be used to record and track all project risks, action items, issues and decisions.
- [SOW-540] The RAID register shall be exportable to Microsoft Excel.

6.5.1 Risk Register

- [SOW-541] The Risk Register within the RAID register shall list all project risks and for each risk indicate the following information (but not limited to):
- (1) Risk identifier: unique code to allow grouping of all information on this risk;
 - (2) Risk category (e.g. management, technical, schedule, quality and cost risks);
 - (3) Description: brief description of the risk pointing on the uncertain event (risk), and its cause or causes;
 - (4) Impact: description of the effect on the project if this risk were to occur;
 - (5) Impact assessment: estimate the impact of the risk using five (5) level scale
 - (6) Probability: estimate of the likelihood of the risk occurring using five (5) level scale;
 - (7) Risk rating (High, Medium, Low);
 - (8) Proximity: how close in time is the risk likely to occur;
 - (9) Response strategy: avoidance, mitigation, acceptance, transference
 - (10) Response plan(s): what actions have been taken/will be taken to counter this risk;
 - (11) Owner: who has been appointed to keep an eye on this risk;
 - (12) Status: e.g. closed, reducing, increasing, no change;
 - (13) Date of last update: when was the status of this risk last reviewed;
 - (14) Originator: who submitted the risk;

- (15) Date identified: when was the risk first identified.

6.5.2 Action Register

[SOW-542] The Action Register within the RAID register shall list all action items, and for each action item indicate the following information (but not limited to):

- (1) Action identifier: unique identifier of the action item;
- (2) Description: brief description of the action item;
- (3) Owner: who is responsible for the action item;
- (4) Date identified: when was the action item was raised;
- (5) Due date: when the action item is expected to be completed;
- (6) Status: e.g. open, closed, obsolete;
- (7) Date status update: when the action item's status changed.

6.5.3 Issue Register

[SOW-543] The Issue Register within the RAID register shall list all issues that require formal management by the project and for each issue indicate the following information (but not limited to):

- (1) Issue identifier: unique identifier of the issue;
- (2) Issue type (request for change, project issue, problem or concern);
- (3) Description: brief description of the issue and its impact;
- (4) Severity: Statement of the severity of the issue;
- (5) Owner: who is responsible to deal with the issue;
- (6) Date raised: when was the issue first raised/encountered;
- (7) Originator: who identified the issue;
- (8) Status: e.g. closed, reducing, increasing, no change;
- (9) Date status update: when the issue's status changed.

6.5.4 Decision Register

[SOW-544] The Decision Register with in the RAID register shall list all taken decisions and for each decision indicate the following information (but not limited to):

- (1) Decision identifier: unique identifier of the decision;
- (2) Description: brief description of the decision;
- (3) Date approved: when was the decision taken approved;
- (4) Approved by: reference to the Purchaser's approver.

[SOW-545] All decisions entered on the register shall be submitted for Purchaser approval and the status shown on the register.

6.6 Configuration Management Plan

[SOW-546] The Configuration Management Plan (CMP) shall comply with the requirements and the format defined within [ACMP-2009-SRD-41].

[SOW-547] The Contractor shall analyse the Purchaser's configuration management procedures and tools, and incorporate those in the software configuration management process.

[SOW-548] The CMP shall define software configuration management process of the functional and physical characteristics of the configuration items, including interfaces and configuration identification documentation.

- [SOW-549] In preparing the CMP the Contractor shall:
- (1) Ensure that all required elements of configuration management are documented in such a manner as to provide a comprehensive configuration management program;
 - (2) Identify the means by which continuity of effort and understanding is achieved between the Contractor (prime) and its Subcontractors, if any, and between the project manager and the configuration manager, and internally within the organization, for the allocated configuration items, integrating, interfacing or otherwise related configuration items, supplier organizations, test and evaluation activities, and managers; and
 - (3) Establish his internal configuration management requirements for the Contract.
- [SOW-550] The CMP shall identify explicitly any format and content requirements in [ACMP-2009-SRD-41] deemed by the Contractor to be not applicable for the Contract. The relevant sections shall be marked not applicable (N/A) followed by a short justification why the requirement is considered not applicable. Note: Requirements in [ACMP-2009-SRD-41] that are readily expected to be declared N/A for a software acquisition are found in:
- (1) Paragraph 3.2.1 - Hardware Configuration Item Identification;
 - (2) Paragraph 3.7 - Drawing library;
 - (3) Paragraph 5.1.3 - Interface Control Working Group.
- [SOW-551] The CMP shall define the configuration management organization including the configuration manager role and any other supporting configuration management personnel.
- [SOW-552] The CMP shall be tailored, specifically addressing how configuration management shall be performed using an incremental delivery approach and iterative development process and integrate with NATO Software Factory.
- [SOW-553] The CMP shall identify the alternative means and tools proposed by the Purchaser beyond the Azure DevOps tools furnished by the NATO Software Factory in order to meet the configuration management requirements.
- [SOW-554] The CMP shall identify and define all top-level configuration items to be delivered under this Contract and where these top-level configuration items are traced to deliverables as defined in the product breakdown structure and Schedule of Supplies and Services.
- [SOW-555] Per requirements specified in Section 3.10, the CPM shall include the definitions of:
- (1) The types of configuration baselines, and
 - (2) Configuration Status Accounting (CSA), Functional and Physical Configuration Audits, by specifying the inputs, outputs, timing and the resources.
- [SOW-556] The CMP shall define the template for engineering change proposals (ECP), which as a minimum shall include the elements specified by the template in Annex D.1.

[SOW-557] The CMP shall define the template for request for deviation (RFD)/request for waiver (RFW), which as a minimum shall include the elements specified by the template in Annex D.2.

6.7 Quality Plan

- [SOW-558] The Quality Plan shall specify how the quality related contract requirements will be met, and shall comply with the requirements as defined by [AQAP 2110] and [AQAP 2210].
- [SOW-559] The Quality Plan (QP) shall be compliant with [AQAP-2105] as specified in this section.
- [SOW-560] The Quality Plan shall be kept reviewed and updated at least on a yearly basis. Initial and follow-on revisions shall be subject to Purchaser approval.
- [SOW-561] The Quality Plan shall include or refer to all applicable contractual processes and procedures within the Contractor's Quality Management System.
- [SOW-562] The scope of the Quality Management System shall be documented in the Quality Plan as it applies to the Contract.
- [SOW-563] The Quality Plan shall refer to and/or include all procedures, plans and other documents applicable to the Contract.
- [SOW-564] The Quality Plan shall specify the activities (managerial and technical) to be implemented, either directly or by reference to procedures and documents.
- [SOW-565] The Quality Plan shall include how processes are identified along with their application, sequence and interaction.
- [SOW-566] Criteria and methods to ensure that processes are effective shall be included, as well as resources to support and monitor their implementation. Emphasis shall be put on processes that are complex or involving significant levels of risk as well as new processes.
- [SOW-567] The Quality Plan shall include how the Contractor will control externally provided products, processes and activities, including the avoidance, detection, mitigation and disposition of counterfeit materiel.
- [SOW-568] The Quality Plan shall include how processes are monitored, measured, analysed and continually improved. Appropriate performance indicators shall be determined.
- [SOW-569] The Quality Plan shall describe how documentation requirements, including quality policy, quality objectives, scope of quality management system, procedures, records and other documents are maintained and controlled, including retention periods. A document status list shall be available at all times, and shall be formalized during transitions between phases and/or product baselines e.g. prior to design reviews.
- [SOW-570] The Quality Plan shall include a Contract specific description of the organizational structure and identify those responsible for ensuring that the required activities are carried out. The responsibilities and authorities of responsible personnel related to quality, including the Management Representative, shall be described. The independence of personnel designated for contract related quality

responsibilities shall be clearly documented. The inter-relationships between those responsible personnel shall be explained.

- [SOW-571] The Quality Plan shall describe the Contract specific activities for Risk Management and/or give reference to the required Risk Management Plan.
- [SOW-572] The Quality Plan shall describe the Contractor's software corrective action system.
- [SOW-573] The provision of resources, human resources, infrastructure and work environment needed to implement the Contract requirements shall be specified in the Quality Plan.
- [SOW-574] The Quality Plan shall describe the processes used to ensure that measurement processes and measuring equipment meet requirements. The measurement management system shall be described; including the metrological function, measurement processes and the metrological confirmation process. The control of monitoring and measuring tools in order to provide evidence of product conformity to Contract requirements shall be described.
- [SOW-575] The Quality Plan shall describe the activities related to how the planning process for product realization/operation will be carried out. This shall include, or be referenced to the Deliverable Requirements Traceability Matrix. It shall describe how the matrix is maintained and controlled.
- [SOW-576] The Quality Plan shall describe how the Contract specific activities for identification, management, traceability, review and validation of requirements is planned. Giving reference to related processes, documents (i.e.: software requirements specifications) and test procedures.
- [SOW-577] The Quality Plan shall describe the Contract specific activities for Configuration Management and/or give reference to the required Configuration Management Plan.
- [SOW-578] The Quality Plan shall describe the arrangements for communication with the Purchaser.
- [SOW-579] The Quality Plan shall identify and describe the activities associated with determining and reviewing requirements.
- [SOW-580] The Quality Plan shall describe how design and development of products are performed, including processes for design and development planning, inputs, controls, reviews, evaluation, acceptance criteria, verification, validation, outputs and changes.
- [SOW-581] The Quality Plan shall describe how externally provided products are controlled through the supply chain. This shall include the flow down of requirements, the acquisition process, ensuring product conformity, Supplier evaluation and selection, quality auditing and other activities associated with externally provided products through the supply chain. Specific risks related to the supply chain products shall be identified and managed as part of Contractor's Risk Management.
- [SOW-582] The Quality Plan shall describe how the Contractor will ensure that only acceptable products intended for delivery are released to the Purchaser. The Contractor QA organization shall verify that all tests are adequately planned,

designed and executed in accordance with the approved Contractor's Master Test Plan.

- [SOW-583] The Quality Plan shall refer to the Contract specific arrangements for release authority, which may include the use of a Certificate of Conformity.
- [SOW-584] The Quality Plan shall describe how the Contract specific requirements for identification and control of non-conforming products will be carried out.
- [SOW-585] The Quality Plan shall identify the processes/procedures that are required for product/service improvement.
- [SOW-586] The Quality Plan shall describe how continual improvement and corrective actions will be carried out.
- [SOW-587] The Quality Plan shall describe how the Contractor monitors, measures and improves customer satisfaction.
- [SOW-588] The Quality Plan shall describe the analysis of data used in order to demonstrate the suitability and effectiveness of planned activities that lead to improvements.
- [SOW-589] The Quality Plan shall describe how internal audits will be performed in order to determine whether the Quality Plan conforms to the requirements and is effectively implemented and maintained.

6.8 Integrated Product Support Plan

- [215] The integrated product support plan (IPSP) shall specify how integrated product support will be designed, managed, procured and delivered, and how it intends to meet the Integrated product support requirements of the Contract.
- [216] The IPSP shall in general comply with the requirements and the format defined within the template in the Annex-E of [ALP-10].
- [SOW-590] The IPSP shall to meet the following requirements. Any requirements deemed by the Contractor to be not applicable for the Contract shall be marked not applicable (N/A) followed by a short justification why the requirement is deemed not applicable.
- (1) **Introduction** - The IPSP shall provide general information on the purpose and scope of the IPSP and top-level supportability issues such as software description, management organization, milestone schedule, and indicate any applicable documents.
 - (2) **Supportability** - The IPSP shall describe the strategies for attaining IPS objectives within the context of the Contract. A description of the operational requirements and supportability objectives will provide essential information to ensure that supportability is thoroughly planned.
 - (3) **Operational and supportability requirements** - The IPSP shall briefly describe the mission scenarios and requirements, operational environment, security requirements, transportability requirements and employment.
 - (4) **Acquisition strategy** - The IPSP shall describe the anticipated third-party software and components (COTS and FOSS) acquisition approach.
 - (5) **Personnel requirements** - The IPSP shall describe actions to limit the requirements for a high degree of skill to support and maintain the software.

(6) **IPS element plans** - Provide details on plans for the IPS element (i.e. the TOPFAS Application Suite with its documentation and training materiel).

(a) Maintenance planning

[SOW-590(i)] Describe the maintenance concept for the software including all levels of maintenance. Identify trade-offs to be performed and maintenance considerations peculiar to the software.

[SOW-590(ii)] Identify maintenance tasks required to sustain the end item at a defined level of readiness, include all critical and high driver tasks.

[SOW-590(iii)] Describe maintenance environment.

- Describe the maintenance environment, limitations, constraints, and requirements projected for the deployment timeframes.
- State the nature and extent of maintenance to be performed by each level of maintenance.
- Identify the organizational and logistic support structure that will be responsible for providing direct and general supply support and maintenance support.

(b) Personnel

[SOW-590(i)] Describe the operation and maintenance personnel requirements.

[SOW-590(ii)] Describe skill requirements for personnel necessary to operate, maintain, and support the end item. Consider the following:

- Present skills that may be used with little or no retraining.
- New skills required (skill evaluation and justification).
- Assigned duties.
- Task, skill, behaviour, and user interface analyses.

[SOW-590(iii)] Identify safety and human factors constraints to help minimize problems with the user interface during operation, maintenance, and transport.

(c) Training

[SOW-590(i)] Describe how training requirements will be met and who is responsible for meeting those requirements in reference to the Training Plan (Section 4.5.3).

[SOW-590(ii)] Describe training requirements and plans unique to operation and maintenance of software.

(d) Packaging, handling, storage, and transportation (PHS&T)

[SOW-590(i)] Describe requirements, management responsibilities, and procedures used to ensure that PHS&T requirements are identified and met in a timely manner.

[SOW-590(ii)] Describe anticipated PHS&T modes and constraints.

[SOW-590(iii)] Describe PHS&T assets required and those expected to be available/in-place.

(e) Supportability in fielding and operational life

[SOW-590(i)] Initial fielding - Briefly describe planning for initial fielding and achieving initial operational capability. Summarize the procedure and schedule for preparation of all materiel fielding documentation. Provide information on how fielding will be implemented.

[SOW-590(ii)] Transition - If applicable, provide a description of how and when the Integrated product support will be transferred from the Contractor to the Purchaser. Show how components usage, skills, training, procedures, technical data, and so forth will be obtained and used. Provide sufficient detail to assure that all necessary data is provided in time to adequately provision, train, and maintain the software after transition.

6.8.1 In-Service Support Plan

- [SOW-591] The In-Service Support Plan (ISSP) is an annex to the IPSP and shall cover the following as a minimum:
- (1) The Contractor's support organization, roles, responsibilities, processes and procedures (from the first baseline release till final system acceptance, during warranty and during the optional maintenance and support post the warranty period);
 - (2) Description of the capability of interest in scope of integrated support;
 - (3) Description of the integrated support concept, including the maintenance concept, warranty concept, support concept, service management & control concept, including but not limited to the incident, problem management, release and deployment 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 points of contact;
 - (5) Description and allocation of operation, service management & control and corrective, preventive, adaptive and perfective maintenance tasks required to operate and maintain the capability;
 - (6) Procedures to follow in case of failures; Contractor response times for analyses and resolution.

6.9 Solution Design Specification

- [217] The purpose of the solution design specification (SDS) provided by the Contractor is to describe the solution design and design decisions to a level of detail that will enable the Purchaser to assess the solution's feasibility and ability to fulfil the requirements of the Contract.
- [SOW-592] The solution design specification shall describe the proposed software application design, design consideration and design decisions to a level of detail that enables the Purchaser to understand and assess how the capabilities will fulfil the requirements and how they will be implemented.
- [SOW-593] The solution design specification shall include an analysis of the requirements where this analysis shall:
- (1) Identify potential issues with the requirements;
 - (2) Propose changes to the requirements definitions to resolve inconsistencies or ambiguities, or to suggest no-cost improvements.
- [SOW-594] The solution design specification shall also include:
- (1) The proposed application design (diagrams), identifying key components and services and how they relate to each other;
 - (2) Description of purpose of each of the identified components and services;
 - (3) Description of business logic and algorithms;
 - (4) Identification of key technologies and frameworks to be used;
 - (5) Identification of all third-party software and components to be used, including licensing information.
 - (6) Assessment of the proposed solution against the non-functional requirements as defined in the statement of requirements.

- [SOW-595] The resulting design shall be suitable to support any identified use case scenarios and provide flexibility to optimize the human-machine interface and usability, and minimize the impacts of future modifications.
- [SOW-596] In the case of newly proposed third-party software and components, the software design description shall specify the third-party product, version, its vendor, licence type, a summary of the main capabilities, full lifecycle cost specification (licence/subscription fee), and any constraints that may apply to the product.
- [SOW-597] The solution design specification shall record all fundamental solution decisions. Each such decision shall include:
- (1) An issue or problem statement paragraph that describes the issue/problem, the motivation for change, and a reference to requirements of statement of requirements, if applicable;
 - (2) An assumption paragraph, that provides background information on (external) context, expected future situations, etc.;
 - (3) A recommended solution paragraph that describes the proposed solution, its implications and justification.

6.10 Deliverable Requirements Traceability Matrix

- [SOW-598] The deliverable requirements traceability matrix (DRTM) shall be established to track the status of deliverables and SRS requirements throughout the development lifecycle and prove that requirements have been fulfilled, verified and validated.
- [SOW-599] The DRTM shall allow for traceability of all TOPFAS BMD ARS² requirements to SRS requirements, to work packages. The Purchaser will provide an SRS matrix with the initial traceability.
- [SOW-600] The DRTM shall allow tracing of SRS requirements, to sprints, to design artefacts, to product backlog items, to test cases, to deliverables, and back.
- [SOW-601] The DRTM shall trace SRS requirements to ECPs, RfDs and RfWs.
- [SOW-602] The DRTM shall for each SRS requirement include the agreed work package allocation and MoSCoW prioritization category, i.e. “must have”, “should have” and “could have”.
- [SOW-603] Full traceability shall be enabled and maintained within the NATO Software Factory. The DRTM shall be kept consistent with the NATO Software Factory.
- [SOW-604] The DRTM shall identify the Value Items as per BMD Scope Implementation Monitoring methodology (Section 3.9.9) and shall include the agreed progress

² ARS stands for Architectural Requirements Specifications, the high-level BMD requirements.

measurement baseline and the Value Items' value points, validation and verification status, progress and BSIM metrics.

- [SOW-605] The DRTM shall include a Verification Cross Reference Matrix (VCRM) identifying the method(s) for verifying the requirements and trace requirement with test cases. The verification methods are defined in Table 6.1 - Verification Methods.
- [SOW-606] The DRTM shall track the verification and validation status (e.g. Verified, Not Verified...) of all requirements.
- [SOW-607] The DRTM shall track the verification and validation results of all requirements against test cases and test/verification/validation execution, with identification of the deliverable and baseline release, and include references to objective evidence supporting the assessment of each entry³.
- [SOW-608] The DRTM shall provide the status and results⁴ of requirement level verification and validation aggregated at ARS-level.
- [SOW-609] The DRTM shall for each requirement that has been invoiced by the Contractor, record the Contractor's invoice number and the invoice date.
- [SOW-610] The DRTM shall be delivered as an Excel spreadsheet where the information is organized and can be pivoted, filtered and sorted by column values.
- [SOW-611] The DRTM Excel spreadsheet shall include a view that is importable in the BMD DOORS application.

³ The data provided should include, at minimum, details about the event including the event title, dates conducted, software version identifier, database version identifier, configuration files and references of the final test report and of the baselined versions of the relevant SRS and test cases used.

⁴ ARS-level verification results are determined based on verification results of the related SRS requirements.

Table 6.1 - 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 prove a capability meets a 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.

6.11 Software Design Description

- [218] The software design description (SDD) is a representation of a software application's design that is to be used for documenting design information: explaining the structure, components, interfaces; and other design features to a level of detail that will enable the stakeholders to effectively maintain and support the new baseline and develop future baselines.
- [219] The software design description shall in general be consistent with the standard IEEE 1016-2009 (IEEE Standard for Software Design Descriptions).
- [SOW-612] The software design description will be evolved from the current TOPFAS Application Suite baseline software design description [TOPFAS-SDD] encompassing the enhancements and the new features developed in the course of the Contract, and staying consistent with the content, format and the style of the [TOPFAS-SDD].
- [SOW-613] The software design description shall describe the baseline's design, design consideration and design decisions to a level of detail that enables the Purchaser to understand and assess how the capabilities fulfil the requirements and how they are implemented.
- [SOW-614] The software design description shall include:
- (1) The application design, identifying key components and services and how they relate to each other;
 - (2) Description of purpose of each of the identified components and services;

- (3) Description of business logic and algorithms;
- (4) Graphical design standards, including look-and-feel design features, colour scheme, font type and size, etc.;
- (5) Identification of key technologies and frameworks;
- (6) Identification of all third-party software and components used, including licensing information.

[SOW-615] The software design description shall include detailed user stories provide traceability to requirements and document the user interface specifications, designs, interactions and workflows from the user's point of view as an annex.

[SOW-616] The software design description shall include a database schema and documented data model as an annex.

6.12 Interface Control Document

[SOW-617] The interface control document (ICD) shall document the service interfaces provisioned by the baseline (existing, updated or new), as well as the external service interfaces that the capabilities interact with. Service interfaces also include file-based exchange services.

[SOW-618] The interface control document includes machine-readable interface files, in a standardized format/representation, i.e. OpenAPI for describing RESTful services, etc.

[SOW-619] The interface control document shall include service specifications to document the services so that software developers implementing functionality that consumes the service will have sufficient information to build functionality that can successfully interact with the service.

[SOW-620] The service specifications shall, when applicable, include documentation of, or reference to, a conceptual information model.

[SOW-621] The service specifications shall include documentation of the business logic and business rules implemented by the service.

[SOW-622] The service specification shall include documentation on the service non-functional/ performance characteristics (e.g. response times).

6.13 Programmer's Manual

[SOW-623] The Programmer's Manual (or system build manual) shall define specific information regarding the set-up and configuration of the personal and central development, build and release environment, and shall include the programmer's rulebook and coding best-practices.

[SOW-624] The Contractor shall update the Purchaser's latest Programmer's Manual with necessary modifications prior to the kick-off meeting.

6.14 Installation and Configuration Manual

[SOW-625] The installation and configuration manual shall describe the procedures to install, configure and activate the applications and shall cover the following topics at minimum:

- (1) General introduction and description of the capabilities and of functional components and interfaces, with appropriate drawings;
- (2) Prerequisites:
 - (a) Platform requirements, including storage space;
 - (b) Access rights to perform the installation;
 - (c) Required interfaces to external services, i.e. CoreGIS;
 - (d) Accounts and settings, i.e. ports, to operate and to maintain.
- (3) Configuration of the platform and third-party software and components required to operate the capabilities;
- (4) Configuration file information (location, content, available settings and purpose);
- (5) Recovery procedures;
- (6) Migration and update procedures as far as these are not covered by the automatic installation routines;
- (7) Installation and configuration tasks, detailed step by step with screenshots of the feedback, displayed after each action;
- (8) Backup, restore and maintenance procedures to be enabled;
- (9) Activation checklist to verify correct installation and configuration;
- (10) Troubleshoot information and techniques to solve installation and configuration problems.

[SOW-626] For third-party products, maximum advantage shall be taken of the vendor-supplied third-party software and component documentation artefacts, however specific settings and procedures pertaining to the baseline delivered shall be covered by this manual, and in case there is no vendor-supplied documentation, this manual shall include all possible information needed to configure, manage and maintain the third-party product.

6.15 Maintenance and Administration Manual

[SOW-627] The maintenance and administration manual shall describe the procedures to perform the maintenance tasks as defined in the maintenance concept, and shall cover the following topics at minimum:

- (1) General introduction and description of the capabilities and of functional components and interfaces, with appropriate drawings;
- (2) A full product breakdown of configuration items, including third-party software and components;
- (3) Scheduled (preventive, adaptive and perfective) and unscheduled (corrective) maintenance procedures defining step-by-step how to perform the first, second and third level maintenance tasks and service management and control (SM&C) tasks for the configuration items;
- (4) Usage of third-party applications or tools (if any) needed to configure, manage and maintain the capabilities;
- (5) Configuration, use and the locations of the log files;
- (6) Disaster recovery procedures, including backup and restore procedures;
- (7) Database maintenance plan, including executable scripts;
- (8) Troubleshoot information and techniques to check for and solve a full range of (potential) problems or to enable workarounds.

- [SOW-628] Each procedure described within the maintenance and administration manual shall incorporate the results of the operations and maintenance task analysis (OMTA) and include the following topics at minimum:
- (1) The support level to be assigned;
 - (2) Location/facility involved (if the operation is performed remotely, it has to be specified);
 - (3) Task duration and frequency, reusing MTBF and MTTR data available (if applicable);
 - (4) Personnel skills required;
 - (5) Labour required;
 - (6) Tools required (if any);
 - (7) The steps to perform the procedure.
- [SOW-629] The task described within the maintenance and administration manual shall make reference to the different Purchaser operations and maintenance roles and identify where the interfacing between Contractor and Purchaser takes place.
- [SOW-630] For third-party products, maximum advantage shall be taken of the vendor-supplied third-party software and component documentation artefacts, however specific settings and procedures pertaining to the baseline delivered shall be covered by this manual, and in case there is no vendor-supplied documentation, this manual shall include all possible information needed to configure, manage and maintain the third-party product.
- [SOW-631] The maintenance and administration manual shall be integrated within the TOPFAS Help Centre.

6.16 Online Help

- [SOW-632] The online help shall describe the complete software application by explanation of functional blocks and each function in a structured manner as well as interrelationships between them.
- [SOW-633] The online help shall document and explain the purpose and usage of each entry field and provide reference information with further details regarding the usage, for example as input for algorithms and status indicators.
- [SOW-634] The online help shall explain the algorithms that are being used in the processing and visualization information.
- [SOW-635] The online help shall include a glossary providing definitions of all terms and acronyms used.
- [SOW-636] The online help shall have a style similar to the Microsoft Office online help.
- [SOW-637] The online help shall include screenshots of views and dialog boxes where they add to the comprehension. The screenshots shall be provided in a suitable lightweight, but quality format (i.e. JPG, PNG).
- [SOW-638] The online help shall be integrated within each application of the TOPFAS Application Suite.
- [SOW-639] The online help shall be integrated within the TOPFAS Help Centre.

6.17 Standard Operating Procedures Manual

- [SOW-640] The standard operating procedures manual shall document the standard operating procedures (SOP), which describe the use of the software consisting of sets of written guidelines and systematic, step by step, instructions for the completion of common tasks by the different user roles.
- [SOW-641] The standard operating procedures manual shall include screenshots of views and dialog boxes where they add to the comprehension of the instructions and activities. The screenshots shall be provided in a suitable lightweight, but quality format (i.e. JPG, PNG).
- [SOW-642] The standard operating procedures manual shall be integrated within the TOPFAS Help Centre.

6.18 Release Notes

- [SOW-643] The release notes shall summarise the changes and the new features provided with the release and shall cover the following at minimum:
- (1) Identification of the release, its media, and its associated artefacts;
 - (2) Overview;
 - (3) Intended audience;
 - (4) What's changed in this release
 - (a) List of new features (with reference work item);
 - (b) List of enhancements (with reference work item);
 - (c) List of fixes (with reference to work item);
 - (d) List of updates to used third-party components which impact functionality;
 - (e) List of other changes (with reference work item).
 - (5) Installation
 - (a) Summary of new installation procedures;
 - (b) Summary of upgrade installation procedures;
 - (6) Security caveats;
 - (7) Known issues and workarounds.

7 References

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

Table 7.1 - References

[ACMP-2009-SRD-41]	Examples of Configuration Management Plan Requirements, Ed.A V1, Mar 2017
[ACMP-2100]	The Core Set of Configuration Management Contractual Requirements, Ed.A V.2, Mar 2017
[ALP-10]	NATO Guidance on Integrated Logistics Support for Multinational Armament Programs, Ed.C V1, 2017
[AQAP-2110]	NATO Quality Assurance Requirements for Design, Development and Production, Ed.D V1, Jun 2016
[AQAP-2105]	NATO Requirements for Quality Plans, Ed.C V1, Jan 2019
[AQAP-2210]	NATO Supplementary SQA Requirements to AQAP-2110 or AQAP-2310, Ed.A V2, Sep 2015
[ASD-SX000i]	International Specification for Integrated Product Support (IPS), Issue No.3.0, Apr 2021
[ASD-S3000L]	International Procedure Specification for Logistic Support Analysis (LSA), Issue No.2.0, Apr 2021
[ASOP-07.01.25]	NCI Academy Standard Operating Procedure - Grading and Assessment, May 2020
[BMD-ARS]	[NR] TOPFAS BMD Architecture Requirements Specification (ARS) V2.1, Sep 2021
[C-M(2002)49-G]	Enclosure G to C-M(2002)49, Classified Project and Industrial Security, Amdt. 12, Sep 2015
[IEEE-1016-2009]	IEEE Standard for Software Design Descriptions, Jul 2009
[ISO/IEC/IEEE-29119]	International Standard for Software Testing, 2013-2015
[NATO-Bi-SC-DIR-075-007]	NATO Bi-SC Education and Individual Training Directive (E&ITD) 075-007, Sep 2015
[NCIA-AD-06.00.16]	NCIA - Agency Directive 06.00.16, Configuration Management, Feb 2020
[NCIA-AD-07.01.01]	NCIA - Agency Directive 07.01.01, Education and Training, Apr 2017
[NCIA-AI-23.02]	NCIA - Agency Instruction 23.02, Deployment Management Planning, Oct 2019
[NCIA-AI-TECH-06.03.01]	NCIA - Agency Instruction 06.03.01, Identification of Software Assets, Jun 2016
[NCIA-SOP-06.03.05]	NCIA – Agency Standard Operating Procedure 06.03.05, Software Patch Management, Oct 2020
[NCIA-SOP-23.01]	NCIA – Agency Standard Operating Procedure 23.01, Enterprise IT Change Management, Mar 2020
[SOA-IdM-ICD]	SOA-IDM Service Oriented Architecture (SOA) and Identity Management (IdM) Platform - Wave 1, Interface Control Document (ICD) V15.0, Jun 2021

[SOA-IdM-SDS]	SOA-IDM Service Oriented Architecture (SOA) and Identity Management (IdM) Platform - Wave 1, System Design Specification (SDS) V9.3, May 2021
[SOA-IdM-SUM]	SOA-IDM Service Oriented Architecture (SOA) and Identity Management (IdM) Platform - Wave 1, System User and Operation Manual V8.0, Feb 2021
[TBCDM]	BMD Programme Tranche-Based Capability Delivery Methodology Guide, NCIA/AMDC2/2019/01195, Dec 2019
[TOPFAS-SDD]	TOPFAS Software Design Description Documents

[221] All documents are unclassified or NATO Unclassified, unless indicated otherwise.

Annex A Software Requirements Specifications

[222] The software requirements specifications will be provided separately, and consists of two parts, the software requirements specifications document and a requirements matrix.

Annex B TOPFAS Application Suite

B.1 Introduction

- [223] TOPFAS is NATO's modern suite of software applications, consisting of desktop applications, server-hosted or web applications for the management, analysis, planning, execution, and assessment of operations.
- [224] The first version of TOPFAS contained the Operations Planning Tool, ORBAT Management Tool and TOPFAS Web Portal. Over the years and several increments later, TOPFAS has grown substantially into a full-featured and unified application suite with closer and tighter integration between applications and many shared features.
- [225] The TOPFAS Application Suite currently comprises a collection of desktop applications (TOPFAS Desktop), a collection of web applications (TOPFAS Online), Microsoft Office utilities, and system administrator applications for data, user and configuration management, and service monitoring.
- [226] The TOPFAS Application Suite has been put in use across the NATO Command Structure, supporting the NATO Crisis Management Process from strategic to operational level, and down to component level. These processes are not executed in isolation and TOPFAS needs to support the seamless and timely flow of information from/to other functional mission areas, which are supported by other COI specific functional services. Data exchanges exist and are maintained for the following applications services: AirC2IS, INTEL-FS, JTS, LC2IS, LOGFAS and NCOP.

B.1.1 TOPFAS Application Domain

- [227] The TOPFAS Application Suite has been designed using the high-level of abstraction applicable within the NATO Crisis Management Process domain. The NATO Crisis Management Process is a six-phase consultation and decision-making process that can be adapted to any crisis situation [NATO Crisis Response System Manual 2019]. It allows the relevant staff and NATO Committees to coordinate their work and to submit comprehensive advice to the North Atlantic Council (NAC) in a timely and compelling way.
- [228] Within the NATO Crisis Response Process domain, the TOPFAS Application Suite is serving multiple, distinct communities of interest. Each application or app within the TOPFAS Application Suite serves a distinct purpose and offers specific capabilities.
- [229] This includes the following six application areas, each supported by one or more TOPFAS applications (Figure B.1). The applications are complemented with general purpose or common applications, and configuration and management applications.

NATO CRISIS RESPONSE PROCESS	Operations Planning	 TOPFAS Systems Analysis Tool (SAT)  TOPFAS Operations Planning Tool (OPT)  TOPFAS Campaign Assessment Tool (CAT)	TOPFAS Help Centre - Online help and support portal
	Force Generation and Activation	 TOPFAS enhanced Force Generation Management Tool (eFGMT)	
	Force & Readiness Management	 TOPFAS ORBAT Management Tool (OMT)  TOPFAS Readiness Reporting Tool (RRT)	
		Crisis Response Measures Management	
	Force Evaluation	 TOPFAS OCC Force Evaluation and Feedback Tool (OCC E&F Tool)	
RFI	Request for Information Management	 TOPFAS RFI	
COMMON	Microsoft Office Add-in	 TOPFAS Briefing Tool (TBT)	
	Slides Management	 TOPFAS Slides Management	
	Collaboration	 TOPFAS Collaboration Apps and Services	
SERVICE CONFIG & MANAGEMENT	Data Management	 TOPFAS Data Management Tool (DMT)	
	User and Configuration Management	 TOPFAS User Management Tool (UMT)	
	Service Monitoring	 TOPFAS Service Monitor	

Figure B.1 - TOPFAS Application Domain

B.1.2 Operations Planning

[230] The Operations Planning application area consists of applications providing an integrated environment to represent and model the engagement space, to plan potential response options, to develop and implement adequate operational strategies and solutions, and to assess their progress over time. These applications directly support the Allied Command Operations (ACO) Comprehensive Operations Planning Directive (COPD). They offer a collaborative platform linking multiple headquarters of different operational levels of command to support their planning processes from situational awareness and assessment of the crisis through plan development integrated with force management and generation, to the conduct of operations assessment.

B.1.3 Force Generation and Activation

[231] The Force Generation process is initiated once the operations planning process has defined its operational requirements expressed through the Combined Joint Statement of Requirements (CJSOR). The process continues for the whole duration of the operation and consists of generating and managing the capabilities for follow-on rotations. The Force Generation and Activation application area is supported by one web app.

B.1.4 Force and Readiness Management

[232] The Force and Readiness Management application area is supported by two applications, one web app facilitating the NATO's readiness reporting process and another application for general ORBAT management.

B.1.5 Crisis Response Measure Management

[233] The Crisis Response Measure Management application area has a specific focus on managing and tracking the declaration (implementation and cancellation) of NATO Counter Surprise and Counter Aggression components, and NATO Crisis Response Measures.

B.1.6 Force Evaluation

[234] The Operational Capability Concept (OCC) Evaluation & Feedback Programme is established to improve and evaluate the levels of interoperability and operational capabilities of NATO partner nations' units, particularly those contributing to NATO-led operations. With the introduction of Level-2 evaluations, the OCC E&F Programme supports the full range of NATO force evaluations in accordance with the ACE Force Standards, and the application is used by both NATO nations/command and partner nations.

B.1.7 Request for Information Management

[235] The need for information is constant. All Blue/Allied and Green/Neutral Requests for Information (RFIs) need to be managed effectively through their complete lifecycle in order to provide timely responses.

B.2 TOPFAS Desktop

[236] TOPFAS Desktop provides a collection of full-featured Microsoft Windows Applications mainly focusing on the operations planning and force management applications domains. TOPFAS Desktop comprises the following applications:

- **TOPFAS Systems Analysis Tool (SAT):** for Comprehensive Preparation of the Operational Environment as a system of systems with their relationships and interactions. It includes modelling and analytical tools which, combined with the visualization capabilities, help in identifying the key system elements that can be acted upon to achieve the desired state changes.
- **TOPFAS Operations Planning Tool (OPT):** for collaborative development of planning frameworks and elaborate planning products such as SACEUR Strategic Assessment, SACEUR Strategic Planning Directive as well as the participating commands' CONOPS, OPLAN and SUPLAN. OPT includes a broad and impressive range of functionality to cover the operations planning main activities including the development of military response options, courses of action and provides geo-spatial and temporal tools for optimal synchronization.
- **TOPFAS Campaign Assessment Tool (CAT):** for planning, collection, storage, and processing of data for operations assessment. It covers the assessment of

progress towards achieving the desired end-states at all operational levels, the performance assessment of key actions and trend analysis in support of the planning and decision-making process.

- **TOPFAS ORBAT Management Tool (OMT):** for managing the composition and organization of friendly, neutral, and opposing forces with their personnel and equipment. The application is fully integrated with the Defence Planning Capability Code Catalogue for classifying forces according to their capabilities, and the LOGFAS Reportable Item Code for categorising equipment and personnel. OMT enables the definition of generic and real ORBATs for all actors which can be subsequently used in the OPT to provide a force pool for operations planning.
- **TOPFAS OCC Evaluation and Feedback Tool (OCC E&F Tool):** originally developed to support the Operational Capability Concept (OCC) Evaluation & Feedback Programme, which is to improve and evaluate the levels of interoperability and operational capabilities of NATO partner nations' units, particularly those contributing to NATO-led operations. With the introduction of Level-2 evaluations, the application supports the full range of NATO force evaluations as well. The OCC E&F Tool's database gives access to declared partner units and their achievements. The tool is the core enabler to prepare and conduct evaluations, and a documentation of all evaluation results of units and their history.
- **TOPFAS Lite:** consists of straightforward Document, Spreadsheet and Drawing applications permitting the development of rich text content, tables and drawings that can easily be integrated within existing TOPFAS planning products. The TOPFAS Lite environment is ideal for developing CONOPS and OPLAN annexes and appendices, and for collecting the inputs of remote contributors.

B.3 TOPFAS Online

[237] TOPFAS Online provides a collection of server-hosted or web apps covering the full application domain. These applications are complemented with a collection of collaboration apps and services.

B.3.1 Operations Planning

[238] The operations planning domain comprises the following apps:

- **TOPFAS Systems Analysis Tool (SAT):** web app offering key features and functionality of the TOPFAS SAT desktop application.
- **TOPFAS Operations Planning Tool (OPT):** web app offering key features and functionality of the TOPFAS OPT desktop application.
- **TOPFAS Campaign Assessment Tool (CAT):** web app offering key features and functionality of the TOPFAS CAT desktop application.

B.3.2 Force Generation and Activation

[239] The force generation and activation domain comprises the following app:

- **TOPFAS enhanced Force Generation Management Tool (eFGMT):** supports NATO's force generation process. It includes managing the operational requirements defined during the operation planning process as well as managing the national force offers and contributions to satisfy those requirements. It provides tools to conduct effective force sensing and balancing of force packages as well as force rotation planning, managing the national contributions and their associated caveats. The Force Generation process is conducted at SHAPE and involves coordination between NATO nations, partner nations and other involved parties providing nation resources to NATO in order to fulfil capability requirements for ongoing and/or new missions.

B.3.3 Force and Readiness Management

[240] The force and readiness management domain comprises the following apps:

- **TOPFAS ORBAT Management Tool (OMT):** web app offering key features and functionality of the TOPFAS OMT desktop application.
- **TOPFAS Readiness Reporting Tool (RRT):** supports the readiness reporting process and assessment of mission readiness based on units and capabilities assigned. During the reporting phase of the process, nations and force providers report on the various readiness characteristics of their NRF/NRI contributions. Readiness characteristics include notice to move, manning, equipment level, sustainability, training and projection. The reporting phase is followed by an assessment phase during which HQs and commands provide their assessment on the mission readiness of their assigned NRF/NRI force elements. The readiness information and assessments are being tracked through dashboards. The Readiness Reporting Tool also supports the development of the commanders' assessment based on available readiness information.

B.3.4 Request for Information Management

[241] The request for information management domain comprises the following app:

- **TOPFAS RFI:** a specialised app for the effective management of all Blue/Allied and Green/Neutral Requests for Information (RFIs) through their complete life cycle. Although being a separate app part of **TOPFAS Online**, the TOPFAS RFI app integrates with the TOPFAS Desktop applications so that RFIs can be viewed and created directly from these desktop applications. Furthermore, the application permits the visualization of Red/OPFOR RFIs under the management of the Intelligence community.

B.3.5 Crisis Response Measure Management

[242] The crisis response measure management domain comprises the following app:

- **TOPFAS NATO Crisis Response System Apps (NCRS):** supports tracking the declaration and implementation of counter aggression, counter surprise and crisis response measures needed to respond to crises. The NCRS concept aims to provide the Alliance with a comprehensive set of options and measures to

manage and respond to crises including sudden shifts in the security environment, by taking full advantage of the tools and capabilities available to NATO. The purpose of the NCRS is to provide for required preparedness and support for crisis and conflict prevention and for crisis management across the range of Article 5 and Non-Article 5 operations. The NCRS as a whole is the overarching system for Crisis Management (CM) against which all planning processes should be designed.

B.3.6 TOPFAS Collaboration Apps and Services

[243] The TOPFAS collaboration apps and services comprise the following:

- **Task Planner** app allows users to create boards where they can create and manage tasks. These tasks can be grouped in categories: not-started, in-progress, completed, have a status: to do, doing, completed, a due date, and can be assigned to someone. The task planner offers a schedule view, charting capabilities and excel import / export options.
- **Video** app allows users to set up a video channel where they can upload and organize their videos. The channel and videos can be shared with others and can be visualised in the browser.
- **Business Intelligence** app allows users to create and manage dashboards for TOPFAS planning objects such as actions, effects, data boxes, MOEs and MOPs. The dashboards have a data source, advanced charting capabilities, import / export functionality, and several other configurable options.
- **Assessment** is an app where users can see Action/MOPs and Effect/MOEs in a table format inside a web page. Users can select different lines of operation, a time period, a region, can inspect all relevant details and can download the data in excel format.
- **Documents** app allows users to manage and read plan documents in a web page. Users can select the plan and the workspace, can search or browse documents lists, can open and edit documents through the WebDAV interface, apply various filters and upload their own documents. Once uploaded these documents will be in the TOPFAS database and visible from the Web and Desktop applications.
- **Calendar** app offers a scheduler for tasks/appointments in a plan. Calendars can be developed and consulted from the TOPFAS Desktop applications as well as from the TOPFAS Online apps and they are easy to use. Users can create appointments and display them at different levels of granularity: day, working week, full week and month. This module also offers a new auto-generated timeline view, making the timelines developed in the OPT application directly accessible via a browser. Once developed and maintained, users can quickly get visibility of their team schedule.
- **Wiki** app offers a modern way of managing attachments with an enhanced rich-text editor easing the creation and edition of pages. With appropriate roles and permission, the Wiki gives access to the planning products developed using the TOPFAS operations planning applications.
- **Collaboration Space** app is a sketch collaboration tool, which allows drawing, chatting, adding TOPFAS objects in real time.

B.3.7 TOPFAS Help Centre

- **TOPFAS Help Centre** offers a single support hub for accessing the latest documentation, on-line help, presentations, videos and tutorials for the entire TOPFAS Application Suite. The Help Centre is accessible via a browser and acts a central point to access all TOPFAS user documentation, guides, training material, videos and useful references. The Help Centre is not only accessible via the global Help Centre, but also directly via the Help functions offered within the TOPFAS applications and apps.

B.4 TOPFAS Office Add-in and Slides Management

[244] The TOPFAS Application Suite comes with the following add-ins and utilities for dynamic integration and management of TOPFAS content within Microsoft PowerPoint.

- **TOPFAS Briefing Tool (TBT):** a Microsoft PowerPoint Add-in allowing the dynamic integration of TOPFAS entities and diagrams into presentations. The TBT provides access to the TOPFAS operations planning repository from Microsoft PowerPoint and allows the user to choose the plan or engagement space from which to include content on a slide. For the maps, it is even possible to add individual presentation slides. Content can be synchronised and updated according to the latest version within the repository.
- **TOPFAS Slides Management:** offers a slide creation and slide management capability within the TOPFAS Application Suite.

B.5 Service Configuration and Management

[245] The TOPFAS Application Suite includes the following applications and apps to manage, monitor and configure the TOPFAS Application Suite.

- **TOPFAS Data Management Tool (DMT):** an administrator application for configuring lookup tables and custom-made planning objects, for performing core maintenance tasks and for constructing training databases. This is a Microsoft Windows Desktop application.
- **TOPFAS User Management Tool (UMT):** an administrator application for managing users, groups and organizations with their preferences, roles, and privileges. It also includes functionalities for systems and endpoints configuration, and service monitoring. This is a Microsoft Windows Desktop application.
- **TOPFAS Service Monitor:** a web app offering service monitoring to TOPFAS system administrators and support engineers.

Annex C Software Acceptance Criteria

[246] Software Acceptance Criteria derived from the [BMD-ARS] will be provided separately in an MS Excel Workbook.

Annex D Templates

D.1 Engineering Change Proposal Template

[247] The ECP template will be provided separately.

D.2 Request for Deviation / Request for Waiver Template

[248] The RFD/RFW template will be provided separately.

NATO UNCLASSIFIED



**IFB-CO-115498-TOFPAS-BMD
BOOK II-PART-IV-SOW-ANNEX-A-SRS**

SOFTWARE REQUIREMENTS SPECIFICATIONS

Version 2.0

13/02/2023

NATO UNCLASSIFIED

TABLE OF CONTENTS

1	Introduction	1
1.1	Purpose and Aim	1
1.2	Conventions and Common Terminology	1
1.3	Structure	1
1.4	References	2
1.5	Background – Envisioned Capability	2
2	Functional Requirements	4
2.1	Cross-cutting Requirements	4
2.1.1	General	4
2.1.2	Data Management through REST API	6
2.1.3	SOA & IdM Platform Integration	8
2.1.4	Export of Information	10
2.1.5	User Interface	11
2.1.6	Access Control	15
2.1.7	Logging	17
2.1.8	Monitoring	18
2.1.9	Preservation of Data	18
2.1.10	Management Requirements	18
2.2	Data Entity Requirements	19
2.2.1	DE Data Management Requirements	19
2.2.2	General Requirements for DE Property Panels	20
2.2.3	General Requirements for DE Preview Panel	20
2.2.4	Approval Workflow Requirements	21
2.3	Audit	22
2.3.1	Data Entity Auditing	22
2.3.2	Global Audit View	22
2.4	General Requirements for Existing Module and Component Usage	22
2.4.1	Explorer Module	22
2.4.2	List View Component	23
2.4.3	Hierarchical View Component	25
2.4.4	Relationship View Component	26
2.4.5	StoryLine View Component	27
2.4.6	Quick Map Component	28
2.4.7	Table View Component	30
2.4.8	OpsDesign View Component	31
2.4.9	TimeLine View Component	31
2.4.10	Map View Component	33
2.4.11	Document View Component	37
2.4.12	Forces View Component	37
2.4.13	SOR Management View Component	38
2.4.14	EFGMT Views	39
2.4.15	Missile Defence Module	40
2.4.16	C2 Arrangement View Component	41

2.4.17	Template Organiser	41
2.4.18	COA Comparison View Component.....	41
2.4.19	Holdings View Component.....	42
2.4.20	Readiness View Component.....	43
2.4.21	ORBAT View Component	43
2.5	BMD Scenario Building Module.....	44
2.5.1	Data Sources	44
2.5.2	Manage local DEs	47
2.5.3	Explorer Module	48
2.5.4	Map View	49
2.5.5	Scenario Building View	49
2.6	BMD Threat Identification Module	50
2.6.1	Geo-processing service	50
2.6.2	Threat Identification View.....	51
2.7	BMD Requirements Management	60
2.8	BMD Reporting Module	63
2.8.1	Document Views	63
2.8.2	COA Comparison View	66
2.9	BMD Catalogue Services	67
2.10	CRM Management Module	68
2.11	TOPFAS Training and Exercise Management App.....	68
2.12	Data Exchange.....	75
2.12.1	Use of FASInterop schema for XML data exchange.....	75
2.12.2	Sharing data.....	76
2.12.3	Consuming data	80
2.13	Documentation & Training.....	85
2.13.1	Documentation	85
2.13.2	Training	85
3	Non-functional Requirements	87
3.1	Transverse Non-Functional Requirements.....	87
3.2	Architectural Non-Functional Requirements.....	88
3.3	Functional Suitability	89
3.3.1	Functional completeness	89
3.3.2	Functional correctness	90
3.3.3	Functional appropriateness.....	90
3.3.4	Compliance	90
3.4	Performance Requirements	91
3.4.1	Time Behaviour	91
3.4.2	Resource Utilization	92
3.4.3	Capacity	92
3.5	Compatibility	92
3.5.1	Co-existence	92
3.5.2	Interoperability.....	93
3.6	Usability/Learnability	94
3.6.1	Appropriateness recognisability	94
3.6.2	Learnability.....	95

3.6.3	Operability	96
3.6.4	User error protection	99
3.6.5	User interface aesthetics.....	100
3.6.6	Accessibility.....	101
3.7	Reliability	101
3.7.1	Maturity	101
3.7.2	Availability	102
3.7.3	Fault Tolerance	102
3.7.4	Recoverability.....	103
3.8	Security	104
3.9	Maintainability.....	106
3.10	Portability.....	108

INDEX OF TABLES

Table 1-1	References.....	2
Table 2-1	Location formats automatically detected.....	14
Table 3-1	Maintainability by Failure Criticality	103

Document Revision History

Date	Version	Changes
13 Feb 2023	2.0	<p>Insert of "Document Revision History" section;</p> <p>Table 1.1 Inserted TCLM reference;</p> <p>Editorial change paragraph [009] (b);</p> <p>Editorial change title section 2.1;</p> <p>Modified title section 2.1.1;</p> <p>Modified section 2.1.1;</p> <p>Modified requirement [REQ-0010];</p> <p>Inserted requirements [REQ-0011] to [REQ-0018] instead of paragraphs [011]-[018];</p> <p>Inserted requirements [REQ-0030] to [REQ-0090];</p> <p>Swapped sections 2.1.2 and 2.1.3, resulting in modified requirements numbering;</p> <p>Modified section 2.1.2 and 2.1.3 and changed requirements in both sections accordingly;</p> <p>Section 2.1.4: due to changes in section 2.1.2 and 2.2.3, the requirements numbering from section 2.1.4 has been off-set to [REQ-0360], similar for paragraph numbering.</p> <p>Editorial change title section 2.1.5 and 2.4.14;</p> <p>Modified paragraph [048] and changed paragraph number to [045];</p> <p>Inserted paragraphs [045(i)], [045(ii)], [046(i)]</p> <p>Modified requirement REQ-5940] and changed number to [REQ-5901];</p> <p>Inserted requirement REQ-5920];</p> <p>Inserted requirement REQ-7111];</p> <p>Modified requirement REQ-7980] and changed number to [REQ-7960];</p> <p>Modified requirement REQ-8110] and changed number to [REQ-8090];</p> <p>Modified requirement REQ-8260] and changed number to [REQ-8240];</p>
08 Dec 2022	1.0	IFB package release version

1 Introduction

1.1 Purpose and Aim

- [001] This document describes the functional and non-functional requirements for implementation of the TOPFAS BMD Increment-1&2 scope with the TOPFAS Application Suite (TOPFAS in short).
- [002] The aim is to develop and deliver a comprehensive capabilities and enhancement of the TOPFAS Application Suite with the required functionalities to support BMD specific functions.

1.2 Conventions and Common Terminology

- [003] The headings in this document are for ease of reference only and shall not affect its interpretation.
- [004] In this document, unless the context otherwise requires:
- (a) A number in brackets “[*number*]” precedes each informational or context paragraph;
 - (b) A unique identifier, consisting of a prefix and number “[REQ-*number*]”, precedes each requirement;
 - (c) Requirements are formulated using the form “shall” and contractually binding. Context information supporting the requirements definition is provided using the form “will” and implies the intent or aim on the part of the Purchaser; the context forms one part with the requirements;
 - (d) Any phrase introduced by the words "including", "includes", "in particular", "for example" or similar, shall be construed as illustrative and without limitation to the generality of the related general words;
 - (e) Any reference made to a section or paragraph encompasses the referenced section or paragraph including all subordinate sections and paragraphs;
 - (f) The convention used for dates (e.g. quoting dates of meetings) is “day-month-year” and not “month-day-year”;
 - (g) With respect to data manipulation requirements, the term “manage” is used to cover all CRUD (Create, Read, Update and Delete) operations.

1.3 Structure

- [005] This document is structured as follows:
- Chapter 1: The introduction to this document;
 - Chapter 2: Specification of general functional requirements;
 - Chapter 3: Specification of the module specific functional requirements;
 - Chapter 4: The mapping of the specific functional requirements to applications;
 - Chapter 5: Specification of the non-functional requirements.

1.4 References

- [006] The references listed below provide further amplifications and contextual information related to the requirements.

Table 1-1 References

[AC-322-D0048-REV3]	Technical and Implementation Directive on CIS Security, Nov 2019
[AC-322-N(2011)130]	Guidance on the Marking of NATO Information, Jun 2011
[AC-324-D(2014)0008]	Directive on the Preservation of NATO Digital Information of Permanent Value, Jul 2014
[AC-35-D-2004-REV3]	Primary Directive on CIS Security, Nov 2013
[ADatP-4774]	(STANAG 4774) Confidentiality Metadata Label Syntax, Ed.A V1, Dec 2017
[ADatP-4778]	(STANAG 4778) Metadata Binding Mechanism, Ed.1, Oct 2018
[APP-11]	NATO Standard APP-11, NATO Message Catalogue, Ed.D V1, Nov 2015
[BMD-ARS]	[NR] TOPFAS BMD Architecture Requirements Specification (ARS) V2.1. Sep 2021
[BMD-IDD]	[NR] Ballistic Missile Defence Programme Interface Design Description (IDD) V4.0. May 2021
[NIMA-TR8350.2]	World Geodetic System-84, NIMA TR8350.2, Ed.3, Amdt.1, Jan 2020
[OWASP]	Open Web Application Security Project (OWASP), https://www.owasp.org/index.php/Main_Page
[SOA-IdM-ICD]	SOA-IDM Service Oriented Architecture (SOA) and Identity Management (IdM) Platform - Wave 1, Interface Control Document (ICD), V15.0, Jun 2021
[SOA-IdM-SDS]	SOA-IDM Service Oriented Architecture (SOA) and Identity Management (IdM) Platform - Wave 1, System Design Specification (SDS), V9.3, May 2021
[SOA-IdM-SUM]	SOA-IDM Service Oriented Architecture (SOA) and Identity Management (IdM) Platform - Wave 1, System User and Operation Manual, V8.0, Feb 2021
[SonarQube]	SonarQube, https://www.sonarqube.org/
[STANAG-5500]	(ADatP-03) NATO Message Text Formatting System (FORMETS) – Concept of FORMETS, Ed.A V3, Nov 2019
[TCLM]	NATO Trusted container lifecycle management v1.4, 2022

1.5 Background – Envisioned Capability

- [007] With the TOPFAS BMD, NATO will acquire a set of user applications for a full BMD capability within the TOPFAS Application Suite in support of the NATO Ballistic Missile Defence (BMD) community.
- [008] The final, enhanced TOPFAS Application Suite will provide all current existing TOPFAS functionality plus: support for the BMD Pol-Mil consultation process,

between the strategic commands, the North Atlantic Council (NAC) and Military Committee (MC); integration with other functional services to provide greater focus on passive defence (CBRN-FS), support for Education, Training, Exercises and Evaluation (ETEE-FS), utilization of OPFOR information (INTEL-FS) and defence designs (AirC2IS); integration with the NATO platform and core services.

[009] The technical solution of TOPFAS application suite is envisioned to encompass the following user applications:

- (a) TOPFAS Desktop - Windows applications: Systems Analysis Tool (SAT), Operations Planning Tool (OPT), Campaign Assessment Tool (CAT), ORBAT Management Tool (OMT), TOPFAS Lite, TOPFAS OCC E&F (Operational Capabilities Concept Evaluation & Feedback) Tool.
- (b) TOPFAS Online - server-hosted or web apps: web apps of SAT, OPT, CAT and OMT, TOPFAS eFGMT (Enhanced Force Generation Management Tool), TOPFAS RRT (Readiness Reporting Tool), TOPFAS RFI (Request For Information), TOPFAS NCRS (NATO Crisis Response System), TOPFAS TEM (Training and Exercise Management), TOPFAS Help Centre, TOPFAS Collaboration Apps and Services (Task Planner, Video, Business Intelligence, Assessment, Documents with WebDAV support, Calendar, Wiki, Collaboration Space).
- (c) TOPFAS Office Add-in and Slides Management: TOPFAS Briefing Tool (TBT), TOPFAS Slides Management.
- (d) Service Configuration and Management: User Management, Application and Service Configuration Management, Data Management Tool (DMT), TOPFAS Catalogue Management, TOPFAS Service Monitoring.

2 Functional Requirements

- [010] This chapter defines a set of functional requirements that are generally applicable to most if not all of the TOPFAS Application Suite.
- [011] Reserved.
- [012] Reserved.
- [013] Reserved.
- [014] Reserved.
- [015] Reserved.
- [016] Reserved.
- [017] Reserved.
- [018] Reserved.

2.1 Cross-cutting Requirements

2.1.1 General

- [REQ-0010] The evolution of the TOPFAS Application Suite, while incorporating the requirements specified herein, shall be based on the principle of no regression, no loss of functionality and no loss of non-functional qualities (e.g. loss in performance), unless specified otherwise and agreed with the Purchaser.
- Reference: TOPFAS
- [REQ-0011] The TOPFAS capabilities specified in this SRS are to be implemented in the TOPFAS Desktop and TOPFAS Online apps where applicable. All modules and components not specifically mentioned are subject to potential modification if they are impacted by any of the requirements.
- Reference: TOPFAS
- [REQ-0012] The TOPFAS Desktop application modules that are web-based (existing and new to be developed) shall be implemented and integrated in TOPFAS Online with the same functionality.
- Reference: TOPFAS
- [REQ-0013] The TOPFAS Desktop Explorer, List and Map components shall be migrated to be web-based with all their existing functionality and integrated in TOPFAS Online.
- Reference: TOPFAS
- [REQ-0014] The BMD specific modules, existing and new, (e.g. Missile Defence - Assets/Asset List/PCAL/JPCAL/JPDAL/IPB Report/Defence Design/OPFOR

TBM COA) shall be web-based and shall be integrated in both TOPFAS Desktop and TOPFAS Online with the same functionality.

Reference: TOPFAS

[REQ-0015] Any requirement related to force requirements shall be implemented in TOPFAS Desktop and TOPFAS Online (e.g. TOPFAS OMT, TOPFAS RRT and/or TOPFAS eFGMT) where applicable.

Reference: TOPFAS

[REQ-0016] Any requirement related to Education, Training, Exercises and Evaluation and ETEE-FS shall be implemented in TOPFAS TEM, and relevant applications/apps of TOPFAS Desktop and TOPFAS Online.

Reference: TOPFAS

[REQ-0017] Any requirement related to user documentation and online help shall be implemented in the relevant application.

Reference: TOPFAS

[REQ-0018] Any requirement related to user and system documentation, online help and training material shall be implemented/integrated in the TOPFAS Help Centre.

Reference: TOPFAS

[REQ-0020] The TOPFAS architecture shall contain the implementation of the management of structured Data Entities (DEs, see section 2.2) as micro services using containers. These services shall be utilized by TOPFAS itself and be exposed for consumption by other systems.

Reference: TOPFAS

[REQ-0030] All containers must be able to be deployed onto Kubernetes.

Reference: TOPFAS

[REQ-0040] Containers must be built using the NATO Trusted Container process (defined by [TCLM]) on NSF. For this they will need to be derived from approved and hardened base images. Exceptionally, if containers cannot be based on these (e.g. for COTS containers), the trusted import process must be followed as defined in the NATO trusted container process.

Reference: TOPFAS

[REQ-0050] The system will utilize infrastructure as code and configuration as code for deployment and configuration. 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.

Reference: TOPFAS

[REQ-0060] For the infrastructure layer (deployment of VMs, clusters, storage), Terraform shall be used in line with agency guidance to provide agnostic cloud service support.

Reference: TOPFAS

[REQ-0070] Kubernetes YAML (Yet Another Mark-up Language) shall be used for containers deployments/orchestration.

Reference: TOPFAS

[REQ-0080] For installation of software (on VMs) and configuration, Ansible shall be used.

Reference: TOPFAS

[REQ-0090] Test-automation, Continuous Integration (CI) and Continuous Delivery (CD) processes shall be implemented for the services and these shall feed in to the pipeline stages for staging, security scanning, container signing, base image registration, etc.

Reference: TOPFAS

2.1.2 Data Management through REST API

[019] TOPFAS will expose the Data Entities (see paragraph 2.2) through a Representational State Transfer (REST) architectural style Application Programming Interface (API).

[REQ-0100] The TOPFAS API shall deliver versioned REST APIs.

Reference: TOPFAS

[REQ-0110] 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. 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 formats.

Reference: TOPFAS

[REQ-0120] The services shall 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 Data Entities type), the URI requested, the requester, the action, etc.

Reference: BMD-ARS-2291

[REQ-0130] The services shall, for all exposed Data Entities, implement full entity lifecycle management (create, read, update, soft-delete, hard-delete, un-delete etc.)

Reference: TOPFAS

- [REQ-0140] The services shall, for all exposed Data Entities, implement the full set of query operators and filters appropriate to the types of the Data Entity properties (numeric, string, datetime, enumeration, etc.)
Reference: TOPFAS
- [REQ-0150] The services shall, for all exposed Data Entities, implement extent management (paging, top, skip, etc.)
Reference: TOPFAS
- [REQ-0160] The services shall, for all exposed Data Entities, implement Partial GETs.
Reference: TOPFAS
- [REQ-0170] The services shall, for all exposed Data Entities, implement partial updates (PATCH).
Reference: TOPFAS
- [REQ-0180] The services shall, for all exposed Data Entities, implement 'navigation properties' for entity relationships.
Reference: TOPFAS
- [REQ-0190] The services shall, for all exposed Data Entities, provide optimistic concurrency (ETag).
Reference: TOPFAS
- [REQ-0200] The services shall, for all exposed Data Entities, provide batching of operations (functions and actions) / queries.
Reference: TOPFAS
- [REQ-0210] The services API implementation shall enforce the authorisation / validation rules. Services shall prevent commands succeeding in case of validation error.
Reference: BMD-ARS-8865 / BMD-ARS-7859
- [REQ-0220] The services shall mark the data being created such that exercise-related and training-related information are distinguishable from operational information.
Reference: BMD-ARS-7304 / BMD-ARS-7305
- [REQ-0230] The services shall, whenever a Data Entity through the service API is created, updated or deleted, publish an appropriate Data Entity Create / Update / Delete / etc. event notification for potential subscribers.
Reference: TOPFAS
- [REQ-0240] The service API shall for all Data Entity actions, support individual actions on a single Data Entity as well as applying the action on a list of Data Entities (e.g. soft-deleting many Data Entities in one operation).
Reference: TOPFAS

[REQ-0250] All services shall, implement observability interfaces and services to support central management, accessing and analysis of the service logs and metrics.

Reference: TOPFAS

[REQ-0260] At a minimum, all activities / actions / queries of all 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 data entities; i.e. identification of which identity received the data entity and at what time.

Reference: TOPFAS

[REQ-0270] 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 fault / error.

Reference: TOPFAS

2.1.3 SOA & IdM Platform Integration

[020] The SOA & IdM Platform general requirements span all phases of the service lifecycle – a key service offered by the SOA & IdM Platform is Service Lifecycle Automation; for detailed, authoritative specification see [SOA-IdM-SDS].

[021] The SOA & IdM Platform provides services to three client / consumer hosting models. These include:

- (a) Native Hosted Services: These services leverage a pre-canned 'base runtime' and include extensions to support integration, mediation, edge and common business services.
- (b) Non-Native Hosted Services: Non-Native base images are provided to create runtime implementations that follow standard NATO technology stacks including: .Net Core Framework; Java Web Application Server; generic Web Application Server, etc.
- (c) 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.

[022] 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.

[023] Various pre-canned, curated, container base images are available from the SOA & IdM Platform.

[024] The SOA & IdM Platform will provide 'Platform Services' in support of Domain Specific Services such as the catalogue service specified herein.

[025] SOA & IdM Platform services include:

- (a) Observability service: logging, metrics, audit, traces, customizable dashboards, alert management and notification rules, etc.
- (b) Security services: Identity Management, Authentication, Single Sign On (SSO), Authorisation, Authoring (Policies, etc.), Credential Management, etc.
- (c) 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.
- (d) Platform Management Services manage, configure and operate the SOA & IdM Platform, its tenants and the services hosted on it.
- (e) Message Oriented Middleware Services are offered 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.
- (f) Service Lifecycle Management: lifecycle automation, container registry, service configuration management, etc.

[REQ-0280] The relevant TOPFAS services (i.e. all Data Entities services consumed or exchanged with other systems) shall be made available as published services onto the SOA & IdM Platform.

Reference: [BMD-IDD] / BMD-ARS-7127 / BMD-ARS-7128 / BMD-ARS-7129 / BMD-ARS-8298 / BMD-ARS-7138 / BMD-ARS-2039 / BMD-ARS-7142 / BMD-ARS-8837 / BMD-ARS-7310

[REQ-0290] All published services shall be hosted upon the SOA & IdM Platform, and re-use and / or integrate with the SOA & IdM Platform services.

Reference: [BMD-IDD] / BMD-ARS-7127 / BMD-ARS-7128 / BMD-ARS-7129 / BMD-ARS-8298 / BMD-ARS-7138 / BMD-ARS-2039 / BMD-ARS-7142 / BMD-ARS-8837 / BMD-ARS-7310

[REQ-0300] All published services implementations shall derive from the SOA & IdM Platform provided, pre-canned service base images.

Reference: [BMD-IDD] / BMD-ARS-7127 / BMD-ARS-7128 / BMD-ARS-7129 / BMD-ARS-8298 / BMD-ARS-7138 / BMD-ARS-2039 / BMD-ARS-7142 / BMD-ARS-8837 / BMD-ARS-7310

[REQ-0310] For all published 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-SDS].

Reference: [BMD-IDD] / BMD-ARS-7127 / BMD-ARS-7128 / BMD-ARS-7129 / BMD-ARS-8298 / BMD-ARS-7138 / BMD-ARS-2039 / BMD-ARS-7142 / BMD-ARS-8837 / BMD-ARS-7310

- [REQ-0320] All published services shall use the SOA & IdM Platform Configuration Server for the complete lifecycle management of their runtime parameterisation, see [SOA-IdM-SDS].
- Reference: [BMD-IDD] / BMD-ARS-7127 / BMD-ARS-7128 / BMD-ARS-7129 / BMD-ARS-8298 / BMD-ARS-7138 / BMD-ARS-2039 / BMD-ARS-7142 / BMD-ARS-8837 / BMD-ARS-7310
- [REQ-0330] All published services shall conform to the SOA & IdM Hosted Services Implementation Contract, see [SOA-IdM-SDS].
- Reference: [BMD-IDD] / BMD-ARS-7127 / BMD-ARS-7128 / BMD-ARS-7129 / BMD-ARS-8298 / BMD-ARS-7138 / BMD-ARS-2039 / BMD-ARS-7142 / BMD-ARS-8837 / BMD-ARS-7310
- [REQ-0340] The published services shall work consistently with the quality of service characteristics facilitated by the SOA & IdM Platform including observability, elasticity/ scale-out, resilience, etc.
- Reference: [BMD-IDD] / BMD-ARS-7127 / BMD-ARS-7128 / BMD-ARS-7129 / BMD-ARS-8298 / BMD-ARS-7138 / BMD-ARS-2039 / BMD-ARS-7142 / BMD-ARS-8837 / BMD-ARS-7310
- [026] Collectively, the security services provided by the SOA & IdM Platform are referred to as Identity and Access Management (IAM) and in the [SOA-IdM-SDS] cover four broad areas:
- (a) Authentication and Authorisation
 - (b) Identity Management
 - (c) Service and Application (delegated) Authentication
 - (d) Attribute Based Access Control.
- [027] The security technologies, implementations and standards used with the SOA & IdM Platform include OAuth2, Open ID Connect (OIDC), WS-Security, SAML, XACML, etc.
- [028] SOA & IdM Platform service security features cover both RESTful and SOAP based services.
- [REQ-0350] All published services shall make use of the identity management, authentication and authorization services provided by the SOA & IdM Platform in addition to the current TOPFAS Application Suite capabilities.
- Reference: BMD-ARS-8865 / BMD-ARS-7861

2.1.4 Export of Information

- [REQ-0360] TOPFAS shall ensure that the highest security classification and the most restricted releasability of the data is captured in the metadata of the exported file.
- Reference: BMD-ARS-7558

- [REQ-0370] TOPFAS shall implement the confidentiality metadata label specification defined by [ADatP-4774].
Reference: BMD-ARS-8227
- [REQ-0380] TOPFAS shall implement the metadata label binding specification defined by [ADatP-4778].
Reference: BMD-ARS-8228
- [REQ-0390] TOPFAS shall always require the user to specify/confirm the highest security classification and most restricted releasability of the file before saving an export file. Attempts to export without a classification shall not be accepted. The system shall alert the user that a selected export classification level is lower than the classification level of the data selected for export.
Reference: BMD-ARS-5389 / BMD-ARS-8853
- [REQ-0400] TOPFAS shall ensure that the file name conveys the security classification as a prefix (e.g. using an (NR) prefix for files with NATO RESTRICTED information).
Reference: BMD-ARS-947
- [REQ-0410] TOPFAS shall insert a security classification construct into headers/footers of generated, created and/or exported reports, Microsoft Office files and PDF files. For file formats that do not use or support headers/footers, the capability shall include a security classification construct into an appropriate part, preferably at or close to the top of the file so that it is clearly visible to the user.
Reference: BMD-ARS-947
- [REQ-0420] TOPFAS shall head all exported files with metadata including:
(1) The user who carried out the export;
(2) The date and time of the export;
(3) The system and database the data was exported from;
(4) The version numbers of the objects being exported if applicable.
Reference: BMD-ARS-948
- [REQ-0430] TOPFAS shall log all exports with the metadata in a human readable format.
Reference: BMD-ARS-5656

2.1.5 User Interface

2.1.5.1 User Interface (UI) Implementation

- [REQ-0440] The web-based applications shall require only a Chromium-based web browser present on the Approved Fielded Product List (AFPL) at the time of deployment, and shall not require the installation of additional software, components or plug-ins on the user workstation.
Reference: TOPFAS

[REQ-0450] The TOPFAS Desktop applications (client component) shall not require the installation of additional software, components or plug-ins on the user workstation, unless explicitly approved by the Purchaser.

Reference: TOPFAS

2.1.5.2 Adapted to User Roles and User Privileges

[REQ-0460] The UI shall adapt to the individual users roles and privileges (e.g., a user with only read privileges shall not have access to create/update/delete functionalities, a user with no privilege to access an application shall not be able to log in, etc.).

Reference: BMD-ARS-7847 / BMD-ARS-7848

[REQ-0470] TOPFAS shall only provide access to data based on user roles and privileges (e.g. a user with no access to particular data shall not see the data).

Reference: BMD-ARS-7846

2.1.5.3 User Guidance and Feedback

[REQ-0480] TOPFAS shall display the expected input format on all form fields to the user if the label is not clear enough (e.g. date input format - ddmmyyyy or dd-mm-yyyy). This shall be done via tooltips, greyed-out example content or watermarks, additional labels, or other suitable, non-intrusive, means.

Reference: BMD-ARS-4654

[REQ-0490] TOPFAS 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).

Reference: BMD-ARS-4654

[REQ-0500] TOPFAS's user guidance information shall be readily distinguishable from other displayed information, e.g. data. This user guidance information shall be provided to the user through feedback, status information and error management:

- (1) Feedback provides information in response to the user's input. In general, users can be expected to make mistakes while entering data; they shall not be considered errors and should be caught by input field validation rules;
- (2) Status information indicates the current state of the application or processes;
- (3) Error management provides 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.

Reference: BMD-ARS-4654

[REQ-0510] TOPFAS shall include a visual label that at all times inform the user of which mission or database the user is connected to (i.e. operational mission, training database, exercise database, ...)

Reference: BMD-ARS-8883

2.1.5.4 Data Entry Interactions

[REQ-0520] The UI shall run successfully independent of environment regional settings (e.g. decimal symbol, date/time format).

Reference: BMD-ARS-4654

[REQ-0530] Where the user is entering (or changing) data, the user interface shall detect invalid and missing entries. The invalid or missing entries shall be highlighted or marked so that the user can be quickly identify and correct them. The validation (and subsequent highlighting) of the value in an entry field shall take place "dynamically" upon moving to the next entry field.

Reference: BMD-ARS-8863

[REQ-0540] For all attributes related to geographic co-ordinates, TOPFAS shall allow the user to enter geographic co-ordinates using a gazetteer function. The user shall be able to:

- (1) Select a gazetteer (or optionally use the default gazetteer), and
- (2) Select a place/area name from the gazetteer.

Reference: BMD-ARS-4654 / BMD-ARS-8008

[REQ-0550] TOPFAS shall provide prompts (i.e., allow cancellation or confirmation) when input or changes may be lost due to navigation or logging out.

Reference: BMD-ARS-4654

[REQ-0560] Any user interface shall support normal Microsoft (MS) Windows Accelerators. These shall include: CTRL+C (Copy), CTRL+X (Cut), CTRL+V (Paste), CTRL+Z (Undo), CTRL+Y (Redo) and Delete.

Reference: BMD-ARS-5385

[REQ-0570] TOPFAS shall allow the user to cut, copy and paste textual or tabulated data between (to and from) the TOPFAS applications and Microsoft Office applications.

Reference: BMD-ARS-5385

[REQ-0580] TOPFAS shall support Microsoft Office 2016 and later versions (latest Microsoft Office version available from Microsoft at initiation phase).

Reference: BMD-ARS-7736

[REQ-0590] TOPFAS shall allow the display, import and export of NATO Vector Graphics (NVG). It shall maintain the currently supported versions and shall implement the latest draft version at the time of implementation.

Reference: BMD-ARS-8873 / BMD-ARS-7276 / BMD-ARS-7318 / BMD-ARS-7277 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635

[REQ-0600] For all attributes related to geographic coordinates, TOPFAS shall allow the user to enter geographic coordinates in a single text field (not requiring the user to copy/paste more than once to input a geographic value). TOPFAS shall be able to automatically identify and parse the location formats as listed in the Table 2-1 below.

Reference: BMD-ARS-4654

Table 2-1 Location formats automatically detected

1	Degrees/Minutes/Seconds
2	Decimal Degrees
3	Degrees and Decimal Minutes
4	Degrees, Minutes and Decimal Seconds
5	Military Grid Reference System (MGRS)
6	Universal Transverse Mercator (UTM)

2.1.5.5 User eXperience (UX)

[REQ-0610] The TOPFAS user interface shall be in line with the current TOPFAS interface style.

Reference: BMD-ARS-4654

[REQ-0620] The TOPFAS user interface shall provide theme support with a light and dark theme.

Reference: BMD-ARS-4654

[REQ-0630] All TOPFAS user interfaces shall automatically updated whenever a user makes a change that has an impact on the information presented in the UI.

Reference: BMD-ARS-4654

[REQ-0640] TOPFAS shall, for all multi-select actions, support consecutive item selection by selecting first and last item in a list or tree (e.g. by shift-key plus left mouse click) and support adding individual (non-consecutive) items to the multi-selected set (e.g. by control-key plus left mouse click).

Reference: BMD-ARS-4654

[REQ-0650] TOPFAS shall, for all panels and dialog windows containing data entry fields, support navigation between entry fields using the Tab key (i.e. Tab key to move cursor to next entry field and Shift-Tab key to move cursor to previous entry field)

Reference: BMD-ARS-4654

2.1.6 Access Control

- [REQ-0660] TOPFAS shall provide single sign-on capabilities with the following services:
- Integrated Windows Authentication / Active Directory (IWA/AD);
 - Active Directory Federated Services (ADFS);
 - OAuth2 / OpenID Connect (OIDC).
- Reference: BMD-ARS-8865
- [REQ-0670] TOPFAS shall allow the enabling of one or multiple authentication services and to configure each of them.
- Reference: BMD-ARS-8865
- [REQ-0680] TOPFAS shall require users to identify themselves before being allowed to perform any other actions, and shall use a protected mechanism for uniquely identifying and authenticating users.
- Reference: BMD-ARS-7858
- [REQ-0690] TOPFAS shall implement role-based access control as a method of restricting access to applications, functions and information to authenticated users as defined by their assigned roles or individually assigned privileges, and shall ensure that these are enforced correctly throughout the application.
- Reference: BMD-ARS-7859
- [REQ-0700] TOPFAS shall obscure authenticator feedback information from the user during the authentication process.
- Reference: BMD-ARS-7861
- [REQ-0710] TOPFAS shall protect user credentials in transit. The applications shall employ encryption of the entire login transaction using SSL or similar technologies.
- Reference: BMD-ARS-7868
- [REQ-0720] TOPFAS shall enforce a "strong passwords" policy in accordance with the "Technical and Implementation Directive on CIS Security [AC-322-D0048-REV3]".
- Reference: BMD-ARS-7862
- [REQ-0730] TOPFAS shall enforce a maximum password age policy that determines the period of time (in days) users can keep a password before they are required to change. By default, passwords do not age. Furthermore, administrator accounts are excluded from this policy completely.
- Reference: BMD-ARS-7863
- [REQ-0740] TOPFAS shall allow a user to view and update their user account profile, including their password. TOPFAS shall enforce password change control policy, meaning the user shall be required to provide both their current password and the new password. The new password shall be entered twice to avoid mistakes when entering the new password.
- Reference: BMD-ARS-7864

- [REQ-0750] TOPFAS shall prohibit password reuse for 10 generations (i.e. users cannot re-use their last 10 passwords).
- Reference: BMD-ARS-7865
- [REQ-0760] TOPFAS shall allow a user to reset their password using a secure Self-service Password Reset, when they do not remember their password or when they have locked it. When their account was locked after failed login attempts, the account shall be unlocked once the password has been changed.
- Reference: BMD-ARS-7865
- [REQ-0770] A Self-service Password Reset request shall expire after 10 minutes; after 10 minutes, the user will have to request a new reset of their password. Existing passwords shall not change before the user has changed their password.
- Reference: BMD-ARS-7865
- [REQ-0780] When the user changes their password, either from within TOPFAS or after requesting a reset, then TOPFAS shall send an email notification that their password has been changed.
- Reference: BMD-ARS-7865
- [REQ-0790] TOPFAS shall implement a policy to lock a user account for which a configurable number of failed login attempts have been made and await action to unlock the account. Administrator accounts shall be excluded from this policy, though a progressive delay shall be implemented after the third sequential failed login attempt before administrator credentials can be entered again.
- Reference: BMD-ARS-7866
- [REQ-0800] TOPFAS shall provide a "Self-service Sign-up" for users to request an account, provide details (including email address) and justification for the account request.
- Reference: BMD-ARS-7858
- [REQ-0810] TOPFAS shall provide user administrators with the ability to review and approve or deny accounts requests. This includes notification of pending requests (by email and through a specific indicator in the user interface when logged in as a user administrator) and management of the list of pending requests in UMT interface.
- Reference: BMD-ARS-7858
- [REQ-0820] Upon approval or rejection of an account request, TOPFAS shall send an email notification to the user requesting an account with the result of the request.
- Reference: BMD-ARS-7858

[REQ-0830] TOPFAS shall provide a user with the ability to request access to a plan using a form to provide details (including email address) and justification for the access request.

Reference: BMD-ARS-7859

[REQ-0840] TOPFAS shall provide functional managers with the ability to review and approve or deny access requests to those plans they are administrators of. This includes notification of pending requests (by email and through a specific indicator in the user interface when logged in) and management of the list of pending requests in the TOPFAS user interface.

Reference: BMD-ARS-7859

[REQ-0850] Upon approval or rejection of an access request, TOPFAS shall send an email notification to the user requesting access with the result of the request.

Reference: BMD-ARS-7859

2.1.7 Logging

[REQ-0860] The TOPFAS applications shall log the following activities: authentication events (successful and failed logins etc.), file events; export and import events; user account events (change of role, group membership etc.) to security logs.

Reference: BMD-ARS-8135 / BMD-ARS-8136 / BMD-ARS-8137 / BMD-ARS-5656

[REQ-0870] The TOPFAS applications shall log application errors and faults automatically to application logs with technical and debug information.

Reference: BMD-ARS-8141

[REQ-0880] TOPFAS logs shall contain as a minimum: timestamp; event, status and/or error codes; service/command/application; name/user(s) or system account(s) associated with an event; device used (e.g. MAC address, source and destination IP address, web browser).

Reference: BMD-ARS-8138

[REQ-0890] TOPFAS logs shall be only accessible by users with Administrator privileges.

Reference: BMD-ARS-8139

[REQ-0900] TOPFAS shall provide a UI for viewing logs with sorting and filtering capabilities on all log events.

Reference: BMD-ARS-8135 / BMD-ARS-5656

[REQ-0910] The TOPFAS applications' logging configuration settings shall be only accessible by users with Administrator privileges.

Reference: BMD-ARS-8140

[REQ-0920] The TOPFAS applications' logging configuration settings shall include options to specify log size, log recycling, log level details etc.

Reference: BMD-ARS-8135

[REQ-0930] TOPFAS shall provide a UI for managing logging configuration settings.

Reference: BMD-ARS-8135

[REQ-0940] TOPFAS shall present an archive option prior to logs being automatically overwritten if configured as such.

Reference: BMD-ARS-7885

[REQ-0950] TOPFAS shall provide auditing and logging mechanisms for all database activities.

Reference: BMD-ARS-7886

2.1.8 Monitoring

[REQ-0960] TOPFAS shall provide an Application Performance Monitoring (APM) capability by providing reports to a Service Quality Management (SQM) application. This capability shall be compatible with the current enterprise monitoring service.

Reference: BMD-ARS-2291

[REQ-0970] TOPFAS shall gather data on the use and performance of the applications, i.e. how often features and commands are used, measurements of start-up time and processing time, hardware utilization, application crashes, and general usage statistics and/or user behaviour (TOPFAS telemetry component).

Reference: BMD-ARS-2291

[REQ-0980] TOPFAS shall allow a system administrator to view, analyse and export the telemetry.

Reference: BMD-ARS-2291

2.1.9 Preservation of Data

[REQ-0990] TOPFAS shall adhere to the guidelines for the preservation of information of permanent value in accordance with [AC/324-D(2014)0008] - Directive on the Preservation of NATO Digital Information of Permanent Value.

Reference: BMD-ARS-7839

2.1.10 Management Requirements

[029] The current user management functionality of the TOPFAS User Management Tool (UMT) shall be migrated into a web app for user management. The remaining UMT functionality shall be migrated to an application and service configuration web app.

- [REQ-1000] TOPFAS shall have a User Management web app that shall allow management of the user accounts / groups and user roles within each application database.
Reference: BMD-ARS-7249
- [REQ-1010] TOPFAS shall allow a privileged user to create new data repositories: Plans, Engagement Spaces, Areas of Interest, ORBATs and Data Sources, CJSORs etc.
Reference: BMD-ARS-7249
- [REQ-1020] TOPFAS shall allow a privileged user to manage user roles and permissions within a data repository.
Reference: BMD-ARS-7249
- [REQ-1030] TOPFAS shall have an Application and Service Configuration Management web app that shall allow management of the configuration of each application.
Reference: BMD-ARS-7251

2.2 Data Entity Requirements

- [030] Data Entities (DE) represent the different types of (composite) objects that can be created in the TOPFAS applications/apps (e.g. Unit, Effect, RFI (Request for Information), force contribution, readiness report, MRO etc.) and their properties.

2.2.1 DE Data Management Requirements

- [REQ-1040] The applications shall implement user interfaces for managing all DEs that are identified through the requirements and use cases to be of relevance for the particular application.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1050] The applications data entry form shall support the confidentiality metadata label syntax as defined by [ADatP-4774] for the DEs in accordance with the DE's confidentiality metadata attribute definitions.
Reference: BMD-ARS-8227
- [REQ-1060] The user shall be able to define default values for the applications data entry forms for the different DEs as per definition of the DE.
Reference: BMD-ARS-4654
- [REQ-1070] The application responsible for managing particular DE types shall enable an authorized user to select one or multiple DEs and tag them as soft-deleted.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1080] The application responsible for managing particular DE types shall enable an authorized user to select one or multiple soft-deleted DEs and un-delete them (i.e. recycle bin functionality).
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

2.2.2 General Requirements for DE Property Panels

- [REQ-1090] The DE Property Panel shall be used for presenting all details of a selected DE (in read-only mode), and for editing all attributes of a DE (in edit mode).
Reference: BMD-ARS-4654
- [REQ-1100] The user shall be able to manage rich-text Notes of a DE in the property panel.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1110] The user shall be able to add/open/delete Attachments (files or URIs) of a DE in the property panel. One attachment (image) can be made the primary image displayed in e.g. DE preview visualization.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1120] The user shall be able to add/reply to/delete Comments of a DE in the property panel.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1130] The user shall be able to view the relations between the DE and other DEs/Views in the property panel and open the related DE/View directly from the dialog.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-8722
- [REQ-1140] The user shall be able to view the Audit Trail of the DE in the property panel.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-7886
- [REQ-1150] The user shall be able to view a small quick map in the property panel for DEs that are geo-located.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1160] The user shall be able to display nationality flags for DEs that have a nation attribute in the property panel.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-1743
- [REQ-1170] The user shall be able to manage military APP-6D symbols for appropriate DEs in the property panel.
Reference: BMD-ARS-4655

2.2.3 General Requirements for DE Preview Panel

- [REQ-1180] The DE Preview Panel shall be used for presenting the main details of a selected DE in read-only mode.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

- [REQ-1190] The user shall be able to open the Property Panel of the DE from a hyperlink in the Preview Panel.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1200] The user shall be able to view the relations between the DE and other DEs/Views in the preview panel.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1210] The user shall be able to open the Property Panel of a related DE from a hyperlink in the Preview Panel.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1220] The user shall be able to open a view related to the DE from a hyperlink in the Preview Panel.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1230] The user shall be able to view a small quick map in the preview panel for DEs that are geolocated.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1240] The user shall be able to display nationality flags for DEs that have a nation attribute in the preview panel.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-1743
- [REQ-1250] The user shall be able to display military APP-6D symbols for appropriate DEs in the preview panel.
Reference: BMD-ARS-4655

2.2.4 Approval Workflow Requirements

- [REQ-1260] The user shall be able to search for and select one or multiple draft application-specific DEs and request for the selected DEs to be proposed/approved/rejected.
Reference: BMD-ARS-2179 / BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6195 / BMD-ARS-6192 / BMD-ARS-6933 / BMD-ARS-6934
- [REQ-1270] The user shall be able to search for, filter, and sort application-specific proposed DEs, select one or multiple such DEs, and approve or reject the DEs.
Reference: BMD-ARS-2179 / BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6195 / BMD-ARS-6192 / BMD-ARS-6933 / BMD-ARS-6934

[REQ-1280] The user shall be able to search, filter, and sort application-specific DEs where the approval has been rejected. It shall then be possible to update the DEs and set the status to draft or proposed, or delete them.

Reference: BMD-ARS-2179 / BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6195 / BMD-ARS-6192 / BMD-ARS-6933 / BMD-ARS-6934

2.3 Audit

[031] TOPFAS shall provide an audit trail of all changes in data (what data was created/changed/deleted) by which user, and when.

2.3.1 Data Entity Auditing

[REQ-1290] TOPFAS shall maintain an Audit Trail for each DE. This audit trail shall contain details about any modifications to the DE: the action (create/update), the time it was carried out and the user who carried it out.

Reference: BMD-ARS-7886

2.3.2 Global Audit View

[REQ-1300] TOPFAS applications shall provide a global Audit View. This view shall contain details about any modifications to DEs: the action (create/update/delete), the time it was carried out and the user who carried it out. It shall also contain application login audits.

Reference: BMD-ARS-7886

[REQ-1310] The user shall be able to filter the audit by action (e.g., create, update, delete, login, etc.), information attributes, users, context (e.g. Plan, Engagement Space, CJSOR, etc.) as well as selecting a period to view changes within the specified timeframe.

Reference: BMD-ARS-7886

[REQ-1320] The user shall be able to sort the audit information.

Reference: BMD-ARS-7886

[REQ-1330] The user shall be able to search the audit information.

Reference: BMD-ARS-7886

2.4 General Requirements for Existing Module and Component Usage

2.4.1 Explorer Module

[REQ-1340] The Explorer Module shall contain two panes. The left pane shall display a tree of filters. Each filter can be defined with a rule that determines which type of DE will be loaded in the filter as well as possible conditions on properties of the DE. The right pane shall display different visualisations of the DE in the selected filter: the List View (see section 2.4.2), the Hierarchical View (see

section 2.4.3), the Relationship View (see section 2.4.4), the Story Line View (see section 2.4.5), the Quick Map View (see section 2.4.6) and the Table View (see section 2.4.7).

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-1350] Each filter shall display the number of DEs matching the filter's rule.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-1360] The user shall be able to organize the filters in the Explorer Module in folders.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-1370] The user shall be able to define user specific filters and shared filters in the Explorer Module.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

2.4.2 List View Component

[REQ-1380] The List View shall display a grid with rows of DEs with their properties as columns.

Reference: BMD-ARS-6513 / BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-1390] The user shall be able to sort the List View by groups and by columns. When the List View includes groups, the column sorting shall be done within the groups (per group).

Reference: BMD-ARS-4654

[REQ-1400] The user shall be able to filter the List View by value per column.

Reference: BMD-ARS-4654

[REQ-1410] The user shall be able to hide and unhide columns in the List View.

Reference: BMD-ARS-4654

[REQ-1420] The user shall be able to display the columns using three predefined settings: Basic (the most basic set of properties), Extended (a useful set of properties including the ones from Basic) and All Columns.

Reference: BMD-ARS-4654

[REQ-1430] The user shall be able to define collapsible groups in the List View by dragging and dropping an attribute column header to a "Group By field". It shall be possible to add multiple tier groups by dragging additional column headers to the "Group By field". It shall also be possible to reorder the tiers in the groups and remove a tier from the groups.

Reference: BMD-ARS-4654

- [REQ-1440] The user shall be able to perform free-text search against the content in the grid and have the search hits highlighted and rows filtered out.
Reference: BMD-ARS-4654
- [REQ-1450] The user shall be able to change multiple properties of the current selection of DEs in one “bulk change” operation. The possible operations for each property shall depend on the field type. For instance, for string fields it shall be possible to use operations like update/append/prepend and for date fields is shall be possible to select a date from a date picker control.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1460] The user shall be able to duplicate a row and create a new DE with cell values from the copied row, except for label which must be unique (append with underscore and sequence number) and name (append with “ (Copy)”).
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1470] The List View shall include scroll bars for both vertical and horizontal scrolling that appears when the available data exceeds the current viewport.
Reference: BMD-ARS-4654
- [REQ-1480] The List View shall allow both a horizontal and vertical split where each part can individually scroll the data set.
Reference: BMD-ARS-4654
- [REQ-1490] The user shall be able to switch between the following display settings: List View (the default mode), Tiles View (displays a large icon and description), Extra Large View (displays a large thumbnail).
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1500] The user shall be able to format cells based on conditions (e.g. contains text, greater than, duplicates etc.).
Reference: BMD-ARS-4654
- [REQ-1510] The user shall be able to access the Notes of a DE in the List View.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1520] The user shall be able to access the Attachments of a DE in the List View.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1530] The user shall be able to access the Comments of a DE in the List View.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1540] The List View shall have a charting functionality to allow users to present selected DEs on one or more charts.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-4654

- [REQ-1550] The charting functionality shall support the following chart types: pie charts, horizontal and vertical bar charts, doughnut charts and counters.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-4654
- [REQ-1560] The charting functionality shall allow a user to selection of the DE property by which to group DEs on the chart.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-4654
- [REQ-1570] The user shall be able to export the data in the List View directly to a Microsoft Excel file. Note that hidden columns and rows shall not be exported.
Reference: BMD-ARS-7558 / BMD-ARS-8227 / BMD-ARS-8228 / BMD-ARS-5389 / BMD-ARS-8853 / BMD-ARS-947 / BMD-ARS-948 / BMD-ARS-5656
- [REQ-1580] The user shall be able to load the Preview Panel with the main DE details when a DE is selected in the List View.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1590] The user shall be able to display nationality flags for DEs that have a nation attribute in the List View.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-1743
- [REQ-1600] The user shall be able to display military APP-6D symbols for appropriate DEs in the List View.
Reference: BMD-ARS-4655
- [REQ-1610] The user shall be able to switch the display of the List View between requirements and contributions (i.e. show capability and flag) of DEs of type Resource.
Reference: BMD-ARS-8822

2.4.3 Hierarchical View Component

- [REQ-1620] The Hierarchical View shall be able to display the parent/child relationships of DEs as a tree grid structure.
Reference: BMD-ARS-8157 / BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1630] The Hierarchical View shall be able to display the C2 relationships of DEs of type Resource.
Reference: BMD-ARS-4773 / BMD-ARS-4774
- [REQ-1640] The user shall be able to expand/collapse any or all nodes.
Reference: BMD-ARS-8157 / BMD-ARS-4654

- [REQ-1650] The user shall be able to load the Preview Panel with the main DE details when a DE is selected in the Hierarchical View.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1660] The user shall be able to display military APP-6D symbols for appropriate DEs in the Hierarchical View.
Reference: BMD-ARS-4655
- [REQ-1670] The user shall be able to switch the display of the Hierarchical View between requirements and contributions (i.e. show capability and flag) of DEs of type Resource.
Reference: BMD-ARS-8822

2.4.4 Relationship View Component

- [REQ-1680] The Relationship View shall visualise how DEs are related in a network diagram.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1690] The Relationship View shall have support for different layout algorithms to include spring, tree, radial tree and chord diagram.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1700] The Relationship View shall include functionality for reducing clutter. The de-cluttering function shall include grouping/ combining of nodes by user-selected attributes. The grouped nodes shall depict glyphs informing about the nature of the grouping of nodes. The rendered size of the grouped nodes shall visually be distinguishable based on the number of nodes within the combined node.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1710] The user shall be able to filter the information in the Relationship View by utilizing the current List View filter, and then only show those nodes and any nodes that they are related to.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1720] The user shall be able to expand any node with all nodes it is linked to (e.g. by double-clicking, or right-clicking, a node).
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1730] The user shall be able to hide/unhide names and/or labels for the DEs and the relationships.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1740] The user shall be able to render nodes in the Relationship View as circles or as icons based on DE type.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

- [REQ-1750] The user shall be able to decorate the symbols in Relationship View with nationality flags for DEs that have a nation attribute.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-1743
- [REQ-1760] The user shall be able to load the Preview Panel with the main DE details when a DE is selected in the Relationship View.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1770] The user shall be able to display military APP-6D symbols for appropriate DEs in the Relationship View.
Reference: BMD-ARS-4655

2.4.5 StoryLine View Component

- [REQ-1780] The StoryLine View shall visualise DEs with a time attribute on two panes: a timeline on the bottom where the horizontal axis shall represent the time dimension and shall display the DEs and an overview pane at the top which will show details of the selected DE in the timeline below.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1790] If a DE has multiple time attributes, the user shall be able to select the attribute to be used in the timeline.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1800] The user shall be able to zoom in and out of/ pan along the timeline.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1810] The user shall be able to move to the next or previous event and centre the timeline on that event.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1820] The StoryLine View plot area (canvas) shall have support for callout-boxes and other graphical shapes that can contain formatted text (i.e. font size, type, and colours is dynamically configurable) and pictures combined with text. The user shall be able to show DE symbols within the call-out box. The colours of the call-out boxes and the graphical shapes can be dynamically changed.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1830] The StoryLine View shall have support for automatic de-cluttering of the timeline. E.g. stacking callout boxes horizontally or vertically.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1840] When a user selects a DE in the Timeline View, the overview pane shall display the main details and image of the DE and a Quick Map when it is geolocated.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-1850] It shall be possible to load the Preview Panel with the main DE details when a DE is selected in the StoryLine View

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

2.4.6 Quick Map Component

[REQ-1860] The Quick Map shall display geographical attributes of DEs on a map view.

Reference: BMD-ARS-6513 / BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-1870] The Quick Map shall allow the user to create, update and delete the geographical attributes of DEs.

Reference: BMD-ARS-6513 / BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-1880] The Quick Map shall allow the user to create, update and delete generic geographical objects unrelated to DEs.

Reference: TOPFAS

[032] The Quick Map shall include control functions for working with overlays.

[REQ-1890] The Quick Map View shall be able to create named and hierarchical overlays.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635

[REQ-1900] The Quick Map View shall be able to remove an overlay and all features and objects within the overlay.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635

[REQ-1910] The Quick Map View shall be able to hide an overlay and all features and objects within the overlay.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635

[REQ-1920] The Quick Map View shall be able to unhide an overlay (and all its content).

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635

[REQ-1930] The Quick Map View shall be able to reorder the sequence of layers (from foreground to background).

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635

[REQ-1940] The Quick Map View shall be able to display layers provided by NCOP.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635

- [REQ-1950] The Quick Map View shall be able to display NVG layers from services (e.g. AirC2IS).
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635
- [REQ-1960] The Quick Map shall enable the easy identification of the DE and its associated geographical characteristics (e.g. links). For instance, the view shall allow the highlight or display of those links when the DE is selected. The semantic meaning of the links must be taken into account to control the extend of the highlight.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-1970] The Quick Map shall display a scale indicator.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-4654
- [REQ-1980] The Quick Map shall continuously display the current mouse coordinates in LatLong / MGRS / UTM.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-4654
- [REQ-1990] It shall be possible to zoom in or out or pan the Quick Map.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-4654
- [REQ-2000] The user shall be able to measure distances on the Quick Map.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-4654
- [REQ-2010] The user shall be able to display LatLong / MGRS / UTM grids on the Quick Map.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-4654
- [REQ-2020] When a DE is selected on the Quick Map, a popup will display label, name and coordinates of the DE and a link to open the Properties Panel.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2030] The user shall be able to show/hide DE labels on the Quick Map.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2040] The user shall be able to enable/disable decluttering of DEs on the Quick Map.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

- [REQ-2050] The Quick Map shall be able to display background maps from CoreGIS (WMS/WMTS), any WMS provider, any WMTS provider, OpenStreetMap and offline map tiles.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-1634 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635
- [REQ-2060] The user shall be able to select the background map from a list of providers for the Quick Map.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-1634 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635
- [REQ-2070] The user shall be able to use a geocoder service to search for a location and mark the selected location on the Quick Map.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2080] The user shall be able to load the Preview Panel with the main DE details when a DE is selected on the Quick Map.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2090] The user shall be able to display heat maps of the DEs on the Quick Map. The scale radius of the heat maps shall be configurable.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2100] The user shall be able to display military APP-6D symbols for appropriate DEs on the Quick Map.
Reference: BMD-ARS-4655
- [REQ-2110] The user shall be able to export any combination of overlays of the Quick Map to an NVG file.
Reference: BMD-ARS-8797 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635
- [REQ-2120] The user shall be able to switch the display of the Quick Map View between requirements and contributions (i.e. show capability and flag) of DEs of type Resource.
Reference: BMD-ARS-8822

2.4.7 Table View Component

- [REQ-2130] The Table View shall display a summary table with rows of DEs with label and name as columns.
Reference: BMD-ARS-6513

[REQ-2140] The Table View shall include scroll bars for both vertical and horizontal scrolling that appears when the available data exceeds the current viewport.

Reference: BMD-ARS-4654

[REQ-2150] The user shall be able to export the data in the Table View directly to a Microsoft Excel file.

Reference: BMD-ARS-8797 / BMD-ARS-8800 / BMD-ARS-8807

[REQ-2160] The user shall be able to load the Preview Panel with the main DE details when a DE is selected in the Table View.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

2.4.8 OpsDesign View Component

[REQ-2170] The user shall be able to create multiple OpsDesigns diagrams within the OpsDesign View.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-2180] The user shall be able to add DEs to an OpsDesign View.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-2190] It shall be possible zoom in and out of the OpsDesign diagram.

Reference: BMD-ARS-4654

[REQ-2200] The OpsDesign View shall include scroll bars for both vertical and horizontal scrolling that appears when the available data exceeds the current viewport.

Reference: BMD-ARS-4654

[REQ-2210] The user shall be able to export the data in the OpsDesign View directly to a Microsoft PowerPoint / Adobe PDF / Image file, see also section 2.1.4.

Reference: BMD-ARS-8797 / BMD-ARS-8800 / BMD-ARS-8807

[REQ-2220] The user shall be able to load the Preview Panel with the main DE details when a DE is selected in the OpsDesign View.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

2.4.9 TimeLine View Component

[REQ-2230] The user shall be able to create multiple TimeLine diagrams within the TimeLine View. Each diagram shall consist of two panes: a data grid on the left with the DEs and a timeline on the right with a Gantt chart.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-2240] The user shall be able to zoom in and out and pan within the timeline part of the TimeLine diagram.

Reference: BMD-ARS-4654

- [REQ-2250] The user shall be able to render DEs with a timing aspect in the timeline part of the TimeLine diagram.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2260] The user shall be able to depict date lines in the timeline part of the TimeLine diagram.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2270] The user shall be able to view more the main properties of DEs in columns in the data grid part of the TimeLine diagram.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2280] The user shall be able to view the DEs in a hierarchy in the data grid part of the TimeLine diagram.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2290] The user shall be able to search for data in the grid part of the TimeLine diagram.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2300] The user shall be able to hide and un-hide columns in the grid part of the TimeLine diagram.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2310] The user shall be able to display either relative or calendar dates in the timeline part of the TimeLine diagram.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2320] The user shall be able to scroll horizontally and vertically in both the data grid part and the timeline part of the TimeLine diagram.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2330] The TimeLine View shall have a summary functionality to present selected DEs on a single line to highlight key planning objects of the TimeLine.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2340] The user shall be able to load the Preview Panel with the main DE details when a DE is selected in both the grid part and timeline part of the TimeLine diagram.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2350] The user shall be able to display military APP-6D symbols for appropriate DEs on the TimeLine diagram.
Reference: BMD-ARS-4655

[REQ-2360] The user shall be able to switch the display of the TimeLine View between requirements and contributions (i.e. show capability and flag) of DEs of type Resource.

Reference: BMD-ARS-8822

2.4.10 Map View Component

[REQ-2370] The user shall be able to create multiple maps within the Map View.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-2380] The Map shall be able to display background maps from CoreGIS (WMS/WMTS), any WMS provider, any WMTS provider and OpenStreetMap.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-1634 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635

[033] The Map will include control functions for managing overlays.

[REQ-2390] The user shall be able to create named and hierarchical overlays.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635

[REQ-2400] The user shall be able remove an overlay and all features and objects within the overlay.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635

[REQ-2410] The user shall be able to turn visibility of an overlay and all features and objects within the overlay on/off.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635

[REQ-2420] The user shall be able to reorder the sequence of layers (from foreground to background).

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635

[REQ-2430] The user shall be able to display layers provided by NCOP.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635

[REQ-2440] The user shall be able to display NVG layers from services (e.g. AirC2IS).

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635

- [REQ-2450] The user shall be able to display feature layers from DEs (System Element, GeoLoc, etc.).
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635
- [034] The Map will include control functions for rendering features and objects.
- [REQ-2460] The user shall be able to create/update/delete APP-6D symbols on the Map.
Reference: BMD-ARS-4655 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635
- [REQ-2470] The user shall be able to draw icons, pictures, and geometric shapes (with selectable styles like colour, fill pattern, line width etc.) on the Map.
Reference: BMD-ARS-4655 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635
- [REQ-2480] The Map shall be able to render NATO Vector Graphics (NVG) data and Keyhole Markup Language (KML) in overlays.
Reference: BMD-ARS-4655 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635
- [REQ-2490] The user shall be able to display and query features from CoreGIS (WMS and WFS).
Reference: BMD-ARS-4655 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635
- [REQ-2500] The user shall be able to hide/unhide labels for DEs.
Reference: BMD-ARS-4655 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635
- [REQ-2510] The user shall be able to remove features from the Map.
Reference: BMD-ARS-4655 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635
- [REQ-2520] The user shall be able to turn the visibility of features in the Map on/off.
Reference: BMD-ARS-4655 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635 / BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635
- [035] The Map will include control functions for selecting features.

- [REQ-2530] The Application Framework shall detect when features are selected in the Map and subsequently identify the feature (e.g. as a particular DE) and display the main characteristics in the Preview Pane.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2540] The Application Framework shall be able to command the Map to select (and highlight) features when the user selects a DE.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2550] The Application Framework shall be able to query the Map for status information and receive information on which features in the Map are currently selected/visible.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [036] The Map will implement control functions to support searching and querying.
- [REQ-2560] The user shall be able to click in the Map and use the location as the centre point of a circle with customizable radius to define a geolocation boundary and the Map shall display the selected features within the circle in a list.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2570] The user shall be able to draw an area in Map to define a geolocation boundary and the Map shall display the selected features within the area in a list.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2580] The user shall be able to perform location searches using a geocoder service and mark the selected location on the map.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2590] The user shall be able to perform location searches from a gazetteer service and mark the selected location on the map.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2600] The user shall be able to filter DE objects on the Map by one or more DE attributes, e.g. Units by Capability Code and nation, System Elements by type, Geolocs by nation etc.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [037] The Map will include control functions for selecting the view-port.
- [REQ-2610] The user shall be able to incrementally zoom in and out of the Map.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-4654

- [REQ-2620] The Map shall be able to detect that the zoom level has been changed from within the Map.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-4654
- [REQ-2630] The user shall be able to re-centre the Map on a particular overlay.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-4654
- [REQ-2640] The user shall be able to centre and zoom to a specific feature on the Map.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-4654
- [REQ-2650] The user shall be able to centre the Map on a specific geolocation at a user-defined zoom-level.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-4654
- [038] TOPFAS will include functions for exporting files from the Map and importing files to the Map.
- [REQ-2660] The user shall be able to import NVG files and display as overlays in the Map.
Reference: BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635
- [REQ-2670] The user shall be able to import KML and zipped KML (KMZ) files and display them as overlays in the Map.
Reference: BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635
- [REQ-2680] The user shall be able to export the visual viewport of the Map as a PNG/JPG/BMP file.
Reference: BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635
- [REQ-2690] The user shall be able to export an overlay of the Map as an NVG file.
Reference: BMD-ARS-7830 / BMD-ARS-7831 / BMD-ARS-7829 / BMD-ARS-7635
- [REQ-2700] The user shall be able to display LatLong, MGRS and UTM grids on the Map.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2710] The Map shall display a scale indicator.
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146
- [REQ-2720] The Map shall continuously display the current mouse coordinates. The user shall be able to select the output format (LatLong/MGRS/UTM).
Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-2730] The user shall be able to load the Preview Panel with the main DE details when a DE is selected in the Map.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

2.4.11 Document View Component

[REQ-2740] The user shall be able to create multiple Documents within the Document Module.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6195 / BMD-ARS-6192 / BMD-ARS-6933 / BMD-ARS-6934

[REQ-2750] The user shall be able to add DEs to a Document. It shall be configurable which properties of the different DE types will be shown in the document.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6195 / BMD-ARS-6192 / BMD-ARS-6933 / BMD-ARS-6934

[REQ-2760] The Document View shall be able to export the document to Microsoft Word.

Reference: BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6195 / BMD-ARS-6192 / BMD-ARS-6933 / BMD-ARS-6934 / see section 2.1.4

2.4.12 Forces View Component

[REQ-2770] The Forces View shall manage the Force requirements as a tree grid structure.

Reference: BMD-ARS-8008 / BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-2780] The tree grid shall allow the operator to filter DEs by column values.

Reference: BMD-ARS-8009 / BMD-ARS-8030 / BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-2790] The user shall be able to create Force requirements (Organisations/Resources) manually, from an ORBAT or from a Capability Code.

Reference: BMD-ARS-8008 / BMD-ARS-8028

[REQ-2800] The Forces View shall be able to display Force Contributions from EFGMT.

Reference: BMD-ARS-8822

[REQ-2810] The Forces View shall be able to switch the display between requirements and contributions (i.e. show capability and flag).

Reference: BMD-ARS-8822

[REQ-2820] The Force View shall allow the operator to compare two ORBATs and produce SOR lines for identified differences.

Reference: BMD-ARS-8709

2.4.13 SOR Management View Component

[REQ-2830] The user shall be able to manage Statement of Requirements (SORs), Allied Disposition Lists (ADLs) and Allied Forces Lists (AFLs). They shall support baselining and change tracking.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-2840] The SOR Management View shall allow the planner to generate a new SOR. When the planner decides to update an existing SOR, the requirement data shall be merged with the existing SOR baseline.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-2850] The user shall be able to show the status of an SOR/ADL/AFL at a specific date.

Reference: BMD-ARS-8042 / BMD-ARS-8043 / BMD-ARS-8114

[REQ-2860] The user shall be able to show the differences of an SOR/ADL/AFL between two specific dates. It shall be possible to filter the results on any property of the SOR/ADL/AFL.

Reference: BMD-ARS-8110 / BMD-ARS-8114 / BMD-ARS-8113 / BMD-ARS-8112 / BMD-ARS-8708 / BMD-ARS-8821

[REQ-2870] The user shall be able to display force contributions filtered by status 'Informal Offer' or 'Formal Offer' from EFGMT in the SOR by using the FEL service (see [REQ-6150]).

Reference: BMD-ARS-8822

[REQ-2880] The SOR Management View shall be able to display any CRUD operation made to contributions in EFGMT automatically using the CJSOR services (see [REQ-6150]).

Reference: BMD-ARS-8822

[REQ-2890] The SOR Management View shall highlight changes to the CJSOR using icons that display 'new', 'updated' or 'deleted' for a configurable amount of time. When objects are deleted in EFGMT, they are highlighted as such in OPT, but not removed until the planner deliberately confirms the delete.

Reference: BMD-ARS-8822

[REQ-2900] The SOR Management View shall be able to highlight unfulfilled requirements (i.e. without 'Informal Offer' or 'Formal Offer')

Reference: BMD-ARS-8042 / BMD-ARS-8043 / BMD-ARS-8114

- [REQ-2910] The user shall be able to generate a report containing unfulfilled requirements and associated Actions to support planners in re-planning the mission.
Reference: BMD-ARS-8042 / BMD-ARS-8043 / BMD-ARS-8114
- [REQ-2920] The user shall be able to save the SOR as an ORBAT containing the requirements as generic Units.
Reference: BMD-ARS-8717
- [REQ-2930] The user shall be able to export the SOR to a Microsoft Excel file.
Reference: BMD-ARS-7142 / see section 2.1.4
- [REQ-2940] The user shall be able to export the SOR to an XML file using the latest FASInterop schema at the time of implementation.
Reference: BMD-ARS-7142 / see section 2.1.4
- [REQ-2950] The user shall be able to export the AFL to an XML file using the latest FASInterop schema at the time of implementation.
Reference: BMD-ARS-7128 / see section 2.1.4
- [REQ-2960] The user shall be able to import the AFL from an XML file using the latest FASInterop schema at the time of implementation.
Reference: BMD-ARS-7109 / BMD-ARS-8311
- [REQ-2970] The user shall be able to export the ADL to an XML file using the latest FASInterop schema at the time of implementation.
Reference: BMD-ARS-7127 / see section 2.1.4
- [REQ-2980] The user shall be able to import the ADL from an XML file using the latest FASInterop schema at the time of implementation.
Reference: MD-ARS-7109 / BMD-ARS-8311

2.4.14 EFGMT Views

- [REQ-2990] EFGMT shall allow a force generator to select a CJSOR from OPT via the CJSOR service (see [REQ-6140]) and perform force generation on the selected CJSOR. The selected CJSOR will be common to both planners in OPT and force generators in EFGMT from this point onwards.
Reference: BMD-ARS-8008 / BMD-ARS-8009 / BMD-ARS-8030 / BMD-ARS-8028 / BMD-ARS-8026 / BMD-ARS-8042 / BMD-ARS-8043 / BMD-ARS-8041 / BMD-ARS-8040 / BMD-ARS-8037 / BMD-ARS-8820 / BMD-ARS-8114
- [REQ-3000] EFGMT shall display any CRUD operation made to requirements of the CJSOR in OPT automatically using the CJSOR services (see [REQ-6140]).
Reference: BMD-ARS-8008 / BMD-ARS-8112
- [REQ-3010] EFGMT shall highlight changes to the CJSOR using icons that display 'new', 'updated' or 'deleted' for a configurable amount of time. When objects are

deleted in OPT, they are highlighted as such in EFGMT, but not removed until the force generator deliberately confirms the delete.

Reference: BMD-ARS-8008 / BMD-ARS-8112

2.4.15 Missile Defence Module

[039] The Missile Defence Module has a collection of components to manage Assets, Defence Designs, IPB Reports, OPFOR TBM COAs and CALs/PCALs/JPCALs/JPDALs.

[REQ-3020] The Missile Defence Module shall allow a user to create JPDALs from selected JPCALs or Defence Designs.

Reference: TOPFAS

2.4.15.1 CAL/PCAL/JPCAL View Component

[REQ-3030] The CAL/PCAL/JPCAL View shall allow users to manage Critical Assets, allow changing the rank by ordering or calculation from CVRT (Criticality, Vulnerability, Recuperability and Threat) values and filtering by priority levels.

Reference: TOPFAS

2.4.15.2 JPDAL View Component

[REQ-3040] The JPDAL View shall allow users to provide a capability to manage Defended Assets, allow changing the rank by ordering or calculation from CVRT (Criticality, Vulnerability, Recuperability and Threat) values, filtering by priority levels and filtering by defended and at risk assets.

Reference: TOPFAS

2.4.15.3 OPFOR TBM COA View Component

[REQ-3050] The OPFOR TBM COA View shall allow the user to view OPFOR TBM COAs from Defence Designs. The view shall contain two panes. The left pane shall display a tree with a breakdown of the OPFOR TBM COA received from AirC2IS data sources. The right pane shall display a Quick Map of the OPFOR TBM COA.

Reference: TOPFAS

2.4.15.4 Defence Design View Component

[REQ-3060] The Defence Design View shall contain two panes. The left pane shall display a tree with a breakdown of Defence Design DEs received from AirC2IS data sources. The pane can show a Defence Resource-, Asset- or Threat-centric tree. The right pane shall display a Quick Map of the Defence Design and highlight selections made in the tree by the user.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

2.4.16 C2 Arrangement View Component

[REQ-3070] The user shall be able to create multiple C2 arrangement diagrams within the C2 Arrangement View.

Reference: BMD-ARS-4773

[REQ-3080] The user shall be able to create a C2 arrangement per phase of the operation.

Reference: BMD-ARS-4774

[REQ-3090] The user shall be able to select the phase of the operation and display the associated C2 arrangement diagram.

Reference: BMD-ARS-4774

[REQ-3100] The user shall be able to create one or more of the following types of C2 relations between units: Full Command, Functional Command, National Command, Administrative Control, LOGCON, OPCOM, OPCON, TACOM, TACON, Ad-Hoc, Cooperation, Coordination, Liaison, Supporting and Reporting.

Reference: BMD-ARS-4773 / BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-3110] The user shall be able to load the Preview Panel with the main unit details when a unit is selected in the C2 arrangement View.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

2.4.17 Template Organiser

[REQ-3120] The user shall be able to manage all document templates with the Template Organizer.

Reference: BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6195 / BMD-ARS-6192 / BMD-ARS-6933 / BMD-ARS-6934

[REQ-3130] The user shall be able to duplicate a document template with the Template Organizer.

Reference: BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6195 / BMD-ARS-6192 / BMD-ARS-6933 / BMD-ARS-6934

[REQ-3140] The user shall be able to import/export document templates with the Template Organizer.

Reference: BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6195 / BMD-ARS-6192 / BMD-ARS-6933 / BMD-ARS-6934

2.4.18 COA Comparison View Component

[REQ-3150] The user shall be able to compare COAs with the COA Comparison View. Supported types of comparison are:

- Advantages and Disadvantages;
- Friendly and Opposing COA;

- Commander's Criteria Narrative;
- Commander's Criteria Single Word;
- Commander's Criteria Numerical Analysis;
- Commander's Criteria Broad Categories.

Reference: BMD-ARS-8149 / BMD-ARS-8151 / BMD-ARS-8152 / BMD-ARS-8153 / BMD-ARS-8154

2.4.19 Holdings View Component

[REQ-3160] The user shall be able to display Force Holdings (number and type of equipment, personnel etc.) within the Holdings View.

Reference: BMD-ARS-8710

[REQ-3170] The Holdings View shall display different grids with unit, holdings (Items) and Reportable Item Code (RIC) information: By Category, By Item, By Category Details and By Unit.

Reference: BMD-ARS-8710

[REQ-3180] The user shall be able to sort the Holdings View by groups and by columns. When the Holdings View includes groups, the column sorting shall be done within the groups (per group).

Reference: BMD-ARS-4654

[REQ-3190] The user shall be able to hide and unhide columns in the Holdings View.

Reference: BMD-ARS-4654

[REQ-3200] The user shall be able to define collapsible groups in the Holdings View by dragging and dropping an attribute column header to a "Group By field". It shall be possible to add multiple tier groups by dragging additional column headers to the "Group By field". It shall also be possible to reorder the tiers in the groups and remove a tier from the groups.

Reference: BMD-ARS-4654

[REQ-3210] The user shall be able to assign a location to a Force Holding and display it in the properties and on the Quick Map View.

Reference: BMD-ARS-6515 / BMD-ARS-6516 / BMD-ARS-6517 / BMD-ARS-6518 / BMD-ARS-6519 / BMD-ARS-6520 / BMD-ARS-6521 / BMD-ARS-8157 / BMD-ARS-6522 / BMD-ARS-6523 / BMD-ARS-6524 / BMD-ARS-6525 / BMD-ARS-6526 / BMD-ARS-8817

[REQ-3220] It shall be possible to load the Preview Panel with the main unit details when a unit is selected in the Holdings View

Reference: BMD-ARS-8710

2.4.20 Readiness View Component

- [REQ-3230] The user shall be able to display unit readiness information within the Readiness View.
Reference: BMD-ARS-8710
- [REQ-3240] The Readiness View shall a grid with the different unit readiness categories (unit/personnel/equipment/ammunition/fuel/training).
Reference: BMD-ARS-8710
- [REQ-3250] The user shall be able to select a readiness status date to display the readiness state as of the status date.
Reference: BMD-ARS-8710
- [REQ-3260] It shall be possible to load the Preview Panel with the main unit details when a unit is selected in the Readiness View.
Reference: BMD-ARS-8710

2.4.21 ORBAT View Component

- [REQ-3270] It shall be possible to display ORBATs (Friendly, OPFOR, BMOPFOR) within the ORBAT View.
Reference: BMD-ARS-8710 / BMD-ARS-6519 / BMD-ARS-6520 / BMD-ARS-6521 / BMD-ARS-6522 / BMD-ARS-8817
- [REQ-3280] The ORBAT View shall have a Hierarchy view (see 2.4.3)
Reference: BMD-ARS-8157
- [REQ-3290] The ORBAT View shall have a List view (see 2.4.2)
Reference: BMD-ARS-6519 / BMD-ARS-6521 / BMD-ARS-6522
- [REQ-3300] The ORBAT View shall have a Quick Map view (see 2.4.6)
Reference: BMD-ARS-8710 / BMD-ARS-6519 / BMD-ARS-6520 / BMD-ARS-6521 / BMD-ARS-6522 / BMD-ARS-8817
- [REQ-3310] The ORBAT View shall have a C2 Diagram view (see 2.4.16), but without planning phase-dependent C2 relationships.
Reference: BMD-ARS-8710 / BMD-ARS-6519 / BMD-ARS-6520 / BMD-ARS-6521 / BMD-ARS-6522 / BMD-ARS-8817
- [REQ-3320] The ORBAT View shall have a Holdings view (see 2.4.19)
Reference: BMD-ARS-8710 / BMD-ARS-6519 / BMD-ARS-6520 / BMD-ARS-6521 / BMD-ARS-6522 / BMD-ARS-8817
- [REQ-3330] The ORBAT View shall have a Readiness view (see 2.4.20)
Reference: BMD-ARS-8710 / BMD-ARS-6519 / BMD-ARS-6520 / BMD-ARS-6521 / BMD-ARS-6522 / BMD-ARS-8817

[REQ-3340] The ORBAT View shall be able to receive Friendly ORBATs from an AirC2IS data source (see section 2.5.1.2). The ORBAT can consist of 'full' (i.e. real) or generic Units. It shall be possible to only import a subset of an ORBAT via selection of the units in the source.

Reference: BMD-ARS-8710 / BMD-ARS-8713

[REQ-3350] The user shall be able to export Friendly ORBATs. The ORBAT can consist of 'full' (i.e. real) or generic Units.

Reference: BMD-ARS-8711

[REQ-3360] The ORBAT View shall be able to aggregate a collection of individual OPFOR BM Force information into a higher echelon OPFOR ORBAT unit. The aggregation shall only be done in the user interface of the ORBAT View, the underlying data shall remain unchanged. The links between the individual OPFOR BM Force information and the aggregated Force shall be maintained, but not be visible in any tree view, map view etc.

Reference: BMD-ARS-8818

[REQ-3370] The ORBAT View shall be able to aggregate individual OPFOR BM holdings into an aggregated holding and to associate it with an existing OPFOR ORBAT unit. The aggregation shall only be done in the user interface, the underlying data shall remain unchanged. The links between the individual OPFOR BM holdings and the aggregated holding shall be maintained, but not be visible in any tree view, map view etc.

Reference: BMD-ARS-8819

[REQ-3380] The ORBAT View shall automatically update OPFOR BM Force and Holdings information when the data source to INTEL-FS gets updated (see section 2.5.1.1).

Reference: BMD-ARS-8818 / BMD-ARS-8819

[REQ-3390] The user shall be able to compare two ORBATs and save the output to a Microsoft Excel file. It shall be possible to filter the results on any property of the ORBAT.

Reference: BMD-ARS-8708 / BMD-ARS-8821

[REQ-3400] The user shall be able to integrate OPFOR BM ORBAT information into the Enemy ORBAT.

Reference: BMD-ARS-8817

2.5 BMD Scenario Building Module

2.5.1 Data Sources

[040] To utilize data from external systems, TOPFAS will use Data Sources.

[REQ-3410] Any information that is provided via a service or direct database connection shall be automatically updated in TOPFAS when the source information is updated. Any information that is provided via file exchange shall be manually updated in TOPFAS by the user by importing a new file.

Reference: TOPFAS

[REQ-3420] Any information from a Data Source shall not be changed in TOPFAS.

Reference: TOPFAS

2.5.1.1 INTEL-FS

[REQ-3430] The TOPFAS operator shall be able to interface with INTEL-FS and be presented with an entry point into INTEL-FS.

Reference: BMD-ARS-8814

[REQ-3440] The TOPFAS operator shall be able to select from a list of BMOPFORCOAs and BMOPFORORBATs the relevant ones to be added to the Data Source.

Reference: BMD-ARS-8814

[REQ-3450] TOPFAS shall be able to decompose the BMOPFORCOAs and BMOPFORORBATs in the Data Source and load the content into filters of the Explorer Module component for the DE types: Area at Risk, BMOA, BM Types, OPFORORBAT and OPFORBMForce.

Reference: BMD-ARS-6508 / BMD-ARS-5979 / BMD-ARS-6075 / BMD-ARS-6146 / BMD-ARS-6515 / BMD-ARS-6517 / BMD-ARS-6523 / BMD-ARS-6525 / BMD-ARS-6511 / BMD-ARS-6512

[REQ-3460] TOPFAS shall update an existing Data Source with the latest data from INTEL-FS automatically.

Reference: BMD-ARS-6508 / BMD-ARS-6516 / BMD-ARS-6518 / BMD-ARS-6524 / BMD-ARS-6526 / BMD-ARS-6511 / BMD-ARS-6512

2.5.1.2 AirC2IS

[REQ-3470] The TOPFAS operator shall be able to interface with AirC2IS and be presented with an entry point into AirC2IS.

Reference: BMD-ARS-5415 / BMD-ARS-5416 / BMD-ARS-5990 / BMD-ARS-5991 / BMD-ARS-6186 / BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6192 / BMD-ARS-6457 / BMD-ARS-6933 / BMD-ARS-6934 / BMD-ARS-8026 / BMD-ARS-8027 / BMD-ARS-8042 / BMD-ARS-8248 / BMD-ARS-8800 / BMD-ARS-8809

[REQ-3480] The TOPFAS operator shall be able to select from a list of missions the relevant ones to be added to the Data Source.

Reference: BMD-ARS-5415 / BMD-ARS-5416 / BMD-ARS-5990 / BMD-ARS-5991 / BMD-ARS-6186 / BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6192 / BMD-ARS-6457 / BMD-ARS-6933 / BMD-ARS-6934 / BMD-ARS-8026 / BMD-ARS-8027 / BMD-ARS-8042 / BMD-ARS-8248 / BMD-ARS-8800 / BMD-ARS-8809

[REQ-3490] TOPFAS shall be able to decompose the mission in the Data Source and load the content into filters of the Explorer Module component for the DE types: OPFOR TBM COA, Friendly ORBAT, Defence Design, Asset, PCAL, JPCAL and JPDAL.

Reference: BMD-ARS-5415 / BMD-ARS-5416 / BMD-ARS-5990 / BMD-ARS-5991 / BMD-ARS-6186 / BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6192 / BMD-ARS-6457 / BMD-ARS-6933 / BMD-ARS-6934 / BMD-ARS-8026 / BMD-ARS-8027 / BMD-ARS-8042 / BMD-ARS-8248 / BMD-ARS-8800 / BMD-ARS-8809 / BMD-ARS-8280 / BMD-ARS-8281

[REQ-3500] TOPFAS shall update an existing Data Source with the latest data from AirC2IS automatically.

Reference: BMD-ARS-5415 / BMD-ARS-5416 / BMD-ARS-5990 / BMD-ARS-5991 / BMD-ARS-6186 / BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6192 / BMD-ARS-6457 / BMD-ARS-6933 / BMD-ARS-6934 / BMD-ARS-8026 / BMD-ARS-8027 / BMD-ARS-8042 / BMD-ARS-8248 / BMD-ARS-8800 / BMD-ARS-8809

2.5.1.3 CBRN-FS

[REQ-3510] The TOPFAS operator shall be able to interface with CBRN-FS and be presented with an entry point into CBRN-FS.

Reference: BMD-ARS-8796 / BMD-ARS-8798 / BMD-ARS-8799 / BMD-ARS-8803 / BMD-ARS-8804 / BMD-ARS-8146 / BMD-ARS-8152 / BMD-ARS-2411 / BMD-ARS-8720 / BMD-ARS-2505 / BMD-ARS-8722 / BMD-ARS-8719 / BMD-ARS-8793 / BMD-ARS-8794 / BMD-ARS-7642 / BMD-ARS-7643

[REQ-3520] The TOPFAS operator shall be able to select from a list of Areas at Risk with CBRN Annotations the relevant ones to be added to the Data Source.

Reference: BMD-ARS-8720

[REQ-3530] TOPFAS shall be able to decompose the mission in the Data Source and load the content into an Areas at Risk with CBRN Annotations filter of the Explorer Module component.

Reference: BMD-ARS-8796 / BMD-ARS-8798 / BMD-ARS-8799 / BMD-ARS-8803 / BMD-ARS-8804 / BMD-ARS-8146 / BMD-ARS-8152 / BMD-ARS-2411 / BMD-ARS-8720 / BMD-ARS-2505 / BMD-ARS-8722 / BMD-ARS-8719 / BMD-ARS-8793 / BMD-ARS-8794 / BMD-ARS-7642 / BMD-ARS-7643

[REQ-3540] TOPFAS shall update an existing Data Source with the latest data from CBRN-FS automatically.

Reference: BMD-ARS-8796 / BMD-ARS-8798 / BMD-ARS-8799 / BMD-ARS-8803 / BMD-ARS-8804 / BMD-ARS-8146 / BMD-ARS-8152 / BMD-ARS-2411 / BMD-ARS-8720 / BMD-ARS-2505 / BMD-ARS-8722 / BMD-ARS-8719 / BMD-ARS-8793 / BMD-ARS-8794 / BMD-ARS-7642 / BMD-ARS-7643

2.5.2 Manage local DEs

- [041] As well as getting DEs from external systems through Data Sources, it is possible to manage DEs in local TOPFAS storage, i.e. local DEs.
- [REQ-3550] The user shall be able to manage BMOAs. During create and update it shall be possible to use the Property Panel to define the BMOA either by drawing on the Quick Map or by entering coordinates.
Reference: BMD-ARS-5979
- [REQ-3560] The user shall be able to import BMOAs from an XML file.
Reference: BMD-ARS-6919
- [REQ-3570] The user shall be able to manage BM Types.
Reference: BMD-ARS-5981
- [REQ-3580] The user shall be able to manage Area at Risk. During create and update it shall be possible to use the Property Panel to define the Area at Risk either by drawing on the Quick Map or by entering coordinates.
Reference: BMD-ARS-6146
- [REQ-3590] The user shall be able to import Area at Risk from an XML file.
Reference: BMD-ARS-6921
- [REQ-3600] The user shall be able to manage BMOPFORCOAs.
Reference: BMD-ARS-6075
- [REQ-3610] The user shall be able to import BMOPFORCOAs from an XML file.
Reference: BMD-ARS-6920
- [REQ-3620] The user shall be able to associate a BM Type to a BMOA in the Scenario Building View (see section 2.5.5).
Reference: BMD-ARS-5980
- [REQ-3630] The user shall be able to associate a BMOA to an Area at Risk in the Scenario Building module (see section 2.5.5) if the BMOA and the BM types within the BMOA are compatible with the Area at Risk (i.e., the Area at Risk is completely within the maximum range of the related BMs within the BMOA as determined by the CoreGIS geo-processing service). If they are not compatible, the module shall display a warning to the operator and the association shall not be saved.
Reference: BMD-ARS-6918
- [REQ-3640] The user shall be able to modify an Area at Risk in the Scenario Building module (see section 2.5.5), if the changes are not making the Area incompatible with existing BMOA associations (i.e., the Area At Risk is completely within the maximum range of the related BMs within the associated BMOAs as determined by the CoreGIS geo-processing service). If the

changes make the Area incompatible, the module shall display a warning to the user and not allow the changes to be saved.

Reference: BMD-ARS-6918

[REQ-3650] The user shall be able to associate a TBMD/BMD Defence Design result with COAs.

Reference: BMD-ARS-8143

[REQ-3660] The user shall be able to associate a TBMD/BMD Defence Design evaluation result with COAs.

Reference: BMD-ARS-8144

[REQ-3670] The user shall be able to associate a BMOPFORCOA with Red COAs. A Red COA can only be associated with one BMOPFORCOA. When making the association, the operator shall be able to select which aspects of the BMOPFORCOA are used in the Red COA.

Reference: BMD-ARS-8170 / BMD-ARS-8171 / BMD-ARS-8813 / BMD-ARS-8816

[REQ-3680] TOPFAS shall store BMOPFORCOAs with greater than or equal to 150 threats.

Reference: BMD-ARS-6509

2.5.3 Explorer Module

2.5.3.1 DE Property Panels

[REQ-3690] The BMD Scenario Building module shall include DE Property Panels as defined in section 2.2.2 to edit DEs managed by the application.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

2.5.3.2 DE Preview Panel

[REQ-3700] The BMD Scenario Building module shall support the DE Preview Panels as defined in section 2.2.3 to display the main properties of a selected DE.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

2.5.3.3 List View

[REQ-3710] The BMD Scenario Building module shall use the List View Component with all its features as defined in section 2.4.2.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

2.5.3.4 Hierarchical View

[REQ-3720] The BMD Scenario Building module shall use the Hierarchical View Component with all its features as defined in section 2.4.3.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

2.5.3.5 Quick Map View

[REQ-3730] The BMD Scenario Building module shall use the Quick Map View component with all its features as defined in section 2.4.6 for the DEs that have a geospatial aspect.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-3740] The Quick Map View shall show all the BMOAs as red filled shapes.

Reference: BMD-ARS-5979 / BMD-ARS-5408

[REQ-3750] When the user clicks a BMOA on the Quick Map View, a tooltip shall be shown with the BMOA name and all Threat BMs in the BMOA with their minimum and maximum ranges.

Reference: BMD-ARS-3548 / BMD-ARS-5408

2.5.3.6 Table View

[REQ-3760] The BMD Scenario Building module shall use the table View Component with all its features as defined in section 2.4.7.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

2.5.4 Map View

[REQ-3770] The BMD Scenario Building module shall use the Map View component as described in section 2.4.10.

Reference: BMD-ARS-5979 / BMD-ARS-5981 / BMD-ARS-6075 / BMD-ARS-6146

[REQ-3780] The user shall be able to display an overlay with the BMOPFORCOA (Area at Risk, BMOA, BM Types, Launcher positions, OPFORORBAT and OPFORBMForce or a subset of these DE types).

Reference: BMD-ARS-5408 / BMD-ARS-6513

[REQ-3790] The user shall be able to display an overlay with the Critical Areas and Assets.

Reference: BMD-ARS-5990 / BMD-ARS-5991 / BMD-ARS-8799

[REQ-3800] The user shall be able to display an overlay with the maximum range of the interceptors as range rings.

Reference: BMD-ARS-6187

2.5.5 Scenario Building View

[REQ-3810] The Scenario Building View shall be able to visualize a BMOPFORCOA in a structured manner. The view shall contain two panes: on the left a tree grid with the BMOPFORCOA and its constituent DEs and on the right a Quick Map which will display the active selection of the left pane.

Reference: BMD-ARS-8815

[REQ-3820] The Scenario Building View shall be able to visualize display BMOPFORCOA in ≤ 1 second.

Reference: BMD-ARS-6510

[REQ-3830] The tree grid of the Scenario Building View shall be allow the following operations: expand/collapse/open DE properties.

Reference: BMD-ARS-4654

[REQ-3840] The user shall be able to display the BMOAs of the selected BMOPFORCOA on the Quick Map.

Reference: BMD-ARS-5408

[REQ-3850] The Scenario Building View shall provide a clear indication that any DE information was entered locally within TOPFAS and did not originate from a Data Source.

Reference: BMD-ARS-8810

2.6 BMD Threat Identification Module

2.6.1 Geo-processing service

[042] TOPFAS shall rely on CoreGIS to provide spatial information on territories (including marine areas), countries (NATO Countries and Third States) and areas corresponding to the first administrative level below the National level (e.g. states, departments, provinces etc.).

[REQ-3860] TOPFAS shall provide a geo-processing service that can consume a set of source locations (e.g. Threat BM sites, interceptor sites, etc.) with or without ranges and azimuth and provide both an overlay and a list of target territories (including marine areas), countries (NATO Countries and Third States) and areas corresponding to the first administrative level below the National level (e.g. states, departments, provinces etc.) that can be impacted by BMs or overflowed by own interceptors.

Reference: BMD-ARS-5667 / BMD-ARS-5405 / BMD-ARS-5661

[REQ-3870] TOPFAS shall provide a geo-processing service that can consume a set of territories (including marine areas), countries (NATO Countries and Third States) etc. and a set of Areas at Risk/Areas at Risk with CBRN Annotations and provide both an overlay and a list of territories that are overlapping with the Areas at Risk/Areas at Risk with CBRN Annotations.

Reference: BMD-ARS-8811 / BMD-ARS-8796

[REQ-3880] TOPFAS shall provide a geo-processing service that can consume a set of source location (e.g. Threat BM sites) with a range and a list of target locations and areas (e.g. Critical Areas and Assets) and provide a lists of targets can be impacted by BMs.

Reference: BMD-ARS-5415

[REQ-3890] TOPFAS shall provide a geo-processing service that can consume a set of BMOAs and BM locations plus ranges and an Area at Risk and determine if the Area at Risk is completely within the maximum range of the BMs.

Reference: BMD-ARS-6918

2.6.2 Threat Identification View

[REQ-3900] The Threat Identification View shall be able to visualize threats in a structured manner. It will consist of two panes and have different types of content:

- (1) When viewing the BMOPFORCOA, the left pane shall show a tree grid with the BMOPFORCOA and its constituent DEs and the right pane either a Quick Map or a Table View which will display the active selection of the left pane.
- (2) When viewing territories (including marine areas) and countries (NATO Countries and Third States), the left pane shall show a tree grid with the territories and countries and the right pane either a Quick Map or a Table View which will display the active threats to the selection of the left pane.
- (3) When viewing Critical Assets and Areas from the CAAL (Critical Area and Asset List), the left pane shall show a tree grid with the Critical Assets and Areas and the right pane either a Quick Map or a Table View which will display the active threats to the selection of the left pane.
- (4) When viewing Areas at Risk/Areas at Risk with CBRN Annotations, the left pane shall show a tree grid with the Areas and the right pane either a Quick Map or a Table View which will display the active threats to the selection of the left pane.

Reference: BMD-ARS-6075 / BMD-ARS-3548 / BMD-ARS-6002 / BMD-ARS-6187 / BMD-ARS-5408 / BMD-ARS-5990 / BMD-ARS-5991 / BMD-ARS-6186 / BMD-ARS-8798 / BMD-ARS-8799 / BMD-ARS-8801 / BMD-ARS-8802 / BMD-ARS-8803 / BMD-ARS-8804 / BMD-ARS-8806 / BMD-ARS-8808

[REQ-3910] The Quick Map shall allow the operator to create areas to be used as possible threatened areas for the threat identification.

Reference: BMD-ARS-6918 / BMD-ARS-3548 / BMD-ARS-5667 / BMD-ARS-8811 / BMD-ARS-6002 / BMD-ARS-8805

[REQ-3920] The Threat Identification View shall provide a clear indication that any DE information was entered locally within TOPFAS and did not originate from a Data Source.

Reference: BMD-ARS-8810

2.6.2.1 Performance Based Threat Identification

[REQ-3930] The Quick Map shall allow the operator to display the BM threat as range rings. The analysis should be based on performance data of the Threat BMs and the BMOAs in which they are located and the maximum and minimum ranges of those Threat BMs.

Reference: BMD-ARS-3548

- [REQ-3940] The Threat Identification View shall allow the operator to determine territories and countries (Marine areas, NATO Countries, Third States, areas corresponding to first administrative level below the National level and operator defined areas) which could be impacted by Threat Ballistic Missiles (BMs). The calculation shall be based on Threat BM maximum Ranges and taking into account the shape of the BMOA (point, circle, polygon).
- Reference: BMD-ARS-5667
- [REQ-3950] The Threat Identification View shall allow the operator to associate the results from the analysis of affected territories based on Threat BM maximum Ranges and taking into account the shape of the BMOA (point, circle, polygon) to COAs.
- Reference: BMD-ARS-8147
- [REQ-3960] The Quick Map shall allow the operator to display the results from the analysis of affected territories based on Threat BM maximum Ranges and taking into account the shape of the BMOA (point, circle, polygon).
- Reference: BMD-ARS-3548
- [REQ-3970] The Quick Map shall allow the operator to filter the results from the analysis of affected territories based on Threat BM maximum Ranges and taking into account the shape of the BMOA (point, circle, polygon) by the types of area to be display: Marine areas, NATO Countries, Third States, areas corresponding to first administrative level below the National level and operator defined areas.
- Reference: BMD-ARS-3548
- [REQ-3980] The Table View shall allow the operator to display the results from the analysis of affected territories based on Threat BM maximum Ranges and taking into account the shape of the BMOA (point, circle, polygon). The Table View shall display the names of each affected area/territory.
- Reference: BMD-ARS-3548
- [REQ-3990] The Table View shall allow the operator to filter the results from the analysis of affected territories based on Threat BM maximum Ranges and taking into account the shape of the BMOA (point, circle, polygon) by the types of area to be displayed: Marine areas, NATO Countries, Third States, areas corresponding to first administrative level below the National level and operator defined areas.
- Reference: BMD-ARS-3548
- [REQ-4000] The Threat Identification View shall allow the operator to determine territories (including marine areas) and countries (NATO Countries and Third States) which could be overflowed by own interceptors. The operator shall be able to limit the potentially overflowed areas by own interceptors by an operator-

defined azimuth area for each interceptor type and deployment location. The calculation shall be based on the characteristics of the interceptors.

Reference: BMD-ARS-5405 / BMD-ARS-5661

[REQ-4010] The Threat Identification View shall allow the operator to associate the results from the analysis of territories which could be overflowed by own interceptors based on the characteristics of the interceptors to COAs.

Reference: BMD-ARS-8147

[REQ-4020] The Quick Map shall allow the operator to display the results from the analysis of territories which could be overflowed by own interceptors based on the characteristics of the interceptors.

Reference: BMD-ARS-6187

[REQ-4030] The Quick Map shall allow the operator to filter the results from the analysis of territories which could be overflowed by own interceptors based on the characteristics of the interceptors by the types of area to be displayed: Marine areas, NATO Countries, Third States, areas corresponding to first administrative level below the National level and operator defined areas.

Reference: BMD-ARS-6187

[REQ-4040] The Quick Map shall allow the operator to display the results from the analysis of territories which could be overflowed by own interceptors based on the characteristics of the interceptors. It shall be possible to display the maximum range of the interceptors as range rings.

Reference: BMD-ARS-6187

[REQ-4050] The Table View shall allow the operator to display the results from the analysis of territories which could be overflowed by own interceptors based on the characteristics of the interceptors. The Table View shall display the names of each territory that can be overflowed by own interceptors.

Reference: BMD-ARS-6187

[REQ-4060] The Table View shall allow the operator to filter the results from the analysis of territories which could be overflowed by own interceptors based on the characteristics of the interceptors by the types of area to be displayed: Marine areas, NATO Countries, Third States, areas corresponding to first administrative level below the National level and operator defined areas.

Reference: BMD-ARS-6187

[REQ-4070] The Threat Identification View shall allow the operator to identify the Critical Assets and Areas from the CAAL (Critical Area and Asset List) that could be impacted by Threat Ballistic Missiles (BMs). The calculation shall be based on performance data of the BMOAs in which are located and the maximum and minimum ranges of those Threat BMs. The calculations shall be performed with and without taking the BM Targeting Strategy into account.

Reference: BMD-ARS-5415 / BMD-ARS-5991

[REQ-4080] The Threat Identification View shall allow the operator to determine the type of Threat BM and in particular the Warhead Type that each Critical Asset and Area could be impacted by.

Reference: BMD-ARS-5416 / BMD-ARS-5415

[REQ-4090] The Threat Identification View shall allow the operator to associate the results from the analysis of affected Critical Areas and Assets based on performance data of the Threat BMs and the BMOAs in which they are located and the maximum and minimum ranges of those Threat BMs (with or without taking the BM Targeting Strategy into account) to COAs.

Reference: BMD-ARS-8148

[REQ-4100] The Quick Map shall allow the operator to display the results of the calculation based on performance data of the Threat BMs and the BMOAs in which they are located and the maximum and minimum ranges of those Threat BMs (with or without taking the BM Targeting Strategy into account).

Reference: BMD-ARS-5990 / BMD-ARS-6186 / BMD-ARS-5991 / BMD-ARS-8809

[REQ-4110] The Quick Map shall allow the operator to filter the results of the calculation based on performance data of the Threat BMs and the BMOAs in which they are located and the maximum and minimum ranges of those Threat BMs (with or without taking the BM Targeting Strategy into account) by the asset type (political or military assets), Threat BM Type and Warhead Types.

Reference: BMD-ARS-5990 / BMD-ARS-5991 / BMD-ARS-6186 / BMD-ARS-8809

[REQ-4120] The Table View shall allow the operator to display the results of the calculation based on performance data of the Threat BMs and the BMOAs in which they are located and the maximum and minimum ranges of those Threat BMs (with or without taking the BM Targeting Strategy into account). The Table View shall display for each Critical Asset and Area the name and the associated Threat BM Types and the Warhead Types according to the selected filters.

Reference: BMD-ARS-5990

[REQ-4130] The Table View shall allow the operator to filter the results of the calculation based on performance data of the Threat BMs and the BMOAs in which they are located and the maximum and minimum ranges of those Threat BMs (with or without taking the BM Targeting Strategy into account) by the asset type (political or military assets), Threat BM Type and Warhead Types and the BM Targeting Strategy.

Reference: BMD-ARS-5990 / BMD-ARS-5991 / BMD-ARS-8809 / BMD-ARS-6186

[REQ-4140] The Threat Identification View shall allow the operator to select a territory or country (Marine areas, NATO Countries, Third States, areas corresponding to first administrative level below the National level and operator defined areas) and determine the Threat Ballistic Missiles (BMs) that can impact it. The

calculation shall be based on maximum Ranges and taking into account the shape of the BMOA (point, circle, polygon) and Areas At Risk.

Reference: BMD-ARS-8801

[REQ-4150] The Quick Map shall allow the operator to display the Threat Ballistic Missiles (BMs) that can impact the selected territory.

Reference: BMD-ARS-8801

[REQ-4160] The Quick Map shall allow the operator to filter the Threat Ballistic Missiles (BMs) that can impact the selected territory by the BMOAs.

Reference: BMD-ARS-8801

[REQ-4170] The Table View shall allow the operator to display the Threat Ballistic Missiles (BMs) that can impact the selected territory. The Table View shall display the details of the Threat BMs and the associated BMOAs.

Reference: BMD-ARS-8801

[REQ-4180] The Threat Identification View shall allow the operator to select a Critical Asset or Area and determine the Threat Ballistic Missiles (BMs) that can impact it. The calculation shall be based on maximum Ranges and taking into account the shape of the BMOA (point, circle, polygon) and Areas At Risk.

Reference: BMD-ARS-8802

[REQ-4190] The Quick Map shall allow the operator to display the Threat Ballistic Missiles (BMs) that can impact the selected Critical Asset or Area.

Reference: BMD-ARS-8802

[REQ-4200] The Table View shall allow the operator to display the Threat Ballistic Missiles (BMs) that can impact the selected Critical Asset or Area. The Table View shall display the details of the Threat BMs and associated BMOAs.

Reference: BMD-ARS-8802

[REQ-4210] The Threat Identification View shall allow the operator to select a territory or country (Marine areas, NATO Countries, Third States, areas corresponding to first administrative level below the National level and operator defined areas) and determine the Threat BM Types and the Warhead Types it is threatened by. The calculation shall be based on performance data of the Threat BMs and the BMOAs in which they are located and the maximum and minimum ranges of those Threat BMs.

Reference: BMD-ARS-8805

[REQ-4220] The Table View shall allow the operator to display the Threat BM Types and the Warhead Types that can threaten the selected territory based on performance data of the Threat BMs and the BMOAs in which they are located and the maximum and minimum ranges of those Threat BMs. The Table View

shall display the names of each territory and the associated Threat BM Types and the Warhead Types.

Reference: BMD-ARS-8806

2.6.2.2 Area at Risk Based Threat Identification

[REQ-4230] The Threat Identification View shall allow the operator to determine territories and countries (Marine areas, NATO Countries, Third States, areas corresponding to first administrative level below the National level and operator defined areas) which could be impacted by Threat Ballistic Missiles (BMs). The operator shall be able to select the types of areas to be displayed: Marine areas, NATO Countries, Third States, areas corresponding to first administrative level below the National level and operator defined areas. The calculation shall be based on the Areas at Risk.

Reference: BMD-ARS-8811

[REQ-4240] The Threat Identification View shall allow the operator to associate the results from the analysis of affected territories based on the Areas at Risk to COAs.

Reference: BMD-ARS-8147

[REQ-4250] The Quick Map shall allow the operator to display the results from the analysis of affected territories based on the Areas at Risk.

Reference: BMD-ARS-6002

[REQ-4260] The Quick Map shall allow the operator to filter the results from the analysis of affected territories based on the Areas at Risk by the types of areas to be displayed: Marine areas, NATO Countries, Third States, areas corresponding to first administrative level below the National level and operator defined areas.

Reference: BMD-ARS-6002

[REQ-4270] The Table View shall allow the operator to display the results from the analysis of affected territories based on the Areas at Risk. The Table View shall display for each Area at Risk the name and territories/countries.

Reference: BMD-ARS-6002

[REQ-4280] The Table View shall allow the operator to filter the results from the analysis of affected territories based on the Areas at Risk by the type of area to be displayed: Marine areas, NATO Countries, Third States, areas corresponding to first administrative level below the National level and operator defined areas.

Reference: BMD-ARS-6002

[REQ-4290] The Threat Identification View shall allow the operator to identify the Critical Assets and Areas that could be impacted by Threat Ballistic Missiles (BMs) based on Areas At Risk. This data is contained in the DE "Areas at Risk" from INTEL-FS.

Reference: BMD-ARS-5990

- [REQ-4300] The Quick Map shall allow the operator to display the results from the analysis of the Critical Assets and Areas that could be impacted by Threat Ballistic Missiles (BMs) based on Areas At Risk.
- Reference: BMD-ARS-5990
- [REQ-4310] The Quick Map shall allow the operator to filter the results from the analysis of the Critical Assets and Areas that could be impacted by Threat Ballistic Missiles (BMs) based on Areas At Risk by asset type (political or military assets) and Areas at Risk.
- Reference: BMD-ARS-5990
- [REQ-4320] The Table View shall allow the operator to display the results from the analysis of the Critical Assets and Areas that could be impacted by Threat Ballistic Missiles (BMs) based on Areas At Risk. The Table View shall display the name of each Critical Asset and Area and the name of the associated Area At Risk according to the selected filters.
- Reference: BMD-ARS-5990
- [REQ-4330] The Table View shall allow the operator to filter the results from the analysis of the Critical Assets and Areas that could be impacted by Threat Ballistic Missiles (BMs) based on Areas At Risk by asset type (political or military assets) and Areas at Risk.
- Reference: BMD-ARS-5990 / BMD-ARS-8809
- [REQ-4340] The Threat Identification View shall allow the operator to determine territories and countries which could be impacted by COI/COE/CONI effects. The operator shall be able to select the types of areas to be displayed: Marine areas, NATO Countries, Third States, areas corresponding to first administrative level below the National level and operator defined areas. The calculation shall be based on Areas At Risk with CBRN Annotations.
- Reference: BMD-ARS-8796
- [REQ-4350] The Threat Identification View shall allow the operator to associate the results from the analysis of territories which could be impacted by COI/COE/CONI effects based on Areas At Risk with CBRN Annotations to COAs.
- Reference: BMD-ARS-8146
- [REQ-4360] The Quick Map shall allow the operator to display the results from the analysis of territories which could be impacted by COI/COE/CONI effects based on Areas At Risk with CBRN Annotations.
- Reference: BMD-ARS-8798
- [REQ-4370] The Quick Map shall allow the operator to filter the results from the analysis of territories which could be impacted by COI/COE/CONI effects based on Areas At Risk with CBRN Annotations by the types of areas to be displayed: Marine

areas, NATO Countries, Third States, areas corresponding to first administrative level below the National level and operator defined areas.

Reference: BMD-ARS-8798

[REQ-4380] The Table View shall allow the operator to display the results from the analysis of territories which could be impacted by COI/COE/CONI effects based on Areas At Risk with CBRN Annotations. The Table View shall display for each Area at Risk with CBRN Annotations the name and territories/countries.

Reference: BMD-ARS-8798

[REQ-4390] The Table View shall allow the operator to filter the results from the analysis of territories which could be impacted by COI/COE/CONI effects based on Areas At Risk with CBRN Annotations by the type of area to be displayed: Marine areas, NATO Countries, Third States, areas corresponding to first administrative level below the National level and operator defined areas.

Reference: BMD-ARS-8798

[REQ-4400] The Table View shall allow the operator to export the results from the analysis of territories which could be impacted by COI/COE/CONI effects based on Areas At Risk with CBRN Annotations using the active filtering parameters.

Reference: BMD-ARS-8797

[REQ-4410] The Threat Identification View shall allow the operator to identify the Critical Assets and Areas from the CAAL (Critical Area and Asset List) that could be impacted by COI/COE/CONI effects. This data is contained in the in the DE "Areas at Risk with CBRN Annotations" from CBRN-FS.

Reference: BMD-ARS-8799

[REQ-4420] The Threat Identification View shall allow the operator to associate the results from the analysis of the Critical Assets and Areas from the CAAL that could be impacted by COI/COE/CONI effects to COAs.

Reference: BMD-ARS-8146

[REQ-4430] The Quick Map shall allow the operator to display the results from the analysis of the Critical Assets and Areas from the CAAL that could be impacted by COI/COE/CONI effects.

Reference: BMD-ARS-8799

[REQ-4440] The Quick Map shall allow the operator to filter the results from the analysis of the Critical Assets and Areas from the CAAL that could be impacted by COI/COE/CONI effects by Areas at Risk with CBRN Annotations.

Reference: BMD-ARS-8799

[REQ-4450] The Table View shall allow the operator to display the results from the analysis of the Critical Assets and Areas from the CAAL that could be impacted by

COI/COE/CONI effects. The Table View shall display for each Area at Risk with CBRN Annotations the Critical Assets and Areas.

Reference: BMD-ARS-8799

[REQ-4460] The Table View shall allow the operator to filter the results from the analysis of the Critical Assets and Areas from the CAAL that could be impacted by COI/COE/CONI effects by Areas at Risk with CBRN Annotations.

Reference: BMD-ARS-8799

[REQ-4470] The Table View shall allow the operator to export the results from the analysis of the Critical Assets and Areas from the CAAL that could be impacted by COI/COE/CONI effects using the active filtering parameters.

Reference: BMD-ARS-8800

[REQ-4480] The Threat Identification View shall allow the operator to select a territory or country (Marine areas, NATO Countries, Third States, areas corresponding to first administrative level below the National level and operator defined areas) and show the COI/COE/CONI effects it could be impacted by based on Areas At Risk with CBRN Annotations it in the Table View.

Reference: BMD-ARS-8803

[REQ-4490] The Threat Identification View shall allow the operator to select a Critical Asset or Area and show the COI/COE/CONI effects it could be impacted by based on Areas At Risk with CBRN Annotations it in the Table View.

Reference: BMD-ARS-8804

[REQ-4500] The Threat Identification View shall allow the operator to select a territory or country (Marine areas, NATO Countries, Third States, areas corresponding to first administrative level below the National level and operator defined areas) and determine the Threat BM Types and the Warhead Types it is threatened by. The calculation shall be based on Areas At Risk.

Reference: BMD-ARS-8805

[REQ-4510] The Table View shall allow the operator to display the Threat BM Types and the Warhead Types that can threaten the selected territory based on Areas At Risk. The Table View shall display the name of the territory and the associated Threat BM Types and the Warhead Types.

Reference: BMD-ARS-8806

[REQ-4520] The Table View shall allow the operator to export the Threat BM Types and the Warhead Types that can threaten the selected territory based on Areas At Risk.

Reference: BMD-ARS-8807

[REQ-4530] The Threat Identification View shall allow the operator to select a territory or country (Marine areas, NATO Countries, Third States, areas corresponding to first administrative level below the National level and operator defined areas)

and show the applicable operational tempo information based on the relevant Areas at Risk in the Table View. The calculation shall be based on Areas At Risk.

Reference: BMD-ARS-8808

[REQ-4540] The Threat Identification View shall allow the operator to display the Areas at Risk with CBRN Annotations on the Quick Map.

Reference: BMD-ARS-2411 / BMD-ARS-6513

[REQ-4550] The Threat Identification View shall allow the operator to filter Areas at Risk with CBRN Annotations on the Quick Map by associated BMOAs, associated BM types, associated OPFOR BM COAs, intersection with a Critical Assets and Areas and intersection with a geospatial feature of interest.

Reference: BMD-ARS-8719 / BMD-ARS-8793

[REQ-4560] The Threat Identification View shall allow the operator to display the Areas at Risk with CBRN Annotations on the Table View. The Table View shall display the details of the Areas at Risk with CBRN Annotations and parameters of the associated OPFOR Ballistic Missile COAs (e.g. location).

Reference: BMD-ARS-8722

[REQ-4570] The Threat Identification View shall display the predictions within 1 second from execution of the display command.

Reference: BMD-ARS-2505

[REQ-4580] The Threat Identification View shall allow the operator to display system elements and geospatial feature of interest that intersect with the selected Areas at Risk with CBRN Annotations in the Table View. The operator shall be able to filter by Areas at Risk with CBRN Annotations and system element types.

Reference: BMD-ARS-8794

2.7 BMD Requirements Management

[REQ-4590] The Forces View shall allow the operator to manage the BMD capability requirements.

Reference: BMD-ARS-8008

[REQ-4600] The Forces View shall allow the operator to distinguish between BMD, TBMD and other requirements.

Reference: BMD-ARS-8009

[REQ-4610] The Forces View shall allow the operator to clearly distinguish the BMD requirements in terms of functions (e.g. sensing/engaging/supporting).

Reference: BMD-ARS-8030

- [REQ-4620] The Forces View shall be able to include the capability requirements identified in the defence design from an AirC2IS data source.
Reference: BMD-ARS-8026 / BMD-ARS-8110
- [REQ-4630] The Defence Design View shall allow the operator to display the planned usage of each BMD force requirement and their role in the planned defence designs, e.g. defended assets and threats being countered
Reference: BMD-ARS-8027
- [REQ-4640] The Defence Design View shall allow the operator to identify unfulfilled BMD force requirements and display the planned usage of these BMD force requirement and their role in the planned defence designs.
Reference: BMD-ARS-8027
- [REQ-4650] The SOR Management View shall display the fulfilment level of each BMD capability requirement.
Reference: BMD-ARS-8042 / BMD-ARS-8114
- [REQ-4660] TOPFAS shall allow the user to receive and manage impact reports from AirC2IS.
Reference: BMD-ARS-8042
- [REQ-4670] The EFGMT shall be able to manage the apportioned to nations of each BMD capability requirement.
Reference: BMD-ARS-8041
- [REQ-4680] The SOR Management View shall be able to display apportionment of nations to each BMD capability requirement.
Reference: BMD-ARS-8041
- [REQ-4690] The EFGMT shall be able to display the shortfalls of each BMD capability requirement.
Reference: BMD-ARS-8043
- [REQ-4700] The SOR Management View shall be able to display shortfalls of each BMD capability requirement from EFGMT taking time filters into account.
Reference: BMD-ARS-8043
- [REQ-4710] The Defence Design View shall be able to display shortfalls of each BMD capability requirement from EFGMT taking time filters into account.
Reference: BMD-ARS-8043
- [REQ-4720] The Defence Design View shall be able to display shortfalls of each BMD capability requirement from EFGMT in space.
Reference: BMD-ARS-8043

- [REQ-4730] TOPFAS shall allow the user to receive and manage analysis of shortfalls in BMD capabilities both in time and space reports from AirC2IS.
Reference: BMD-ARS-8043
- [REQ-4740] The EFGMT shall allow the operator to generate the ACTWARN Force Request message for BMD requirements.
Reference: BMD-ARS-8040
- [REQ-4750] The EFGMT shall be able to process national BMD force contribution (FORCEPREP) messages.
Reference: BMD-ARS-8039 / BMD-ARS-8114
- [REQ-4760] TOPFAS shall disseminate the information on forces contribution to component systems.
Reference: BMD-ARS-8039
- [REQ-4770] The EFGMT shall be able to manage associations of caveats to (BMD) national force contributions and related Friendly Order of Battle units.
Reference: BMD-ARS-8037 / BMD-ARS-8820 / BMD-ARS-8114
- [REQ-4780] OPT shall be able to retrieve caveats associated to Friendly Order of Battle units from EFGMT and display them on the Forces View and SOR Management View.
Reference: BMD-ARS-8820 / BMD-ARS-8114
- [REQ-4790] OMT shall be able to retrieve caveats associated to Friendly Order of Battle units from EFGMT and display them on the ORBAT View.
Reference: BMD-ARS-8820 / BMD-ARS-8114
- [REQ-4800] The EFGMT shall be able to show the impact of a new operation on the standing BMD mission. When BMD contributions are allocated during force sensing to another mission, EFGMT shall show an indication on the requirement and on the contribution in both missions.
Reference: BMD-ARS-8035
- [REQ-4810] OPT shall be able to retrieve the impact of a new operation on the standing BMD mission from EFGMT and display it on the SOR Management View.
Reference: BMD-ARS-8035
- [REQ-4820] OPT shall be able to show the impact of a new operation on the standing BMD mission and display it on the Defence Design View.
Reference: BMD-ARS-8035
- [REQ-4830] OPT shall be able to compare Defended Asses Lists and show the differences in Defended Assets. The differences shall include the level of protection (i.e. the defence status).
Reference: BMD-ARS-8714 / BMD-ARS-8715

[REQ-4840] OPT shall be able to store the comparison between Defended Asses Lists as a document.

Reference: BMD-ARS-8716

2.8 BMD Reporting Module

2.8.1 Document Views

[REQ-4850] The user shall be able to add a BMOPFORCOA to a document as a paragraph and as a table with the following information:

- (1) BMOPFORCOA Label, Name, Description, COA Type, Actor
- (2) For each BMOA: The OperatingAreald, LocationCountry, Status, Operational Tempo, Period Of Validity Start, Period Of Validity End, Threat Launchers Present, Threat Missiles Present
- (3) For each OPFORBMForce: Label, Name, Description, Location

Reference: BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6195 / BMD-ARS-6192 / BMD-ARS-6933 / BMD-ARS-6934

[REQ-4860] The user shall be able to add a table to a document with territories and countries which could be impacted by Threat BMs with the following information: the area/country name, the Threat BM Type and the Warhead Type.

Reference: BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6195 / BMD-ARS-6192 / BMD-ARS-6933 / BMD-ARS-6934

[REQ-4870] The user shall be able to add a table to a document with the expected raid size per threatened area with the following information: the area/country name, expected raid size.

Reference: BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6195 / BMD-ARS-6192 / BMD-ARS-6933 / BMD-ARS-6934

[REQ-4880] The user shall be able to add a table to a document with the territories and countries which could be which could be overflowed by own interceptors with the following information: the area/country name, interceptor deployment location, interceptor maximum range.

Reference: BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6195 / BMD-ARS-6192 / BMD-ARS-6933 / BMD-ARS-6934

[REQ-4890] The user shall be able to add a table to a document with the Critical Assets and Areas that could be impacted by Threat BMs with the following information: for each Critical Asset/Area the name, the Threat BM Types and the Warhead Types and whether or not the BM Targeting Strategy was taken into account for the calculation.

Reference: BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6195 / BMD-ARS-6192 / BMD-ARS-6933 / BMD-ARS-6934

- [REQ-4900] The user shall be able to add a table to a document with territories and countries which could be impacted by Threat BMs based on Areas at Risk with the following information: for each Area at Risk the name and the territories/countries.
- Reference: BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6195 / BMD-ARS-6192 / BMD-ARS-6933 / BMD-ARS-6934
- [REQ-4910] The user shall be able to add a table to a document with the Critical Assets and Areas that could be impacted by Threat BMs based on Areas at Risk with the following information: for each Area at Risk the name and all the Critical Asset/Area names impacted.
- Reference: BMD-ARS-6190 / BMD-ARS-6191 / BMD-ARS-6195 / BMD-ARS-6192 / BMD-ARS-6933 / BMD-ARS-6934
- [REQ-4920] The user shall be able to develop SACEURs Strategic Military Advice (SMA) in accordance with the NATO Crisis Response System Manual (NCRSM) in the Document View.
- Reference: BMD-ARS-6190
- [REQ-4930] The user shall be able to add the following content to the SMA: Assets, Critical Asset List (CAL), Prioritised Critical Asset List (PCAL), Joint Prioritised Critical Asset List (JPCAL) and Joint Prioritised Defended Asset List (JPDAL).
- Reference: BMD-ARS-6190
- [REQ-4940] The user shall be able to generate the SMA in accordance with the NATO Crisis Response System Manual (NCRSM).
- Reference: BMD-ARS-5204
- [REQ-4950] TOPFAS shall contain SMA process and document templates including BMD specific content.
- Reference: BMD-ARS-5204
- [REQ-4960] The user shall be able to develop SACEUR's Strategic Assessment (SSA) in accordance with the COPD in the Document View.
- Reference: BMD-ARS-6191
- [REQ-4970] The user shall be able to add the following content to the SSA: Assets, Critical Asset List (CAL), Prioritised Critical Asset List (PCAL), Joint Prioritised Critical Asset List (JPCAL) and Joint Prioritised Defended Asset List (JPDAL).
- Reference: BMD-ARS-6191
- [REQ-4980] The user shall be able to generate the SSA in accordance with the COPD.
- Reference: BMD-ARS-5207
- [REQ-4990] TOPFAS shall contain SSA process and document templates including BMD specific content.
- Reference: BMD-ARS-5207

- [REQ-5000] The user shall be able to develop the Standing Defence Plan (SDP) regarding BMD specific content in the Document View.
Reference: BMD-ARS-6195
- [REQ-5010] TOPFAS shall contain SDP process and document templates including BMD specific content.
Reference: BMD-ARS-6195 / BMD-ARS-6196 / BMD-ARS-8849
- [REQ-5020] The user shall be able to export the SDP to Word either including or excluding passive defence content.
Reference: BMD-ARS-6196 / BMD-ARS-8849
- [REQ-5030] The user shall be able to develop Military Response Options (MROs) in accordance with the COPD.
Reference: BMD-ARS-6192
- [REQ-5040] The user shall be able to add the following content to the MRO: Assets, Critical Asset List (CAL), Prioritised Critical Asset List (PCAL), Joint Prioritised Critical Asset List (JPCAL) and Joint Prioritised Defended Asset List (JPDAL).
Reference: BMD-ARS-6192
- [REQ-5050] The user shall be able to export MROs to Word either including or excluding passive defence content in accordance with the COPD.
Reference: BMD-ARS-5209 / BMD-ARS-8850
- [REQ-5060] The user shall be able to export selected parts of the MROs to PowerPoint either including or excluding passive defence content in accordance with the COPD.
Reference: BMD-ARS-5209 / BMD-ARS-8850
- [REQ-5070] TOPFAS shall contain MRO process and document templates including BMD specific content.
Reference: BMD-ARS-6192
- [REQ-5080] The user shall be able to develop the Course of Action (COA) Decision Briefing in accordance with the COPD.
Reference: BMD-ARS-6933
- [REQ-5090] The user shall be able to add the following content to the COA Decision Briefing: Assets, Critical Asset List (CAL), Prioritised Critical Asset List (PCAL), Joint Prioritised Critical Asset List (JPCAL) and Joint Prioritised Defended Asset List (JPDAL).
Reference: BMD-ARS-6933

- [REQ-5100] The user shall be able to create the COA Decision Briefing with TOPFAS content in PowerPoint, either including or excluding passive defence content in accordance with the COPD.
Reference: BMD-ARS-6929 / BMD-ARS-8851
- [REQ-5110] The user shall be able to develop the Mission Analysis Briefing (MAB) in accordance with the COPD.
Reference: BMD-ARS-6934
- [REQ-5120] The user shall be able to add the following content to the MAB: Assets, Critical Asset List (CAL), Prioritised Critical Asset List (PCAL), Joint Prioritised Critical Asset List (JPCAL) and Joint Prioritised Defended Asset List (JPDAL).
Reference: BMD-ARS-6934
- [REQ-5130] The user shall be able to create the Mission Analysis Briefing (MAB) with TOPFAS content in PowerPoint, either including or excluding passive defence content in accordance with the COPD.
Reference: BMD-ARS-6928 / BMD-ARS-8852

2.8.2 COA Comparison View

- [REQ-5140] The user shall be able to include TBMD/BMD Defence Design results in the COA Comparison View to compare COAs.
Reference: BMD-ARS-8149
- [REQ-5150] The user shall be able to include TBMD/BMD Defence Design evaluation results in the COA Comparison View to compare COAs.
Reference: BMD-ARS-8151
- [REQ-5160] The user shall be able to include CBRN hazard analysis results in the COA Comparison View to compare COAs. The details shall display territories and countries which could be impacted by COI/COE/CONI effects (see [REQ-4340]) and the Critical Assets and Areas from the CAAL (Critical Area and Asset List) which could be impacted by COI/COE/CONI effects (see [REQ-4410]).
Reference: BMD-ARS-8152
- [REQ-5170] The user shall be able to include affected Nations analysis results in the COA Comparison View to compare COAs. The details shall display nations which could be impacted by Threat (BMs) based on BM maximum range (see [REQ-3940]), the nations which could be impacted by Threat (BMs) based on Areas At Risk (see [REQ-4210]) and the nations which could be overflowed by own interceptors (see [REQ-4000]).
Reference: BMD-ARS-8153
- [REQ-5180] The user shall be able to include affected Critical Areas and Assets in the COA Comparison View to compare COAs. The details shall display Critical

Areas and Assets which could be impacted by Threat (BMs) based on BM maximum range (see [REQ-4070]) and the Critical Areas and Assets which could be impacted by Threat (BMs) based on Areas At Risk (see [REQ-6450])

Reference: BMD-ARS-8154

2.9 BMD Catalogue Services

[043] A catalogue is a collection of reference Data Entities with all their properties.

[044] Reserved

[REQ-5190] TOPFAS shall provide a queryable CRM (Crisis Response Measures) catalogue service. The service shall be implemented as a REST service (see section 2.1.2).

Reference: BMD-ARS-8837 / BMD-ARS-7310

[REQ-5200] TOPFAS shall provide a queryable ROE (Rule of Engagement) catalogue service. The service shall be implemented as a REST service (see section 2.1.2).

Reference: BMD-ARS-7310

[REQ-5210] TOPFAS shall provide a queryable Capability Code catalogue service. The service shall be implemented as a REST service (see section 2.1.2).

Reference: BMD-ARS-8028

[REQ-5220] The catalogue services shall support multiple versions for each catalogue.

Reference: BMD-ARS-8837 / BMD-ARS-7310 / BMD-ARS-8028

[REQ-5230] The catalogue services shall be integrated in all relevant TOPFAS applications.

Reference: BMD-ARS-8837 / BMD-ARS-7310 / BMD-ARS-8028

[REQ-5240] TOPFAS shall provide a catalogue browser to access the catalogue services.

Reference: BMD-ARS-8837 / BMD-ARS-7310 / BMD-ARS-8028

[REQ-5250] The catalogue browser shall be semantically aware of the data context to display all relevant properties of catalogue items.

Reference: BMD-ARS-8837 / BMD-ARS-7310 / BMD-ARS-8028

[REQ-5260] The catalogue browser shall be semantically aware of the data context and display of the data shall have relevant grouping, filtering and sorting.

Reference: BMD-ARS-8837 / BMD-ARS-7310 / BMD-ARS-8028

[REQ-5270] The catalogue browser shall be semantically aware of the data context to allow searching for catalogue items.

Reference: BMD-ARS-8837 / BMD-ARS-7310 / BMD-ARS-8028

[REQ-5280] TOPFAS shall have a Catalogue Management web app that shall allow a user to manage the catalogues, based on the user permissions.

Reference: BMD-ARS-8837 / BMD-ARS-7310 / BMD-ARS-8028

[REQ-5290] The Catalogue Management app shall allow management of catalogues on all TOPFAS applications.

Reference: BMD-ARS-8837 / BMD-ARS-7310 / BMD-ARS-8028

2.10 CRM Management Module

[REQ-5300] OPT shall support the Crisis Response Measure Procedures to allow the user to identify CRMs to be declared in the context of an operation or exercise. This includes:

- select CRMs from the CRM catalogue during the planning process
- allow the creation of Annex JJ of the OPLAN

Reference: BMD-ARS-6191 / BMD-ARS-6195 / BMD-ARS-8837

[REQ-5310] NCRS shall allow the users to retrieve the approved list of CRMs from OPT to support CRM life-cycle management.

Reference: BMD-ARS-6191 / BMD-ARS-6195 / BMD-ARS-8837

2.11 TOPFAS Training and Exercise Management App

[045] The Education, Training, Exercises and Evaluation Functional Services (ETEE-FS) provides collective training and exercise capabilities to the BMD community for the preparation, conduct and analysis of their weekly training and periodic exercises. TOPFAS shall be able to interface with the ETEE-FS during preparation and execution of training and exercises for the latter to be able to release planning Training Components (DEs, diagrams, containers, files, EFGMT/NCRS messages etc.) at scripted times into TOPFAS.

[045(i)] ETEE-FS uses the concept of "content update file" that should be generated and consumed by TOPFAS. The generated file is to be considered an "instruction set" defining an intended update and/or actions to be taken TOPFAS when the file is released by ETEE-FS. The file will be made available by TOPFAS to ETEE FS for attaching it to an exercise script element. At the scheduled time in the exercise script, ETEE FS will send the file to TOPFAS for processing.

[045(ii)] There is no predefined structure of the content update file and ETEE FS is agnostic of its content. The content update file can contain small payloads/updates in addition to the instruction set (total size max 10MB). Larger payloads shall be managed separately by TOPFAS. Training Components can be considered a payload.

[046] User roles for the TEM need to be defined at design time based on the functional requirements.

[REQ-5320] TOPFAS shall have an exercise/training preparation web app TEM (Training and Exercise Management) that shall allow management of Training

Components to be used by ETEE-FS during the planning and execution of trainings and exercises.

Reference: BMD-ARS-8873 / BMD-ARS-7307 / BMD-ARS-7276

[REQ-5330] The TEM shall allow the user to create Training Components (TCs). These TCs can be internal TOPFAS objects, e.g. ORBATS and COAs or external input, e.g. AIFS (Allied Information Flow System) and email messages to be send to EFGMT/RRT/NCRS, files to be imported etc.

Reference: BMD-ARS-8873 / BMD-ARS-7254

[REQ-5340] TOPFAS shall use different databases for operational use and exercise/training, with the exception of NCRS (see [REQ-5350])

Reference: BMD-ARS-8877 / BMD-ARS-8879 / BMD-ARS-8880 / BMD-ARS-8881 / BMD-ARS-7309

[REQ-5350] NCRS shall use the operational database for exercise and training. Filtering shall be used for operational, exercise and training sessions to ensure separation of data sources and information.

Reference: BMD-ARS-8877 / BMD-ARS-8879 / BMD-ARS-8880 / BMD-ARS-8881 / BMD-ARS-7309

[REQ-5360] The TEM shall allow the user to interface with ETEE-FS and be presented with an entry point into ETEE-FS.

Reference: BMD-ARS-7267 / BMD-ARS-7272 / BMD-ARS-7288 / BMD-ARS-8876

[REQ-5370] The TEM shall allow the user to select a training or exercise scenario in ETEE-FS to be used for linking of the Training Components. If no connection to ETEE-FS is available, it shall be possible to create a scenario in the TEM.

Reference: BMD-ARS-8873 / BMD-ARS-7267 / BMD-ARS-7272 / BMD-ARS-7288 / BMD-ARS-8876

[REQ-5380] The TEM shall allow the user to select Training Components (see [REQ-5330]) and add them to the selected scenario which will generate a unique token that links the Training Component with the selected scenario. This shall set the activation state of each Training Components in the scenario to 'not published'.

Reference: BMD-ARS-7317 / BMD-ARS-7276 / BMD-ARS-7284 / BMD-ARS-7318

[REQ-5390] The Training Components shall be marked as "Training" or "Exercise" in their metadata in addition to any standard security and exercise markers that are normally be present to mitigate the likelihood of operational use of training data.

Reference: BMD-ARS-7301 / BMD-ARS-7302 / BMD-ARS-7304 / BMD-ARS-8875

[REQ-5400] The Training Components shall have the following activation states:

- (1) not published: not published to ETEE-FS;
- (2) published: published to ETEE-FS and the scenario is not active yet.

- (3) pending release: published to ETEE-FS and waiting for ETEE-FS to release to the training audience and the scenario is active;
- (4) released: released by ETEE-FS to the training audience.
- (5) deleted: soft deleted from the scenario, revocation sent to ETEE-FS.

Reference: BMD-ARS-8873 / BMD-ARS-7276 / BMD-ARS-7267 / BMD-ARS-7269 / BMD-ARS-7272

[REQ-5410] The Training Components shall have the following modification states:

- (1) modification required: still requires modification;
- (2) modification in progress: waiting for modification to be completed;
- (3) modification ready: modification completed.

Reference: BMD-ARS-7278

[REQ-5420] The TEM shall have a list control showing all the Training Components of the selected scenario with label, name, type, visibility (visible to TEM users only or to all users), activation state (not published/published/pending release/released) and modification state (required/in progress/ready). The TEM shall allow the user to reorder the Training Components in the list.

Reference: BMD-ARS-8873

[REQ-5430] The TEM shall allow the user to filter on Training Component type, visibility, activation state and modification state.

Reference: BMD-ARS-4654

[REQ-5440] The TEM shall allow the user to search by Training Component label and name.

Reference: BMD-ARS-4654

[REQ-5450] The TEM shall allow the user to make a selection of Training Components and turn the visibility for TOPFAS operators on or off.

Reference: BMD-ARS-8873

[REQ-5460] The TEM list control shall allow the user to make a selection of Training Components and publish the tokens to ETEE-FS in the order of the list control. This shall set the activation state of each Training Components in the scenario to 'published'.

Reference: BMD-ARS-8873

[REQ-5470] The TEM shall be able to receive a notification from ETEE-FS to set the scenario state to active once the training or exercise starts. This shall set the activation state of each Training Components in the scenario with state 'published' to 'pending release'.

Reference: BMD-ARS-8873

[REQ-5480] The TEM shall allow the user to manually set the scenario state to active once the training or exercise starts. This shall set the activation state of each

Training Components in the scenario with state 'published' to 'pending release'.

Reference: BMD-ARS-8873

[REQ-5490] The TEM shall allow the user to set the scenario state to inactive. This shall set the activation state of each Training Components in the scenario with state 'pending release' to 'published'.

Reference: BMD-ARS-8873

[REQ-5500] The TEM list control shall allow the user to make a selection of Training Components and set the activation state to any value.

Reference: BMD-ARS-8873

[REQ-5510] The TEM list control shall allow the user to make a selection of Training Components and notify ETEE-FS that the selected Training Components need modification using the other TOPFAS applications including an estimated time of completion of the modification for each Training Component. This shall set the modification state of each selected Training Components to 'modification required'.

Reference: BMD-ARS-7260

[REQ-5520] The TEM list control shall allow the user to make a selection of Training Components and notify ETEE-FS that the modification of the selected Training Components is in progress. This shall set the modification state of each selected Training Components to 'modification in progress'.

Reference: BMD-ARS-7260 / BMD-ARS-7278

[REQ-5530] The TEM list control shall allow the user to make a selection of Training Components and notify ETEE-FS that the modification of the selected Training Components has been completed and they can be activated in ETEE-FS again. This shall set the modification state of each selected Training Components to 'modification ready'.

Reference: BMD-ARS-7260

[046(i)] A "Recorded message" is an operational message, data file, or document prepared during the preparation phase of a training or exercise event. Recorded messages can be considered "Training Components".

[REQ-5540] Recorded Messages shall replicate operational messages.

Reference: BMD-ARS-7255

[REQ-5550] The TEM shall have a service component that can be invoked by ETEE-FS to send activation messages containing the tokens for Training Components to be released.

Reference: BMD-ARS-7259 / BMD-ARS-7277 / BMD-ARS-8876

[REQ-5560] The user shall be able to configure TEM to either automatically process incoming activation messages from ETEE-FS or to use manually processing in the TEM client application.

Reference: BMD-ARS-8876

[REQ-5570] The TEM service shall process all incoming activation messages from ETEE-FS and set the associated Training Components activation state to 'released'. This will either turn the visibility on to the training audience in TOPFAS or send the TC to the training audience in TOPFAS (e.g. email messages). Upon successful activation of each Training Component, a notification shall be send to ETEE-FS.

Reference: BMD-ARS-7259 / BMD-ARS-7267 / BMD-ARS-7269 / BMD-ARS-7270 / BMD-ARS-7272 / BMD-ARS-7310 / BMD-ARS-7311 / BMD-ARS-7277 / BMD-ARS-8876

[REQ-5580] The TEM list control shall allow the user to make a selection of Training Components and delete them from the scenario. If the deleted Training Components have been published to ETEE-FS, the TEM shall send revocation notifications to ETEE-FS to delete the Training Components.

Reference: BMD-ARS-7261 / BMD-ARS-7279

[REQ-5590] The TEM list control shall allow the user to make a selection of deleted Training Components and either permanently delete them from the scenario or set the status back to 'not published'.

Reference: BMD-ARS-7261 / BMD-ARS-7279

[REQ-5600] The user shall be able to export/import TOPFAS DMT business object specifications (e.g. ExtendedAttribute / ExtendedAttributeGroup) and domain values to facilitate Training Component exchange between TOPFAS databases.

Reference: BMD-ARS-7307

[REQ-5610] The user shall be able to export/import Training Component between TOPFAS databases.

Reference: BMD-ARS-7307

[REQ-5620] The TEM shall log the following events (scenario, timestamp, TC type, token identifier, source system, target system):

- (1) Training Component added to scenario
- (2) Training Component removed from scenario
- (3) Training Component ownership changed to/from users and/or groups with the TEM Admin role
- (4) Training Component published to ETEE-FS
- (5) Notification of modification required of Training Component sent to ETEE-FS
- (6) Notification of modification in progress of Training Component sent to ETEE-FS

- (7) Notification of modification completion of Training Component sent to ETEE-FS
- (8) Incoming activation token received from ETEE-FS
- (9) Pending activation processed
- (10) Training Component revocation sent to ETEE-FS

Reference: BMD-ARS-7286 / BMD-ARS-7287

[REQ-5630] The TEM shall have a log viewer that displays all log messages belonging to a scenario.

Reference: BMD-ARS-7286 / BMD-ARS-7287

[REQ-5640] The log viewer shall allow sorting and filtering on different properties of the log entries.

Reference: BMD-ARS-4654

[REQ-5650] The TEM shall allow the operator to make a selection of logs and send them to ETEE-FS.

Reference: BMD-ARS-7288

[REQ-5660] TOPFAS shall mark displays with a "Training" or "Exercise" caveat when the user is logged into a training or exercise session.

Reference: BMD-ARS-8883

[REQ-5670] TOPFAS shall mark any data produced whilst the user is logged into a training session with a "Training" or "Exercise" caveat in the data object meta-data.

Reference: BMD-ARS-7305

[REQ-5680] TOPFAS shall be able to load fictitious geo-spatial data sets.

Reference: BMD-ARS-1634

[REQ-5690] TOPFAS shall be able to load fictitious nation data sets.

Reference: BMD-ARS-1743

[REQ-5700] TOPFAS shall be able to load received Training Components.

Reference: BMD-ARS-7314

[REQ-5710] The TEM shall allow a user to time-shift DEs of training/exercise packages automatically, e.g. shift all dates with 1 year, so the database content and documents stay current and not use fixed dates that will go more-and-more out of date as time passes.

Reference: BMD-ARS-398 / BMD-ARS-399 / BMD-ARS-403 / BMD-ARS-400 / BMD-ARS-401 / BMD-ARS-1637 / BMD-ARS-1638 / BMD-ARS-402 / BMD-ARS-8873

- [REQ-5720] TOPFAS shall be able to initialize with fictitious state actors/non-state actors/ORBATs/defence designs/assets/threat systems/OPFOR COAs/security markings.
Reference: BMD-ARS-398 / BMD-ARS-399 / BMD-ARS-403 / BMD-ARS-400 / BMD-ARS-401 / BMD-ARS-1637 / BMD-ARS-1638 / BMD-ARS-402
- [REQ-5730] TOPFAS shall be able to process Intelligence Information Entities that include fictitious state and non-state actors.
Reference: BMD-ARS-4321
- [REQ-5740] TOPFAS shall be able to process Intelligence Information Entities that include fictitious weapon and sensor systems.
Reference: BMD-ARS-4322
- [REQ-5750] TOPFAS shall be able to process Intelligence Information Entities that include fictitious security markings.
Reference: BMD-ARS-4323
- [REQ-5760] TOPFAS shall be able to process fictitious Opposing Forces Ballistic Missile Order of Battle (OPFOR BM ORBAT).
Reference: BMD-ARS-4324
- [REQ-5770] TOPFAS shall be able to process fictitious Opposing Forces Ballistic Missile Order of Battle (OPFOR BM ORBAT) as an information product.
Reference: BMD-ARS-5384
- [REQ-5780] TOPFAS shall have capacity for ≥ 4000 Recorded Messages.
Reference: BMD-ARS-7265
- [REQ-5790] TOPFAS shall process Recorded Message commands within ≤ 1 seconds from the user initiating a command.
Reference: BMD-ARS-7266
- [REQ-5800] TOPFAS shall have capacity for ≥ 5 Training Components.
Reference: BMD-ARS-7285
- [REQ-5810] TOPFAS shall send Recorded Messages within ≤ 1 second from execution of the send command.
Reference: BMD-ARS-7273
- [REQ-5820] TOPFAS shall have capacity for $\geq 1,000,000$ recorded messages.
Reference: BMD-ARS-7289
- [REQ-5830] TOPFAS shall transmit the recorded message logs to ETEE-FS within ≤ 1 second after the send command.
Reference: BMD-ARS-7290

- [REQ-5840] TOPFAS shall support ≥ 5 sessions to run concurrently.
Reference: BMD-ARS-7296
- [REQ-5850] TOPFAS shall compromise in the fields of [COMPROMISE.AREA.1] and/or [COMPROMISE.AREA.3] to maintain separate operational and exercise session functionality in the presence of a fault.
Reference: BMD-ARS-8882
- [REQ-5860] TOPFAS shall initialise with fictitious geo-spatial data in ≤ 15 minutes on execution of the initialise command.
Reference: BMD-ARS-1636
- [REQ-5870] TOPFAS shall initialise with fictitious nations data in ≤ 15 minutes on execution of the initialise command.
Reference: BMD-ARS-1746
- [REQ-5880] TOPFAS shall load received TCs within ≤ 15 minutes seconds of receipt of data.
Reference: BMD-ARS-7316
- [REQ-5890] TOPFAS shall initialise with fictitious components in ≤ 15 minutes seconds for execution of initialise command.
Reference: BMD-ARS-404
- [REQ-5900] TOPFAS shall send selected Training Components to the Training Audience within ≤ 1 second from execution of send command.
Reference: BMD-ARS-7312

2.12 Data Exchange

- [REQ-5901] TOPFAS shall be able to import both APP-6D and APP-6A/B/C data. The latter shall be mapped to APP-6D and the original APP-6A/B/C value shall be maintained so that during export, the original value can be included in the output again. This will prevent data loss when repeatedly exchanging data back and forth with systems that do not support version APP-6D yet.
Reference: BMD-ARS-4655 / BMD-ARS-8710 / BMD-ARS-8711 / BMD-ARS-8713 / BMD-ARS-8717 / BMD-ARS-6515 / BMD-ARS-6516 / BMD-ARS-8298 / BMD-ARS-7704 / BMD-ARS-7631

2.12.1 Use of FASInterop schema for XML data exchange

- [REQ-5910] Any requirement related to XML data exchange based on the FASInterop schema shall use the latest FASInterop schema.
Reference: BMD-ARS-4655 / BMD-ARS-7142 / BMD-ARS-7128 / BMD-ARS-7109 / BMD-ARS-7127 / BMD-ARS-8822 / BMD-ARS-8710 / BMD-ARS-8711 / BMD-ARS-8713 / BMD-ARS-8717

[REQ-5920] Any requirement related to data exchange with XML using the latest FASInterop schema shall be implemented in TOPFAS Desktop and TOPFAS Online where applicable, in order to maintain interoperability.

Reference: TOPFAS

2.12.2 Sharing data

2.12.2.1 Share via e-mail / SFTP / TOPFAS Collaboration Apps

[047] For sharing information, TOPFAS shall be able to save data products to a file. Structured data shall be exported in XML, non-structured data in suitable Microsoft Office formats.

[048] For sharing information, TOPFAS shall be able to generate links to data products that can either point to the TOPFAS Collaboration Apps or to registered TOPFAS Desktop applications.

[REQ-5930] TOPFAS shall be able to:

- Save the Additional Defence Resource Response to a file in suitable Microsoft Office formats so the user can:
 - (1) attach it to an e-mail in a standard e-mail client;
 - (2) send it via a standard SFTP client;
 - (3) upload it to TOPFAS Collaboration Apps.
- Generate a link to the Additional Defence Resource Response so the user can:
 - (1) insert it into an e-mail in a standard e-mail client;
 - (2) publish the link on TOPFAS Collaboration Apps.

Reference: BMD-ARS-7122

[REQ-5940] TOPFAS shall be able to:

- Save the Allied Disposition List to a file in XML format so the user can:
 - (1) attach it to an e-mail in a standard e-mail client;
 - (2) send it via a standard SFTP client;
 - (3) upload it to TOPFAS Collaboration Apps.
- Generate a link to the Allied Disposition List so the user can:
 - (1) insert it into an e-mail in a standard e-mail client;
 - (2) publish the link on TOPFAS Collaboration Apps.

Reference: BMD-ARS-7127

[REQ-5950] TOPFAS shall be able to:

- Save the Allied Force List to a file in XML format so the user can:
 - (1) attach it to an e-mail in a standard e-mail client;
 - (2) send it via a standard SFTP client;
 - (3) upload it to TOPFAS Collaboration Apps.
- Generate a link to the Allied Force List so the user can:
 - (1) insert it into an e-mail in a standard e-mail client;
 - (2) publish the link on TOPFAS Collaboration Apps.

Reference: BMD-ARS-7128

- [REQ-5960] TOPFAS shall be able to:
- Save the BMD force requirement per COA to a file in suitable Microsoft Office formats so the user can:
 - (1) attach it to an e-mail in a standard e-mail client;
 - (2) send it via a standard SFTP client;
 - (3) upload it to TOPFAS Collaboration Apps.
 - Generate a link to the BMD force requirement per COA so the user can:
 - (1) insert it into an e-mail in a standard e-mail client;
 - (2) publish the link on TOPFAS Collaboration Apps.
- Reference: BMD-ARS-7129
- [REQ-5970] TOPFAS shall be able to:
- Save the Crisis Response Measures to a file in suitable Microsoft Office formats so the user can:
 - (1) attach it to an e-mail in a standard e-mail client;
 - (2) send it via a standard SFTP client;
 - (3) upload it to TOPFAS Collaboration Apps.
 - Generate a link to the Crisis Response Measures so the user can:
 - (1) insert it into an e-mail in a standard e-mail client;
 - (2) publish the link on TOPFAS Collaboration Apps.
- Reference: BMD-ARS-8837
- [REQ-5980] TOPFAS shall be able to:
- Save the Friendly Order of Battle to a file in XML and Excel formats so the user can:
 - (1) attach it to an e-mail in a standard e-mail client;
 - (2) send it via a standard SFTP client;
 - (3) upload it to TOPFAS Collaboration Apps.
 - Generate a link to the Friendly Order of Battle so the user can:
 - (1) insert it into an e-mail in a standard e-mail client;
 - (2) publish the link on TOPFAS Collaboration Apps.
- Reference: BMD-ARS-8298
- [REQ-5990] TOPFAS shall be able to:
- Save the Military Response Options to a file in suitable Microsoft Office formats so the user can:
 - (1) attach it to an e-mail in a standard e-mail client;
 - (2) send it via a standard SFTP client;
 - (3) upload it to TOPFAS Collaboration Apps.
 - Generate a link to the Military Response Options so the user can:
 - (1) insert it into an e-mail in a standard e-mail client;
 - (2) publish the link on TOPFAS Collaboration Apps.
- Reference: BMD-ARS-8307
- [REQ-6000] TOPFAS shall be able to:
- Save the Operation Plan to a file in suitable Microsoft Office formats so the user can:
 - (1) attach it to an e-mail in a standard e-mail client;

- (2) send it via a standard SFTP client;
- (3) upload it to TOPFAS Collaboration Apps.
- Generate a link to the Operation Plan so the user can:
 - (1) insert it into an e-mail in a standard e-mail client;
 - (2) publish the link on TOPFAS Collaboration Apps.

Reference: BMD-ARS-8836

- [REQ-6010] TOPFAS shall be able to:
- Save the Operational CONOPS to a file in suitable Microsoft Office formats so the user can:
 - (1) attach it to an e-mail in a standard e-mail client;
 - (2) send it via a standard SFTP client;
 - (3) upload it to TOPFAS Collaboration Apps.
 - Generate a link to the Operational CONOPS so the user can:
 - (1) insert it into an e-mail in a standard e-mail client;
 - (2) publish the link on TOPFAS Collaboration Apps.

Reference: BMD-ARS-7131

- [REQ-6020] TOPFAS shall be able to:
- Save the Prioritised Defended Asset List to a file in XML format so the user can:
 - (1) attach it to an e-mail in a standard e-mail client;
 - (2) send it via a standard SFTP client;
 - (3) upload it to TOPFAS Collaboration Apps.
 - Generate a link to the Prioritised Defended Asset List so the user can:
 - (1) insert it into an e-mail in a standard e-mail client;
 - (2) publish the link on TOPFAS Collaboration Apps.

Reference: BMD-ARS-7138

- [REQ-6030] TOPFAS shall be able to:
- Save a Recorded Message Template to a file in XML format so the user can:
 - (1) attach it to an e-mail in a standard e-mail client;
 - (2) send it via a standard SFTP client;
 - (3) upload it to TOPFAS Collaboration Apps.
 - Generate a link to a Recorded Message Template so the user can:
 - (1) insert it into an e-mail in a standard e-mail client;
 - (2) publish the link on TOPFAS Collaboration Apps.

Reference: BMD-ARS-2039

- [REQ-6040] TOPFAS shall be able to:
- Save the SACEUR's Strategic Assessment to a file in suitable Microsoft Office formats so the user can:
 - (1) attach it to an e-mail in a standard e-mail client;
 - (2) send it via a standard SFTP client;
 - (3) upload it to TOPFAS Collaboration Apps.
 - Generate a link to the SACEUR's Strategic Assessment so the user can:

- (1) insert it into an e-mail in a standard e-mail client;
- (2) publish the link on TOPFAS Collaboration Apps.

Reference: BMD-ARS-8835

- [REQ-6050] TOPFAS shall be able to:
- Save the Statement of Required Force / Capabilities Requirement to a file in XML format so the user can:
 - (1) attach it to an e-mail in a standard e-mail client;
 - (2) send it via a standard SFTP client;
 - (3) upload it to TOPFAS Collaboration Apps.
 - Generate a link to the Statement of Required Force / Capabilities Requirement so the user can:
 - (1) insert it into an e-mail in a standard e-mail client;
 - (2) publish the link on TOPFAS Collaboration Apps.

Reference: BMD-ARS-7142

- [REQ-6060] TOPFAS shall be able to:
- Save the Strategic CONOPS to a file in suitable Microsoft Office formats so the user can:
 - (1) attach it to an e-mail in a standard e-mail client;
 - (2) send it via a standard SFTP client;
 - (3) upload it to TOPFAS Collaboration Apps.
 - Generate a link to the Strategic CONOPS so the user can:
 - (1) insert it into an e-mail in a standard e-mail client;
 - (2) publish the link on TOPFAS Collaboration Apps.

Reference: BMD-ARS-8838

- [REQ-6070] TOPFAS shall be able to:
- Save the Strategic Planning Directive to a file in suitable Microsoft Office formats so the user can:
 - (1) attach it to an e-mail in a standard e-mail client;
 - (2) send it via a standard SFTP client;
 - (3) upload it to TOPFAS Collaboration Apps.
 - Generate a link to the Strategic Planning Directive so the user can:
 - (1) insert it into an e-mail in a standard e-mail client;
 - (2) publish the link on TOPFAS Collaboration Apps.

Reference: BMD-ARS-8308

2.12.2.2 Share via services

[049] TOPFAS shall provide RESTful based services to enable data exchange with other systems.

[050] Reserved.

[REQ-6080] TOPFAS shall provide a service to access the Allied Disposition List. The service shall be implemented as Rest services (see section 2.1.2).

Reference: BMD-ARS-7127

- [REQ-6090] TOPFAS shall provide a service to access the Allied Force List. The service shall be implemented as Rest services (see section 2.1.2).
Reference: BMD-ARS-7128
- [REQ-6100] TOPFAS shall provide a service to access the BMD force requirement per COA. The service shall be implemented as Rest services (see section 2.1.2).
Reference: BMD-ARS-7129
- [REQ-6110] TOPFAS shall provide a service to access the Friendly Order of Battle including C2 relationships by phase. The service shall be implemented as Rest services (see section 2.1.2).
Reference: BMD-ARS-8298
- [REQ-6120] TOPFAS shall provide a service to access the Prioritised Defended Asset List. The service shall be implemented as Rest services (see section 2.1.2).
Reference: BMD-ARS-7138
- [REQ-6130] TOPFAS shall provide a service to access the Recorded Message Template. The service shall be implemented as Rest services (see section 2.1.2).
Reference: BMD-ARS-2039
- [REQ-6140] TOPFAS shall provide a service to access the Statement of Required Force / Capabilities Requirement and their baselines from OPT. The service shall be implemented as Rest services (see section 2.1.2).
Reference: BMD-ARS-7142
- [REQ-6150] TOPFAS shall provide a CJSOR/AFL service that exposes CJSORs and AFLs and their baselines from EFGMT.
Reference: BMD-ARS-8008 / BMD-ARS-8009 / BMD-ARS-8030 / BMD-ARS-8028 / BMD-ARS-8026 / BMD-ARS-8042 / BMD-ARS-8043 / BMD-ARS-8041 / BMD-ARS-8040 / BMD-ARS-8037 / BMD-ARS-8820 / BMD-ARS-8114

2.12.3 Consuming data

2.12.3.1 Consume via e-mail / SFTP / TOPFAS Collaboration Apps

- [051] For consuming information, TOPFAS shall be able to consume data products provided as a file by either creating an attachment (for non-structured data in Microsoft Office and PDF formats) to a planning object or importing into a plan (for structured data in XML format).
- [052] For consuming information, TOPFAS shall be able to attach links to TOPFAS Collaboration Apps to a planning object.
- [REQ-6160] TOPFAS shall be able to import the Allied Disposition List from a file in XML format into a plan.
Reference: BMD-ARS-7109 / BMD-ARS-8311

- [REQ-6170] TOPFAS shall be able to:
- Import Background Information from a file in Microsoft Office or PDF format and attach it to a planning object;
 - Add a hyperlink to Background Information in TOPFAS Collaboration Apps to a planning object.
- Reference: BMD-ARS-1924 / BMD-ARS-7634
- [REQ-6180] TOPFAS shall be able to:
- Import BMD force requirements per COA from a file in Microsoft Office or PDF format and attach it to a planning object;
 - Add a hyperlink to BMD force requirements per COA in TOPFAS Collaboration Apps to a planning object.
- Reference: BMD-ARS-8290 / BMD-ARS-8330
- [REQ-6190] TOPFAS shall be able to:
- Import a Decision Sheet from a file in Microsoft Office or PDF format and attach it to a planning object;
 - Add a hyperlink to a Decision Sheet in TOPFAS Collaboration Apps to a planning object.
- Reference: BMD-ARS-8831 / BMD-ARS-8832
- [REQ-6200] TOPFAS shall be able to:
- Import an Exercise Specification from a file in Microsoft Office or PDF format and attach it to a planning object;
 - Add a hyperlink to an Exercise Specification in TOPFAS Collaboration Apps to a planning object.
- Reference: BMD-ARS-2837 / BMD-ARS-7909
- [REQ-6210] TOPFAS shall be able to:
- Import a Force Activation Directive from a file in Microsoft Office or PDF format and attach it to a planning object;
 - Add a hyperlink to a Force Activation Directive in TOPFAS Collaboration Apps to a planning object.
- Reference: BMD-ARS-7112 / BMD-ARS-8339
- [REQ-6220] TOPFAS shall be able to:
- Import a Force Planning Ceiling from a file in Microsoft Office or PDF format and attach it to a planning object;
 - Add a hyperlink to a Force Planning Ceiling in TOPFAS Collaboration Apps to a planning object.
- Reference: BMD-ARS-7113 / BMD-ARS-8340
- [REQ-6230] TOPFAS shall be able to:
- Import Military Response Options from a file in Microsoft Office or PDF format and attach it to a planning object;

- Add a hyperlink to Military Response Options in TOPFAS Collaboration Apps to a planning object.

Reference: BMD-ARS-7114 / BMD-ARS-8349

[REQ-6240] TOPFAS shall be able to:

- Import the NAC Execution Directive from a file in Microsoft Office or PDF format and attach it to a planning object;
- Add a hyperlink to the NAC Execution Directive in the Collaboration Space.

Reference: BMD-ARS-8825 / BMD-ARS-8826

[REQ-6250] TOPFAS shall be able to:

- Import the NAC Initiating Directive from a file in Microsoft Office or PDF format and attach it to a planning object;
- Add a hyperlink to the NAC Initiating Directive in TOPFAS Collaboration Apps to a planning object.

Reference: BMD-ARS-8823 / BMD-ARS-8824

[REQ-6260] TOPFAS shall be able to:

- Import National Caveats from a file in Microsoft Office or PDF format and attach it to a planning object;
- Add a hyperlink to National Caveats in TOPFAS Collaboration Apps to a planning object.

Reference: BMD-ARS-7115 / BMD-ARS-8350

[REQ-6270] TOPFAS shall be able to:

- Import the Operational CONOPS from a file in Microsoft Office or PDF format and attach it to a planning object;
- Add a hyperlink to the Operational CONOPS in TOPFAS Collaboration Apps to a planning object.

Reference: BMD-ARS-7116 / BMD-ARS-8354

[REQ-6280] TOPFAS shall be able to import the Recorded Message Trigger from a file in XML format into the TEM.

Reference: BMD-ARS-1929 / BMD-ARS-7920

[REQ-6290] TOPFAS shall be able to:

- Import the Request for additional defence resources from a file in Microsoft Office or PDF format and attach it to a planning object;
- Add a hyperlink to the Request for additional defence resources in TOPFAS Collaboration Apps to a planning object.

Reference: BMD-ARS-7119 / BMD-ARS-8359

[REQ-6300] TOPFAS shall be able to:

- Import the Strategic CONOPS from a file in Microsoft Office or PDF format and attach it to a planning object;

- Add a hyperlink to the Strategic CONOPS in TOPFAS Collaboration Apps to a planning object.

Reference: BMD-ARS-7120 / BMD-ARS-8365

[REQ-6310] TOPFAS shall be able to:

- Import the Strategic Planning Directive from a file in Microsoft Office or PDF format and attach it to a planning object;
- Add a hyperlink to the Strategic Planning Directive in TOPFAS Collaboration Apps to a planning object.

Reference: BMD-ARS-7121 / BMD-ARS-8366

[REQ-6320] TOPFAS shall be able to:

- Import the Strategic Situation from a file in Microsoft Office or PDF format and attach it to a planning object;
- Add a hyperlink to the Strategic Situation in TOPFAS Collaboration Apps to a planning object.

Reference: BMD-ARS-2852 / BMD-ARS-7632

2.12.3.2 Consume via Services

[053] TOPFAS shall be able to exchange data with other systems using RESTful based services. Additional SOAP services will only be implemented if required.

[054] For source systems that do not exist / are not accessible at time of development, the Contractor shall develop and use stubs to allow testing of requirements.

[REQ-6330] TOPFAS shall be able to consume the Allied Disposition List service and import the data into a plan.

Reference: BMD-ARS-7109 / BMD-ARS-8311

[REQ-6340] TOPFAS shall be able to consume the Areas at Risk service and import the data into a plan.

Reference: BMD-ARS-8169 / BMD-ARS-8328

[REQ-6350] TOPFAS shall be able to consume the Areas at Risk with CBRN annotations service and import the data into a plan.

Reference: BMD-ARS-7642 / BMD-ARS-7643

[REQ-6360] TOPFAS shall be able to consume BMD force requirements per COA service and import the data into a plan.

Reference: BMD-ARS-8290 / BMD-ARS-8330

[REQ-6370] TOPFAS shall be able to consume the Defence Design (BC) service and import the data into a plan.

Reference: BMD-ARS-6457 / BMD-ARS-8248

[REQ-6380] TOPFAS shall be able to consume the Defence Design (BMD) service and import the data into a plan.

Reference: BMD-ARS-2064 / BMD-ARS-7947

- [REQ-6390] TOPFAS shall be able to consume the Friendly ORBAT service and import the data into TOPFAS.
Reference: TOPFAS
- [REQ-6400] TOPFAS shall be able to consume Geospatial Information service and display it in TOPFAS.
Reference: BMD-ARS-7830 / BMD-ARS-7831
- [REQ-6410] TOPFAS shall be able to consume Geospatial Information (Exercise) service and display it in TOPFAS.
Reference: BMD-ARS-7829 / BMD-ARS-7635
- [REQ-6420] TOPFAS shall be able to consume the Intelligence Report service and import the data into a plan.
Reference: BMD-ARS-7396 / BMD-ARS-7951
- [REQ-6430] TOPFAS shall be able to consume the Mission Scheduling Information service and import the data into a plan.
Reference: BMD-ARS-8833 / BMD-ARS-8834
- [REQ-6440] TOPFAS shall be able to consume the NATO Common Operational Picture service and display it in TOPFAS.
Reference: BMD-ARS-3572 / BMD-ARS-4953
- [REQ-6450] TOPFAS shall be able to consume the OPFOR Ballistic Missile COA service and import the data into a plan.
Reference: BMD-ARS-4769 / BMD-ARS-7630
- [REQ-6460] TOPFAS shall be able to consume the OPFOR Ballistic Missile ORBAT service and import the data into a plan.
Reference: BMD-ARS-7704 / BMD-ARS-7631
- [REQ-6470] TOPFAS shall be able to consume the OPFOR TBM COA service and import the data into a plan.
Reference: BMD-ARS-8280 / BMD-ARS-8281
- [REQ-6480] TOPFAS shall be able to consume the Prioritised Defended Asset List service and import the data into a plan.
Reference: BMD-ARS-2857 / BMD-ARS-8268
- [REQ-6490] TOPFAS shall be able to consume the Recorded Message Trigger service and import the data into the TEM.
Reference: BMD-ARS-1929 / BMD-ARS-7920
- [REQ-6500] TOPFAS shall be able to consume the Request for additional defence resources service and import the data into a plan.
Reference: BMD-ARS-7119 / BMD-ARS-8359

2.13 Documentation & Training

2.13.1 Documentation

[REQ-6510] The TOPFAS Help Centre shall implement the help information as Markdown documents.

Reference: BMD-ARS-4665 / BMD-ARS-4667

[REQ-6520] The online help shall include a full text and topic search function.

Reference: BMD-ARS-4665

[REQ-6530] From the help source material, it shall be possible to generate a user manual in PDF format. The content shall be integrated with the TOPFAS Help Centre.

Reference: BMD-ARS-4665 / BMD-ARS-4667 / BMD-ARS-5339

2.13.2 Training

[REQ-6540] The TOPFAS training packages and instruction videos shall be integrated within the TOPFAS Help Centre.

Reference: BMD-ARS-5338 / BMD-ARS-5340 / BMD-ARS-5341 / BMD-ARS-5342 / BMD-ARS-5343

[REQ-6550] TOPFAS shall be provided with a set of in-application workflows that guide the users through the applications with step-by-step instructions for the completion of common tasks.

Reference: BMD-ARS-5338 / BMD-ARS-5340 / BMD-ARS-5341 / BMD-ARS-5342 / BMD-ARS-5343

[REQ-6560] TOPFAS shall provide simulation tutorials to guide users through the steps and screens to achieve the outcomes of the COPD Phase 1 flows defined in the Architecture Definition Document (ADD) using the capability from [REQ-6550].

Reference: BMD-ARS-5338

[REQ-6570] TOPFAS shall provide simulation tutorials to guide users through the steps and screens to achieve the outcomes of the COPD Phase 2 flows defined in the Architecture Definition Document (ADD) using the capability from [REQ-6550].

Reference: BMD-ARS-5340

[REQ-6580] TOPFAS shall provide simulation tutorials to guide users through the steps and screens to achieve the outcomes of the COPD Phase 3 flows defined in the Architecture Definition Document (ADD) using the capability from [REQ-6550].

Reference: BMD-ARS-5341

[REQ-6590] TOPFASS shall provide simulation tutorials to guide users through the steps and screens to achieve the outcomes of the COPD Phase 4 flows defined in the Architecture Definition Document (ADD) using the capability f from [REQ-6550].

Reference: BMD-ARS-5342

[REQ-6600] TOPFASS shall provide simulation tutorials to guide users through the steps and screens to achieve the outcomes of the COPD Phase 5 flows defined in the Architecture Definition Document (ADD) using the capability from [REQ-6550].

Reference: BMD-ARS-5343

3 Non-functional Requirements

- [055] Non-Functional Requirements (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.
- [056] TOPFAS shall comply with the NFRs. In general all NFRs are relevant for all applications and modules delivered.

3.1 Transverse Non-Functional Requirements

- [REQ-6610] TOPFAS shall be self-sustaining for a 30-day period when deployed into an out-of-area operation.
Reference: BMD-ARS-7150
- [REQ-6620] TOPFAS shall comply with STANAG 5067 Standard for interconnection of IPV4 Networks at Mission Secret and Unclassified Security Levels, Edition 1.
Reference: BMD-ARS-4744
- [REQ-6630] TOPFAS shall comply with STANAG 5500 Concept Of NATO Message Text Formatting System (CONFORMETS), Edition 7 - ADatP-3 Baseline 11.0 [STANAG-5500].
Reference: BMD-ARS-4748
- [REQ-6640] TOPFAS shall comply with STANAG 7149 NATO Message Catalogue, Edition 6 - APP-11 Edition D [APP-11].
Reference: BMD-ARS-4910
- [REQ-6650] TOPFAS shall comply with STANAG 5500 Concept Of NATO Message Text Formatting System (CONFORMETS), Edition 7 - ADatP-3 Baseline 11.0.
Reference: BMD-ARS-7151
- [REQ-6660] TOPFAS shall comply with NATO guidelines to ensure adequate margin for scalability and growth within the framework of life-cycle cost analysis and control.
Reference: BMD-ARS-1685
- [REQ-6670] TOPFAS shall comply with the NATO Network Enabled Capability concept for new developments of BMC3I systems.
Reference: BMD-ARS-7147
- [REQ-6680] TOPFAS shall comply with NATO policy, doctrine and concepts.
Reference: BMD-ARS-7149
- [REQ-6690] TOPFAS shall employ the World Geodetic System-84 as defined in NIMA TR8350.2, Third Edition, Amendment 1, dated 3 January 2000 [NIMA-TR8350.2].
Reference: BMD-ARS-4909

[REQ-6700] TOPFAS shall support an in-service life of 30 years by combination of design for non-obsolescence and technology insertion.

Reference: BMD-ARS-3579

[REQ-6710] TOPFAS shall not have to reinitialise when operational systems leave or join the Architecture.

Reference: BMD-ARS-3582

3.2 Architectural Non-Functional Requirements

[REQ-6720] TOPFAS shall be able to achieve planning function availability in operational sites' local area network (LAN), static and deployed, 24 hours a day, seven days a week, with an availability rate of 99.5%. Measurements of availability shall not include failures resulting from factors determined to be external to the capability (e.g., loss of domain controller, loss of servers or loss of network connectivity).

Reference: BMD-ARS-1699

[REQ-6730] TOPFAS shall be able to achieve planning function loss of availability frequency of \leq once per week.

Reference: BMD-ARS-1700

[REQ-6740] TOPFAS shall be able to achieve consultancy function availability in operational sites' local area network (LAN), static and deployed, 24 hours a day, seven days a week, with an availability rate of 99.5%. Measurements of availability shall not include failures resulting from factors determined to be external to the capability (e.g., loss of domain controller, loss of servers or loss of network connectivity).

Reference: BMD-ARS-1703

[REQ-6750] TOPFAS shall be able to achieve consultancy function loss of availability frequency of \leq once per week.

Reference: BMD-ARS-1704

[REQ-6760] TOPFAS shall achieve intelligence function availability in operational sites' local area network (LAN), static and deployed, 24 hours a day, seven days a week, with an availability rate of 99.5%. Measurements of availability shall not include failures resulting from factors determined to be external to the capability (e.g., loss of domain controller, loss of servers or loss of network connectivity).

Reference: BMD-ARS-1705

[REQ-6770] TOPFAS shall achieve intelligence function loss of availability frequency of \leq once per week.

Reference: BMD-ARS-1706

[REQ-6780] TOPFAS shall be able to achieve passive defence function availability in operational sites' local area network (LAN), static and deployed, 24 hours a

day, seven days a week, with an availability rate of 99.5%. Measurements of availability shall not include failures resulting from factors determined to be external to the capability (e.g., loss of domain controller, loss of servers or loss of network connectivity).

Reference: BMD-ARS-1707

[REQ-6790] TOPFAS shall be able to achieve passive defence function loss of availability frequency of \leq once per week.

Reference: BMD-ARS-1708

[REQ-6800] TOPFAS shall be able to achieve education, training, exercises and evaluation function availability in operational sites' local area network (LAN), static and deployed, 24 hours a day, seven days a week, with an availability rate of 99.5%. Measurements of availability shall not include failures resulting from factors determined to be external to the capability (e.g., loss of domain controller, loss of servers or loss of network connectivity).

Reference: BMD-ARS-1711

[REQ-6810] TOPFAS shall be able to achieve education, training, exercises and evaluation function loss of availability frequency of \leq once per week.

Reference: BMD-ARS-1712

[REQ-6820] Common environmental definitions must be the basis for all assets and areas that constitute PC(A)AL, RJPD(A)AL, JPD(A)AL and associated tasks.

Reference: BMD-ARS-1717

3.3 Functional Suitability

[057] 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.

3.3.1 Functional completeness

[058] ISO 25010: Degree to which the set of functions covers all the specified tasks and user objectives.

[REQ-6830] All requirements that have been included in the SRS are implemented (functional implementation completeness).

Reference: TOPFAS

[REQ-6840] All requirements that have been implemented have undergone a test process (functional test completeness).

Reference: TOPFAS

3.3.2 Functional correctness

[059] ISO 25010: Degree to which a product or system provides the correct results with the needed degree of precision.

[REQ-6850] TOPFAS shall provide accuracy of location better than 1 meter (i.e., sub-meter accuracy) for translation of values (UTM, Latitude/Longitudes, others).

Reference: TOPFAS

[REQ-6860] TOPFAS shall provide accuracy of timing (e.g. for timestamps) to one second or better for the timestamps for auditing purposes. Note: The precision of the timestamps shall be the one provided by the operating system.

Reference: TOPFAS

3.3.3 Functional appropriateness

[060] ISO 25010: Degree to which the functions facilitate the accomplishment of specified tasks and objectives.

[REQ-6870] TOPFAS shall fulfil all usage objectives (functional adequacy).

Reference: TOPFAS

[REQ-6880] TOPFAS shall support printing of generated information products, documents and reports through the standard operating system printing functionality.

Reference: TOPFAS

[REQ-6890] TOPFAS shall ensure consistency of all data displayed on all open views within the same application framework.

Reference: TOPFAS

[REQ-6900] TOPFAS shall ensure consistency throughout its interface and generated products.

Reference: TOPFAS

3.3.4 Compliance

[REQ-6910] Output generated in Microsoft Office shall be compliant with: Office Open XML, ISO/IEC 29500:2008.

Reference: TOPFAS

[REQ-6920] Output generated in PDF-Format shall be compliant with: PDF-Format 1.4 ed.1 (PDF/A-1, ISO 19005-1:2005).

Reference: TOPFAS

[REQ-6930] TOPFAS shall use and store data internally as Zulu time (i.e. GMT) as standard time and allow the user to choose an additional time zone for display purposes.

Reference: TOPFAS

3.4 Performance Requirements

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

3.4.1 Time Behaviour

[062] ISO 25010: Degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements.

[REQ-6940] The time from restarting all servers until all services are restored and fully operational again shall be less than 5 minutes for at least 99.5% of the Operational Time

Reference: TOPFAS

[REQ-6950] TOPFAS's user functionality shall be available, within ten seconds after launching each application.

Reference: TOPFAS

[REQ-6960] The loading of any view, dialog or web part or view shall not take more than five seconds on average, with 90% of views loading in less than 2 seconds under normal usage and load conditions.

Reference: TOPFAS

[REQ-6970] The web applications shall score good ("Green") on all 6 criteria (First Contentful Paint, Speed Index, Largest Contentful Paint, Total Blocking Time, Time to Interactive and Cumulative Layout Shift) of the Google Lighthouse (V6 or newer) performance scoring tool as available in Chromium browsers.

Reference: TOPFAS

[REQ-6980] TOPFAS's performance shall be optimised for used on the NATO operational networks. This includes but is not limited to:

- aggressive caching of resources
- maximised usage according to best practices of minification, bundling and compression of all application assets
- usage of web sockets when appropriate
- lazy loading and rendering
- etc.

Reference: TOPFAS

3.4.2 Resource Utilization

[063] ISO 25010: Degree to which the amounts and types of resources used by a product or system, when performing its functions, meet requirements.

[REQ-6990] TOPFAS shall not suffer from any memory leaks. This also includes managing the memory efficiently (e.g. caching strategy) making sure that the memory pressure never goes beyond a set threshold (to be defined during design phase).

Reference: TOPFAS

3.4.3 Capacity

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

[REQ-7000] TOPFAS shall support concurrent use of up to 50 editors and 200 readers on a single site/database, without noticeable performance impact or degradation in response times.

Reference: TOPFAS

[REQ-7010] TOPFAS's database shall be dimensioned to support all the relevant data based on current estimates of numbers and sizes of data elements, and provide a 50% of additional space a year for five years.

Reference: TOPFAS

3.5 Compatibility

[065] 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.

3.5.1 Co-existence

[066] ISO 25010: 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.

[REQ-7020] The implemented applications and services shall be capable of operating within the NS and MS WAN environment (including servers, network, services and workstations) in the presence of the latest approved NATO Security Settings, without impact on other applications nor services. The target version to be provided by the Purchaser during the design stage. Any deviations from the approved security settings shall be identified by the Contractor prior to testing and shall be subject to approval of the Purchaser.

Reference: TOPFAS

[REQ-7030] TOPFAS shall support access to the underlying file system using Windows standards, including long file names and all legal naming characters.

Reference: TOPFAS

3.5.2 Interoperability

[067] ISO 25010: Degree to which two or more systems, products or components can exchange information and use the information that has been exchanged.

[REQ-7040] Web-based applications shall be compatible with

Operating System	Microsoft Windows 10 64-bit editions and later
Components	Microsoft Edge LTS (87 and later) Mozilla Firefox ESR (91 and later)

Reference: TOPFAS

[REQ-7050] TOPFAS shall support the following environment configurations for the Desktop applications:

Operating System	Microsoft Windows 10 64-bit editions and later
Microsoft Office	Professional Plus 2016 and later
Microsoft SharePoint Server	2016 and later

Reference: TOPFAS

[REQ-7060] TOPFAS shall support the following environment configurations for the server components:

Operating System	Microsoft Windows Server 2019 and later (normal and Core versions)
Database Server	Microsoft SQL Server 2019 and later
Web Server	Internet Information Services (IIS) version as per OS version used.

Reference: TOPFAS

[REQ-7070] TOPFAS shall provide a file-based data exchange interface to enable the exchange of information between applications for reasons of legacy, security, capability, efficiency, connectivity or lack thereof.

Reference: TOPFAS

[REQ-7080] The file-based data exchange file formats shall use XML or JSON as the primary mechanism for file-level information exchange and shall be based, where possible, on existing data format standards or adapted revisions thereof.

Reference: TOPFAS

[REQ-7090] TOPFAS shall validate the format and contents of all incoming and outgoing data exchange against the documented format or schemas published by the suppliers or originators of the data, this includes data exchange initiated from

own capabilities. The capability shall report with explicit warning messages when validation is unsuccessful.

Reference: TOPFAS

[REQ-7100] The data exchange interface shall use commonly used formats for exchanging specific types of data such as images.

Reference: TOPFAS

[REQ-7110] TOPFAS shall provide integration with Core and Enabling Services including:

- (1) Email / Exchange
- (2) Microsoft Office Applications
- (3) CoreGIS (Map Service Provider)
- (4) Integrated Windows Authentication / Active Directory (IWA/AD)
- (5) Active Directory Federated Services (ADFS)
- (6) SAML authentication Secure Token Server (STS)

Reference: TOPFAS

[REQ-7111] TOPFAS shall be compatible with the latest versions of external capabilities and services, and their latest interface control documents and service definitions, as long as the latest relevant interface control document is available a minimum of 12 months prior to a planned release of TOPFAS.

Reference: TOPFAS

3.6 Usability/Learnability

[068] ISO 25010: 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.

3.6.1 Appropriateness recognisability

[069] ISO 25010: Degree to which users can recognize whether a product or system is appropriate for their needs.

[REQ-7120] TOPFAS requires a user-friendly interface for operators who vary considerably in their experience in the domain, technical skills, and frequency and time spent using the capability. In order to help the user feel at ease with the capability, some general principles are to be followed.

Reference: TOPFAS

[REQ-7130] TOPFAS shall comply with the following criteria for information presentation:

- Clarity: information shall be conveyed quickly and accurately;
- Discriminability: information shall be able to be distinguished accurately;
- Consistency: the same information shall be presented in the same way throughout the application;
- Detectability: the user's attention shall be directed to the information required;
- Legibility: information shall be easy to read;

- Comprehensibility: the meaning of the information shall be clearly understandable.

Reference: TOPFAS

[REQ-7140] Visual elements and interaction schemes of the user interface shall be reused for similar functions and features. Uniformity is created this way, which helps users to understand where they are and what they can do

Reference: TOPFAS

[REQ-7150] TOPFAS shall be optimised to provide direct feedback in views, dialogs and controls and reduce the amount of popups or dialogs containing errors, warnings or information notifications or messages. This includes limiting the number of popups and dialogs to the extent that they do not to show the same message, for the same occasion, multiple times

Reference: TOPFAS

[REQ-7160] TOPFAS's user interface shall clearly distinguish between display/visualisation views, dialogs, panels, etc. and editable views, dialogs, panels, etc. Each type requiring specific design, i.e. editable forms rendered read-only are not considered suitable visualisations.

Reference: TOPFAS

3.6.2 Learnability

[070] ISO 25010: 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.

[REQ-7170] TOPFAS shall support and guide the user in understanding and learning how to use its functions.

Reference: TOPFAS

[REQ-7180] TOPFAS's user guidance information shall be readily distinguishable from other displayed information, e.g. data. This user guidance information shall be provided to the user through feedback, status information and error management:

- (1) Feedback provides information in response to the user's input. In general, users can be expected to make mistakes while entering data; they shall not be considered errors and should be caught by input field validation rules;
- (2) Status information indicates the current state of the application or processes;
- (3) Error management provides information in responses to failures.

Reference: TOPFAS

3.6.3 Operability

[071] ISO 25010: Degree to which a product or system has attributes that make it easy to operate and control.

[REQ-7190] TOPFAS shall use United Kingdom Standard 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, training material and documentation.

Reference: BMD-ARS-4654

[REQ-7200] TOPFAS shall support context menus (i.e. right button mouse click, or equivalent menus). General and common functions shall also be accessible through the function bar, ribbon, view or dialog buttons.

Reference: TOPFAS

[REQ-7210] For the ribbon or toolbars, (context) menus and buttons, the following aspects shall be considered:

- (1) Structure, such as logical categories, grouping options and ordering items;
- (2) Navigation, including titles and access time;
- (3) Option selection and execution, including selection methods, use of the keyboard;
- (4) Presentation, including placement and use of icons.

Reference: TOPFAS

[REQ-7220] Popup dialogs used to report errors, warnings, information or any other notification or message shall be closable with a single click.

Reference: TOPFAS

[REQ-7230] TOPFAS shall offer undo/redo (not limited to formatting) support for all operations. Exceptions shall be agreed with the Purchaser.

Reference: BMD-ARS-4654

[REQ-7240] TOPFAS's user interface shall be structured so that options, features and functions of applications are organised in a way that reflects their relationships (i.e., similar things shall be organised in similar ways).

Reference: TOPFAS

[REQ-7250] TOPFAS shall support editing of information in a logical order. In the user interface, dialogs shall be navigable using the tab key in a logical order.

Reference: TOPFAS

[REQ-7260] TOPFAS shall use labels that are context-dependent, meaningful and descriptive to the function or action at hand.

Reference: TOPFAS

- [REQ-7270] TOPFAS shall use a consistent user interface font.
Reference: TOPFAS
- [REQ-7280] TOPFAS shall use domain terminology consistent with the subject area handbooks and directives
Reference: TOPFAS
- [REQ-7290] TOPFAS shall provide scrollbars and/or panning shall be available when information does not fit within the current view.
Reference: TOPFAS
- [REQ-7300] Within TOPFAS, it shall be unambiguous and clear what information in what format is required for each field. The expected input format on all dialog or view fields shall be shown if it is not already clear from the label.
Reference: TOPFAS
- [REQ-7310] TOPFAS shall be tolerant to the input format including location formats (e.g. latitude/longitude could be entered as degrees-minutes-seconds, decimal degrees, etc.) and date formats (e.g. yyyy-mm-dd could also be entered as yyyyymmdd or yy-mm-dd without error or picked from a calendar) and shall apply automatic layout (format) of data where possible (e.g. correct format of dates). Military DTG support shall be provided where relevant.
Reference: TOPFAS
- [REQ-7320] Clickable (selectable) text (e.g. links) shall be clearly distinguishable from non-clickable text.
Reference: TOPFAS
- [REQ-7330] TOPFAS shall support selections using:
(1) Menu (Select All);
(2) Context Menu;
(3) Accelerators (Ctrl+A);
(4) Mouse;
(5) Arrow keys.
Reference: TOPFAS
- [REQ-7340] TOPFAS shall support extended selection by Ctrl (i.e. individual selected items) and Shift (i.e. select from-to) keys.
Reference: TOPFAS
- [REQ-7350] TOPFAS shall support multi-select in grid controls, tree controls / views and hierarchal tree grids.
Reference: TOPFAS

- [REQ-7360] TOPFAS shall notify the user who has initiated a prolonged action that processing of the action has started and convey the sense of processing progress (by means of a progress indicator).
- Reference: BMD-ARS-4654
- [REQ-7370] TOPFAS shall provide information tooltips within views, dialogs and controls to provide further explanation about specific fields or options. However, it should not be required to include these tooltips for every field or option; dialogs and views should be self-descriptive.
- Reference: TOPFAS
- [REQ-7380] TOPFAS shall support tooltips on all icons and ribbon buttons that offer additional explanation and assistance.
- Reference: TOPFAS
- [REQ-7390] TOPFAS shall include, for significant user interface elements, from the tooltips further links to training materials in the online help sections and videos of the TOPFAS Help Centre.
- Reference: BMD-ARS-4665 / BMD-ARS-4667
- [REQ-7400] Tooltips shall be easily accessible, not intrusive and shall only be shown after a short initial delay. The tooltips will disappear after a certain amount of time and will not show-up again before the user hovers over a different user interface element with the mouse pointer or returns to the same element after leaving it first. When the user hovers from one element to another while the tooltip is still visible, the tooltip will first disappear and only appear again for the new element after a short initial delay.
- Reference: TOPFAS
- [REQ-7410] For tabular or lists of information, TOPFAS shall allow the user to navigate:
- (1) One row at a time;
 - (2) By paging.
- Reference: TOPFAS
- [REQ-7420] For hierarchical (tree) and grid views, TOPFAS shall support the full range of capabilities including sorting, filtering (Excel filter style), column selector, grouping, banded view, column ordering, column width selection, etc. The availability of those features may depend on the grid usage i.e. not all features are required for all grids based on the information content displayed.
- Reference: TOPFAS
- [REQ-7430] TOPFAS shall provide zoom functions for views or diagrams that contain or can contain large amounts of data or information objects. The zoom function shall include a proportional zoom control that allows the user to zoom to any zoom-level (zoom in and zoom out) and provide a number of pre-sets, including fit to current window and full-page size, or equivalent.
- Reference: TOPFAS

[REQ-7440] TOPFAS shall provide a date-time picker supporting the user entering and using dates and timings in absolute format or in relative format, when relative date-time is required.

Reference: TOPFAS

[REQ-7450] The user interface of TOPFAS shall support a minimum resolution of 1280x1024 or wide-screen equivalent.

Reference: TOPFAS

[REQ-7460] TOPFAS shall allow the user to launch more than one instance of an application on the same workstation.

Reference: TOPFAS

[REQ-7470] The design of the user interface shall be based on a single theme with variations, and have a common look and feel carried across the entire user interface of an application.

Reference: TOPFAS

[REQ-7480] TOPFAS shall provide an appropriate level of prompts (i.e. allow cancellation or confirmation) when input or changes may be lost due to closing a window, view, dialog, or application.

Reference: TOPFAS

3.6.4 User error protection

[072] ISO 25010: Degree to which a system protects users against making errors.

[REQ-7490] TOPFAS shall notify the user for potential loss of information objects during change of any data element or information product. The user shall be able choose the action that has to be taken by the application, identified by a warning notification, which provides information about the data that might be lost.

Reference: TOPFAS

[REQ-7500] The application's messages (e.g. error, warning, notification or informational messages) shall be provided in context and directed towards the user. The message shall contain initiating module information, context information, suggested (corrective) actions or guidance on where to find answers and solutions.

Reference: TOPFAS

[REQ-7510] TOPFAS shall highlight or mark empty required fields by means of "error" providers in dialogs and views once the user tries to save the information within the dialog or view. No information shall be lost when saving fails and the users is completing the remaining fields, before saving again.

Reference: TOPFAS

[REQ-7520] TOPFAS's user interface shall be tolerant to input mistakes. The user shall be given guidance and suggestions to help them correct or overcome mistakes they have already made.

Reference: TOPFAS

[REQ-7530] TOPFAS shall for all textual entry fields spell-check the entered text, visually highlight spelling errors, and suggest spelling corrections.

Reference: BMD-ARS-4654

[REQ-7540] TOPFAS shall provide data defaults where applicable.

Reference: TOPFAS

[REQ-7550] TOPFAS's user interface shall use predefined drop-down or pull-down lists or controls in appropriate situations based on configured domain values to speed up the entry of information and prevent input mistakes.

Reference: BMD-ARS-4654

3.6.5 User interface aesthetics

[073] ISO 25010: Degree to which a user interface enables pleasing and satisfying interaction for the user.

[REQ-7560] TOPFAS shall use the latest Microsoft Office theme look and feel (Microsoft Office 2021 / Office 365 2021) for desktop and web applications. This includes upgrading existing Office 2016 theming to Office 2021 for desktop and web applications. Use of a common library of user interface components shall be favoured for each technology stack (desktop and web).

Reference: BMD-ARS-4654

[REQ-7570] TOPFAS User Interface shall be compatible with high DPI displays without blur or other artefacts. This includes the use of a common set of scalable vector icons for all user interface elements and replacement of bitmap icons by their scalable vector equivalent when applicable.

Reference: TOPFAS

[REQ-7580] TOPFAS shall save the positions of the user interface elements for each user between application sessions and restore the user interface on starting another session.

Reference: TOPFAS

[REQ-7590] TOPFAS shall restore the tree expansion state of a tree control/view as well as the last selected item. When the item does not exist anymore, the next level up shall be used instead. On opening the first time, a tree control/view shall be expanded to the second level (first and second level shall be visible). These settings shall be persisted per user and over application sessions.

Reference: TOPFAS

[REQ-7600] TOPFAS shall pre-populate editable combo boxes using previously entered data.

Reference: TOPFAS

[REQ-7610] TOPFAS's messages (e.g. error, warning, notification or informational messages) shall be properly formatted. This means that presented text shall not exceed 80 characters per line and a carriage return is inserted between the last two words before reaching 80 characters. The display of long text shall not exceed more than 3 lines and in case it is longer, the text will be shorted and a marking (e.g. "...") is added indicating the text is shortened. In case the long text does not consist of words, but is for example a long file path, the text is shown on one line only and the text is shorted in the middle showing the beginning of the path and the end of the path with the marker in the middle (for example "C:\My\Very\Very\...\Very\Long\FileName.doc").

Reference: TOPFAS

[REQ-7620] The use of acronyms within the applications and documentation shall be limited in order not to affect readability and comprehension negatively.

Reference: TOPFAS

3.6.6 Accessibility

[074] ISO 25010: Degree to which a product or system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use.

[REQ-7630] Use of colour or sound alone does not indicate status or errors.

Reference: TOPFAS

[REQ-7640] The system shall avoid the use of colour combinations that impact the use of the applications by colour-blind users, or accompany such use by additional graphics.

Reference: TOPFAS

[REQ-7650] The system shall ensure all images in web applications include alternate (alt) text description (e.g. for actions).

Reference: TOPFAS

3.7 Reliability

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

3.7.1 Maturity

[076] ISO 25010: Degree to which a system, product or component meets needs for reliability under normal operation.

- [REQ-7660] The capability shall have a Mean-Time between Failures (MTBF) > 168 hours. The Time between Failures (TBF) is defined as the difference between the start of unplanned downtime and the start of uptime. MTBF (mean time between failures) is defined as the mean time between two consecutive failures:

$$\text{Mean time between failures} = \text{MTBF} = \frac{\sum (\text{start of downtime} - \text{start of uptime})}{\text{number of failures}}$$

Reference: TOPFAS

- [REQ-7670] TOPFAS shall maintain integrity between data elements both within application as well as within storage.

Reference: TOPFAS

3.7.2 Availability

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

- [REQ-7680] TOPFAS shall be available in operational sites' local area network (LAN), static and deployed, 24 hours a day, seven days a week, with an availability rate of 99.5%. Measurements of availability shall not include failures resulting from factors determined to be external to the capability (e.g., loss of domain controller, loss of servers or loss of network connectivity).

Reference: TOPFAS

- [REQ-7690] TOPFAS shall automatically detect the availability and re-establishment of network connectivity.

Reference: TOPFAS

- [REQ-7700] TOPFAS applications shall be upgradable without an outage of more than 1 hour.

Reference: TOPFAS

- [REQ-7710] Replicated TOPFAS databases shall be upgradable without an outage of more than 1 day.

Reference: TOPFAS

3.7.3 Fault Tolerance

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

- [REQ-7720] TOPFAS shall handle errors in a way that helps users rather than disturb or otherwise hinder their work.

Reference: TOPFAS

- [REQ-7730] TOPFAS shall ensure availability to users so that they do not experience interruption of services as a result of intermittent connection. Intermittent

connection is defined as loss of connectivity that is less than thirty (30) seconds.

Reference: TOPFAS

[REQ-7740] TOPFAS shall gracefully degrade in the condition where externally provided services (such as Core-GIS, E-mail, etc.) are not available. Gracefully degrade means that applications shall not raises exceptions, or even crash, but elegantly notify the users and if possible, continues to provide some functions using local cache.

Reference: TOPFAS

[REQ-7750] TOPFAS shall gracefully degrade in the condition where the networking services are not available. Gracefully degrade means that applications shall not raises exceptions, or even crash, but elegantly notify the users and if possible, continues to provide some functions using local cache.

Reference: TOPFAS

3.7.4 Recoverability

[079] ISO 25010: 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.

[REQ-7760] TOPFAS shall provide the administrators with the ability to perform full and incremental backups of the data repositories and software without impacting the availability.

Reference: BMD-ARS-4871

[REQ-7770] TOPFAS shall provide a database maintenance plan for automatically handling backups at a configurable frequency and conducted required database health operations (e.g. rebuilding indexes). This includes a retention policy for backups.

Reference: BMD-ARS-4871

[REQ-7780] TOPFAS shall allow the system administrators to restore backups of data repositories and software with no data loss (i.e. only not yet committed transactions can be lost in case of a crash).

Reference: BMD-ARS-4871

[080] 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.

Table 3-1 Maintainability by Failure Criticality

Failure Type	MTTR
Critical Failure	1 hours
Failure	2 hours
Critical Failure in replicated database	8 hours

Failure in replicated database	8 hours
--------------------------------	---------

[REQ-7790] 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 shall not exceed the time limits defined in the table above for each single maintenance action.

Reference: TOPFAS

3.8 Security

[081] 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. This characteristic is composed of the following sub-characteristics: confidentiality, integrity, non-repudiation, accountability and authenticity.

[REQ-7800] The web 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].

Reference: TOPFAS

[REQ-7810] In line with [AC/322-N(2011)0130], the security classification construct shall include at least:

- (1) Policy Identifier/Information Ownership: e.g. NATO, NATO/EAPC (Euro-Atlantic Partnership Council), ISAF (International Security Assistance Force);
- (2) Classification Marking: e.g. Unclassified, RESTRICTED, CONFIDENTIAL, SECRET;
- (3) Category/Caveats: e.g. one or more Releasability statements such as Releasable to Finland, Sweden, Releasable to ISAF; Releasable to PfP.

Reference: BMD-ARS-7857

[REQ-7820] TOPFAS shall ensure that a security classification construct is automatically included into each shown or generated information product, showing the highest classification marking of information it contains.

Reference: BMD-ARS-7855

[REQ-7830] The security classification construct shall be assembled from domain values and shall include the standardised (NATO) colour scheme to differentiate the various security classifications.

Reference: BMD-ARS-4654

[REQ-7840] TOPFAS shall show the security classification construct at the top of the application framework, showing the relevant security classification of the data visible on the screen. The security classification construct shall use the defined colour scheme to differentiate the various security classifications.

Reference: BMD-ARS-4654

- [REQ-7850] Components within an application shall be configured to provide only required capabilities (least functionality). Components which are not required are either uninstalled, not installed or disabled.
Reference: BMD-ARS-7852
- [REQ-7860] If digital certificates are required by an application, they shall be NATO certificates, provided by NATO PKI.
Reference: BMD-ARS-8864
- [REQ-7870] The validity of PKI certificates shall be verified (that they are neither expired nor revoked) before they are used.
Reference: BMD-ARS-7845
- [REQ-7880] All software packages shall be delivered with latest security updates.
Reference: BMD-ARS-7842
- [REQ-7890] TOPFAS shall only use versions of software that are supported with security patches and do not require an obsolete version of OS, libraries and dependencies to function.
Reference: BMD-ARS-7843
- [REQ-7900] TOPFAS shall properly apply encryption mechanisms to protect credentials and similar highly sensitive information.
Reference: BMD-ARS-7849
- [REQ-7910] TOPFAS shall use custom error pages to prevent server error messages from being disclosed.
Reference: BMD-ARS-7850
- [REQ-7920] TOPFAS shall not disclose sensitive information in error responses, including system/application details, session identifiers or account information.
Reference: BMD-ARS-7851
- [REQ-7930] Any sensitive/classified pieces of information (e.g. passwords, IP-addresses etc.) shall not be hard-coded in any source code.
Reference: BMD-ARS-7867
- [REQ-7940] TOPFAS shall be compliant with the security rules as defined by the NCIRC. This includes protection for SQL injection, cross-site scripting prevention, authentication, etc.
Reference: TOPFAS

[REQ-7950] TOPFAS shall protect passwords in storage. All passwords shall be stored in a hashed and salted form to protect them from exposure, regardless of where they are stored.

Reference: TOPFAS

3.9 Maintainability

[082] 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. This characteristic is composed of the following sub-characteristics: modularity, reusability, analysability, modifiability and testability.

[REQ-7960] The full TOPFAS application suite, with the exception of NCRS and EFGMT, shall be migrated from .Net Framework and/or updated to the latest .NET and C#.

Reference: TOPFAS

[REQ-7970] The software shall be designed and structured for good testability. This includes usage of patterns such as, for example, decoupling, test data generation and dependency injection to enable unit testing.

Reference: TOPFAS

[REQ-7980] The design, software architecture and development environment shall be properly documented to allow for future maintenance of the capability.

Reference: TOPFAS

[REQ-7990] TOPFAS shall use a standard naming convention for the database design.

Reference: TOPFAS

[REQ-8000] TOPFAS shall comply with latest versions of the Microsoft Windows operating system available and supported by the Bi-SC AIS servers and workstations. This shall include all versions of the operating systems planned to become available prior to final acceptance testing.

Reference: TOPFAS

[REQ-8010] Source code artefacts developed for the applications shall be written using US Standard English (e.g. for Classes, Methods, Variables etc.).

Reference: TOPFAS

[REQ-8020] Source code artefacts developed for the application shall be documented with in-line comments using United Kingdom Standard English. Industry best practices shall be used in the level of commenting. Comments shall, at a minimum, be provided for publicly visible:

- (1) class definition explaining what the class represents;
- (2) member function explaining what the function does;
- (3) member (input/output) variable explaining what the variable means;

(4) type definition (enumeration) explaining what the type represents.

Reference: TOPFAS

[REQ-8030] Source code developed for the applications shall be documented with comments, which can be extracted and formatted to augment technical documentation. The comments shall be formatted according to the "XML Comments" format (i.e., beginning with three forward slashes '///').

Reference: TOPFAS

[REQ-8040] The security classification of any example data that is displayed in any documentation, including online help, shall not exceed the level of NATO UNCLASSIFIED.

Reference: TOPFAS

[REQ-8050] 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.

Reference: TOPFAS

[REQ-8060] New View components shall be implemented as reusable web components that can be used in many of the TOPFAS applications, in order to provide a homogenous interface across both desktop and web applications, unless specified otherwise and agreed with the Purchaser.

Reference: TOPFAS

[REQ-8070] New components for the desktop applications shall be implemented entirely using .NET Core and C#.

Reference: TOPFAS

[REQ-8080] New backend components for the desktop and web applications shall be implemented entirely using the latest .NET Core and C#.

Reference: TOPFAS

[REQ-8090] The web-based applications frontend, with the exception of NCRS and EFGMT, shall be implemented entirely using a single TypeScript-based technology stack, HTML5, and cascading style sheets (CSS).

Reference: TOPFAS

[REQ-8100] TOPFAS shall standardize on the (off-the-shelf) development components. The introduction of new off-the-shelf components shall be approved by the Purchaser.

Reference: TOPFAS

[REQ-8110] Use of components (free, open source, or commercial or government) shall not limit the deployment or use of the capability in any way and shall not require the release of code developed for the capability.

Reference: TOPFAS

[REQ-8120] Any component shall be verified for compliance to other non-functional requirements, including security requirements.

Reference: TOPFAS

3.10 Portability

[083] ISO 25010: 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. This characteristic is composed of the following sub-characteristics: adaptability, installability and replaceability.

[REQ-8130] All usage of the Windows registry and user profile by TOPFAS shall be fully documented. TOPFAS shall not use Windows registry hives other than HKEY_LOCAL_MACHINE during installation and HKEY_CURRENT_USER during application operation. The use of the Windows registry shall be avoided.

Reference: TOPFAS

[REQ-8140] TOPFAS shall store temporary files only in the user's temporary folder.

Reference: TOPFAS

[REQ-8150] TOPFAS shall operate well and be compliant with a virtualised server environment (e.g. Microsoft Hyper-V, VMware virtual servers) as well as physical environments.

Reference: TOPFAS

[REQ-8160] TOPFAS shall use an architecture that allows vertical scalability and allows the various components to be deployed on separate machines.

Reference: TOPFAS

[REQ-8170] TOPFAS applications shall be provided with their own and separated installation package. The installation packages shall also support the uninstallation of the complete application.

Reference: TOPFAS

[REQ-8180] TOPFAS web apps shall not require any client installation and be directly usable from a web browser.

Reference: TOPFAS

[REQ-8190] TOPFAS's installation packages shall detect its environment and run all necessary checks (appropriately address the correct Microsoft Windows and SQL Server version, disk space, etc.). Note: This includes the installation on non-English operating system versions.

Reference: TOPFAS

- [REQ-8200] In case of cancellation or error during the installation process leaving the installation in an incomplete state, TOPFAS's installation package shall allow the (re)-installation to complete without error.
- Reference: TOPFAS
- [REQ-8210] TOPFAS installation packages shall allow multiple instances of TOPFAS (e.g. operations, exercise and training).
- Reference: TOPFAS
- [REQ-8220] TOPFAS's installation packages shall provide an option to completely uninstall components of the capability. Only system files, shared files and files containing user specific settings shall be retained, if appropriate. The installation package shall not adversely impact other applications or the system when the full capability or one of its components is de-installed.
- Reference: TOPFAS
- [REQ-8230] It shall be possible to run fully automated installation and/or uninstallation of the applications and services.
- Reference: TOPFAS
- [REQ-8240] It shall be possible to replace a previous release with a new release in a fully automated way without loss of any data and configuration settings using a blue-green or canary deployment strategy.
- Reference: TOPFAS