ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Μόνιμη Αντιπροσωπεία της Ελλάδος
στο ΝΑΤΟ

Αρμόδιος:	Ασμχος (ΜΕ) Δημήτριος Κανταρτζόγλου	Βρυξέλλες,	07 Απριλίου 2021
Τηλ.:	+32 2 707 6734	**Α.Π.:**	1726
Ηλεκ. Δνση:	**d.kantartzoglou@grdel-nato.be**		

ΠΡΟΣ: ΥΠΕΘΑ/ΓΔΑΕΕ/ΔΑΕΤΕ   (μ. η.)

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

ΘΕΜΑ: 1η Τροποποίηση Πρόσκλησης Υποβολής Προσφορών IFB-CO-115112-ETEE, Διαγωνιστικής Διαδικασίας Έργου: «Enhancement of the Joint Exercise Management Module (JEMM) within Ballistic Missile Defence (BMD) Functions in Education, Training, Exercise and Evaluation (ETEE) Functional Services (FS)»

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

     2.   Καταληκτική ημερομηνία υποβολής προσφορών ορίζεται πλέον η 6η Μαΐου 2021, 12:00 τ.ώ.

     3.   Ενδιαφερόμενες εταιρίες αναζητήσουν πληροφορίες μέσω καθοριζομένου σημείου επαφής (Point of Contact/POC, βλ. παρ. 8 τροποποιήσεως).

     4.   Παρακαλούμε για τις ενέργειές σας.

               ΛΑΜΠΡΙΔΗΣ

Συν. Σελ: 217

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

NCIA/ACQ/21/06730
01 April 2021

To	:	All Nominated Prospective Bidders
Subject	:	**INVITATION FOR BID NO. IFB-CO-115112-ETEE, AMENDMENT NO. 1**

ENHANCEMENT OF JOINT EXERCISE MANAGEMENT MODULE (JEMM) WITHIN BMD FUNCTIONS IN EDUCATION, TRAINING, EXERCISE AND EVALUATION FUNCTIONAL SERVICES (ETEE FS)

Reference(s) : A. AC/4-D/2261 (1996 Edition)
B. NCI AGENCY IFB-CO-115112-ETEE issued 19 January 2021

Dear Sir / Madam,

1. The purpose of this Amendment 1 is to:

   a) Revise the IFB Bid Closing Date,

   b) Publish IFB Bidders' questions and NCI Agency answers,

   c) Issue revised IFB documents (Book I + Book II).

2. In accordance with an official request for extension of the time limit for submission of bids in accordance with the Procedures for International Competitive Bidding AC/4-D/2261 (1996 Edition), paragraph 10 (b), sub-paragraphs (i), (ii) and (iii), the Book I, Part I, Bidding Instructions, Section 2, General Bidding Information, Para 2.3.1, is hereby revised as follows:

   FROM:

   "*The closing date and time for electronic submission of bids in response to this IFB at the email address given below in Section 2.3.2 is on/or before 12h00 / 12pm (Brussels Time) on **14 April 2021**, at which time and date Bidding shall be closed.*"

NCIA/ACQ/21/06730

TO:

"*The closing date and time for electronic submission of bids in response to this IFB at the email address given below in Section 2.3.2 is on/or before 12h00 / 12pm (Brussels Time) on **6 May 2021**, at which time and date Bidding shall be closed.*"

3.   Bidders shall note that due to ongoing protection measures at NATO HQ due to the COVID-19 situation, a decision has been made to convert this bidding procedure from physical delivery of bidding materials to 100% electronic delivery (e-bidding) via email. This has necessitated a comprehensive change in the Book I Bidding Instructions in order to implement the e-bidding procedure. All potential bidders are strongly advised to use only these revised bidding instructions and to no longer use the original IFB Book I Bidding Instructions as a reference.

4.   Final NCI Agency answers to all Bidders' questions received before 17 March 2021 are hereby published with this IFB Amendment 1 as Attachment 1. Bidders' shall take note of the process and deadlines regarding additional Bidder requests for clarification as per Para 2.6.3 of the IFB Book I Bidding Instructions.

5.   Some answers to Bidder questions have necessitated changes to the IFB bidding documents. Revised bidding documents as indicated in Para 1 above are attached to this IFB Amendment 1 as Attachment 2 and replace the original versions in their entirety. Potential Bidders are strongly advised to carefully review these revised bidding documents.

6.   With the exception of the revisions mentioned above, all other IFB documents remain unchanged from their original version as issued on 19 January 2021.

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

8.   The sole NCI Agency point of contact for all information concerning this IFB is Mr. Peter Kowalski, Senior Contracting Officer, who may be reached at Peter.Kowalski@ncia.nato.int.

FOR THE DIRECTOR:

[*Original Signed By*]

Gael Craver
Principal Contracting Officer

Attachments: IFB Amendment 1

1) IFB Bidder Questions and Answers at AMD 1

2) Revised Bidding Documents:

      a) IFB Book I – Bidding Instructions, Annex A, Annex E

      b) IFB Book II – Statement of Work, Annex B, Annex D

Distribution List

All Nominated Prospective Bidders 1

NATO Delegations (Attn: Infrastructure Adviser):

Albania	1
Belgium	1
Bulgaria	1
Canada	1
Croatia	1
Czech Republic	1
Denmark	1
Estonia	1
France	1
Germany	1
Greece	1
Hungary	1
Iceland	1
Italy	1
Latvia	1
Lithuania	1
Luxembourg	1
Montenegro	1
The Netherlands	1
Norway	1
Poland	1
Portugal	1
Romania	1
Slovakia	1
Slovenia	1
Spain	1
Turkey	1
United Kingdom	1
United States	1

Distribution for information

NATO HQ

NATO Office of Resources
Management and Implementation Branch – Attn: Deputy Branch Chief 1

Director, NATO HQ C3 Staff
Attn: Executive Co-ordinator 1

SACTREPEUR
Attn: Infrastructure Assistant 1

Strategic Commands

ACT

HQ SACT CAPDEV IAMD BMD
    Program Director BMD - Attn: CDR Eric Schuurmans   1

SHAPE

SHAPE SDP SDF COR COO
    Attn: LTC Marcus Nieswand   1

NCI Agency – All NATEXs

NCI Agency

Director of Acquisition	1
Deputy Director of Acquisition	1
Contract Award Board Administrator	1
Acting Chief of Contracts	1
Principal Contracting Officer	1
Principal Contracting Assistant	1
Director AMDC2	1
Director NCI Academy	1
NCI Academy – Senior Supplier	1
NCI Academy – Project Manager	1
NCI Academy – Technical Lead	1
Liaison Officer to the Investment Committee	1
Legal Office	1

Index No.	IFB Source Document	IFB Paragraph Reference	Bidder's Question	Purchaser's Answer	IFB Documents Changed ? (Yes or No)	Released @ AMD #
CR#1	N/A	N/A	Is there a contractor currently supporting and/or enhancing the JEMM system?	Support and enhancement of JEMM is organic to NATO. No commercial contractors are currently involved.	NO	AMD 1
CR#2	N/A	N/A	Are contractors currently supporting or that have developed the JEMM system eligible to compete for this procurement?	Please see answer given at CR#1. JEMM is developed, maintained, and supported organically by NATO.	NO	AMD 1
CR#3	N/A	N/A	We found the System Architecture to be too high level whereas the SRS is too specific for us to correctly estimate the level of effort and propose an implementation strategy for JEMM. Can the Purchaser provide additional documentation that provides additional information about JEMM? We would find the following documentation to be useful: System Design documentation including use cases, detailed workflows, user interface design and screenshots. Additionally, we would like to have access to the JEMM user guide and training guide or training documentation. If available, we would like for the Purchaser to provide a demo of the JEMM system. All this additional information would allow us to put the SRS in the proper context.	Section 3.4 of the IFB Book II Statement of Work, Annex B, describes for all the application functions, their interfaces and the related data objects. The section also indicates whether the application function is new, i.e. to be developed by the Contractor or only requires updating. The required level of effort can be estimated by the use of function point analysis. Releasing the User Guide or providing a demo of the JEMM system during the bidding phase would provide no additional insight to the Bidder as to the estimated level of effort needed to execute the resulting contract.	NO	AMD 1
CR#4	IFB	N/A	Will you share the source code of the software? If yes, what/which part(s) is going to be shared? Do you have any other prerequisite to utilize the source codes in our facilities other than the NATO clearance for facility and engineers?	**Question 1**: Will you share the source code of the software? **Answer 1**: Partially Yes, the Purchaser will share development branches that include the relevant source code software development at hand. This sharing is stated in Book II Statement of Work Para 3.8.7. and 3.9.3. **Question 2**: If yes, what/which part(s) is going to be shared? **Answer 2:** See answer 1. **Question 3**: Do you have any other prerequisite to utilize the source codes in our facilities other than NATO clearance for our facility and engineers? **Answer 3:** All source codes made available to the contractor shall remain inside the NATO Software Factory. Further prerequisites on the handling of the source codes provided are stated in SOW 3.9.4, the Special Contract Provisions clauses 5 and 6 and the General Contract Provisions clauses 12 and 13.	NO	AMD 1

CR#5	IFB	N/A	There is no travel plan in the project schedule given in Book II – Part IV Statement of Work(SoW) Figure 1.2. A travel plan should be needed for integration. Are there any anticipated travel destinations and integration times?	There are no Purchaser mandated travel requirements other than the FAT and SIT events as indicated in Book II Statement of Work Section 2.5.3.1. All other integration activities are scheduled to take place remotely through a collaborative development environment as specified in Book II Statement of Work Sections 3.6 through 3.16. The destination for the FAT and the SIT is NCIA The Hague, NL. The scheduled duration of the tests can be up to 1 month each.	NO	AMD 1
CR#6	IFB	N/A	Where will the acceptance be performed? Contractor Site or NATO Site?	Iteration and Sprint acceptance will be performed by the Purchaser through the collaborative development environment. For FAT and SIT see the Purchaser answer provided at CR#5.	NO	AMD 1
CR#7	IFB	N/A	What are the ways of proving for Prince, Scrum and engineering capabilities?	Please reference the IFB Book I, Instructions to Bidders, Sections 3.6.4 and 3.6.5. Those sections describe in detail the format and content necessary to adequately demonstrate the Bidders required capabilities.	NO	AMD 1
CR#8	IFB Book II, Part IV, Statement of Work	Statement of Work	What is JAMM?	JAMM (Joint Automated Messaging Module) is one of the application component within the JEMM system, like all other application components in the architecture	NO	AMD 1
CR#9	IFB Book II, Part IV, Statement of Work	Statement of Work, Annex B	There is a terminology called "*New COTS – new component that is not developed but acquired as COTS;*" in section "1.2 Terminology and Notation" of Book II – Part IV Statement of Work - Annex B. Would you clarify the "New COTS" term explicitly? Is it a COTS which we will develop in this project or COTS of any other company?	"New COTS" refers to existing COTS that the Purchaser will acquire outside of this contract to fulfil this functionality. "New COTS" are therefore outside the scope of what the Contractor will need to provide under the contract.	NO	AMD 1
CR#10	IFB Book I, Bidding Instructions	Book I, Section 3, Bid Preparation Instructions	Due to COVID-19 restrictions on physical delivery of Bids, would the Purchaser consider allowing the submission of Bids purely by electronic means?	The Purchaser agrees to make this change. The IFB Book I, Bid Preparation instructions have been substantially modified at IFB Amendment 1 to incorporate 100% electronic delivery of all required bidding proposal documents. Bidders are advised to review these instructions very carefully, and to precisely follow those revised bidding document procedures.	YES	AMD 1
CR#11	IFB Book II, Part IV, Statement of Work and Part III, General Provisions.	Book II, Contract General Provisions and Statement of Work	Could the Purchaser please provide a single comprehensive list of Purchaser Furnished Property within the meaning of Clause 13, Purchaser Furnished Property?	A new Annex D entitled "Purchaser Furnished Property" has been added at IFB Amendment 1 to Book II, Part IV of the IFB Statement of Work to provide a comprehensive listing of all Purchaser Provided Property to be furnished to the Contractor during the performance of the contract.	YES	AMD 1

CR#12	IFB Book I, Bidding Instructions	Book I, Section 3, Bid Preparation Instructions and Section 4, Bid evaluation	Could the Purchaser provide more clarity on the expected format of the bid content as specified in Book I sections 3.6.4, 3.6.5 and 3.6.6?	IFB Amendment 1 includes updates for the Book I "Instructions to Bidders" sections 3.6.4, 3.6.5, 3.6.6 and the sections 4.5.2, 4.5.3, 4.5.4. These sections provide more clarity on the expected format and associated content of the various elements of the bid.	YES	AMD 1
CR#13	IFB Book II, Part IV, Statement of Work	Statement of Work, Para 1.4.8	Concerning the "graphical scripting" sprint, will the Purchaser provide in advance some design constraint and/or prototype? Otherwise, the Contractor shall carry out the entire design, taking into account only the guideline included in [NCIA HMI Style Guide, 2015] referenced in Annex B?	**Question 1**: The functionality for the "graphical scripting" sprint is defined in the Statement of Work Annex B section 3.4 under JEMM-Sprint 3.1. This functionality will be designed and implemented in an agile manner where detailed User Stories will be provided by the Purchaser in his role as product owner. **Question 2**: The contractor is not required to carry out the entire design.	NO	AMD 1
CR#14	IFB Book II, Part IV, Statement of Work	Statement of Work, Annex B. Page 20	Will the update of the Link16 formatter be limited to new messages managed by Link16, or does it involve a list of pre-existing messages?	The update of the Link16 formatter is limited to the addition of the messages that are not annotated as being already implemented in Annex A under the JEMM-TI-18, JEMM-TI-19, JEMM-TI-31 requirements.	NO	AMD 1
CR#15	IFB Book II, Part IV, Statement of Work	Statement of Work, Annex B, Page 20	As for link 16, what is the number of messages to be managed in the JREAP dispatcher?	JEMM-TI-19 refers to all Link16 messages in Annex A that need to be managed in the JREAP dispatcher.	NO	AMD 1
CR#16	IFB Book II, Part IV, Statement of Work	Statement of Work, Table 1-1	The project foresees a "graphical scripting"; will graphics be provided or will the design be the responsibility of the proponent?	See the Purchaser answer given at CR#13.	NO	AMD 1
CR#17	IFB Book II, Part IV, Statement of Work	Statement of Work, Annex A, Page A-6	It is not clear to us what the codes in green with the ETE. [0-9] [0-9]. [0-9] [0-9] [0-9] format refer to, in the Refined User Stories.	As stated in Section 1.5 of the Statement of Work Annex A: "*The code in green in the user stories refers to the corresponding function in the ADD*."	NO	AMD 1
CR#18	IFB Book II, Part IV, Statement of Work	Statement of Work, Annex A, Page A-9	Within different Refined User Stories there are several references to an ETE.xx.xx code that looks like a placeholder, we would like to have clarifications.	Those references are used for requirement traceability between the ADD and the Statement of Work and are therefore not relevant for the Bidder.	NO	AMD 1
CR#19	IFB Book II, Part IV, Statement of Work	Statement of Work, Annex C	Is it possible to use Typescript for the development of the application clients?	Yes, that is possible for the client side Angular-based applications.	NO	AMD 1
CR#20	IFB Book II, Part IV, Statement of Work	Statement of Work, Annex B, Page B-46	How can the relationship between the sprint IDs in the table at par 3.4 of annex B and tables 1.1 of the SOWs be mapped?	The mapping is: JEMM-sprint n.m refers to Focus Area n and Sprint m.	NO	AMD 1
CR#21	IFB Book II, Part IV, Statement of Work	Statement of Work, Page 6	NATO Security Regulations - it is not clear whether specific documents should be referred to.	The Contractor is required to comply with the security requirements as stated in Section 3.12 of the Statement of Work and as well with the Clause 5 of the Contract Special Provisions and Clause 11 of the Contract General Provisions.	NO	AMD 1

| CR#22 | IFB Book I, Annex A, Bidding Sheets | N/A | Can the Purchaser please confirm a summation formula error in the Bidding Sheets spreadsheet tab "CLIN Summary", cell K55? | This error is confirmed. A revised Bidding Sheet is released at IFB AMD 1 to correct this error. Bidders are advised to take note to use only this revised AMD 1 Bidding Sheet to submit their Price proposal and to refrain from using the 19 January 2021 IFB version. | YES | AMD 1 |
| CR#23 | Book II, Part IV, Statement of Work and Book I, Instructions for Bidders | Statement of Work, Para 2.1.3 and Bidding Instructions Annex B-13 | Part IV para 2.3.1.2 describes a Deputy Project Manager within the Key Personnel section. It is unclear whether the Deputy is considered Key Personnel. The Deputy position is not listed in Annex B-13. Please clarify whether the Deputy PM is Key. | The Deputy Project Manager is not considered to be Key Personnel. This is clarified by the updated section 2.3 of the SOW AMD1 | YES | AMD 1 |

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

ENHANCEMENT OF JOINT EXERCISE MANAGEMENT MODULE (JEMM) WITHIN BALLISTIC MISSILE DEFENCE (BMD) FUNCTIONS IN EDUCATION, TRAINING, EXERCISE AND EVALUATION (ETEE) FUNCTIONAL SERVICES (FS)

AMD 1 TO IFB-CO-115112-ETEE

BOOK I

INSTRUCTIONS TO BIDDERS

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Purpose and Scope

1.1.1 The BMD Enhanced JEMM System will start from the existing JEMM system and implement JEMM component enhancements identified by the Purchaser (NCI Agency) to deliver a new JEMM system baseline that will provide the following business services to enable the BMD Community of Interest to meet their ETEE requirements:

1.1.1.1 Objectives management Service (Moderate enhancement)

1.1.1.2 MEL/MIL management Service (Moderate enhancement)

1.1.1.3 Training Audience Interaction Service (Major enhancement)

1.1.1.4 Observation management Service (Minor enhancement)

1.1.1.5 Assessment management Service (Minor enhancement)

1.1.1.6 Logging Service (Major enhancement)

1.1.1.7 BMD ETEE Recognized Picture management Service (Major enhancement)

1.1.2 This project will deliver working software that implements the full set of application functions associated with the software requirements for the business services mentioned above. The software will be integrated by the Purchaser into new JEMM system baselines which the Purchaser will deploy for the users. The project will consist of two phases of approximately 18 months each. The first phase will deliver working software that meets the full set of requirements for the BMD enhanced JEMM system. The second phase aims to refine the first delivery based on actual usage and on insights gained during the development of the first delivery. The project will support the system training

periods and the initial operation of the system after final system acceptance by providing corrective maintenance support for the delivered software.

1.1.3 The delivered software will need to comply with cyber security regulations and with specified coding standards.

1.1.4 The software will be designed and implemented according to the architecture and the technologies specified by the Purchaser using Azure DevOps Services.

1.1.5 The project will be conducted in an agile manner where the Contractor shall be expected to perform the roles of Project Manager, of Scrum Master and of a Coding Team including the Lead Engineer.

1.1.6 The project scope includes:

1.1.6.1 Project Management

1.1.6.2 Software Engineering

1.1.6.3 Initial Operations Support

1.1.7 The majority of the project activities performed by the Contractor will be performed at the Contractor's site and via collaborative on-line environments.

1.1.8 The purpose and scope of the Contract are further refined in the Statement of Work (SoW), Book II, Part IV of this Invitation for Bid.

1.2 Overview of the Prospective Contract

1.2.1 The Prospective Contract (Book II) requires the selected Contractor to deliver the enhancements for new Joint Exercise Management Module product baselines. The Contractor shall perform all activities required as per Book II Part IV (Statement of Work – SOW) and shall deliver the associated deliverables as per Book II Part I (Schedule of Supplies and Services – SSS). The Contractor's work encompasses the activities described in Book II Part IV according to the schedule defined in the SOW. The contract is scheduled for 36

month of Contractor performance after Effective Date of Contract (EDC), with follow-on Operation and Maintenance support.

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

1.3 Governing Rules, Eligibility, and Exclusion Provisions

1.3.1 This solicitation is an International Invitation for Bid (IFB) and is issued in accordance with the procedures for International Competitive Bidding set forth in the NATO document AC/4-D/2261 (1996 Edition).

1.3.2 Pursuant to these procedures, bidding is restricted to companies from participating NATO member nations (see Para 2.1.1.5) for which a Declaration of Eligibility has been issued by their respective government authorities.

1.3.3 Best Value Evaluation Method

1.3.3.1 The evaluation method to be used in the selection of the successful Bidder under this solicitation shall follow the Best Value Procedures set forth in AC/4(2008)0002-REV2-ANNEX 1 dated 15 July 2015, or deviations to the procedure, if any, as approved by the NATO Investment Committee.

1.3.3.2 The bid evaluation criteria and the detailed evaluation procedures are described in Section 4.

1.3.4 This Invitation for Bid will not be the subject of a public Bid opening.

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

1.3.6 Prospective Bidders shall note that with the aim to prevent a conflict of interest in industrial roles under the BMD Functions in ETEE Functional Services project, the NATO authorities authorizing this project have directed that Bidders responding to this IFB and their prospective Sub-Contractors shall be excluded from participation in the NCI Agency project under IFB-CO-115115-ETEE entitled "*BMD Functions in ETEE FS - WP4 Operational Assurance & Test*".

1.4 Security

1.4.1 Contractor will be required to handle and store classified material to the level of "NATO RESTRICTED" and the Contractor shall have the appropriate facility and personnel clearances. Should a Contractor be unable to perform the contract due to the fact that the facility clearance has not been provided by their respective national security agency, this lack of clearance cannot be the basis for a claim of adjustment or an extension of schedule, nor the lack of clearance be considered a mitigating circumstance in the case of an assessment of

Liquidated Damages or a determination of Termination For Default by the Purchaser.

1.4.2 Contractor personnel working at NATO sites are required to possess a security clearance of "NATO SECRET". Contractor personnel without such a clearance, confirmed by the appropriate national security authority and transmitted to the cognisant NATO security officer at least fourteen (14) days prior to the site visit, will be denied access to the site. Denial of such access by the Purchaser may not be used by the Contractor as the basis for a claim of adjustment or an extension of schedule nor can the denial of access be considered a mitigating circumstance in the case of an assessment of Liquidated Damages or a determination of Termination for Default by the Purchaser.

1.4.3 Bidders are advised that contract signature will not be delayed in order to allow the processing of security clearances for personnel or facilities. Should the otherwise successful Bidder not be in a position to accept the offered Contract within a period of time deemed to be reasonable by the Purchaser due to the non-availability of the necessary security clearance(s), the Purchaser may determine the Bidder's Offer to be non-compliant and offer the Contract to the next ranking Bidder. In such a case, the Bidder lacking the necessary security clearance(s) shall be liable for forfeiture of the Bid Guarantee.

1.5 Reserved

1.6 Documentation

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

2 GENERAL BIDDING INFORMATION

2.1 Definitions

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

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

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

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

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

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

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

2.1.1.7 "IFB": Invitation for Bid.

2.1.1.8 The Purchaser is defined as the current NCI Agency or its legal successor.

2.2 Eligibility and Origin of Equipment and Services

2.2.1 As stated in Section 1.3.1 above only firms from a Participating Country are eligible to engage in this competitive Bidding process.

2.2.2 In addition, all Contractors, sub-Contractors and manufacturers, at any tier, must be from Participating Countries.

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

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

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

2.2.6 As stated in Section 1.3.6 above, Bidders participating in the NCI Agency project under IFB-CO-115115-ETEE entitled "*BMD Functions In ETEE FS – WP4 Operational Assurance & Test*" are not eligible to participate in this IFB competition.

2.3 Bid Delivery and Bid Closing

2.3.1 The closing date and time for electronic submission of bids in response to this IFB at the email address given below in Section 2.3.2 is on/or before 12h00 / 12pm (Brussels Time) on ***6 May 2021***, at which time and date Bidding shall be closed.

2.3.2 Bids shall be submitted by electronic means **only and solely** to the following email address:

2.3.2.1 IFB-CO-115112-ETEE.Bids@ncia.nato.int

2.3.3 Late Bids

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

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

2.3.3.2.1 A contract has not already been awarded pursuant to the Invitation for Bid, and,

2.3.3.2.2 The Bid was sent to the correct email specified in Section address specified in Section 2.3.2 and the delay was due solely to the fault of the Purchaser.

2.4   Requests for Extension of Bid Closing Date

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

2.5   Purchaser's Point of Contact

2.5.1   The Purchaser point of contact for all information and questions/clarification requests concerning this Invitation for Bid is:

Mr. Peter Kowalski, Senior Contracting Officer
Acquisition
Fax: +32.2.707.87.70
E-mail: peter.kowalski@ncia.nato.int

With a Copy to:

Ms. Dorina Cani, Principal Contracting Assistant
Fax: +32.2.707.87.70
Acquisition
E-mail: dorina.cani@ncia.nato.int

2.5.2 Bid Delivery: all bids shall be delivered by email as stated in paragraph 2.3.2. and only to that email address.

2.6 Request for IFB Clarifications

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

2.6.2 All questions and requests for clarification shall be forwarded to the Purchaser via email to the addresses given in Section 2.5.1 using the Clarification Request Form provided at Annex D of this Book I. Such questions shall be forwarded to the point of contact specified in Section 2.5.1 above and shall arrive **not later than twenty eight (28) calendar days** prior to the stated "Bid Closing Date". The Purchaser is under no obligation to answer requests for clarification submitted after this time. Requests for clarification must address the totality of the concerns of the Bidder, as the Bidder will not be permitted to revisit areas of the IFB for additional clarification except as noted in Section 2.6.3, below.

2.6.3 Additional requests for clarification are limited only to the information provided as answers by the Purchaser to Bidder requests for clarification. Such additional requests shall arrive not later than fourteen (14) calendar days before the established Bid Closing Date.

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

2.6.5 The Purchaser declines all responsibilities associated to any and all circumstances regardless of the nature or subject matter arising from the Bidders' failure or inability to abide to the prescription in Section 2.6.4.

2.6.6 The Purchaser may provide for the removal of any form of identification in the body of the clarification request in those instances in which such practice is feasible as well as providing for a re-wording of the clarification request in those cases in which the original language submitted is deemed ambiguous, unclear, subject to different interpretation or revelatory of the Bidder's identity.

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

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

Purchaser in the event that questions posed are not reflected in the answers published.

2.6.9 Where the extent of the changes implied by the response to a clarification request is of such a magnitude that the Purchaser deems necessary to issue revised documentation, the Purchaser will do so by the mean of the issuance of a formal IFB amendment pursuant to AC/4 D/2261 (1996 Edition) and in accordance with Section 2.8 below.

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

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

2.7 Requests for Waivers and Deviations

2.7.1 Bidders are informed that requests for alteration to, waivers or deviations from the terms and conditions of this IFB and attached Prospective Contract (Book II) will not be considered after the request for clarification process. Requests for alterations to the other requirements, terms or conditions of the Invitation for Bid or the Prospective Contract may only be considered as part of the clarification process set forth in Section 2.6 above. Requests for alterations to the specifications, terms and conditions of the Contract which are included in a Bid as submitted may be regarded by the Purchaser as a qualification or condition of the Bid and may be grounds for a determination of non-compliance.

2.8 Amendment of the Invitation for Bid

2.8.1 The Purchaser may revise, amend or correct the terms, conditions and/or specifications and provisions of the IFB at any time prior to the date set for the Bid Closing. Any and all modifications will be transmitted to all Bidders by an official amendment designated as such and signed by the Contracting Authority. Such amendment will be accompanied by an acknowledgement of receipt which the Bidder shall complete and enclose as part of its Bid. This process may be part of the clarification procedures set forth in Section 2.6 above or may be an independent action on the part of the Purchaser.

2.8.2 The Purchaser will consider the potential impact of amendments on the ability of prospective Bidders to prepare a proper Bid within the allotted time. The

Purchaser may extend the "Bid Closing Date" at its discretion and such extension will be set forth in the amendment document.

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

2.9 Modification and Withdrawal of Bids

2.9.1 Bids, once submitted, may be modified by Bidders, but only to the extent that the modifications are in writing, conform to the requirements of the IFB, and are received by the Purchaser prior to the exact time and date established for Bid Closing. Such modifications shall be considered as an integral part of the submitted Bid.

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

2.9.3 A Bidder may withdraw its Bid at any time prior to Bid Opening without penalty. In order to do so, an authorised agent or employee of the Bidder must provide an original statement of the firm's decision to withdraw the Bid and remove the Bid from the Purchaser's premises.

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

2.10 Bid Validity

2.10.1 Bidders shall be bound by the term of their Bids for a period of eighteen (18) months starting from the Bid Closing Date specified in Section 2.3.1 above.

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

2.10.3 The Purchaser will endeavour to complete the evaluation and make an award within the period referred to above. However, should that period of time prove

insufficient to render an award, the Purchaser reserves the right to request an extension of the period of validity of all Bids which remain under consideration for award.

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

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

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

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

2.11 Bid Guarantee

2.11.1 The Bidder shall furnish with its Bid a guarantee in an amount equal to **one hundred thirty-two thousand Euro (€132,000).** The Bid Guarantee shall be substantially similar to Annex C as an irrevocable, unqualified and unconditional Standby Letter of Credit (SLC) issued by a Belgian banking institution fully governed by Belgian legislation or issued by a non-Belgian financial institution and confirmed by a Belgian banking institution fully governed by Belgian legislation. In the latter case signed letters from both the issuing institution and the confirming institution must be provided. The confirming Belgian bank shall clearly state that it will guarantee the funds, the drawing against can be made by the NCI Agency at its premises in Belgium. Bid Guarantees shall be made payable to the Treasurer, NCI Agency. The validity period of the Bid Guarantee shall be in line with the Bid Validity period as defined in Para 2.10.1.

2.11.2 Alternatively, a Bidder may elect to post the required Guarantee in cash (via direct bank deposit) or by certified cheque a copy of which to be submitted in the Bidder's Bid Administrative Package (Para 3.4). If the latter method is selected, Bidders are informed that the Purchaser will cash the cheque on the Bid Closing Date. Instructions regarding direct cash bank deposit shall be obtained from the designated Point of Contact indicated in Para 2.5

2.11.3 If the Bid Closing Date is extended after a Bidder's financial institution has issued a Bid Guarantee, it is the obligation of the Bidder to have such Bid

Guarantee (and confirmation, as applicable) extended to reflect the revised Bid Validity date occasioned by such extension.

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

2.11.5 In the event that a Bid Guarantee is submitted directly by a banking institution, the Bidder shall furnish a ==scan c==opy of said document in the Bid Administration Package.

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

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

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

2.11.6.3 The Purchaser has offered the Bidder the contract for execution but the Bidder has been unable to demonstrate compliance with the security requirements of the contract within a reasonable time; or

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

2.11.7 Bid Guarantees will be returned to Bidders as follows:

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

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

2.11.7.3 to the successful Bidder upon submission of the Performance Guarantee required by the Contract or, if there is no requirement for such a Performance Guarantee, upon contract execution by both parties;

2.11.7.4 pursuant to Section 2.10.4.2 above.

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

2.12 Cancellation of Invitation for Bid

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

2.13 Electronic Transmission of Information and Data

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

2.13.2 Bidders are cautioned that the Purchaser, when permissible under security classifications, will rely exclusively on electronic mail or portal communication to manage all correspondence related to this IFB, including IFB amendments and clarifications.

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

2.14 Supplemental Agreements

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

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

2.14.3 Bidders are cautioned that failure to provide full disclosure of the anticipated requirements and the terms thereof, to the best of the Bidder's knowledge and experience, may result in the Purchaser withholding award of the contract or cancelling an executed contract if it is discovered that the terms of such Supplemental Agreements contradict salient conditions of the Prospective

Contract to the extent that either key objectives cannot be accomplished or basic contract principles and Purchaser rights have been abridged.

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

2.15.1 Bidders are instructed to review Clauses 6 and 7 of the Contract Special Provisions and Clauses 29 and 30 of the Contract General Provisions set forth Parts II and III of Book II herein. These Clauses sets forth the definitions, terms and conditions regarding the rights of the Parties concerning Intellectual Property developed and/or delivered under this contract or used as a basis of development under this contract.

2.15.2 Bidders are required to disclose, in accordance with the Certificates at Annex B-10 and Annex B-11, the Intellectual Property proposed to be used by the Bidder that will be delivered with either Background Intellectual Property Rights or Third Party Intellectual Property Rights. Bidders are required to identify such Intellectual Property and the basis on which the claim of Background or Third Party Intellectual Property is made. Bidders shall note that Clause 6 of the Special Provisions prohibits the inclusion of any Background Intellectual Property or third party software in the code provided to the Purchaser without the Purchaser's prior agreement.

2.15.3 Bidders are further required to identify any restrictions on Purchaser use of the Intellectual Property that is not in accordance with the definitions and rights set forth in the provisions of the Book II prospective Contract concerning use or dissemination of such Intellectual Property.

2.15.4 Bidders are reminded that restrictions on use or dissemination of Intellectual Property conflicting with the Book II terms and conditions or with the objectives and purposes of the Purchaser as stated in the Prospective Contract shall result in a determination of non-compliant bid.

2.16 Mandatory Quality Assurance and Quality Control Standards

2.16.1 Bidders are requested to note that, in accordance with the Certificate at Annex B-8 hereto, Bidders shall provide documentary evidence that the Bidder possesses a current certification that is compliant with the requirements of Allied Quality Assurance Publication (AQAP) 2110, ISO 9001:2015, or an equivalent QA/QC regime.

2.16.2 Bidders shall further demonstrate that such regime is applied within the Bidder's internal organisation, as well as extended to its relationships with Sub-Contractors.

2.16.3 If the Bidder is offering a QA/QC regime that is claimed to be equivalent to AQAP 2110 or ISO 9001:2015, the burden of proof of such equivalency shall

be on the Bidder and such evidence of equivalency shall be submitted with the Certificate at Annex B-8 in the Bid Administration Package.

2.16.4 Failure to execute this Certificate, or failure to provide documentary evidence of compliance with this requirement may result in a determination of non-compliance for the submitted Bid.

2.17   Receipt of an Unreadable Electronic Bid

2.17.1 If a bid received at the NCI Agency's facility by electronic data interchange is unreadable to the degree that conformance to the essential requirements of the solicitation cannot be ascertained, or due to Bidder's submission, in contravention of these bidding instructions, of electronic files that are encrypted or which contain passwords, the CO shall immediately notify the Bidder that the bid will be rejected unless the Bidder provides clear and convincing evidence:

2.17.1.1   of the content of the bid as originally submitted, and;

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

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

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

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3   BID PREPARATION INSTRUCTIONS

3.1   General

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

3.1.2   Bidders **shall not simply restate the IFB requirements**. A Bid shall demonstrate that the Bidder understands the terms, conditions and requirements of the IFB and shall demonstrate the Bidder's ability to provide all the services and deliverables listed in the Schedules of the prospective Contract. Bidders shall take good note of Para 4.1.4 below in this regard.

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

3.1.4   Partial Bids and/or bids containing conditional statements will be declared non-compliant.

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

3.1.6   If no specific format has been established for electronic versions, Bidders shall deliver documentation in the native electronic format which is best suited for review and maintenance by the Purchaser (e.g., Project Master Schedule in MS Project format, Project Highlight Reports in MS Word).

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

3.2   Bid Package Content

3.2.1   The complete Bid submission shall consist of three distinct and separated parts described in the following table:

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Part	Format and Quantity Details
I: Bid Administration	Two (2) PDF files that include: 1. The completed, signed certificates found in Annex B, provided as a single PDF file. 2. A copy of the Bid Guarantee. Note: this shall also be delivered by email directly to: *NCIAFinanceTreasuryBankGuarantee@ncia.nato.int* ➢ All of the required contents are detailed in Section 3.4.
II: Price	One (1) MS Excel file that includes: 1. The completed Bidding Sheets template provided in Annex A-3. ➢ All of the required contents are detailed in Section 3.5.
III: Technical	1 Zip file, which includes 3 folders, organized as follows: 1. Volume 1: Project Management 2. Volume 2: Software Engineering 3. Volume 3: Integrated Support ➢ All of the required contents are detailed in Section 3.6.

3.2.2 All emails submitted to the Purchaser shall be less than 10 MB in size, and shall in all instances be entirely unlocked and unencrypted.

3.3 Package Marking

3.3.1 The bid shall be consolidated into one email and sent to the correct Bid Delivery email address stated in paragraph 2.3.3. The email shall have the following subject line:

- 115112-ETEE WP1 JEMM for [*Company Name*]

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

3.3.3 The individual electronic bidding files sent by email shall have the names listed below:

3.3.3.1 Part I, Bid Administration:

- 115112-ETEE-*Company Name*–Part I–Admin

- 115112-ETEE-*Company Name*–Part I–Bid Guarantee

3.3.3.2 Part II, Price:

- 115112-ETEE-*Company Name*–Part II–Price

3.3.3.3 Part III, Technical:

- 115112-ETEE-*Company Name*–Part III–Vol1-Intro

- 115112-ETEE-*Company Name*–Part III–Vol1-TOC

- 115112-ETEE-*Company Name*–Part III–Vol1-PMP

- 115112-ETEE-*Company Name*–Part III–Vol1-RR

- 115112-ETEE-*Company Name*–Part III–Vol1-PMQuals

- 115112-ETEE-*Company Name*–Part III–Vol1-BRCM

- 115112-ETEE-Company Name-Part III-Vol2-DDPph1

- 115112-ETEE-Company Name-Part III-Vol2-DDPFATSITph1

- 115112-ETEE-Company Name-Part III-Vol2-DDPph2

- 115112-ETEE-Company Name-Part III-Vol2-DDPFATSITph2

- 115112-ETEE-Company Name-Part III-Vol2-EngPersQuals

- 115112-ETEE-Company Name-Part III-Vol2-EngQAQuals

- 115112-ETEE-Company Name-Part III-Vol2-EngCSQuals

- 115112-ETEE-*Company Name*–Part III–Vol3-ISP

- 115112-ETEE-*Company Name*–Part III–Vol3-CMP

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

3.4 Part I: Bid Administration

3.4.1 The part is comprised of:

- All of the required certificates submitted as 1 (one) consolidated PDF file;

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

  NCIAFinanceTreasuryBankGuarantee@ncia.nato.int

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

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

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

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

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

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

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

3.4.3.6 Annex B-6 (Comprehension and Acceptance of Prospective Contract Provisions);

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

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

3.4.3.9 Annex B-9 (List of Prospective Major Sub-Contractors);

3.4.3.10 Annex B-10 (Bidder Background IPR);

3.4.3.11 Annex B-11 (List of Sub-Contractor IPR);

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

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

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

3.4.3.15 Annex B-15 (Disclosure of Conflict of Interest);

3.4.3.16 Annex B-16 (Disclosure of Involvement of Former NCI Agency Employment).

3.4.4 Documentation Disclosure of Conflict of Interest

3.4.4.1 A conflict of Interest means that because of other activities or relationships with other persons or entities, a Bidder is unable or potentially unable to render impartial assistance or advice to the Purchaser or the Bidder's objectivity in performing the prospective Contract work is, or might be otherwise impaired, or the Bidder has an unfair competitive advantage.

3.4.4.2 If no conflict of interest exists, Bidders shall include a declaration to that extent signed by the individual entitled to commit the company to such statement.

3.4.5 No indication disclosing or contributing to disclose the Bid Price shall be made part of the Bid Administration or Technical Proposal packages. Failure to abide to this prescription may result in the bid being declared non-compliant.

3.4.6 No Bidder participating in this competition may participate, either as Bidder or as a prospective Prime or Sub-Contractor at any tier, in the NCI Agency project under IFB-CO-115115-ETEE entitled "*BMD Functions In ETEE FS - WP4 Operational Assurance & Test*". Bidders shall provide acknowledgement and

certification of their non-participation in the Annex B prescribed Certificate B-15, "Disclosure of Conflict of Interest".

3.5 Part II: Price

3.5.1 This part is comprised of the completed Bidding Sheets Excel file provided with this IFB:

- "02_IFB-CO-115112-ETEE WP1 JEMM Book I Annex A Bidding Sheets FINAL.xlsx"

3.5.2 The IFB Book II Schedule of Supplies and Services Excel files will be completed by the Purchaser immediately prior to contract award and shall not be completed as part of the Bid.

3.5.3 General Rules

3.5.3.1 Bidders are advised that the total bid price for CLINs 1-5 shall not exceed a total of **EUR 3,310,379**. A bid that exceeds this total bid price ceiling shall be determined to be non-compliant and eliminated from further consideration. Bidders shall execute the certificate at B-14 – "Certificate of Price Ceiling" as confirmation of their compliance.

3.5.3.2 Bidders shall prepare their Price Quotation by completing the Bidding Sheets referred in Section 3.5.1.1.1 above, in accordance with the instructions specified in the bidding sheets.

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

3.5.3.4 When completing the Bidding Sheets the Bidder shall insert information in all yellow cells of the Bidding Sheets and complete the Pricing Summary as instructed. A price for each specified element needs to be supplied on each CLIN. Prices should not be grouped. The prices and quantities entered on the document shall reflect the total items required to meet the contractual requirements. The total price shall be indicated in the appropriate columns and in the currency quoted. If the price of a line item is expressed in different currencies, these shall be identified, and there shall be as many totals on that line item as there are currencies. In preparing the Price Quotation, Bidders shall ensure that the prices of the Sub-items total the price of the major item of which they constitute a part.

3.5.3.5 Bidders shall **furnish Firm Fixed Prices for all required items** in accordance with the format set forth in the Instructions for preparation of the Bidding Sheets.

3.5.3.6 Bidders shall furnish Firm Fixed Prices for all CLINs as defined in the Bidding Sheets/Schedule of Supplies and Services. Purchaser evaluation of the submitted bids will be on the basis of the complete submission including administrative, price and technical components for all CLINs. The Contract will be awarded for all CLINs.

3.5.3.7 Offered prices shall not be "conditional" in nature. Any comments supplied in the Bidding Sheets or in any part of the bid package which are conditional in nature, relative to the offered prices may result in a determination that the bid is non-compliant.

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

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

3.5.3.9.1 the currency is of a "participating country" in the project, **and**

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

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

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

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

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

3.5.3.14   All prices bid shall be clearly traceable in the detailed Bidding Sheets.

3.5.3.15   Any adjustment or discount to prices should be clearly traceable to the lowest level of breakdown in the Bidding Sheets and should not be aggregated or summed. Any lack of clarity or traceability may render the bid non-compliant.

3.5.3.16   The Bidder understands that there is no obligation under this contract for the Purchaser to exercise optional line items, if any, and that the Purchaser bears no liability should it decide not to exercise the options (totally or partially).   Further, the Purchaser reserves the right to order another Contractor (or the same), to perform the tasks described in the optional line items of the current contract through a new contract with other conditions.

3.6   Part III: Technical

3.6.1   It is of the utmost importance that Bidders respond to all of the technical requirements of the Purchaser Statement of Work (including all Annexes) and all the bidding instructions, not only with an affirmation of compliance but also with an explanation of how each requirement will be met. To facilitate bidding and the subsequent evaluation of the Bidder's response to the various Sections of the Statement of Work (including all Annexes), bids shall be organised and submitted in three (3) Volumes and delivered in the bid as 1 (one) Zip file as follows:

3.6.1.1   Volume 1 – Project Management– covering the requirements from Section 2 of the SOW (includes the BRCM file);

3.6.1.2   Volume 2 – Software Engineering – covering the requirements from Section 3 of the SOW; and

3.6.1.3   Volume 3 – Integrated Support – covering the requirements from Section 4 of the SOW.

3.6.2   The mapping of SOW Sections to Volumes has been done to facilitate a consistent organisation of the Technical Proposal and its subsequent evaluation.

3.6.2.1   The mapping shall be adhered to by Bidders even if individual requirements within Sections of the SOW may seem to more logically belong in a different Volume. Requirements that are answered in Volumes other than as indicated in Section 3.6.1 may not be evaluated, thus affecting the Best Value score or resulting in a determination of non-compliance.

3.6.2.2 The proposed Technical implementation approach shall not be "conditional" in nature. Any comments supplied in the Technical Proposal Package which are conditional in nature, relative to the proposed Technical implementation approach, may result in a determination that the bid is non-compliant.

3.6.3 Bidding instructions related to each of the three (3) Volumes are provided in Sections 3.6.4 through 3.6.6.

3.6.4 Volume 1 – Project Management

3.6.4.1 This Volume will address the following elements:

3.6.4.1.1 Introduction

3.6.4.1.2 Table of Contents for the whole Technical Proposal

3.6.4.1.3 Draft Project Management Plan with appropriate sections to demonstrate the overall understanding of Purchaser's Project Management requirements by the Bidder including an initial Risk Register (RR) as an annex.

3.6.4.1.4 Bidder Project Management Qualifications and Key Personnel

3.6.4.1.5 Bid-Requirements Cross-Reference Matrix (BRCM)

3.6.4.2 Introduction

3.6.4.2.1 The introduction shall describe the company structure and activities of the prime Contractor. The country in which the prime Contractor is registered shall be identified and the size and location(s) of the company headquarters and subsidiary branches described. Within that structure the location and organizational unit of the office which will manage this contract shall be identified. This Section shall also describe the major activities of the company and how they are distributed across the organisation.

3.6.4.2.2 The introduction shall describe the corporate capabilities of the Bidder, including corporate experience, corporate structure and individual skills and experience in relation to this project.

3.6.4.2.3 The introduction shall highlight the strengths which the Bidder and its team bring to the project in terms of minimising the potential problems and reducing the risks, while meeting the overall implementation schedule, and the key points of the technical implementation approach. This summary shall be concise and to the point and shall not exceed 10 pages.

3.6.4.2.4 Bidders shall explicitly state in the introduction that, should their firm be selected and awarded the contract resulting from this solicitation, the

delivered product(s) and services shall comply with all the requirements of the Statement of Work (including all annexes).

3.6.4.2.5 The introduction shall describe the Bidder's major proposed sub-Contractors for the Project. Major proposed sub-Contractors, for purposes of this Section, refer to the criteria set forth in Clause 10 of the Prospective Contract General Provisions entitled "Sub-Contracts". The Bidder shall identify the firm and the nation of origin and describe the contribution which the sub- Contractor is expected to make to the execution of the project. The Bidder shall also provide rationale for the selection of the sub-Contractor and describe the added value the proposed sub-Contractor will bring to the execution of the project.

3.6.4.3 Table of Contents

3.6.4.3.1 Bidders shall compile a detailed Table of Contents which lists not only the Section headings but also the major sub-Sections, and topic headings of the Bid. Heading, Section and sub-Section titles should be appropriately descriptive in order to permit the Purchaser's bid evaluation team to locate relevant material expeditiously.

3.6.4.4 Draft Project Management Plan (PMP)

3.6.4.4.1 The draft PMP must demonstrate the Bidder's understanding of the Purchaser's Project Management requirements as described in the Statement of Work (SOW) by identifying the key factors of success to execute Project Management that delivers the Purchaser's expected outcome of the project within the milestones and deadlines articulated in the SOW.

3.6.4.4.2 The draft PMP shall demonstrate Project Management qualifications by describing the schedule of Project Management tasks, content and associated effort based on the schedule described in the SOW Tables 1-1 and 1-2 and on the Project Management requirements stated in Section 2 of the SOW.

3.6.4.4.3 The draft PMP shall demonstrate the ability to perform effective project activity resourcing, associated risk assessment and mitigation by describing how the Project Management plan will be maintained to comply with the schedule described in the SOW, how resource-related risks will be assessed and mitigated. The Bidder shall also describe how resources assigned to project activities meet the personnel requirements specified for the activity in a manner that allows the Purchaser to verify that they meet the requirements stated in the SOW for the activity.

3.6.4.4.4 An initial Risk Register (RR) and proposed mitigation actions shall be provided as an annex to the draft PMP.

3.6.4.4.5 The draft PMP shall demonstrate the ability to perform a continuous project team performance assessment by describing the approach and criteria that will be used to verify and validate resource performance in fulfilling assigned role(s) and in completing assigned tasks.

3.6.4.5 Bidder Qualifications and Key Personnel

3.6.4.5.1 The Bidder shall demonstrate in detail the ability to perform agile development by providing a list of such agile software development projects that the Bidder has managed over the past 5 years with a description of the project and of the various roles fulfilled by the Bidder's project members and of their average assignment time to the project.

3.6.4.5.2 The Bidder shall demonstrate in detail the ability to implement service oriented architectures by providing a list of such software development projects that the Bidder has managed over the past 5 years with a description of the project and of the various roles fulfilled by the Bidder's project members and of their average assignment time to the project.

3.6.4.5.3 The Bidder shall demonstrate in detail the ability to perform a continuous project team performance assessment, project activity resourcing, associated risk assessment and mitigation by providing a list of such agile software development projects that the Bidder has managed over the past 5 years with a description of the processes applied on these projects.

3.6.4.5.4 The Bidder shall provide evidence that the Project Management Key Personnel described in Section 2.3 of the SOW meet the required essential qualifications by specifying the Key Personnel university qualification(s) and by describing per agile software development project that they have worked on within the past 8 years: a short, less than 120 words, description of the project, their role, their time assigned to the project, the size of the project expressed in number of team members, the Project Management methodology that was applied, whether the project implemented a service oriented architecture, if applicable which service oriented implementation approach was used, if applicable which service oriented technologies were employed for the implementation. The information shall be presented in a tabular format in descending chronological order.

3.6.4.5.5 The Bidder shall provide evidence, for example via TOEFL certificate, that the Project Management Key Personnel meet the English language proficiency requirement described in Section 2.3 of the SOW.

3.6.4.5.6 The Bidder may provide additional information to demonstrate that the proposed Project Management Key Personnel meet the qualifications described in Section 2.3.6 of the SOW.

3.6.4.6 Bid-Requirements Cross-Reference Matrix (BRCM)

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3.6.4.6.1 Volume 1 shall also contain a **Bid-Requirements Cross reference Matrix (BRCM) in the format indicated at Annex E.**

3.6.5   Volume 2 – Software Engineering

3.6.5.1   This Volume should address the software engineering requirements specified in Section 3 of the SOW for the two (2) delivery phases described in Tables 1-1 and 1-2 of the SOW.

3.6.5.2   The Bidder shall provide for the intermediate delivery phase a Detailed Delivery Plan (DDP) as a tabular description of the functionality that needs to be implemented by Focus Area and Sprint defined in Table 1-1 and the Sections 3.6.1 through 3.6.3 of the SOW. For each table entry, the Bidder shall identify the proposed Scrum Master, the proposed Coding Team Lead Engineer and other Coding Team member profiles, the planned and substitute Contractor personnel that match the profiles and the number of man-days per person or profile that are required to deliver the products of a Sprint defined in the SOW according to the software implementation, Test and Acceptance plan defined in Section 3.10 of the SOW and that meet the acceptance criteria defined in Section 3.10.16 of the SOW. The Bidder shall specify the number of virtual development machines required to perform the development activities per each Sprint.

3.6.5.3   The Bidder shall provide for the intermediate delivery phase a Detailed Delivery Plan as a tabular description of the Factory Acceptance Test (FAT) and System Integration Test (SIT) activities defined in Table 1-1 of the SOW. For each table entry, the Bidder shall identify the proposed Scrum Master, the proposed Coding Team Lead Engineer and other Coding Team member profiles, the planned and substitute Contractor personnel that match the profiles and the number of man-days per person or profile that are required to deliver the intermediate delivery that meets the acceptance criteria defined in Section 3.10.19 of the SOW in addition to those defined in Section 3.10.16 of the SOW.

3.6.5.4   The Bidder shall provide for the final delivery phase a Detailed Delivery Plan as a tabular description for each activity defined in Table 1-2, identifying the proposed Scrum Master if required, the proposed Coding Team Lead Engineer and other Coding Team member profiles, the planned and substitute Contractor personnel that match the profiles and the number of man-days per person or profile based on the estimated effort defined in Sections 3.3.6.2 and 3.16.2 of the SOW. The Bidder shall specify the number of virtual development machines required to perform each activity.

3.6.5.5   The Bidder shall provide for the final delivery phase a Detailed Delivery Plan as a tabular description of the Factory Acceptance Test (FAT) and System Integration Test (SIT) activities defined in Table 1-2 of the SOW. For each table entry, the Bidder shall identify the proposed Scrum Master, the proposed Coding Team Lead Engineer and other Coding Team member profiles, the

planned and substitute Contractor personnel that match the profiles and the number of man-days per person or profile that are required to deliver the final delivery that meets the acceptance criteria defined in Section 3.10.19 of the SOW in addition to those defined in Section 3.10.16 of the SOW.

3.6.5.6   The Bidder shall provide evidence that the Scrum Master personnel proposed in the Tables described above meet the required essential qualifications specified in Section 3.3.4 of the SOW by describing per software development project that they have worked on within the past 8 years: a short, less than 240 words, description of the project including the intended outcome of the project, their role, their time assigned to the project, the technologies employed to implement the project and the software development environment. The information shall be presented in a tabular format in descending chronological order.

3.6.5.7   The Bidder shall provide evidence that the Coding Team Lead Engineer personnel proposed in the Tables described above meet the required essential qualifications specified in Section 3.3.8 of the SOW by describing per software development project that they have worked on within the past 5 years: a short, less than 240 words, description of the project including the approach applied to deliver the project outcome, their role, their time assigned to the project, the technologies employed to implement the project, the software development environment, their usage of architecture modelling languages and their role in designing, executing and documenting unit testing. The information shall be presented in a tabular format in descending chronological order.

3.6.5.8   The Bidder shall provide evidence that the Coding Team member profiles can be fulfilled by Contractor personnel that meet the required essential qualification specified in Section 3.3.8 of the SOW by describing per person the profile that they match, the software development projects that they have worked on within the past 5 years: a short, less than 240 words, description of the project including the approach applied to deliver the project outcome, their role, their time assigned to the project, the technologies employed to implement the project, the software development environment, their usage of architecture modelling languages and their role in designing, executing and documenting unit testing. The information shall be presented in a tabular format in descending chronological order.

3.6.5.9   The Bidder shall provide evidence, for example via TOEFL certificate, that the software engineering Key Personnel meet the English language proficiency requirement described in Section 3.3 of the SOW.

3.6.5.10   Quality assurance will be measured as described in the SOW Section 3.13 and compliance with the measures will constitute a part of the acceptance of the Contract deliverables. Bidders shall, as part of the bid, provide evidence of their usage of quality assurance measures as described in SOW Section 3.13 by describing the quality assurance measures that the

Bidder has applied in agile software development projects within the last 5 years.

3.6.5.11   Bidders shall, as part of the bid, provide evidence of their coding quality standards by describing the coding principles and guidelines that the Bidder has applied in agile software development projects within the last 5 years.

3.6.5.12   Failure to provide comprehensive documentary evidence of the application of coding principles and guidelines as specified in Section <mark>3.6.5.11</mark> may result in a determination of non-compliance for the submitted Bid.

3.6.6   Volume 3 - Integrated Support

3.6.6.1 This Volume shall contain a draft Integrated Support Plan covering the requirements described in Section 4.2 of the SOW and particularly focus on describing in detail how the requirements specified in Sections 4.2.2 and 4.2.3 will be met.

3.6.6.1.1 The Bidder shall describe the process for submitting incident reports.

3.6.6.1.2 The Bidder shall describe the process for responding to incidents requiring corrective maintenance on the Contractor provided software.

3.6.6.1.3 The Bidder shall provide for the Initial Operations Support phases defined in SOW table 1-1 and 1-2, a tabular description of the incident response activities. For each table entry, the Bidder shall identify the proposed Scrum Master if required, the proposed Coding Team Lead Engineer and other Coding Team member profiles, the planned and substitute Contractor personnel that match the profiles and the number of man-days per person or profile that are required to deliver the initial operations support.

3.6.6.1.4 The Bidder shall specify the number of virtual development machines required to perform the initial operations support.

3.6.6.2 This Volume shall contain a draft Configuration Management Plan covering the requirements described in section 4.3 of the SOW with a particular focus on describing the Configuration Management organisation, Configuration Item identification and status accounting.

4   BID EVALUATION AND CONTRACT AWARD

4.1   General

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

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

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

not identified in the Bid and has no obligation to query the Bidder regarding missing information.

4.1.4   The Bidder shall furnish with its Bid all information requested by the Purchaser in Book 1, <u>Section 3 Bid Preparation Instructions</u>. Significant omissions and/or cursory submissions will result in a reduced Best Value Score and may result in a determination of non-compliance without recourse to further clarification. The information provided by the Bidder in its proposal shall be to a level of detail necessary for the Purchaser to fully comprehend exactly what the Bidder proposes to furnish as well as its approach, qualifications, and methodologies.

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

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

4.1.7   The evaluation will be conducted in accordance with NATO Infrastructure Bidding Procedures as set forth in the document, and the Best Value evaluation procedures set forth in AC/4(2008)0002-REV2-ANNEX 1 dated 15 July 2015, or any deviation to these procedures as approved by the NATO Investment Committee. The bid evaluation methodology to be followed, including the top-level evaluation criteria, their weighting factors, and the Best Value calculation formulas for determination of the Best Value scores, have been approved by the NATO Investment Committee.

4.2   Best Value Award Approach and Bid Evaluation Factors

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

to the evaluation method specified in this Section 4. The top level evaluation criteria are: 40% Price / 60% Technical.

4.2.2 Upon approval of the price evaluation report, the NCI Agency Contracts Award Board will open the technical weighting scheme and apply the technical weight to the raw Technical Score (TS) to produce the weighted technical score.

4.2.3 A score for the bid's technical quality is composed of sub-scores in three separate areas:

4.2.3.1 **Management (M)** – Quality of the Bidder qualifications to meet Statement of Work (SOW) requirements as described in Volume 1. The Management Score is defined to contribute with 30% of the overall Technical Score.

4.2.3.2 **Engineering (*E*)** – Quality of engineering technical implementation approach based on the evaluation of the content of Volume 2 and its convincing ability to meet the requirements described in the SOW and SOW Annexes requirements. The Engineering Score is defined to contribute with 50% of the overall Technical Score.

4.2.3.3 **Supportability (S)** – Quality of the support approach which shall be described in Volume 3. The Supportability Score is defined to contribute with 20% of the overall Technical Score.

4.2.4 The Engineering (*EEEE*), Management (*MMMM*) and Supportability (*SSSS*) scores will be calculated based on the scores given to each proposal against the individual sub-criteria in each area.

4.2.5 As technical quality is rated to 60% of the overall bid value, the weighted Technical Score ($TTTTTTTT$) is thus defined as:

$$TTTTTTTT = 60 \times (0.5 \times EEEE + 0.3 \times MMMM + 0.2 \times SSSS) = 30 \times EEEE + 18 \times MMMM + 12 \times SSSS$$

4.2.6 The Purchaser's priorities in the evaluation of the Technical Proposal are described in the form of sub-criteria in Section 4.5 below. The sub-criteria are listed in descending order that reflects the relative importance that the Purchaser places on each sub-criterion.

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

The weighting scheme remains sealed until Step 4 of the evaluation process, described in Section 4.7.

4.2.8   The Purchaser will determine the Best-Value final Score ($BBBBBBBB$) for each compliant bid using the calculated values for weighted Technical Score ($TTTTTTTT = TTTTwwww$) and weighted Price Score ($PPPPwwww$) as:

$$BBBBBBBB = TTTTwwww + PPPPwwww$$

4.2.9   The maximum possible Best Value Score is 100 and the minimum possible is zero.

4.2.10   The bid having the highest BV final score will be selected as the apparent successful bid unless there is a statistical tie (see Para 4.7.3).

4.3   Evaluation Procedure

4.3.1   The evaluation will be done in a four step process, as described below:

4.3.1.1   Step 1: Administrative Compliance

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

4.3.1.2   Step 2: Technical Evaluation

4.3.1.2.1   In Step 2 bids will have their Technical Proposals Packages evaluated against predetermined top-level criteria and identified sub-criteria (see paragraph below), and scored accordingly. This evaluation will result in "raw" or not weighted technical scores against the criteria.

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

4.3.1.3   Step 3: Price Evaluation

4.3.1.3.1   The Price Quotations of all bids remaining after Step 2 will be opened, evaluated and scored in accordance with Section 4.6.

4.3.1.4   Step 4: Calculation of Best Value Scores and Pre-Award Discussions

4.3.1.4.1   Upon completion of the Price Evaluation, the Apparent Successful Bid will be determined in accordance with Section 4.7 hereafter and pre-award discussions shall commence.

4.4   Evaluation Step 1 - Administrative Compliance

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

4.4.1.1 The Bid was received by the Bid Closing Date and Time;

4.4.1.2 The Bid is organized and marked properly in accordance with these instructions;

4.4.1.3 The Bid Administration Part contains the documentation listed in Section 3.4 above and complies with the formal requirements established in Section 3.1 above;

4.4.1.4 The Bidder has not taken exception to the Terms and Conditions of the Prospective Contract or has not qualified or otherwise conditioned its offer on a modification or alteration of the Terms and Conditions or the language of the Statement of Work (including all its Annexes);

4.4.1.5 **Receipt of an unreadable electronic bid**. If a bid received by email is unreadable to the degree that conformance to the essential requirements of the solicitation cannot be ascertained, the Purchaser CO shall immediately notify the Bidder that the bid will be rejected unless the Bidder provides clear and convincing evidence:

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

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

4.4.2   Subject to the stipulation of Section 4.4.1.1 thru 4.4.1.5 Bids failing to conform to the above requirements may be declared non-compliant and may not undergo through further evaluation. Bids that are determined to be administratively compliant will proceed to Step 2, Technical Evaluation.

4.4.3   Notwithstanding Section 4.4.2, if it is later discovered in the evaluation of the Technical Proposal or the Price Quotation that the Bidder has taken exception to the Terms and Conditions of the Prospective Contract, or has qualified and/or otherwise conditioned his offer on a modification or alteration of the Terms and Conditions or the language of the Statement of Work (including all its Annexes),

the Bidder may be determined to have submitted a non-compliant bid at the point in time of discovery.

4.5 Evaluation Step 2 - Technical Evaluation

4.5.1 The Technical Proposal will be evaluated against the criteria set forth in Section 4.2 above. In this Section those criteria will be expanded to identify sub-criteria considered important by the Purchaser during bid evaluation. Sub-criteria appear in descending order of importance within the criterion of which they form a part. For some sub-criteria, there may be additional supporting factors at the next lower level. These lower level factors are not published here but are predetermined and included in the Technical Evaluation Weighting Scheme sealed before Bid Opening. Within each of the three Volumes of the Technical Proposal the criteria and their sub-criteria are identified as follows:

4.5.2 Volume 1 – Project Management

4.5.2.1 Criteria – Management (30% of the Technical Proposal)

4.5.2.1.1 Sub criteria in descending order of importance:

4.5.2.1.1.1 Overall ability of the Contractor to meet the Purchaser's Project Management requirements as described in the Introduction of Volume 1.

4.5.2.1.1.2 Bidder Qualifications and Key Personnel

4.5.2.1.1.2.1 Key personnel qualifications, certifications, and experience including language proficiency as specified in the Bidders PM Qualifications.

4.5.2.1.1.2.2 Demonstrated past ability to perform effective project team management and resourcing for agile development projects extending over more than 2 years as specified in the Bidders PM Qualifications.

4.5.2.1.1.3 Draft Project Management Plan

4.5.2.1.1.3.1 Accuracy and completeness of the schedule of Project tasks, content and associated effort derived from SOW Tables 1-1 and 1-2 and from the Project Management requirements stated in Section 2 of the SOW as specified in the draft PMP.

4.5.2.1.1.3.2 Accuracy and completeness of the description of the approach for performing effective project activity resourcing, associated risk assessment and mitigation including the description of how the Bidder shall present and document assigned resource qualifications for each activity for review by the Purchaser as specified in the draft PMP.

4.5.2.1.1.3.3 Initial Risk Register

4.5.2.1.1.3.4 Accuracy and completeness of the Bidder's approach to perform project team performance assessment as specified in the draft PMP.

4.5.3 Volume 2 – Software Engineering

4.5.3.1 Criteria – Engineering (50% of the Technical Proposal)

4.5.3.1.1 Sub criteria in descending order of importance:

4.5.3.1.1.1 Understanding of the development phase content

4.5.3.1.1.1.1 Quality and completeness of the proposed approach to deliver the outcome of the intermediate delivery phase.

4.5.3.1.1.1.2 Quality and completeness of the proposed approach to deliver the outcome of the intermediate delivery phase FAT and SIT.

4.5.3.1.1.1.3 Quality and completeness of the proposed approach to deliver the outcome of the final delivery phase.

4.5.3.1.1.1.4 Quality and completeness of the proposed approach to deliver the outcome of the final delivery phase FAT and SIT.

4.5.3.1.1.2 Quality and completeness of the qualifications and experience descriptions of the Scrum Master personnel proposed for each activity including their language proficiency.

4.5.3.1.1.3 Quality and completeness of the qualifications and experience descriptions of the Coding Team Lead Engineer personnel proposed for each activity including their language proficiency.

4.5.3.1.1.4 Quality and completeness of the qualifications and experience descriptions of the Coding Team personnel proposed for each activity including their language proficiency.

4.5.3.1.1.5 Demonstration of the understanding of the Quality Assurance measures.

4.5.3.1.1.6 Demonstration of the understanding of the Coding Principles requirements.

4.5.4 Volume 3 – Integrated Support

4.5.4.1 Criteria – Supportability (20% of the Technical Proposal)

4.5.4.1.1 Sub criteria in descending order of importance:

4.5.4.1.1.1 Quality and completeness of the process for submitting and promptly responding to incidents requiring corrective maintenance.

4.5.4.1.1.2 Quality and completeness of the qualifications and experience descriptions of the personnel proposed to support initial operations including their language proficiency.

4.5.4.1.1.3 Quality and completeness of the approach to conduct the configuration management of the non-software related project deliverables as specified in the SOW.

4.6 Evaluation Step 3 - Price Evaluation

4.6.1 The Bidder's Price Quotation will be first assessed for compliance against the following criteria:

4.6.1.1 The Price Quotation meets the requirements set forth in the Bid Preparation Section and the Instructions for Preparation of the Bidding Sheets in the bidding sheets.

4.6.1.2 Detailed pricing information has been provided and is adequate, accurate, traceable, and complete; and,

4.6.1.3 The Price Quotation meets requirements for price realism and balance as described below in Section 4.6.4 and does not exceed the defined ceilings as per Para 3.5.2.1.

4.6.2 A bid which fails to meet the Price Quotation compliance standards defined in this Section may be declared non-compliant and may not be evaluated further by the Purchaser.

4.6.3 Basis of Price Comparison

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

4.6.3.2 The Evaluated Bid Price to be inserted into the formula specified at Section 4.6.7 will be derived from the Grand Total of the Schedule of Supplies and Services calculated as follows:

- The Sum of the Firm - Fixed Prices offered for CLINS 1-5, as detailed below:

CLIN Number	CLIN Name
1.0	PROJECT MANAGEMENT
2.0	SOFTWARE ENGINEERING FOCUS AREA 1
3.0	SOFTWARE ENGINEERING FOCUS AREA 2
4.0	SOFTWARE ENGINEERING FOCUS AREA 3

5.0	INITIAL OPERATION SUPPORT

4.6.4   Price Balance and Realism

4.6.4.1 In the event that the successful Bidder has submitted a price quotation that is less than two thirds of the average of the remaining compliant bids, the Purchaser must ensure that the successful Bidder has not artificially reduced the offered price to assure contract award. As such, the Purchaser will request the firm to provide clarification of the bid and will inform the national delegation of the firm. In this regard, the Bidder shall provide an explanation to both Purchaser and their national delegation on the basis of one of the following reasons:

4.6.4.1.1 An error was made in the preparation of the price quotation. The Bidder must document the nature of the error and show background documentation regarding the preparation of the price quotation that convincingly demonstrates that an error was made by the Bidder. In such a case the Bidder may request to remain in the competition and accept the contract at the bid price, or to withdraw from the competition;

4.6.4.1.2 The Bidder has a competitive advantage due to prior experience or internal business/technological processes that demonstrably reduce cost to the Bidder resulting in an offered price that is realistic. The Bidders explanation must support the technical proposal offered and convincingly and objectively describe the competitive advantage of and savings achieved by the advantage over the standard marked costs, practices and technology;

4.6.4.1.3 The Bidder understands that the submitted price quotations are unrealistically low in comparison with the level of effort required. In this case, the Bidder is required to estimate the potential loss and show that the financial resources of the Bidder are adequate to withstand such a reduction in revenue.

4.6.4.1.4 If a Bidder fails to submit a comprehensive and convincing explanation for one of the based above, the Purchaser shall declare the bid non-compliant and the Bidder will so be notified in accordance with the procedures set forth in paragraph 13(iii)(b) of AC/4-D/2261(1996 Edition). Non-compliance for reasons of bid realism is a basis for lodging a complaint under the dispute procedure.

4.6.4.1.5 If the Purchaser accepts the Bidders explanation of a mistake and allows the Bidder to accept the contract at the Bid price or the explanation regarding competitive advantage is convincing, the Bidder shall agree that the supporting pricing data submitted with this bid will be the basis to determine fair and reasonable pricing for all subsequent negotiations

for modifications or additions to the contract and that no revisions of proposed prices will be made.

4.6.5 In the case of incrementally funded projects, the cost and pricing methodology used by the winning Bidder on the base contract will be used as the basis for all follow-on contracts or amendments to the base contract where these are proposed for IC agreement without competition.

4.6.6 Determination of the weighted Price Score. Once the technical report has been approved by the Contract Awards Board and all issues of compliance completed, the price quotations will be opened and evaluated. The weighted Price Score (Pw) shall be determined according to the following formula:

Pw = 100 x (1 – (Bid Price/ (2 x Average Bid Price))) x 0.4, where 0.4 is the weighted factor for Price, with an expected value of Pw between 0 and 100.

4.7 Evaluation Step 4 – Calculation of Best Value Scores and Pre-Award Discussions

4.7.1 Upon conclusion and approval of the Price Evaluation results, the pre-determined third level weighting scheme for the Technical Evaluation shall be unsealed and the scores for the Engineering, Management, and Supportability factors will be calculated for each compliant bid. Then all partial scores shall be fed into the formula stated in Section 4.2.8 in order to obtain the Best Value Score of each bid.

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

4.7.3 A statistical tie is deemed to exist when the final scores of the highest scoring bids are within one point of each other. The Purchaser will then resolve the statistical tie by awarding the contract to the Bid with the highest weighed technical score.

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

4.7.5 Upon the successful completion of these pre-award discussions, to the Purchaser's full satisfaction, confirmation of final Bid compliance will be noted, and the definitive results of the evaluation process will be notified to the relevant NATO authorities.

4.7.6 When NATO authorities have confirmed completion of all required business clearances, the Purchaser will deliver the final set of contract documents to the Bidder for their signature. Upon the Purchaser's countersignature of those contract documents, the contract shall be considered to be in effect.

Annex A Bidding Sheets

A-1 Introduction

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

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

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

A-2 General Requirements

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

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

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

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

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

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

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

8. If the Bidder identifies an error in the spreadsheet, it should notify the Purchaser through process described section 2.6. The Purchaser will then

make a correction if deeded appropriate and notify all the Bidders of the update.

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

A-3   Bidding Sheets for Bid

1. Bidders are required, in preparing their Price Volume to utilise the correct electronic Bidding Sheets file provided as part of this IFB. This is:

> *"02_IFB-CO-115112-ETEE WP1 JEMM Book I Annex A Bidding Sheets FINAL.xlsx"*

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

Annex B Prescribed Administrative Forms and Certificates

Annex B-1.   Certificate of Legal Name of Bidder

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

FULL NAME OF CORPORATION: _____

DIVISION (IF APPLICABLE):   _____

SUB DIVISION (IF APPLICABLE):   _____

OFFICIAL MAILING ADDRESS

_____

_____

_____

E-MAIL ADDRESS: _____

TELEFAX No: _____

POINT OF CONTACT REGARDING THIS BID:

NAME: _____
POSITION: _____
TELEPHONE: _____

ALTERNATIVE POINT OF CONTACT:

NAME: _____
POSITION: _____
TELEPHONE: _____

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

Annex B-2. Acknowledgement of Receipt of IFB Amendments

I confirm that the following amendments to Invitation for Bid IFB-CO-115112-ETEE have been received and the Bid, as submitted, reflects the content of such amendments.

Amendment no.	Date of Issued	Date of receipt	Bidder's Initials

Note: Failure to acknowledge receipt of <u>all</u> IFB amendments issued may be grounds to determine a Bid as non-compliant.

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

Annex B-3.   Certificate of Independent Determination

It is hereby stated that:

a.   We have read and understand all documentation issued as part of IFB-IFB-CO-115112-ETEE. Our Bid submitted in response to the referred solicitation is fully compliant with the provisions of the IFB and the prospective contract.

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

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

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

Date   :   ....

Signature   :   ....

Name & Title   :   ....

Company   :   ....

Bid Reference   :   ....

Annex B-4. Certificate of Bid Validity

I, the undersigned, as an authorised representative of the firm submitting this Bid, do hereby certify that the pricing and all other aspects of our Bid will remain valid for a period of eighteen (18) months from the Bid Closing Date of this Invitation for Bid.

………………………………………
Date

…………………………………………
Signature of Authorised Representative

…………………………………………
Title

…………………………………………
Company

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

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

…...   …..
Date   Signature of Authorised Representative

                                        …..
                                        Title

                                        …..
                                        Company

Annex B-6. Comprehension and Acceptance of Prospective Contract Provisions

The Bidder hereby certifies that he has reviewed the totality of all provisions as set forth in this Invitation for Bid. The Bidder as well hereby provides its confirmation that he fully comprehends the rights, obligations and responsibilities of the Contractor as set forth in the Book II of the Prospective Contract. The Bidder additionally certifies that the offer submitted by the Bidder is without prejudice, qualification or exception to any of the provisions of the Invitation for Bid Book II, and he will accept and abide by all stated provisions if awarded the contract as a result of this Invitation for Bid.

……………………………………… \
Date

……………………………………… \
Signature of Authorised Representative

……………………………………… \
Title

……………………………………… \
Company

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

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

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

These supplemental agreements are listed as follows:

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

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

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

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

……………………………………..   …………………………………………….
Date   Signature of Authorised Representative

                                           …………………………………………….
                                           Title

                                           …………………………………………….
                                           Company

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

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

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

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

Annex B-9. List of Prospective Major Sub-Contractors

Name and Address of SubContractor	DUNS Number [2]	Primary Location of Work	Items/Services to be Provided	Estimated Value of Subcontract

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

---

[2] Data Universal Numbering System (DUNS). Bidders are requested to provide this data in order to help NCIA to correctly identify major (one that exceeds 15% of total contract value) Sub-Contractors. If a Sub-Contractor's DUNS is not known this field may be left blank.

NATO UNCLASSIFIED

Annex B-10.   Bidder Background IPR

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

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

ITEM	DESCRIPTION

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

c. The Background IPR stated above complies with the terms specified in the Book II prospective contract General and Special Provisions.

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

Annex B-11. List of Sub-Contractor IPR

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

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

ITEM	DESCRIPTION

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

    c. The Sub-Contractor IPR stated above complies with terms specified in the Book II prospective contract General and Special Provisions.

_____

Date

_____

Signature of Authorised Representative

_____

Printed Name

_____

Title

_____

Company

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

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

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

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

(c) the intellectual property rights for all software and documentation incorporated by the prospective Contractor and/or its Sub-Contractors into the work shall vest with persons or legal entities from and within NATO participating nations and no royalties or licence fees for such software and documentation shall be paid by the Contractor to any source that does not reside within a NATO participating nation

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

Annex B-13.   List of Proposed Key Personnel

Position	SOW Reference	Labour Category	Name	Designation Period
Contractor Project Manager (CPM)	2.3.1.1			EDC thru Contract completion
Contractor Scrum Master Focus Area 1 and 3 (CSM FA13)	3.3 1.4.9			During all Sprints, test and training periods related to FA1 and FA3
Contractor Coding Team Lead Engineer Focus Area 1 and 3 (CCTLE FA13)	3.3 1.4.9			During all Sprints, test and training periods related to FA1 and FA3
Contractor Scrum Master Focus Area 2 (CSM FA2)	3.3			During all Sprints, test and training periods related to FA2
Contractor Coding Team Lead Engineer Focus Area 2 (CCTLE FA2)	3.3			During all Sprints, test and training periods related to FA2

—————
Date

—————————————————
Signature of Authorised Representative

—————————————————
Printed Name

—————————————————
Title

—————————————————
Company

Annex B-14.   Certificate of Price Ceiling

I hereby certify that the total price offered in the price quotation of this Bid for CLINs 1, 2, 3, 4, and 5 of the Bidding Sheets does not exceed **EUR 3,310,379** (three million three hundred ten thousand and three hundred seventy nine Euro) as described in Section 3.5.2.1 of Book I.

Important Note: No price information of your Bid shall be disclosed in the Bid Administration Package, or the Technical Proposal Package.

_____

Date

_____

Signature of Authorised Representative

_____

Printed Name

_____

Title

_____

Company

Annex B-15.   Disclosure of Conflict of Interest

I, the undersigned, as an authorised representative of _____,
(*company name*) certify that[3]:

(check one of the following statements:)

☐   a real or apparent conflict of interest as defined in Section 3.4.3 of the Bidding
     Instructions does not exist.

☐   a real or apparent conflict of interest as defined in Section 3.4.3 of the Bidding
     Instructions may exist and a plan for the mitigation of the conflict is provided in
     attachment to this Certificate.

(check one of the following statements:)

☐   business relationships as defined under Section 3.4.3 of the Bidding Instructions
     do not exist.

☐   business relationships as defined under Section 3.4.3 of the Bidding Instructions
     exist and have been identified in attachment to this Certificate.

(check as acknowledgement and confirmation the following statement:)

☐   our firm will not participate in any manner, either as Bidder, or as a prime or sub-
     Contractor at any tier, in the NCI Agency project under IFB-CO-115115-ETEE
     entitled "*BMD Functions In ETEE FS - WP4 Operational Assurance & Test*".

_____
Date

_____
Signature of Authorised Representative

_____
Printed Name

_____
Title

_____
Company

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[3] Bidders are to check the appropriate box(es).

Annex B-16. Disclosure of Involvement of Former NCI Agency Employment

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

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

The Bidder hereby certifies that its personnel working as part of the Bidder's team, at any tier, preparing the Bid:

☐ Have not held employment with NCI Agency within the last two years.

☐ Has obtained a signed statement from the former NCI Agency personnel below, who departed the NCI Agency within the last two years, that they were not previously involved in the project under competition (as defined in the extract of the NCI Agency Code of Conduct provided in Excerpt of NCI Agency AD. 05.00, Code of Conduct dated May 2017):

Employee Name	Former NCI Agency Position	Current Company (Bidder) Position

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

Date   Signature of Authorised Representative

                        Printed Name

                        Title

                        Company

Annex C Bid Guarantee - Standby Letter of Credit

Standby Letter of Credit Number:

Issue Date: _____

Beneficiary: NCI Agency, Financial Management Office
                              Boulevard Leopold III, B-1110, Brussels
                              Belgium

Expiry Date: _____

1.   We, (issuing bank) hereby establish in your favour our irrevocable standby letter of credit number {number} by order and for the account of (NAME AND ADDRESS OF BIDDER) in the original amount of € 132,000 (One Hundred Thirty-Two Thousand Euro). We are advised this Guarantee fulfils a requirement under Invitation for Bid IFB-CO-115112-ETEE dated _____.

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

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

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

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

   d)   The NCI Agency has entered into the contract with (NAME OF BIDDER) but (NAME OF BIDDER) has been unable or unwilling to provide the Performance Guarantee required under the terms of the contract within the time frame required.

3.   This Letter of Credit is effective the date hereof and shall expire at our office located at   (Bank Address) on *[insert a date at least 18 months from the final bid closing date]*. All demands for payment must be made prior to the expiry date.

4.   It is a condition of this letter of credit that the expiry date will be automatically extended without amendment for a period of sixty (60) calendar days from the current

or any successive expiry date unless at least thirty (30) calendar days prior to the then current expiry date the NCI Agency Contracting Officer notifies us that the Letter of Credit is not required to be extended or is required to be extended for a shorter duration.

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

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

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

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

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

8.   Multiple drawings are allowed.

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

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

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

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

Annex D Clarification Request Form

INSERT COMPANY NAME HERE
INSERT SUBMISSION DATE HERE

INVITATION FOR BID
IFB-CO-115112-ETEE

BMD Enhanced JEMM System (WP1)

Annex D CLARIFICATION REQUEST FORM

INSERT COMPANY NAME HERE
INSERT SUBMISSION DATE HERE

ADMINISTRATION or CONTRACTING				
Serial NR	IFB REF	QUESTION	ANSWER	Status
A.1.				
A.2.				
A.3.				
A.4.				

INSERT COMPANY NAME HERE
INSERT SUBMISSION DATE HERE

PRICE				
Serial NR	IFB REF	QUESTION	ANSWER	Status
P.1				
P.2				
P.3				
P.4				
P.5				
P.6				

==INSERT COMPANY NAME HERE==
==INSERT SUBMISSION DATE HERE==

TECHNICAL				
Serial NR	**IFB REF**	**QUESTION**	**ANSWER**	**Status**
T.1				
T.2				
T.3				

Annex E   Bid-Requirements Cross Reference Matrix (BRCM)

Bidders shall provide the BRCM in Excel format according to the template "02B_IFB CO-115112-ETEE WP1 JEMM Book I Annex E BRCM FINAL".

The BRCM shall be completed as per the following instructions:

- "**Reference Document**", the document from which the requirement is defined.

- "**Reference ID**", the reference of the Section/requirement under consideration. The "Reference ID" column shall cover:
    - "Bidding Instruction" references covering Sections 3.6.4, 3.6.5, and 3.6.6 of this document. "Bidding Instruction" references shall be provided in the format [BI - #] where "#" represents the actual paragraph number.
    - "SOW Requirement" references covering all 'shall' statement of the SOW. Requirement References shall be provided in the following format:
        - For the SOW: [SOW - #] where "#" represents the actual requirement (i.e. paragraph) number

- "**Description**": the actual text of the Section/requirement under consideration.
-
- "**Bid Reference**" indicating where in their Bid the associated Bid Instruction Reference and/or SOW Requirement Reference is/are addressed. Bid Reference shall be provided in the form "Volume # - Doc # - Section #"

- "**Remarks**", as applicable. The column "Remarks" might be used by the Bidders to provide a brief description of how the Bidder meets the requirement, to facilitate the reading, but any such descriptions will not form part of the formal evaluation.

- "**Compliance statement**": the way and extent the Bid covers and complies with the Section/requirement under consideration, using the following classifications:
    - "Provided/Detailed": The Bidder states providing a document or details at the mentioned reference. Such a classification is expected for all BIs and the majority of the SOW and SOW Annexes requirements.

- o "Partial": The Bidder states fulfilling the requirement but only describes part of it. Such a classification is expected for a small number of SOW and SOW Annexes requirements.
- o "Deviation proposed": The Bidder states taking and describing an alternative approach to fulfil the Section/requirement under consideration. Such a classification is expected for a very limited amount of SOW and/or SOW Annexes requirements.
- o "Not detailed": The Bidder states fulfilling the requirement, but does not detail/justify how. It is expected that some requirements from the SOW or SOW Annexes cannot be justified/detailed at the bidding stage.

One copy of the duly completed BRCM shall be included in the Technical Proposal Package (Volume 1).

Bidders shall note that, to facilitate the bidding process, the BRCM template already contains the core of BIs and associated descriptions in the columns "Reference ID" and "Description" respectively. However, it is the Bidders' sole responsibility to ensure that all BIs (together with SOW references) are properly addressed and complete in the BRCM.

PROVIDE ENHANCEMENT OF JOINT EXERCISE MANAGEMENT MODULE (JEMM) WITHIN BALLISTIC MISSILE DEFENCE (BMD) FUNCTIONS IN EDUCATION, TRAINING, EXERCISE AND EVALUATION (ETEE) FUNCTIONAL SERVICES (FS)

IFB-CO-115112-ETEE JEMM

BOOK II – PART IV

STATEMENT OF WORK

Table of Contents

1. **Introduction**

1.1. Introduction to the ETEE FS BMD Project:

1.1.1. The Education, Training, Exercises and Evaluation Functional Services (ETEE FS) BMD project is included in the Capability Package CP 0A1303 Revision 1 "*Provide Ballistic Missile Defence Capabilities*." It will provide collective training and exercise capabilities to the BMD community for the preparation, conduct and analysis of their weekly training and of their periodic exercises. All stages of the Collective training and exercises process defined in the BI-SC Directive 75-3 will be supported.

1.1.2. The ETEE FS BMD will be used by BMD exercise planners and BMD Exercise Control Organisations located at HQ AIRCOM, EDCOC Torrejón, EDCOC Uedem and SHAPE to plan and conduct BMD exercises in close coordination with national BMD organisations. It will provide an integrated tool suite based on existing and proven software that will remain in use in other NATO Command Structure (NCS) and NATO Force Structure (NFS) commands: JEMM (Joint Exercise Management Module) and ITC (air Integrated Training Capability).

1.1.3. The aim of the ETEE FS BMD project is to provide an enhanced JEMM system, an Air and Missile Defence (AMD) simulation system including simulation federation management on the basis of ITC and a BMD Exercise Information Management Portal Template system. A specific Work Package for each of these systems is a part of the ETEE FS BMD project. The Work Packages for the systems are numbered 1 through 3. This Contract is for Work Package Number 1. In addition the ETEE FS BMD project includes a fourth Work Package that will support the operational assurance of the systems that are delivered through the ETEE FS BMD project. Work Package 4 will assist the Purchaser in the testing of the individual systems and of their integration. Hand-over to the User, training and mentoring will also be a part of Work Package 4.

1.1.4. Each system aims to provide a logical grouping of functionality from a User perspective which are referred to as User Applications as shown in Figure 1.1.
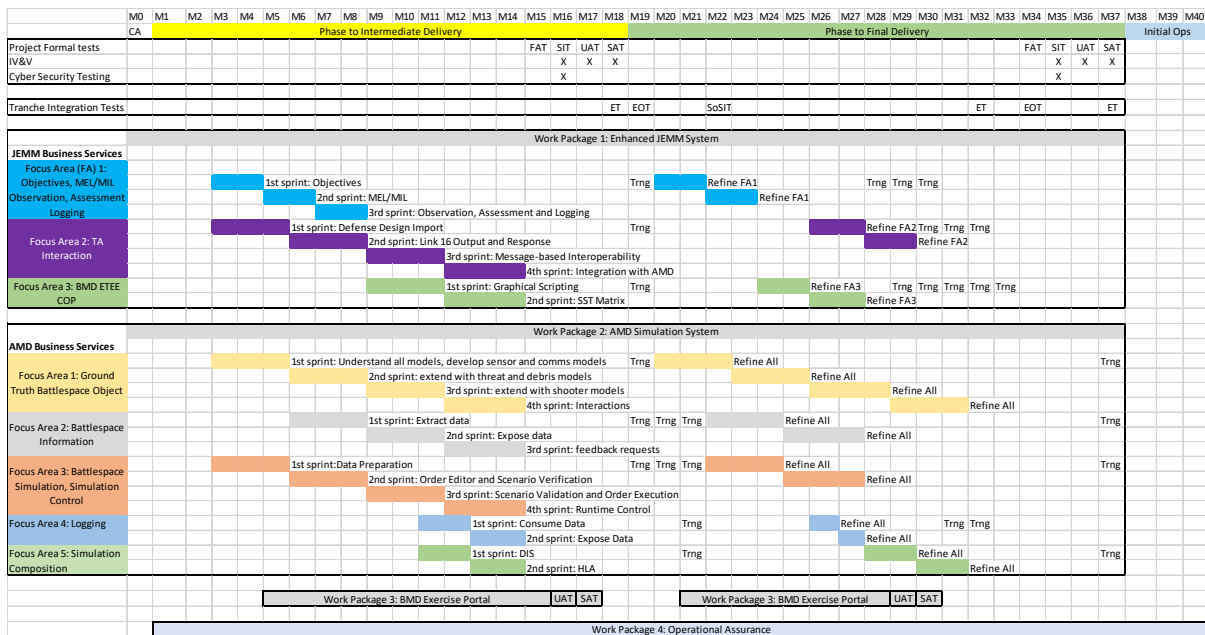
1.1.5. The interactions between the systems are shown in Figure 1.1
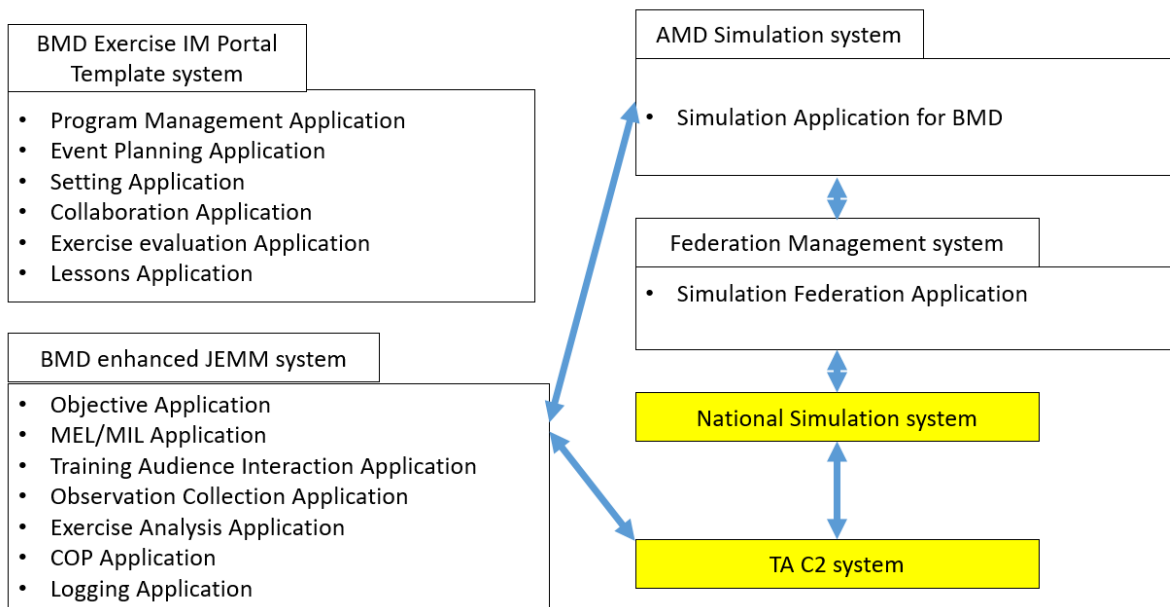
Figure 1.1 System Interaction Diagram

1.1.6. As the JEMM and ITC/AMD systems are already in operational use in the NATO command structure and will remain under maintenance during the period of performance of the ETEE FS BMD project, the Purchaser will act as the integrator of the software delivered by the associated Work Packages into the existing and evolving system baselines.

1.1.7. The ETEE FS BMD project schedule is shown in Figure 1.2. It should be noted that the project will be executed in two phases. Phase 1 aims to produce an intermediate delivery after eighteen (18) months which includes the associated acceptance tests, Factory Acceptance Test (FAT), System Integration Test (SIT), User Acceptance Test (UAT) and Site Acceptance Test (SAT). The intermediate and the final delivery are both intended to meet all the software requirements of the systems. The second delivery aims to refine the first based on the feedback from actual usage and on insights gained during the development of the first delivery. In addition, the ETEE FS BMD project will contribute to the BMD Programme Tranche defined Integration Tests, such as the Ensemble Test (ET), the Ensemble Operator Test (EOT) and the System of Systems Integration Test (SoSIT).

Project Schedule (M0–M40)

Timeline phases: CA (M0); Phase to Intermediate Delivery (M1–M18); Phase to Final Delivery (M19–M37); Initial Ops (M38–M40).

Row	Milestones / Tests
Project Formal tests	FAT, SIT, UAT, SAT (≈M15–M18); FAT, SIT, UAT, SAT (≈M34–M37)
IV&V	X, X, X (SIT/UAT/SAT ≈M16–M18); X, X, X (≈M35–M37)
Cyber Security Testing	X (SIT ≈M16); X (≈M35)
Tranche Integration Tests	ET (M18), EOT (M19), SoSIT (M22); ET (M32), EOT (M34), ET (M37)

Work Package 1: Enhanced JEMM System

JEMM Business Services

Focus Area (FA) 1: Objectives, MEL/MIL Observation, Assessment Logging
- 1st sprint: Objectives — Trng — Refine FA1 — Trng Trng Trng
- 2nd sprint: MEL/MIL — Refine FA1
- 3rd sprint: Observation, Assessment and Logging

Focus Area 2: TA Interaction
- 1st sprint: Defense Design Import — Trng — Refine FA2 Trng Trng Trng — Refine FA2
- 2nd sprint: Link 16 Output and Response
- 3rd sprint: Message-based Interoperability
- 4th sprint: Integration with AMD

Focus Area 3: BMD ETEE COP
- 1st sprint: Graphical Scripting — Trng — Refine FA3 — Trng Trng Trng Trng Trng
- 2nd sprint: SST Matrix — Refine FA3

Work Package 2: AMD Simulation System

AMD Business Services

Focus Area 1: Ground Truth Battlespace Object
- 1st sprint: Understand all models, develop sensor and comms models — Trng — Refine All — Trng
- 2nd sprint: extend with threat and debris models — Refine All
- 3rd sprint: extend with shooter models — Refine All
- 4th sprint: Interactions — Refine All

Focus Area 2: Battlespace Information
- 1st sprint: Extract data — Trng Trng Trng — Refine All — Trng
- 2nd sprint: Expose data — Refine All
- 3rd sprint: feedback requests

Focus Area 3: Battlespace Simulation, Simulation Control
- 1st sprint: Data Preparation — Trng Trng Trng — Refine All — Trng
- 2nd sprint: Order Editor and Scenario Verification — Refine All
- 3rd sprint: Scenario Validation and Order Execution
- 4th sprint: Runtime Control

Focus Area 4: Logging
- 1st sprint: Consume Data — Trng — Refine All — Trng Trng
- 2nd sprint: Expose Data — Refine All

Focus Area 5: Simulation Composition
- 1st sprint: DIS — Trng — Refine All — Trng
- 2nd sprint: HLA — Refine All

Work Package 3: BMD Exercise Portal — UAT SAT (first phase); **Work Package 3: BMD Exercise Portal** — UAT SAT (second phase)

Work Package 4: Operational Assurance (spanning)

Figure 1.2: Project Schedule

1.1.8.   The detailed schedule for Work Package 1, the object of this Contract, is described in Section 1.4.

1.1.9. Integration of functionality that is developed under the ETEE FS BMD project into the yearly maintenance release of the JEMM and of the ITC/AMD simulation system will be decided by the Purchaser and is outside the scope of this Work Package 1 Contract.

1.1.10.   The JEMM and ITC/AMD systems are currently deployed on NATO operational networks and are therefore required to comply with NATO cyber security regulations.

1.2. Purpose and Scope of this Contract

1.2.1. The purpose of this Contract for ETEE Work Package 1 is to implement the necessary enhancements to the JEMM system to meet the BMD requirements for training and exercises, to support the JEMM system training periods, and to provide initial support to its operation by the User community.

1.2.2. The Contract will be executed using the roles and responsibilities as defined by the Scrum framework at www.scrum.org. Agile development is a software development approach based on iterative development, early and frequent inspection, and incremental deliveries in which requirements and solutions evolve through collaboration in cross-functional teams and through continuous stakeholder feedback. All software requirements stated in this SOW are mandatory.

1.3. Statement of Work Organization

1.3.1. The Statement of Work (SoW) describes in detail the exact work to be done to fulfil the purpose of this Contract and is organised as follows:

1.3.1.1.   Section 1 introduces the ETEE FS BMD project and defines the work that needs to be accomplished under this Contract.

1.3.1.2.   Section 2 specifies the Project Management task that the Contractor shall undertake.

1.3.1.3.   Section 3 specifies the Software Engineering tasks that the Contractor shall undertake.

1.3.1.4.   Section 4 specifies the contribution by the Contractor to Integrated Support for the JEMM system.

1.3.1.5.   Section 5 describes the documentation requirements that the Contractor shall conform to under this Contract.

1.3.1.6.   Section 6 contains a set of relevant definitions.

1.4. High-level Contract Objectives

1.4.1. Plan, implement, manage, and maintain an effective and competent Contractor team of subject matter experts throughout the full period of performance of this Contract.

1.4.2. Design and implement the required software enhancements for the BMD enhanced JEMM system for integration by the Purchaser into the JEMM system baselines according to an agile development methodology in a distributed working environment.

1.4.3. Design and implement the required enhancements to the following list of business services at the associated level of agility to provide the functionality of the corresponding User Application:

1.4.3.1.   Objectives management Service - Moderate enhancement – Objective Application

1.4.3.2.   MEL/MIL management Service - Moderate enhancement – MEL/MIL Application

1.4.3.3.   Training Audience Interaction Service - Major enhancement – Training Audience Interaction Application

1.4.3.4.   Observation management Service - Minor enhancement – Observation Collection Application

1.4.3.5.   Assessment management Service - Minor enhancement – Exercise Analysis Application

1.4.3.6.   Logging Service - Major enhancement – Logging Application

1.4.3.7.   BMD ETEE Recognized Picture management Service - Major enhancement – COP Application

1.4.4. Perform development Sprints that deliver software that in the end fulfils all the software requirements defined in ANNEX A for the BMD enhanced JEMM business services. Services requiring minor enhancements will consist of one (1) to two (2) Sprints, moderate enhancements will consist of two (2) to four (4) Sprints whereas major enhancements will consist of three (3) to six (6) Sprints. The Sprints will be distributed over the two (2) delivery phases. Sprints will focus on specific areas of related functionality and will consist of a number of iterations that will progress as follows:

1.4.4.1.   The first iteration will focus on achieving an understanding by the Contractor-provided team of the software requirements, of the intended User interface, business process and associated business objects and logic.

1.4.4.2.   The subsequent iterations will refine the elements of the first Sprint and expand on the data services, storage and administration aspects.

1.4.5. Deliver working software as the outcome of each iteration.

1.4.6. Deliver working software and the associated documentation as the outcome of each Sprint.

1.4.7. Design and implement the software requirements defined in ANNEX A for the BMD enhanced JEMM business services with specific software engineering teams that focus on three (3) distinct areas:

1.4.7.1.   Focus Area 1 (FA1): Objectives, MEL/MIL, Observation, Assessment, Logging

1.4.7.2.   Focus Area 2 (FA2): Training Audience Interaction

1.4.7.3.   Focus Area 3 (FA3): BMD ETEE Recognized Picture

1.4.8. Design and implement the software requirements defined in ANNEX A for the BMD enhanced JEMM business services with specific software engineering teams according to the schedule defined in Tables 1-1 and 1-2 for respectively the intermediate and the final delivery phase. The schedule is expressed in months (M) relative to the Effective Date of Contract (EDC). The start dates specify a not-later-than constraint. Final Contract Acceptance (FCA) is deemed to occur at the acceptance of the SIT for the Final Delivery Phase.

Focus Area	Activity	Business Services	Start Date	Duration
FA1	Sprint 1	Objectives	EDC + 2M	2M
FA1	Sprint 2	MEL/MIL	EDC + 4M	2M
FA1	Sprint 3	Observation Assessment Logging	EDC + 6M	2M

FA2	Sprint 1	Defence Design	EDC+2M	3M
FA2	Sprint 2	Link 16	EDC+5M	3M
FA2	Sprint 3	Messages	EDC+8M	3M
FA2	Sprint 4	Integration with AMD	EDC+11M	3M
FA3	Sprint 1	Graphical Scripting	EDC+8M	3M
FA3	Sprint 2	SST Matrix	EDC+11M	3M
All FAs	FAT	All	EDC+14M	1M
All FAs	SIT	All	EDC+15M	1M
All FAs	IOS	All	EDC+16M	18M

Table 1-1 Schedule of Intermediate Delivery Phase and Initial Operations Support

Focus Area	Activity	Business Services	Start Date	Duration
FA1	Training 1	All FA1 Services	EDC+18M	1M
FA1	Sprint 1	All FA1 Services	EDC+19M	2M
FA1	Sprint 2	All FA1 Services	EDC+21M	2M
FA1	Training 2	All FA1 Services	EDC+27M	3M
FA2	Training 1	All FA2 Services	EDC+18M	1M
FA2	Sprint 1	All FA2 Services	EDC+25M	2M
FA2	Sprint 2	All FA2 Services	EDC+27M	2M
FA2	Training 2	All FA2 Services	EDC+29M	3M
FA3	Training 1	All FA3 Services	EDC+18M	1M
FA3	Sprint 1	All FA3 Services	EDC+23M	2M
FA3	Sprint 2	All FA3 Services	EDC+25M	2M
FA3	Training 2	All FA3 Services	EDC+28M	5M
All FAs	FAT	All FAs Services	EDC+33M	1M
All FAs	SIT	All FAs Services	EDC+34M	1M
All FAs	IOS	All	EDC+35M	12M

Table 1-2 Schedule of Final Delivery Phase and Initial Operations Support

1.4.9. Develop a work plan in which the Contractor software engineering team Key Personnel working on Focus Area 1 is also a part of the team working on Focus Area 3. In this manner, the domain knowledge that is acquired during the work on Focus Area 1 can be leveraged.

1.4.10. To contribute to the FAT and SIT test events and to support Independent Verification & Validation (IV&V) that shall be conducted during these tests.

1.4.11. To deliver software that complies with NATO cyber security regulations as defined in Section 3.12.

1.4.12. To support the training periods indicated in the schedules as defined in Section 1.4.8 and further detailed in section 3.16.

1.4.13. To provide Initial Operations Support (IOS) from SIT acceptance of the Intermediate Delivery Phase until twelve (12) months after FCA.

1.5. Contract Requirements

1.5.1. The requirements for Project Management are described in Section 2.

1.5.2. The requirements for the Software Engineering are described in Section 3.

1.5.3. The software requirements for the BMD enhanced JEMM system are included in ANNEX A and are identified as "*JEMM – NNN - XXX*".

1.5.4. The requirements for the manner in which the software application components that realise business services are designed and implemented are described by the architecture described in ANNEX B and in the coding principles and guidelines described in ANNEX C.

1.5.5. The requirements for training support are described in Section 3.

1.5.6. The requirements for integrated support are described in Section 4.

1.5.7. The requirements for documentation are described in Section 5.

2. __Task 1: Project Management__

2.1. Scope

2.1.1. This task outlines the Project Management activities for the Work Package 1 of the ETEE FS BMD project Contract. The Contractor shall provide Project Management for the execution of the Contractor-assigned work items and shall also provide Project Management support for the Purchaser through specified reporting requirements detailed in Section 2.7.

2.1.2. The goal of the Contractor's Project Management shall be to manage the Contractor-assigned work items in a controlled, transparent and resilient manner to achieve the desired results and, wherever possible, to eliminate problems and to ensure that those problems that do occur are identified early, assessed accurately, and resolved quickly in partnership with the Purchaser.

2.1.3. In particular the Contractor's Project Management Plan shall be focussed on maintaining at all times a detailed plan, including a Project Master Schedule (PMS) and a Work Breakdown Schedule (WBS), that specifies for each of the Work Package Focus Areas described in Section 1 and according to the schedule defined in Tables 1-1 and 1-2 , for each Sprint and for each iteration, for each test event, for each training period and each IOS period the following items:

2.1.3.1. The resource profiles and allocated number of man-days. The resources shall be named at the latest forty (40) working days before the planned start of a Sprint, test event, training or IOS period as specified in Tables 1-1 and 1-2. A named resource experience and project history shall be available for the

Purchaser to verify that the resource has the required skills to perform the assigned role on the project team.

2.1.3.2.   A risk assessment concerning the timely and continued resourcing of the activities by the named resources or their alternates.

2.1.3.3.   A mitigation plan consisting of measures for each identified risk.

2.1.3.4.   A Contractor project team performance verification and validation log detailing for each resource the assigned role, tasks and level of achievement expressed as a percentage of the anticipated performance.

2.1.3.5.   A Contractor project team performance lessons identified list and associated remedial action plan.

2.1.4. The Contractor's Project Manager (PM) shall ensure that all Contractor project team members meet the required Personnel Security requirements, that all project-related documentation is handled in accordance with NATO Security regulations and that the only automation devices that are used to support the Software Engineering activities of this project are those specified in this SoW.

2.1.5. The Project Manager shall ensure and provide proof that all Contractor and Subcontractor personnel that shall work on a NATO site or have access to classified information and facilities shall have, at a minimum, a valid NATO SECRΞT (NS) clearance as required by NATO policy. The security clearance shall be valid for at least another three (3) months when the personnel start to work on the Contract. The PM shall also ensure the timely renewal if the clearance validity ends before the end date of the scheduled performance period.

2.1.6. The Project Manager shall process all Contractor and Subcontractor personnel through NATO security at each site, adhering to the local site procedures for clearances and access to facilities, to obtain security badges for the duration of the on-site activities.

2.2. Project Management Start Date and Schedule

2.2.1. The Performance Start Date of the Project Management task (PSD PM): PSD PM under this Work Package shall be the Effective Date of Contract (EDC).

2.2.2. The Contractor shall perform the Project Management task until the completion of the final IOS period.

2.3. Project Management Key Personnel

2.3.1. The Contractor shall establish and maintain a Project Management Office (PMO), through the entire period of performance of this Contract, to perform and manage all efforts necessary to discharge all his responsibilities under this Contract. The PMO will consist of at least:

2.3.1.1.   Project Manager (Key Personnel)

2.3.1.2. Deputy Project Manager (not Key Personnel)

2.3.2. The Project Manager (PM) shall direct and coordinate the activities of the Contractor's project team.

2.3.3. The PM shall be the Contractor's primary contact for the Purchaser's BMD ETEE FS Project Manager. The PM or his deputy shall be prepared at all times to present and discuss the status of Contract activities with the Purchaser's Project Manager, Contracting Officer, or Technical Lead.

2.3.4. The PM shall assist the Purchaser's Project Manager in assessing schedule and software requirements implementation trade-offs within the scope of this Contract.

2.3.5. The Project Manager shall meet all the following essential qualifications:

2.3.5.1. University degree in computer science or similar technical degree.

2.3.5.2. At least five (5) years of proven working experience in the last 8 years in a software development role as a member or as a lead of a team.

2.3.5.3. At least five (5) years of proven working experience in the last 8 years in the management of software projects of medium and small size using formal project methodologies like PRINCE 2 applied for agile development methodologies.

2.3.5.4. Proven working knowledge for at least five (5) years in the last 8 years of service oriented software architectures, implementation approaches and associated technologies.

2.3.5.5. A thorough knowledge of the English language to the proficiency of at least Level 3 as specified in STANAG 6001 for all language aspects.

2.3.5.6. A valid NATO SECRET (NS) clearance as required by NATO policy. The security clearance shall be valid for at least another six (6) months when the person starts to work on the Contract.

2.3.6. In addition it shall be desirable that the Project Manager meet the following qualifications:

2.3.6.1. Proven working knowledge of ArchiMate or equivalent in the last 5 years.

2.3.6.2. Proven knowledge and working experience in the last 8 years with the design and implementation of web services.

2.3.7. The deputy PM shall meet the same qualifications as the PM and be able to substitute for the PM at any given time. The deputy PM is not considered as Key Personnel.

2.4. Project Management Methodology

2.4.1. The Contractor shall apply the PRINCE2 or a similar Project Management methodology for the planning, delivery and control of services and supplies under this Contract.

2.5. Project Management Location of Work

2.5.1. Unless otherwise specified or approved by the Purchaser, the main effort for this Contract shall be carried out on the Contractor's premises and at all times physically located in a NATO member nation.

2.5.2. The Contractor shall establish the collaboration environment and distributed software development environment specified in this Contract to support the planned agile development methodology.

2.5.3. Work at Purchaser Sites

2.5.3.1. To support the planned agile development approach and integration process, the Contractor PM shall plan to work at the Purchasers site for the Factory Acceptance Test and for the System Integration Test. In addition the Contractor may request to temporarily locate personnel at the Purchaser's facilities, for example during the start-up phase of the project or intensive integration testing periods.

2.5.3.2. If the request is approved by the Purchaser, the Contractor shall be responsible for costs associated with working at the Purchaser's facilities per the Special Provisions of this Contract.

2.5.3.3. The Purchaser will provide Contractor personnel working at Purchaser locations under this Contract free of charge with:

2.5.3.3.1. A desk,

2.5.3.3.2. Standard office furniture,

2.5.3.3.3. Common expendable office supplies,

2.5.3.3.4. Access to the Purchaser's NATO UNCLASSIFIED (NU) Wi-Fi network,

2.5.3.3.5. Access to utilities within the work area and storage space for project support data.

2.5.4. Project Management Collaborative Work Environment

2.5.4.1. The Contractor shall establish the necessary means to conduct WebEx, or similar capability to be agreed at the PSD PM date, meetings on a permanent basis from the Project Management Location of Work.

2.6. Purchaser Responsibilities

2.6.1.1. The Purchaser's Project Manager (PPM) together with the Purchaser's Technical Lead (PTL) shall act as the Purchaser's representative and shall be the

primary interface between the Contractor and Purchaser after the Effective Date of Contract (EDC).

2.6.1.2.　The Purchaser's Project Manager and Technical Lead shall be supported by specialists in certain areas who may, in specific cases, be delegated to act on the Project Manager's or Technical Lead's behalf in their area of expertise.

2.6.1.3.　A list of Purchasers Furnished Property items is provided in Annex D to the Statement of Work.

2.7. Project Management Control (Meeting & Project Highlight Report)

2.7.1. Project Management Milestones and Approval

2.7.1.1.　At least forty (40) working days before the start of each Sprint, test event and training period that the Contractor shall contribute to as described in Tables 1-1 and 1-2, the PM shall present a new or updated Project Management Plan including all the items specified in Section 2.1.3 to the Purchaser's Project Manager and Technical Lead.

2.7.1.2.　Acceptance of the plan shall be conditional on the content of the Project Management Plan with respect to the level of confidence that it provides the Purchaser that the specified activities can be performed successfully by the assigned team for the scope and within the time allocated. The Purchaser shall be provided with the necessary documentation by the PM to verify that the assigned software engineering team for a Sprint, test event and training period meets the requirements specified in task 2 under Section 3.3.

2.7.1.3.　The Purchaser shall provide acceptance notification to the Contractor within ten (10) working days of submission by the Contractor or request additional information or changes to the proposed plan.

2.7.1.4.　The Contractor shall achieve acceptance of the plan within fifteen (15) working days on the initial submission of the plan.

2.7.1.5.　Within five (5) working days following the acceptance of each Sprint, test event or training period that the Contractor contributed to, the PM shall present a Project Highlight Report (PHR) focussing on the items specified in Section 2.1.3.

3.　Task 2: Software Engineering

3.1. Scope

3.1.1.　The scope of the software engineering work consists of the support by specified Software Engineering Key Personnel for the implementation, testing and integration of the Work Package scope defined in Section 1.4 and detailed in ANNEX A in accordance with the schedule defined in Section 1.4 and in compliance with the development and implementation methodology described in

Sections 3.6 through 3.9 and with the requirements expressed in Section 3.12. In addition software engineering support shall be provided for the initial operation of the system as described in Section 4.2.

3.2. Software Engineering Start Date and Schedule

3.2.1. The Software Engineering (SE) PSD under this Work Package shall be the Effective Date of Contract (EDC) + a maximum of forty (40) working days.

3.3. Software Engineering Key Personnel

3.3.1. For each of the software engineering Focus Areas for Work Package 1 defined in Section 1.4.7 and performance period defined in the project schedule in Tables 1-1 and 1-2, the Contractor shall provide a team composed of a Scrum Master and of a Coding Team including a Coding Team Lead Engineer.

3.3.2. The Scrum Master is identified as Key Personnel. The Contractor shall designate a Scrum Master to ensure that the Scrum process is used as intended by the Scrum framework as defined by www.scrumguides.org.

3.3.3. The Scrum Master shall facilitate the Scrum process and is accountable for removing impediments to the ability of the team to deliver the product goals and deliverables. The Scrum Master is not a traditional team lead or Project Manager. The Scrum Master ensures that the Scrum process is used as intended. The Scrum Master is the enforcer of the rules of Scrum, often chairs key meetings, and challenges the team to improve.

3.3.4. The Scrum Master shall meet the following essential qualifications:

3.3.4.1. At least five (5) years of proven working experience in the last 8 years in the role of Scrum Master or comparable role in agile methods for delivering contractually-bound project outcomes.

3.3.4.2. At least three (3) years of proven working experience within the last 8 years with fulfilling the role of Scrum Master for the development of interactive web-based software applications according to a service oriented architecture.

3.3.4.3. A thorough knowledge of the English language to the proficiency of at least Level 3 as specified in STANAG 6001 for all language aspects.

3.3.4.4. A minimum of three (3) years of experience of using the DevOps environment to support the agile process with the technologies specified for the Focus Area in the architecture description at ANNEX B

3.3.5. The Scrum Master shall meet the following desirable qualifications:

3.3.5.1. More than three (3) years of experience with fulfilling the role of Scrum Master in a multi-cultural, international environment.

3.3.6. For each Focus Area specified in Section 1.4.7, the Contractor shall assemble a suitably sized and qualified software engineering team, to the Purchaser's full

and complete satisfaction, to implement the software requirements specified in ANNEX A according to the schedule specified in Tables 1-1 and 1-2. The Scrum framework will be used to manage the development approach.

3.3.6.1.　　　For the first phase of the project all software requirements defined for the JEMM system in ANNEX A shall be addressed.

3.3.6.2.　　　For the second phase of the project, the total effort of the Sprints for a Focus Area shall represent 30% of the total effort associated with the Sprints of the Focus Area of Phase 1.

3.3.7. The role of the coding team will be to implement the User stories associated with the application functions defined in ANNEX B that are part of a Sprint or iteration, to test them independently and to submit them for integration according to the approach specified in Sections 3.6 through 3.16.

3.3.8. The members of the coding team shall all meet the following essential qualifications:

3.3.8.1.　　　A minimum of three (3) years of proven experience within the last 5 years of developing software using an agile development approach.

3.3.8.2.　　　A minimum of three (3) years of proven experience within the last 5 years of developing software using the technologies specified for the Focus Area in the architecture description at ANNEX B or one of its predecessors not older than five (5) years from the date of bid submission.

3.3.8.3.　　　A minimum of three (3) years of proven experience within the last 5 years in developing software using the software implementation environment described in Section 3.8.12 or one of its predecessors not older than five (5) years from the date of bid submission.

3.3.8.4.　　　A minimum of three (3) years of proven experience within the last 5 years in developing software using the Collaboration environment described in Section 3.8.11 or one of its predecessors not older than five (5) years from the date of bid submission.

3.3.8.5.　　　A thorough knowledge of the English language equivalent to the proficiency of at least Level 3 as specified in STANAG 6001 for all language aspects.

3.3.9. Within the Coding Team the Lead Engineer is identified as Key Personnel and shall have at least three (3) years of proven working experience within the last 5 years with the architectural concepts used in the architecture modelling language ArchiMate or an equivalent language.

3.3.10.　　　At least one of the members of the coding team shall have at least three (3) years of proven working experience within the last 5 years with the design, execution and documentation of unit testing.

3.3.11.   The members of the coding team shall meet the following desirable qualifications:

3.3.11.1.   Experience with the actual subject domain of the Focus Area.

3.4. BMD Enhanced JEMM System Requirements

3.4.1. The software requirements for Work Package 1 (this Contract) are incorporated in the overall software requirements for Work Packages 1 and 2 that are described in ANNEX A. The software requirements are organized along the complete concept of utilisation of the BMD ETEE FS in order to provide insight in the overall operational context and to provide traceability from operational requirements to implemented solutions.

3.4.2. The Purchaser will refer to the document in ANNEX A to perform the role of Scrum Product Owner.

3.4.3. The software requirements that will be addressed under Work Package 1 are identified by the code that starts with "JEMM". Software requirements not specifically identified with the "JEMM" code are not included within the scope of this Contract.

3.5. Purchaser Responsibilities

3.5.1. The Purchaser Technical Lead or appointed members of his team shall perform the roles of Product Owner and of Tester as defined by the Scrum framework at www.scrum.org.

3.5.2. The Purchaser shall produce regular releases based on Contractor deliveries for release testing, for integration testing and for end User testing as described in Section 3.10.

3.6. Software development methodology

3.6.1. For Focus Area 1 of Work Package 1 a series of Sprints will address groupings of business services included in the Focus Area. The Sprints will be executed in a way that initially targets the presentation aspect of the business services, the supported business process and the business objects and their logic. Subsequently the data services, associated data storage and the administration services will be addressed in a more complete and consistent manner while further refinement is done for the presentation, business process, business objects and logic.

3.6.2. For Focus Area 2 of Work Package 1, the Sprints will address specific groupings of functionality identified in ANNEX A and specified in ANNEX B for the service. Within a Sprint, the emphasis will progress from business process, business objects, and interoperability with external systems to data services and storage finishing with presentation and administration.

3.6.3. For Focus Area 3 of Work Package 1, the Sprints will address specific groupings of functionality identified in ANNEX A and specified in ANNEX B for the service in a similar approach as described for Focus Area 1.

3.6.4. Each Sprint will be organised in a number of iterations that will be specified by the Purchaser and coordinated with the Contractor at the start of the Sprint. Each iteration will result in a working software solution that fulfils a set of User stories set for the iteration. The duration of an iteration will depend on the complexity of the Sprint and will span one (1) to three (3) weeks.

3.6.5. At the end of each iteration and Sprint, building and testing of the releases will be performed by the Purchaser. The builds will integrate the software developed by the Contractor which has been tested and validated by the Contractor at unit level. At the end of a Sprint or iteration, the application functions and associated User stories will be marked as met, requiring to be incorporated in on-going or follow-on Sprints or iterations, or logged for later attention.

3.6.6. At EDC, a refined design of the various business services, application services, application functions, User stories and components included and described in ANNEX B will be developed by the Purchaser to start the development effort in the most efficient manner.

3.6.7. The Purchaser shall involve appropriate operational Users for review, feedback or testing of the project deliverables throughout the life span of the project.

3.6.8. The Purchaser, supported by the Contractor of Work Package 4 (Operational Assurance), shall perform testing as an integral part of each iteration and Sprint.

3.7. Software architecture

3.7.1. The complete architecture is at ANNEX B.

3.7.2. The architecture description for Work Package 1 is included down to the level of components. The interfaces between Work Packages 1 and 2 are also described.

3.7.3. As mentioned in Para 3.6.6 above, the refined architecture design will be available at EDC to support the agile software development process.

3.8. Software implementation location of work, environment and tools

3.8.1. Unless otherwise specified or approved by the Purchaser, the main effort for this task shall be carried out on the Contractor's premises. The Contractor PM may request to temporarily locate software engineering personnel at the Purchaser's facilities, for example during the initial or final iteration of a Sprint.

3.8.2. If the Contractor request to temporarily locate at the Purchaser's facilities is approved by the Purchaser, the Contractor shall be responsible for any and all costs associated with working at the Purchaser's facilities, and shall not be subject to additional compensation by the Purchaser under the Provisions of this Contract.

3.8.3. The Purchaser will provide Contractor personnel working at Purchaser locations under this Contract free of charge with:

3.8.3.1.   A desk

3.8.3.2.   Standard office furniture

3.8.3.3.   Common expendable office supplies

3.8.3.4.   Access to the Purchaser's NU Wi-Fi network

3.8.3.5.   Access to utilities within the work area and storage space for project support data

3.8.4. Conversely the Purchaser may request the Contractor with five (5) working days' notice to host the Purchaser Project Manager, technical lead or appointed representatives as well as technical subject matter experts and testers at the Contractor location to facilitate the execution of the on-going and planned Work Package activities.

3.8.5. When working at the Contractor's location, the Contractor shall provide the Purchaser personnel under this Contract free of charge with:

3.8.5.1.   A desk

3.8.5.2.   Standard office furniture

3.8.5.3.   Common expendable office supplies

3.8.5.4.   Access to the Contractor's Internet Wi-Fi network

3.8.6. For each service listed in Section 1.4.3 the technologies that are intended to be used for their implementation including third party components are described in the architecture at ANNEX B.

3.8.7. The Purchaser will make provisions to provide the Contractor with a maximum of 12 virtual development machines that are fully configured to support the required development work for the duration of the Contract. The virtual development machines will be made available inside the NATO Software Factory (NSF), an internet facing Azure DevOps environment. The Contractor shall specify the number of virtual development machines that are required concurrently over the duration of the Contract. If the number of virtual development machines required concurrently by the Contractor exceeds 12, the Purchaser will provide the additional machines at the Contractor's expense.

3.8.8. The Contractor shall provide a physical development workstation to each member of the Contractor's team to connect to the NSF. The Contractor shall provide uninterrupted internet connectivity at sufficient bandwidth for online development. The physical development workstation shall meet at least the following specifications:

3.8.8.1.   64-bit CPU ,

3.8.8.2.   Full disk encryption for mobile devices including laptops,

3.8.8.3.   64-bit Operating System supported to run McAfee Endpoint Security and VPN Client,

3.8.8.4.   Weekly software patching,

3.8.8.5.   McAfee Endpoint Security with daily updates,

3.8.8.6.   VPN Client (will be specified at Contract Award) equivalent to Cisco AnyConnect.

3.8.8.7.   Peripherals for video and voice collaboration

3.8.9. The physical development workstation shall be dedicated to this project and not be used for any other activities for the duration of the project.

3.8.10.   The Contractor shall provide the necessary networking facilities and supporting software to connect into the Purchaser's collaborative development environment.

3.8.11.   The collaboration environment shall be based on the integrated use of Microsoft Teams and of the Azure DevOps Services.

3.8.12.   The software development environment shall be based on the Azure DevOps Services and on Visual Studio Code.

3.9. Software development configuration management

3.9.1. A Sprint will start with an identified development branch and result in functioning software that has been verified to fulfil the set of Sprint software requirements. The functioning software and associated documentation will be referred to as a Sprint release. The Purchaser will be able to include a Sprint release in a system baseline.

3.9.2. An iteration within a Sprint will start with an identified development branch and result in functioning software that has been verified to fulfil the set of iteration software requirements. The functioning software will be referred to as an iteration release.

3.9.3. The development branches will be produced by the Purchaser and provided to the Contractor. For existing JEMM software that needs to be enhanced, the Purchaser shall include the necessary code in the branch. The Contractor shall be responsible for managing the development branches used by the coding team. The Purchaser will merge the branches based on pull requests submitted by the Contractor. At the beginning of each Iteration or Sprint the Contractor and the Purchaser shall agree on a schedule for submitting pull requests. The Purchaser will build the releases.

3.9.4. The Contractor shall not share any code obtained or produced under this Work Package with other parties without prior approval of the Purchaser.

3.9.5. The Contractor shall maintain a list of physical development workstations dedicated to this project.

3.9.6. Upon completion of the usage of the physical development workstations, the Contractor shall wipe the workstations completely. The Contractor shall provide to the Purchaser a statement of conformity for the wiping signed by the Contractors Corporate Security Officer. After wiping, the Contractor is free to use the physical development workstations for any other purpose.

3.10.   Software implementation, Test and Acceptance plan

3.10.1.   The Scope is defined in ANNEX A and B for each JEMM business service. The schedule shall be as specified in Tables 1-1 and 1-2.

3.10.2.   As described in Section 1.1.7 this Work Package includes an Intermediate delivery.

3.10.3.   Any bugs reported after the intermediate delivery shall be addressed as part of the training support periods or during the development for the final delivery according to the priorities set by the Purchaser.

3.10.4.   Testing will be conducted as part of the agile development process as a part of each Sprint and iteration. The Purchaser will provide the Contractor with the necessary mock-ups or stubs to perform integration testing agreed for the Sprint or iteration.

3.10.5.   Formal testing prior to the intermediate and final delivery of the baseline that contains the BMD ETEE functionality will comprise of Factory Acceptance Test (FAT), System Integration Test (SIT), User Acceptance Test (UAT) and Site Acceptance Test (SAT).

3.10.6.   The FAT will be performed by the Purchaser and will verify that all the JEMM software requirements associated with the business processes described at ANNEX A can be executed successfully. The test results will be logged by the Purchaser including the test data, outcome and comments. The tests shall be classed as successful, partially successful or failed. Partially successful or failed tests will be addressed and corrected by the Contractor to the Purchaser's full satisfaction. Amended software shall be submitted to the Purchaser in the same manner as for a Sprint release. The Purchaser shall repeat the test a maximum of three (3) times. In the event that a test fails three (3) times, the requirement shall be marked and definitively considered as unfulfilled.

3.10.7.   The SIT will be performed by the Purchaser and will verify that all the JEMM requirements associated with the business processes described at ANNEX A can be executed successfully and that the interaction with systems external to JEMM as depicted in Figure 1.1 function correctly. The test results will be logged.

The partially successful and failed tests associated with JEMM requirements will be resolved by the Contractor in the same manner as for the FAT.

3.10.8.   IV&V testing will also be included in the SIT. The same logging and resolution approach as for FAT and SIT will be applied.

3.10.9.   Cyber security testing by the Purchaser will also be included in the SIT. Testing will be logged by the Purchaser in the specific format used by the Purchaser's change management process. Vulnerabilities shall be classified as critical, high, medium or low. The Contractor shall be responsible for resolving, to the Purchaser's full satisfaction, all critical and high vulnerabilities that are attributed to the software that the Contractor has delivered.

3.10.10.   The FAT, SIT and UAT will be conducted at the Purchaser site. The Purchaser will ensure the availability of the facilities that are necessary to test and accept JEMM compliance with the required interfaces to existing NATO capabilities.

3.10.11.   The Contractor shall participate in the FAT and SIT and shall at least be attended by the Project Manager. The Contractor is not required to participate in the UAT and in the SAT.

3.10.12.   The Contractor is not required to participate in Tranche integration tests: Ensemble Test (ET), Ensemble Operator Test (EOT) and System of Systems Integration Test (SoSIT).

3.10.13.   The following software acceptance tests will be performed by the Purchaser at the end of each iteration:

3.10.13.1.   Review that software has been written according to the software coding principles and guidelines specified in ANNEX C.

3.10.13.2.   Test, verify and validate that the iteration fulfils the Purchaser specified set of User stories that belong to an application function that support a software requirement.

3.10.13.3.   Verify and validate that all the quality assurance criteria mentioned in Section 3.13 have been met.

3.10.13.4.   The Purchaser will provide initial Iteration acceptance test results within 10 working days after the receipt of the pull request.

3.10.14.   The following software acceptance steps will be performed by the Purchaser at the end of each Sprint:

3.10.14.1.   Review that software has been written according to the software coding principles and guidelines in ANNEX C.

3.10.14.2.   Verify and validate that the software complies with the cyber security requirements defined in Section 3.12.

3.10.14.3.   For the first phase of development that leads to intermediate delivery, test, verify and validate that the Sprint fulfils the full set of application functions associated with the software requirements for the business services addressed in the Sprint.

3.10.14.4.   For the second phase of development leading to final delivery, test, verify and validate the enhancements of modifications to application functions of the software requirements specified by the Purchaser at the start of the Sprint for the Focus Area.

3.10.14.5.   Verify and validate that the quality criteria of performance, usability and issue reporting as defined in Section 3.13 are met.

3.10.14.6.   The Purchaser will provide initial Sprint acceptance test results within 20 working days after the receipt of the pull request.

3.10.15.   Acceptance of an iteration shall be conditional on:

3.10.15.1.   Compliance of the software with at least 90% of the coding principles and guidelines defined in ANNEX C.

3.10.15.2.   No failed tests and not more than 10% of the User Stories specified by the Purchaser at the start of the iteration being evaluated as partially successful with a work-around in place.

3.10.15.3.   All quality assurance criteria being met.

3.10.16.   Purchaser acceptance of a Sprint shall be conditional upon:

3.10.16.1.   Compliance of the software with at least 90% of the coding principles and guidelines defined in ANNEX C.

3.10.16.2.   Compliance of the software with all the cyber security non-functional requirements described in ANNEX B.

3.10.16.3.   All tests described in Section 3.10.14 being successful with a maximum number of partially successful tests with a work-around in place not greater than 10% of the full set of application functions identified in ANNEX B for the software requirements described in ANNEX A for the JEMM business service(s) addressed in the Sprint or of the application functions for the software requirements specified by the Purchaser at the start of the Sprint for the Focus Area and zero (0) failed tests.

3.10.16.4.   The quality criteria of performance, usability and issue reporting as defined in Section 3.13 being met.

3.10.17.   Sprint acceptance failure shall not impact the start of follow-on Sprints.

3.10.18.   In addition, the following intermediate and final delivery acceptance steps will be performed by the Purchaser as part of the FAT and of the SIT:

3.10.18.1.   Verify and validate that all critical and high cyber vulnerabilities introduced in Contractor-delivered software have been resolved by the Contractor and verified by cyber security testing.

3.10.18.2.   Verify and validate that all partially failed and failed tests recorded by the IV&V testing in Contractor-delivered software have been resolved by the Contractor and confirmed by the IV&V team.

3.10.18.3.   Verify and validate that the baseline release meets the performance and usability quality criteria described in Section 3.13 and that any failures in quality cannot be attributed to Contractor-delivered software.

3.10.18.4.   Verify and validate that all specified on-line help as described in Section 3.15 is available.

3.10.18.5.   Verify and validate that all operational User training materials as specified in Section 3.16 are available and are complete and correct.

3.10.18.6.   Verify and validate that the system administration documentation as specified in Section 3.17 is complete and correct.

3.10.19.   FAT and SIT acceptance by the Purchaser shall be conditional on the successful outcome of the above steps. No critical or high cyber security vulnerabilities shall remain. A maximum number of partially failed IV&V tests with a work-around in place of less than 10% of the full set of application functions identified in ANNEX B for the requirements identified in ANNEX A for BMD enhanced JEMM system shall be accepted. All minimum quality criteria thresholds defined in 3.13 shall be met and any failure shall not be attributable to Contractor-delivered software.

3.11.   Test scenario data

3.11.1.   Relevant test scenario data will be provided by the Purchaser at the start of each development Sprint and may be amplified during the Sprint.

3.12.   Cyber Security requirements

3.12.1.1.   The cyber security non-functional requirements are described in ANNEX B.

3.12.1.2.   The cyber security requirements for secure coding are described in ANNEX C.

3.12.1.3.   The developed software will be subject to a penetration test executed by the Purchaser.

3.13.   Quality assurance

3.13.1.   The quality of Contractor developed software releases will be tested by the Purchaser using the following criteria:

3.13.1.1.   Performance: all User interaction shall respond within less than two (2) seconds under a load that is defined by the Purchaser as being representative. The Purchaser shall develop, to the maximum extent possible, a set of repeatable and automated tests. These test results shall be provided to the Contractor and the Contractor shall resolve any issues identified in these tests.

3.13.1.2.   Test Reliability: At least 80% of the requirements to be validated for a Sprint release are tested with immediate successful result and 90% after one (1) additional re-test.

3.13.1.3.   Usability: at least 90% of presentation aspects shall be deemed intuitive in their usage and navigation by an operational User supporting the business process described in ANNEX A including consistent presentation and behaviour and on-line help.

3.13.1.4.   Issue reporting: For all partial successful or failed tests, the related software issues will be identified and logged by the Contractor and provided to the Purchaser.

3.13.1.5.   Issue incidence rate: the number of new issues that arise from one release to the next should decrease by a factor of at least 30%.

3.14.   Coding principles and guidelines

3.14.1.   The coding principles and guidelines are described at ANNEX C.

3.15.   On-line Help

3.15.1.   The Contractor shall include tool tips for each presentation aspect of the services that are implemented by the Contractor. The tool tip shall include the description of the requirement and how the functionality is to be used as a part of the User story.

3.16.   Contribution to training materials for operational Users

3.16.1.   The Contractor shall contribute to the training of operational Users by including an interactively accessible description of the business process that the implemented component supports at the level of detail as described for the Concept of Utilization in Annex A.

3.16.2.   During the training periods indicated in the schedule in Tables 1-1 and 1-2, the training support shall consist of 3rd level support by the Contractor to respond to incident reports, to fix bugs and to implement change requests to improve the usability of the Contractor-delivered software. This support shall be scoped at an effort of 30 man-days per calendar month. Support will be executed in the same manner as described for Sprints in Section 3.6.4.

3.17.   Contribution to training for system administrators

3.17.1.　　The Contractor shall contribute to the training for system administrators by producing a specific text document that describes the global configuration variables, file system locations or URLs that affect the operation of the components that the Contractor has implemented.

3.18.　Software licenses

3.18.1.　　The Contractor shall not include without prior written approval of the Purchaser any software requiring a specific license agreement or any software to which background Intellectual Property Rights apply.

4.　**Task 3: Integrated Support**

4.1.　Baseline deployment

4.1.1.　System Baseline deployment will be implemented by the Purchaser as part of the regular operations and maintenance of the system.

4.2.　Initial Operation support

4.2.1.　The NCI Agency operates each system according to a specific Service Delivery Model (SDM). For JEMM, the following levels of support have been and will be defined in the SDM:

4.2.1.1.　　Level 0 support: customer self-help. The self-help consists of two generic activities:

4.2.1.1.1.　　If the JEMM functionality to which the User has access does not appear to be functioning, refer to the scenario administrator guide or to an experienced JEMM User.

4.2.1.1.2.　　If the User does not have access to JEMM functionality that would be expected, contact the JEMM scenario administrator or the JEMM MEL/MIL manager.

4.2.1.2.　　Level 1 support: performed by the NCI Agency Centralized Service desk (CSD) or by the local NCI Agency CIS Supporting Unit (CSU)

4.2.1.2.1.　　CSD will refer JEMM incidents to Level 2 support when supporting and enabling services have been ruled out as potential causes of the incident.

4.2.1.2.2.　　CSUs will provide support for:

4.2.1.2.2.1.　Service operation:

4.2.1.2.2.1.1.Verify that the physical access and connectivity to the service is operational,

4.2.1.2.2.1.2.Monitor that local JEMM servers are operational up to the JEMM processes;

4.2.1.2.2.1.3.Inform the User of scheduled maintenance outages.

4.2.1.2.2.2.   Incident response:

4.2.1.2.2.2.1. Verify that an incident is indeed related to JEMM and not related to supporting and enabling services,

4.2.1.2.2.2.2. Refer incident reports to CSD or directly to Level 2 support.

4.2.1.2.2.3.   Request fulfilment:

4.2.1.2.2.3.1. Request fulfilment by acting on User standard requests;

4.2.1.2.2.3.2. Request fulfilment by acting on User change requests with regards to the JEMM application service by transmitting change requests to the JEMM service delivery managers.

4.2.1.3.   Level 2 support:

4.2.1.3.1.   Analyse reported incidents;

4.2.1.3.2.   Consult knowledge base of known issues and workarounds and assess incidents accordingly;

4.2.1.3.3.   Provide work-around information to incident owner;

4.2.1.3.4.   Refer incident to Level 3 support when required;

4.2.1.3.5.   Support User standard requests with regards to JEMM data stored on centralised JEMM servers: copy, rename, hide, share Users, transfer, backup and restore;

4.2.1.3.6.   Monitor centralized JEMM servers and JEMM processes.

4.2.1.4.   Level 3 support provides corrective, preventive and adaptive maintenance and implements the Deployment and Release Management process in accordance with the ISO/IEC 20000 and ITIL framework or equivalent. The Deployment and Release Management process receives the approved Change Request from the 2nd Level Support and performs the following tasks (not limited to):

4.2.1.4.1.   Activating Level 3 maintenance when new solutions shall be developed;

4.2.1.4.2.   Identify root cause of an incident and develop courses of action (e.g. Code fix, work around, configuration change);

4.2.1.4.3.   Refer incident to Level 4 contractor support if the root cause is identified to reside in the contractor provided software components;

4.2.1.4.4.   Development of the solution (e.g. new Fix, Integrate contractor provided software updates, Repair, Replacement, Patch, or Release);

4.2.1.4.5.   Testing of the solution (e.g. Regression testing, issue/deficiency replication testing);

4.2.1.4.6.   Update of baseline content and status;

4.2.1.4.7.   Release of the solution (release unit/record);

4.2.1.4.8.   Delivery and deployment of the solution.

4.2.2. The Contractor shall provide Level 4 corrective maintenance support with a target of a two (2) working day restoration time from SIT acceptance of the Intermediate Delivery until twelve (12) months after the Final Contract Acceptance (FCA) for the software code that the Contractor has delivered. Bug fixing support will be delivered according to the same process as described in Sections 3.8.8 and 3.9. The bug fixing shall not affect the delivery of Sprints, Iterations or Training periods of the second phase in both schedule and scope.

4.2.3. The Contractor shall provide a fix or workaround within the target restoration time for 90% of the reported incidents. For 100% of the reported bugs a permanent fix shall be provided within 10 working days. Failure to deliver Level 4 bug fixes adequately three (3) times according to the same acceptance criteria as defined for Sprints in Section 3.10.16 shall constitute a default on the part of the Contractor.

4.2.4. The Contractor shall provide and maintain an Integrated Support Plan (ISP), tailored to the Project phases and in accordance with the requirements of this section.

4.2.5. The ISP shall cover the planning, resourcing and detailed activities for the following support areas at minimum:

4.2.5.1.   The Contractor's support organization;

4.2.5.2.   Initial Operations concept;

4.2.5.3.   Required computer resources;

4.2.5.4.   Support activities until FCA including the response times;

4.2.5.5.   Support activities between FCA and end of Initial Operations Support including the response times.

4.3. Configuration Management

4.3.1. The Contractor shall implement a CM process in accordance with [STANAG 4427, 2014], [ACMP-2000, 2017], [ACMP 2009, 2017] and [ACMP-2100,2017] and this SOW.

4.3.2. The contractor shall maintain a Configuration Management Database (CMDB) for all non-software related project deliverables. The non-software related project deliverables are (but not limited to):

4.3.2.1.   Project Management documents

4.3.2.2.   Engineering support documents

4.3.2.3.   Training documents

4.3.2.4.   Operation Support documents

4.3.3. All non-software related project deliverables shall be identified as a Configuration Item (CI) and shall be recorded with at minimum:

4.3.3.1.   Unique identification number

4.3.3.2.   Version number

4.3.3.3.   Change record

4.3.3.4.   Release date

4.3.3.5.   Comments received

4.3.3.6.   Status

4.3.3.7.   Relation (e.g. iteration, sprint, test, training, incident, project CLIN)

4.3.4. The Contractor shall provide an extract of its own CMDB to the Purchaser on request and at contract completion.

4.3.5. The Contractor shall provide a Configuration Management Plan (CMP) in accordance with [STANAG 4427, 2014], [ACMP-2000, 2017], [ACMP 2009, 2017] and [ACMP-2100,2017], tailored to the requirements in this SOW.

4.3.5.1.   In producing the CMP, the Contractor shall define the organisation and procedures used to configuration manage the CIs.

4.3.5.2.   The Contractor's CMP shall address all disciplines within this Section and shall as a minimum include, but not be limited to the following Sections:

4.3.5.2.1.   Introduction;

4.3.5.2.2.   Organisation;

4.3.5.2.3.   Configuration Identification and Documentation;

4.3.5.2.4.   Configuration Control;

4.3.5.2.5.   Configuration Status Accounting;

4.3.5.2.6.   Configuration Audits;

4.3.5.2.7.   Configuration Management Database (CMDB).

5. **Contract Documentation Requirements**

5.1. General

5.1.1. All documentation delivered to the Purchaser shall be written in English with spelling and usage based on the Concise Oxford English Dictionary, 11th edition.

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

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

5.1.4. All documentation deliverables must be "stand-alone" with no dependence on other documentation or applications in the Contractor's environment for its comprehension. Likewise, if there are hyperlinks to other areas of the Contractor environment, they must be explained to the Purchaser's full satisfaction.

5.1.5. Documentation shall not be marked with corporate logos or contain warnings or proprietary markings limiting in any way the Purchaser's rights to use, reproduce, or distribute.

5.1.6. All delivered documentation may be subject to review by the NCIA IV&V team.

5.1.7. Unless otherwise directed by the Purchaser in writing, the Contractor shall furnish requested documentation as follows:

5.1.7.1.   All contractual documentation (e.g., change proposals, invoices, etc.) shall be delivered electronic format;

5.1.7.2.   All Project Management documentation (e.g., plans, schedules, reports, etc.) shall be delivered as electronic copies in Microsoft Office format (Microsoft Office 2013 or higher);

5.1.7.3.   The other documentation deliverables shall be furnished as an electronic copy in a format which is best suited for review and maintenance by the Purchaser (e.g. Project Master Schedule in Microsoft Project format and Project Highlight Reports in Microsoft Word). In general the following guidelines shall be used: Microsoft Word shall be used for text documents; Microsoft Excel shall be used for tabular or matrix data; ArchiMate shall be used for architecture drawings; all architecture models shall be delivered in the ArchiMate Model Exchange File Format; Microsoft Project shall be used for project schedules; and Microsoft PowerPoint shall be used for briefings and presentations. The Contractor shall use Microsoft Office 2013 or higher version. Any other remaining type of documentation deliverable shall be furnished as electronic copy of the agreed tools/media used;

5.1.7.4.   All documentation, including reports, but with the exception of contractual documentation, shall be sent to the Purchaser's Project Manager, the Purchaser's Technical Lead and the IV&V team;

5.1.7.5.	All contractual documentation shall be sent electronically to the Purchaser's Project Manager, the Purchaser's Technical and the Purchaser's Contracting Officer.

5.1.8.	Each document shall contain the following information for identification:

5.1.8.1.	Version of the document and version history;

5.1.8.2.	Version date;

5.1.8.3.	Contract and associated CLIN number(s);

5.1.8.4.	Status (e.g. accepted/approved/draft…).

5.1.9.	The Contractor shall submit all documentation for Purchaser review as described below and as specified for the specific Focus Area. At each review cycle, the Purchaser may state if the document is or is not likely to be accepted in its final version, however this initial Purchaser indication shall not be considered as definitive.

5.1.9.1.	The Contractor shall provide a first draft of each deliverable for Purchaser review by the date specified in the Schedule of Supplies and Services.

5.1.9.2.	The first draft shall be substantially complete and correct.

5.1.9.3.	The Purchaser will provide comments, corrections, and suggested changes to the Contractor within two (2) weeks of receipt.

5.1.9.4.	The Purchaser reserves the right to return without review a document that the Purchaser considers to have significant deficiencies.

5.1.9.5.	The Contractor shall not rely on the Purchaser review to fill in deficiencies, perform deliverable quality control, or obtain missing information.

5.1.9.6.	The Contractor shall resubmit the document as a revised draft incorporating addressing all the Purchaser's comments within two (2) weeks after receipt.

5.1.9.7.	The Purchaser will review the changes made to the revised draft and will endeavour to provide further comments, corrections, and suggested changes to the Contractor within two (2) weeks of receipt.

5.1.9.8.	When all comments, corrections and suggested changes have been incorporated in the document, to the Purchaser's full satisfaction, the Contractor shall provide the final (version 1.0) document within two (2) weeks of receipt of the Purchaser's comments on the revised draft.

5.1.9.9.	If the document in question is a management document or included as part of the product baseline, the Contractor shall remain responsible for continuing updating the document during the approval review cycle to reflect changes in the software requirements, design, or support arrangements.

5.2. Reports

5.2.1. In addition to the general documentation requirements specified in Section 5.1, all reports delivered under this Contract shall meet the following standards:

5.2.1.1.　　The report shall be truthful, forthright and complete;

5.2.1.2.　　The report shall contain only material that can be supported by objective evidence and confirmed by independent analysis;

5.2.1.3.　　The report shall provide evidence to support or justify the conclusions reached;

5.2.1.4.　　The report shall be concise. If necessary, supporting data should be placed in appendices, provided as separate annexes, or referenced as backup material;

5.2.1.5.　　Any report that is over five (5) pages long, excluding the front and the Table of Contents, shall include an Executive Summary of not more than one (1) page in length.

6. **Definitions**

6.1. The following definition of terms shall be used for this project:

6.1.1. Development Branch: A development or develop branch is created from the master. The development branch is the main branch where the source code of HEAD always reflects a state with the latest delivered development changes for the next release. Feature branches are created from a develop branch. When a feature is complete it is merged into the develop branch. The DEVELOP branch is one of the branches with infinite lifetime.

6.1.2. Iteration Release: All the software that fulfils the requirements of the iteration.

6.1.3. Sprint Release: all the software that fulfils the requirements of the Sprint and all the documentation that is required for the software to be included in a system baseline.

6.1.4. Product Baseline: all the software and documentation that is required to meet the Purchaser change management requirements for acceptance as a new approved fielded system.

ANNEX A: Concept of utilisation and Software Requirement Specifications

ANNEX B: System Architecture

ANNEX C: Coding principles and guidelines

ANNEX D: Purchaser Furnished Property

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

**PROVIDE ENHANCEMENT OF JOINT EXERCISE MANAGEMENT
MODULE (JEMM) WITHIN BALLISTIC MISSILE DEFENCE (BMD)
FUNCTIONS IN EDUCATION, TRAINING, EXERCISE AND
EVALUATION (ETEE) FUNCTIONAL SERVICES (FS)**

IFB-CO-115112-ETEE JEMM

BOOK II – PART IV

STATEMENT OF WORK

Annex B: System Architecture

Annex B: System Architecture

Contents

1   Introduction

This document provides the description of the **project solution architecture**, where a solution is a system that offers a coherent set of functionalities to its environment. As such, it concerns those properties of a solution that are necessary and sufficient to meet its essential requirements in the scope of a project.

The content of this document was built from the ArchiMate model and represents a snapshot of the architecture as intended for publishing in the IFB.

The methodologies and frameworks used when developing this architecture are NAFv4 and TOGAF.

The aim of the **NATO Architecture Framework Version 4** (NAFv4) is to provide a standard for developing and describing architectures for both military and business use. It provides a standardized way to develop architecture artefacts, by defining Methodology (how to develop architectures and run an architecture project), Viewpoints (conventions for the construction, interpretation and use of architecture views for communicating the enterprise architecture to different stakeholders), Meta-Model (the application of commercial meta-models identified as compliant with NATO policy), and a Glossary, References and Bibliography. See https://www.nato.int/cps/en/natohq/topics_157575.htm

The Open Group Architecture Framework (TOGAF) is a framework for enterprise architecture that provides an approach for designing, planning, implementing, and governing an enterprise information technology architecture. TOGAF is a high-level approach to design. It is typically modelled at four levels: Business, Application, Data, and Technology.

1.1   Purpose of the Architecture

This project solution architecture has the following purpose:

1) It supports the Agile process:
    a) Should be "reasonably" complete, detailed and correct. The architecture will be subject to refinement during the Agile implementation process.
2) It identifies required changes to existing ETEE and external systems to support the BMD ETEE Incr1 requirements:
    a) It should allow stakeholders to estimate the level of effort required;
    b) It defines interactions between the main applications, focusing primarily on defining sufficiently the interfaces between systems required in different work packages;
    c) It defines the knowledge required for the bidder teams (technology, standards);
    d) It defines the functionality and interactions that should be the subject for testing;
    e) It lays base for an architecture to be developed for and during the implementation project.
3) It provides the minimum documentation required to produce an estimate of effort:
    a) It focuses on defining components with new or modified functionality;

b) It allocates the application functions to the sprints defined in the statement of work;

c) It has only limited documentation of existing components that don't need to be changed;

d) It should minimize the number of diagrams and text that would need to be maintained.

1.2 Terminology and Notation

The following terminology and notations are used in the document:

- **Development Status**
  - New – new component or functionality, from the perspective of this project.
  - New COTS – new component that is not developed but acquired as COTS;
  - Update – existing functionality that needs to be updated by this project;
  - Existing – existing functionality that will most likely not be affected by this project or it may integrate new or updated application components.

- **Stereotypes** – the following stereotypes are applied in the model:
  - <<admin>>: event from the administrator role;
  - <<api>>: API interface;
  - <<apiclient>>: client side of the API interface;
  - <<cots>>: commercial off the shelf software;
  - <<data>>: data artefact;
  - <<external>>: function, data object, component, etc., that is external to the project;
  - <<generic>>: function, data object, component, etc., that is generic (inherited from) or represents multiple specific instances;
  - <<internal>>: low-level internal application service;
  - <<legacy>>: existing function, data object, component, etc., that may be replaced or become obsolete by this project, or is low-level technical;
  - <<license>>: license artefact;
  - <<new>>: function, data object, component, etc., that is new for this project;
  - <<nonfn>>: non-functional requirement;
  - <<physical>>: requirement for physical characteristics
  - <<property>>: data object that is a property of another data object;
  - <<standard>>: standard reference artefact;
  - <<stub>>: component representing data and behaviour of another component;
  - <<timer>>: timer-based event;
  - <<update>>: existing function, data object, component, etc., that is updated by this project;
  - <<user>>: event triggered by the user interaction.

1.3 Meta-model

The meta-model provides a definition of all the types of building blocks that may exist within an architecture, showing how these building blocks can be described and related to one another.
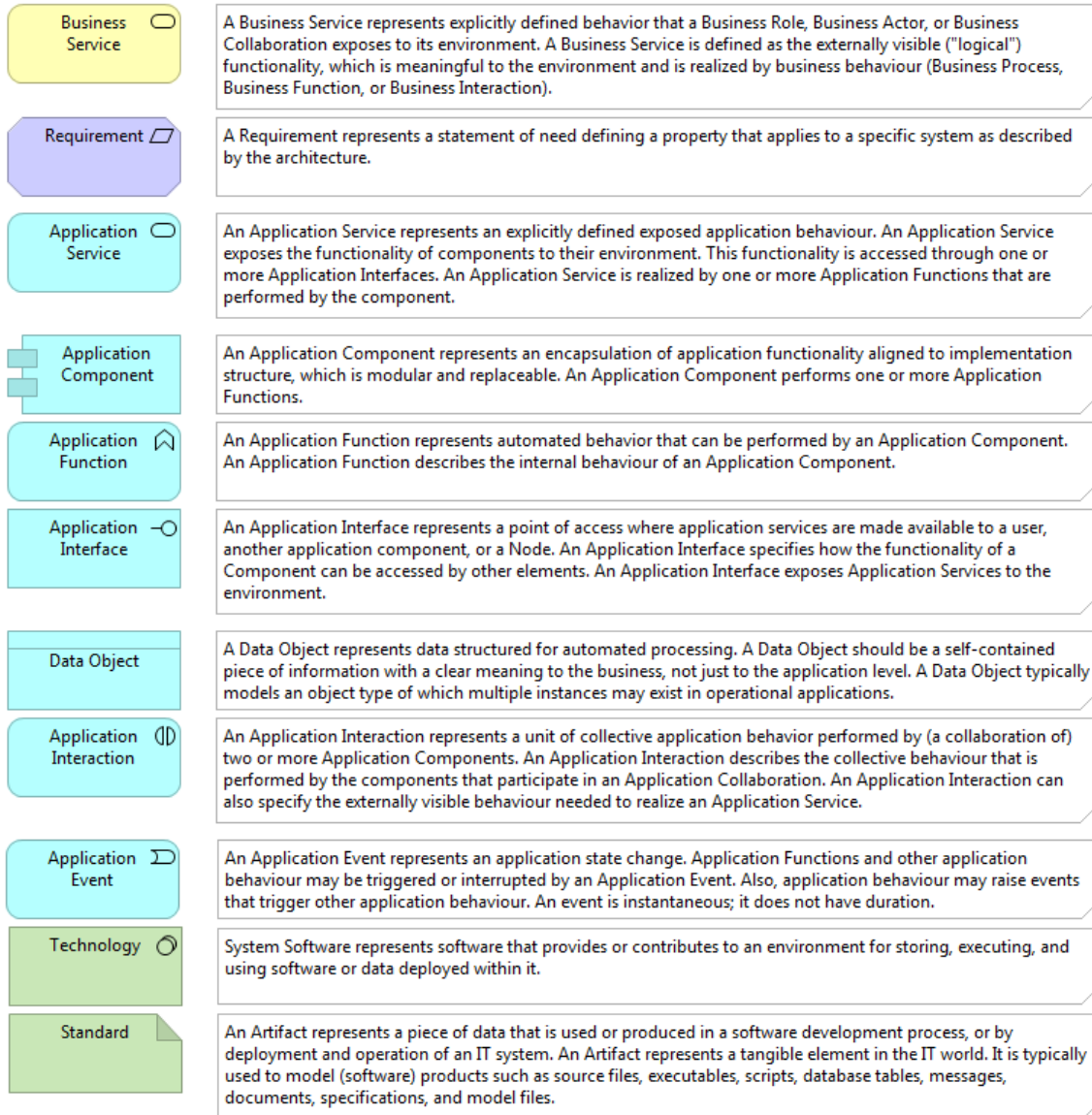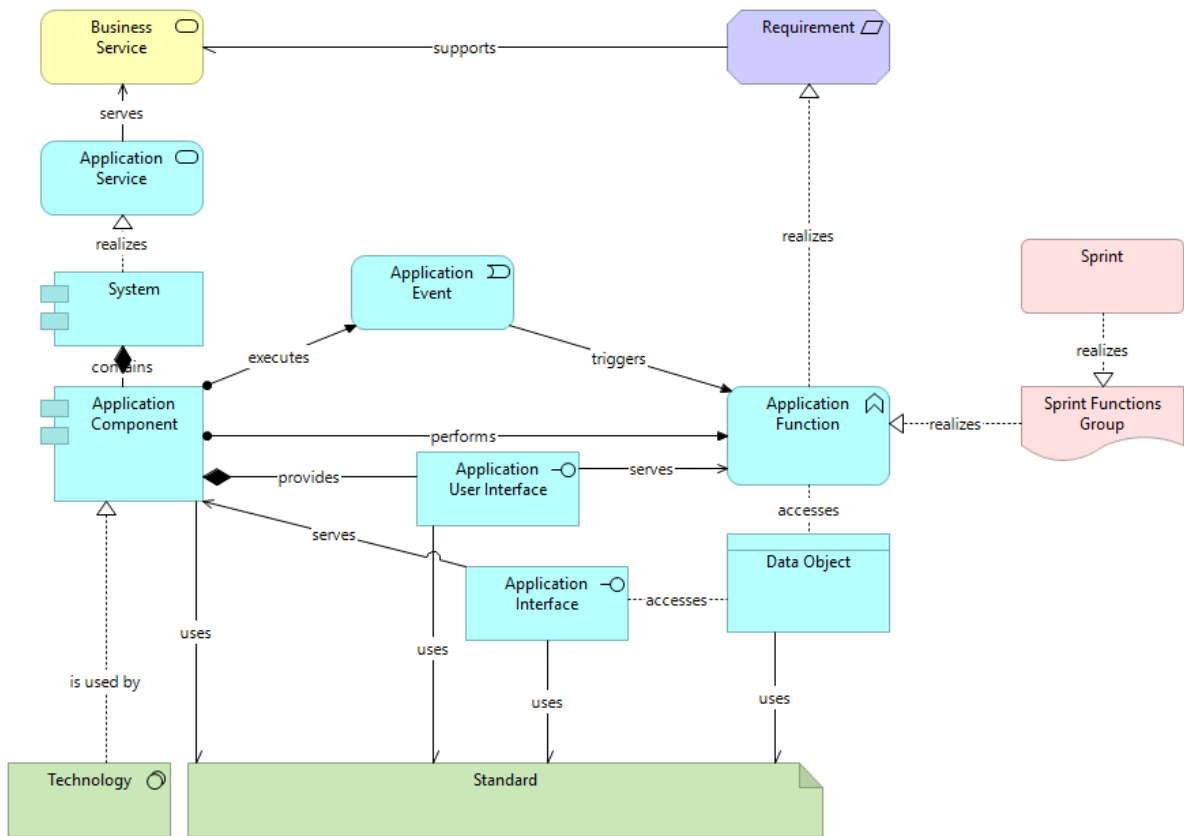
Building Block	Description
Business Service	A Business Service represents explicitly defined behavior that a Business Role, Business Actor, or Business Collaboration exposes to its environment. A Business Service is defined as the externally visible ("logical") functionality, which is meaningful to the environment and is realized by business behaviour (Business Process, Business Function, or Business Interaction).
Requirement	A Requirement represents a statement of need defining a property that applies to a specific system as described by the architecture.
Application Service	An Application Service represents an explicitly defined exposed application behaviour. An Application Service exposes the functionality of components to their environment. This functionality is accessed through one or more Application Interfaces. An Application Service is realized by one or more Application Functions that are performed by the component.
Application Component	An Application Component represents an encapsulation of application functionality aligned to implementation structure, which is modular and replaceable. An Application Component performs one or more Application Functions.
Application Function	An Application Function represents automated behavior that can be performed by an Application Component. An Application Function describes the internal behaviour of an Application Component.
Application Interface	An Application Interface represents a point of access where application services are made available to a user, another application component, or a Node. An Application Interface specifies how the functionality of a Component can be accessed by other elements. An Application Interface exposes Application Services to the environment.
Data Object	A Data Object represents data structured for automated processing. A Data Object should be a self-contained piece of information with a clear meaning to the business, not just to the application level. A Data Object typically models an object type of which multiple instances may exist in operational applications.
Application Interaction	An Application Interaction represents a unit of collective application behavior performed by (a collaboration of) two or more Application Components. An Application Interaction describes the collective behaviour that is performed by the components that participate in an Application Collaboration. An Application Interaction can also specify the externally visible behaviour needed to realize an Application Service.
Application Event	An Application Event represents an application state change. Application Functions and other application behaviour may be triggered or interrupted by an Application Event. Also, application behaviour may raise events that trigger other application behaviour. An event is instantaneous; it does not have duration.
Technology	System Software represents software that provides or contributes to an environment for storing, executing, and using software or data deployed within it.
Standard	An Artifact represents a piece of data that is used or produced in a software development process, or by deployment and operation of an IT system. An Artifact represents a tangible element in the IT world. It is typically used to model (software) products such as source files, executables, scripts, database tables, messages, documents, specifications, and model files.

Figure 1: Model building blocks

Figure 2: Relations between model building blocks

2 Realization of Business Services by Software Application Components and Their Functions

2.1 S4 – Functions Supporting Business Services

This viewpoint specifies the set of application functions that systems implementing the business services are expected to provide and perform.

Business Service	Application Function	Application Function Development Status	System	Application Component
01.01 TO-Objective Mgt	Associate Reference Storyline with reference TO	new	JEMM	JEMM Reference Data Manager
01.01 TO-Objective Mgt	Manage Reference Storylines	new	JEMM	JEMM Reference Data Manager
01.01 TO-Objective Mgt	Create TOs from reference TA's TOs	new	JEMM	TO Manager
01.01 TO-Objective Mgt	View TA and related Events	update	JEMM	TO Manager
01.01 TO-Objective Mgt	Manage TO assignment to Events	new	JEMM	Training Plan Manager
01.02 MM-MEL/MIL Mgt	Initiate the AMD simulation initialization for a specific scenario or event	new	JEMM	Graphical Scripting
01.02 MM-MEL/MIL Mgt	Display TO/TA association in EBT	new	JEMM	JEMM EXCON Reporting
01.02 MM-MEL/MIL Mgt	In BMD Profile, provide access to all the simulation functionalities and to creating virtual activities	new	JEMM	JEMM UI
01.02 MM-MEL/MIL Mgt	Limits the access to functionalities depending on the scenario state	new	JEMM	JEMM UI
01.02 MM-MEL/MIL Mgt	Automatically schedule 'Conditionally scheduled' encouraging items when ISO not achieved	new	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Automatically schedule 'Conditionally scheduled' rewarding items when ISO is achieved	new	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Create ISO based on a primary TO	new	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Create Storyline from reference	new	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Create time dependencies between Injection, Action, Return and ISO	update	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Default date/time selection for event elements set to start time of the event	update	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Display the ISO start and end time in SL Chart	new	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Display the ISO start and end time in SL Dependency	new	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Display the ISO start and end time in SL Timeline	new	JEMM	MELMIL Manager

Business Service	Application Function	Application Function Development Status	System	Application Component
01.02 MM-MEL/MIL Mgt	Display TO/TA as matrix with SL	new	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Duplicate event	new	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Export Injection	update	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Export Return	update	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Import/Export Action	update	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Initiate execution of Virtual Activity and reflect feedback in Action	new	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Manage Event	update	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Manage ISO time dependency	new	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Produce exercise script report	update	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Reset event	new	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Set Action category (was: type)	update	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Set Action type	new	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Store an AMD Order Script with a Virtual Activity	new	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Storyline import/export	update	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Time-shift event	new	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Time-shift of Storyline	update	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Trigger Observation on ISO state change	new	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Update associated TO/TA in Event	new	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	View exercise script	update	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	View ISOs in the MEL/MIL script and update their states	new	JEMM	MELMIL Manager
01.02 MM-MEL/MIL Mgt	Verify all virtual activities in scenario or event	new	JEMM	Virtual Activity Manager
01.02 MM-MEL/MIL Mgt 01.07 RP-Recognised Picture	Manage Virtual Activities related to Actions	new	JEMM	Virtual Activity Manager
01.03 TI-TA Interaction	Process incoming J7.1 Link16 Notification and provide an extended J3.6 message	new	JEMM	JAMM Event Processor

Business Service	Application Function	Application Function Development Status	System	Application Component
01.03 TI-TA Interaction	Feed E-mail	new	JEMM	JAMM TA Interaction
01.03 TI-TA Interaction	Feed INTEL-FS	new	JEMM	JAMM TA Interaction
01.03 TI-TA Interaction	Feed XMPP chat	new	JEMM	JAMM TA Interaction
01.03 TI-TA Interaction	Generate BM launch detection SEW messages	new	JEMM	JAMM TA Interaction
01.03 TI-TA Interaction	Generate Link16 messages	update	JEMM	JAMM TA Interaction
01.03 TI-TA Interaction	Generate Link16 messages for each simulated sensor	new	JEMM	JAMM TA Interaction
01.03 TI-TA Interaction	Import OPTASK	existing	JEMM	JAMM TA Interaction
01.03 TI-TA Interaction	Send Link16 messages over JREAP-C protocol	new	JEMM	JAMM TA Interaction
01.03 TI-TA Interaction	Import Defence Design APP-11 and NVG files	new	JEMM	JAMM TA Message Processor
01.03 TI-TA Interaction	Initiate scenario control commands	new	JEMM	JEMM Scenario Manager
01.03 TI-TA Interaction	Specify the Exercise Mode for each event	new	JEMM	JEMM Scenario Manager
01.03 TI-TA Interaction	Limits the access to functionalities and data depending on the exercise mode specified for the event	new	JEMM	JEMM UI
01.03 TI-TA Interaction	Limits the access to functionalities depending on the exercise mode specified for the scenario	update	JEMM	JEMM UI
01.03 TI-TA Interaction	Provide Link16 J7.1 Notification	new	JEMM	NIRIS JEMMIS Feedback
01.03 TI-TA Interaction	Configure TA Interaction for chat, e-mail, INTEL-FS, JREAP for NIRIS	update	JEMM	Scenario Administration
01.03 TI-TA Interaction	Configure the CAX environment	update	JEMM	Scenario Administration
01.03 TI-TA Interaction	Monitor the state of all AMD services for a particular scenario	new	JEMM	Scenario Administration
01.03 TI-TA Interaction	Monitor the state of all JEMM services for a particular scenario	new	JEMM	Scenario Administration
01.03 TI-TA Interaction	Specify Exercise Mode of scenario	update	JEMM	Scenario Administration
01.03 TI-TA Interaction	Specify scenario state	new	JEMM	Scenario Administration
01.03 TI-TA Interaction	Specify the exercise profile of scenario	new	JEMM	Scenario Administration
01.03 TI-TA Interaction	Specify the simulation order execution service where the virtual activities will be sent	new	JEMM	Scenario Administration
01.03 TI-TA Interaction	Specify the state of the action based on state returned by the simulation order execution service	new	JEMM	Scenario Administration

Business Service	Application Function	Application Function Development Status	System	Application Component
01.03 TI-TA Interaction	Visualize CAX environment configuration as dashboard	new	JEMM	Scenario Administration
01.04 OB-Observation Mgt	Generate Storyline Observation Tasks for all the Storylines included in Event	new	JEMM	Observation Manager
01.04 OB-Observation Mgt	The observation task list view displays the TA in a column	update	JEMM	Observation Manager
01.04 OB-Observation Mgt	Specify which ISO state automatically triggers an observation	new	JEMM	Scenario Administration
01.05 AS-Assessment Mgt	Draft analysis and describe remedial actions	existing	JEMM	Analysis Manager
01.05 AS-Assessment Mgt	Filter on Date in the analysis	update	JEMM	Analysis Manager
01.05 AS-Assessment Mgt	Generate part of the initial Lessons Identified Action List	new	JEMM	Analysis Manager
01.05 AS-Assessment Mgt	Specify ISO state that triggers Encouraging and Rewarding Injection and Action activation	new	JEMM	Scenario Administration
01.06 LOG-Logging Mgt	Provide Link16 State and Events related to a specific source (JU number) over a specific time period	new	JEMM	NIRIS JEMMIS Feedback
01.07 RP-Recognised Picture	Control simulation and simulated Entities	new	JEMM	Graphical Scripting
01.07 RP-Recognised Picture	Display Actions and Injections from selected Storylines on the map and time line	new	JEMM	Graphical Scripting
01.07 RP-Recognised Picture	Display and highlight Elements associated with selected ORBAT entity on the time line	new	JEMM	Graphical Scripting
01.07 RP-Recognised Picture	Display and highlight selected ORBAT entity on map	new	JEMM	Graphical Scripting
01.07 RP-Recognised Picture	Display and manage Actions and Injections on the map and timeline	new	JEMM	Graphical Scripting
01.07 RP-Recognised Picture	Display geospatial representation of Virtual Activities on map	new	JEMM	Graphical Scripting
01.07 RP-Recognised Picture	Display ORBAT in a tree	update	JEMM	Graphical Scripting
01.07 RP-Recognised Picture	Display representation of Defence Design from attachment	new	JEMM	Graphical Scripting
01.07 RP-Recognised Picture	Display representation of Defence Design from file	new	JEMM	Graphical Scripting

Business Service	Application Function	Application Function Development Status	System	Application Component
01.07 RP-Recognised Picture	Display the ORBAT representation involved in a Virtual activity	new	JEMM	Graphical Scripting
01.07 RP-Recognised Picture	Display time representation of Virtual Activities on timeline	new	JEMM	Graphical Scripting
01.07 RP-Recognised Picture	Schedule Action with Virtual Activity	new	JEMM	Graphical Scripting
01.07 RP-Recognised Picture	Select a unit and add an action with a virtual activity	new	JEMM	Graphical Scripting
01.07 RP-Recognised Picture	Switch an ORBAT entity from live to simulated	new	JEMM	Graphical Scripting
01.07 RP-Recognised Picture	Update Link16 source and track blocks assignments	new	JEMM	Graphical Scripting
01.07 RP-Recognised Picture	Update ORBAT Entities using OPTASK	new	JEMM	Graphical Scripting
01.07 RP-Recognised Picture	Validate ORBAT for Link16	new	JEMM	Graphical Scripting
01.07 RP-Recognised Picture	View feedback from AMD simulation, DIS and Link16	new	JEMM	Graphical Scripting
01.07 RP-Recognised Picture	View state of Entities	new	JEMM	Graphical Scripting
01.07 RP-Recognised Picture	Limits the access to functionalities depending on the scenario profile	new	JEMM	JEMM UI
01.07 RP-Recognised Picture	Attach Defence Design to JEMM Scenario or MELMIL Event	new	JEMM	MELMIL Manager
01.07 RP-Recognised Picture	Save STARTEX situation as attachment	new	JEMM	MELMIL Manager
01.07 RP-Recognised Picture	Augment ORBAT and update STARTEX from Defence Design	new	JEMM	ORBAT Manager
01.07 RP-Recognised Picture	Have a single ORBAT per scenario	new	JEMM	ORBAT Manager
01.07 RP-Recognised Picture	Manage Blue and Red sides of ORBAT	new	JEMM	ORBAT Manager

Business Service	Application Function	Application Function Development Status	System	Application Component
01.07 RP-Recognised Picture	Manage STARTEX situation	new	JEMM	ORBAT Manager
01.07 RP-Recognised Picture	Manage the list of available weapon systems and supplies and their characteristics	new	JEMM	ORBAT Manager
01.07 RP-Recognised Picture	Specify for the scenario the types of virtual activities shown in the SST Matrix	new	JEMM	Scenario Administration
01.07 RP-Recognised Picture	Associate ORBAT Entity with Virtual Activity	new	JEMM	SST Matrix
01.07 RP-Recognised Picture	Display SST feedback in Trajectory View	new	JEMM	SST Matrix
01.07 RP-Recognised Picture	Display SST feedback on the map	new	JEMM	SST Matrix
01.07 RP-Recognised Picture	Manage SST Matrix	new	JEMM	SST Matrix
01.07 RP-Recognised Picture	Replay exercise execution	new	JEMM	SST Matrix
01.07 RP-Recognised Picture	Update SST situation for the specified time period	new	JEMM	SST Matrix
01.07 RP-Recognised Picture	Validate SST Matrix	new	JEMM	SST Matrix
01.07 RP-Recognised Picture	View SST Matrix validation results	new	JEMM	SST Matrix
01.07 RP-Recognised Picture	Verify virtual activity	new	JEMM	Virtual Activity Manager
02.01 BS-BMD Battlespace Simulation	Define entity mapping to models	update	AMD Simulation	AMD Data Preparation
02.01 BS-BMD Battlespace Simulation	Initiate the AMD simulation initialization from files	new	AMD Simulation	AMD Data Preparation
02.01 BS-BMD Battlespace Simulation	Receive STARTEX Situation and generate AMD Scenario	new	AMD Simulation	AMD Data Preparation
02.01 BS-BMD Battlespace Simulation	Verify virtual activities	new	AMD Simulation	Order Editor

Business Service	Application Function	Application Function Development Status	System	Application Component
02.03 SCL-Simulation Control Service	Execute Virtual Activity	new	AMD Simulation	AMD Command and Virtual Activity Processor
02.03 SCL-Simulation Control Service	Pause simulation	new	AMD Simulation	AMD Command and Virtual Activity Processor
02.03 SCL-Simulation Control Service	Receive commands and execute the simulation control orders	new	AMD Simulation	AMD Command and Virtual Activity Processor
02.03 SCL-Simulation Control Service	Restore from checkpoint	new	AMD Simulation	AMD Command and Virtual Activity Processor
02.03 SCL-Simulation Control Service	Resume simulation	new	AMD Simulation	AMD Command and Virtual Activity Processor
02.03 SCL-Simulation Control Service	Start simulation	new	AMD Simulation	AMD Command and Virtual Activity Processor
02.03 SCL-Simulation Control Service	Stop simulation	new	AMD Simulation	AMD Command and Virtual Activity Processor
02.03 SCL-Simulation Control Service	Take checkpoint	new	AMD Simulation	AMD Command and Virtual Activity Processor
02.03 SCL-Simulation Control Service	Provide virtual activities in JEMMIS format	new	AMD Simulation	AMD JEMMIS Feedback
02.03 SCL-Simulation Control Service	Execute scenario validation for Scenario or MELMIL Event	new	AMD Simulation	AMD Scenario Validator
02.03 SCL-Simulation Control Service	Modify Virtual Activity in a form	new	AMD Simulation	Order Editor
02.03 SCL-Simulation Control Service	Provide categorised list of supported virtual activities	new	AMD Simulation	Order Editor
02.03 SCL-Simulation Control Service	Provide categorised list of supported virtual activities for an Entity	new	AMD Simulation	Order Editor
02.03 SCL-Simulation Control Service	Provide forms for virtual activities	new	AMD Simulation	Order Editor
02.03 SCL-Simulation Control Service	Provide the geospatial/time/ORBAT representation of each virtual activity	new	AMD Simulation	Order Editor
02.03 SCL-Simulation Control Service	Execute SST Matrix validation	new	AMD Simulation	SST Matrix Validator
02.04 SCN-Simulation	Define DIS properties for simulation entities and interactions	existing	AMD Simulation	AMD DIS Interoperability

Business Service	Application Function	Application Function Development Status	System	Application Component
Composition Service				
02.04 SCN-Simulation Composition Service	Interpret the DIS PDUs and store them as Entity State and Events with a time stamp	new	AMD Simulation	DIS Logger and Feedback
02.04 SCN-Simulation Composition Service	Provide feedback about DIS Entity State and Events over a specific time period	new	AMD Simulation	DIS Logger and Feedback
02.04 SCN-Simulation Composition Service	Record and Replay DIS traffic	new	AMD Simulation	DIS Logger and Feedback
02.04 SCN-Simulation Composition Service	Record and Replay HLA traffic	new	AMD Simulation	HLA Logger
02.05 BI-Battlespace Information Service	Extract information about Entity actual and perceived State, Activities and Interactions	new	AMD Simulation	AMD JEMMIS Feedback
02.05 BI-Battlespace Information Service	Provide feedback about Entity actual and perceived State, Activities and Interactions	new	AMD Simulation	AMD JEMMIS Feedback
02.05 BI-Battlespace Information Service	Transform information about Entity actual and perceived State, Activities and Interactions	new	AMD Simulation	AMD JEMMIS Feedback
02.06 GT-Ground Truth Battlespace Object Service	Accept unit-related orders and behave and interact accordingly	new	AMD Simulation	AMD Simulation Engine
02.06 GT-Ground Truth Battlespace Object Service	Model, configure and simulate interactions for the sensors, air defence systems and Missiles and Ballistic Missiles	new	AMD Simulation	AMD Simulation Engine
02.06 GT-Ground Truth Battlespace Object Service	Model, configure, simulate and accept orders for specified Networks	new	AMD Simulation	AMD Simulation Engine
02.06 GT-Ground Truth Battlespace Object Service	Model, configure, simulate and accept orders for specified Sensors	new	AMD Simulation	AMD Simulation Engine
02.06 GT-Ground Truth Battlespace Object Service	Model, configure, simulate and accept orders for specified Shooters	new	AMD Simulation	AMD Simulation Engine

Business Service	Application Function	Application Function Development Status	System	Application Component
02.06 GT-Ground Truth Battlespace Object Service	Model, configure, simulate and accept orders for specified Threats and Debris	new	AMD Simulation	AMD Simulation Engine
02.06 GT-Ground Truth Battlespace Object Service	Report all BM tracks that each sensor detects and specify the sensor as its source (without automatic track correlation)	new	AMD Simulation	AMD Simulation Engine
02.07 LOG-Logging Service	Provide Entity actual or perceived State changes, Activities and Interactions for a specific period of time	new	AMD Simulation	AMD Simulation Logger
02.07 LOG-Logging Service	Store Entity actual and perceived State changes, Activities and Interactions with a timestamp	new	AMD Simulation	AMD Simulation Logger

3 Functionality of Software Application Components

This section describes the required software application component structure, stubs provided for software development, the required technology and applicable standards. It also describes the required functions, their mapping to the SRS, and the required non-functional requirements. Allocation of application functions to Sprints is also described.

3.1 P1 – Resource Types: Application Portfolio Catalogue

This viewpoint provides the hierarchical catalogue of all application components.

System	Application Component Level 1	Application Component Level 2	Application Component Level 3	Application Component Level 4	Application Component Level 5	Application Component Development Status	Description
AMD Simulation	AMD Command and Virtual Activity Processor					new	Receives and processes commands and virtual activities and provides them to the simulation engine.
AMD Simulation	AMD Command and Virtual Activity Processor	AMD Scenario Validator				new	Provides functionality for validating the AMD simulation scenario.

System	Application Component Level 1	Application Component Level 2	Application Component Level 3	Application Component Level 4	Application Component Level 5	Application Component Development Status	Description
AMD Simulation	AMD Command and Virtual Activity Processor	Order Builder				new	Builds AMD order files for virtual activities.
AMD Simulation	AMD Command and Virtual Activity Processor	Order Editor				new	Provides editing functions for AMD orders and their required representations.
AMD Simulation	AMD Command and Virtual Activity Processor	Order Execution Monitor				new	Monitors execution of orders and provides the required feedback.
AMD Simulation	AMD Command and Virtual Activity Processor	SST Matrix Validator				new	Provides functionality for validating the SST matrix.
AMD Simulation	AMD Data Preparation					new	Provides functionality for preparing the AMD simulation scenario.
AMD Simulation	AMD Data Preparation	AMD JEMMIS Data API Client				new	Provides access to data from JEMM to the AMD Simulation.
AMD Simulation	AMD JEMMIS Feedback					new	Provides information from the AMD simulation to JEMM in the JEMMIS format.
AMD Simulation	AMD Logging					new	Aggregates all of the AMD simulation

System	Application Component Level 1	Application Component Level 2	Application Component Level 3	Application Component Level 4	Application Component Level 5	Application Component Development Status	Description
							logging functionality.
AMD Simulation	AMD Logging	AMD Simulation Logger				new	Records all configured AMD simulation information.
AMD Simulation	AMD Logging	DIS Logger and Feedback				new	Records and replays DIS information and provides it to JEMM in the JEMMIS format.
AMD Simulation	AMD Logging	HLA Logger				new COTS	Records and replays HLA information.
AMD Simulation	AMD Simulation Engine					existing	The simulation engine is at the heart of the AMD simulation. It is based on FLAMES by Ternion. It models and controls all the movements of the C2 assets and the interactions between them. It generates the information required for producing the operational messages and the simulated tracks which are used to stimulate the training audience, as well as information

System	Application Component Level 1	Application Component Level 2	Application Component Level 3	Application Component Level 4	Application Component Level 5	Application Component Development Status	Description
							required by the EXCON.
AMD Simulation	AMD Simulation Engine	AMD DIS Interoperability				existing	Provides functionality required for the AMD simulation to participate in a DIS federation.
AMD Simulation	HLA-DIS Bridge					new COTS	Ensures interoperability between the DIS and HLA federations.
AMD Simulation	Runtime Data Capture					existing	Provides access to the current state of entities and to simulation events.
JEMM	JEMM Application Components					existing	Aggregation of JEMM application components.
JEMM	JEMM Application Components	EXCON COP				existing	Provides the users with a comprehensive exercise common operational picture.
JEMM	JEMM Application Components	EXCON Dashboards				existing	Provides functionality to define and visualize dashboards from data available in JEMM.

System	Application Component Level 1	Application Component Level 2	Application Component Level 3	Application Component Level 4	Application Component Level 5	Application Component Development Status	Description
JEMM	JEMM Application Components	Exercise Script Viewer				existing	Provides a time-based list of MEL/MIL script elements that can be filtered.
JEMM	JEMM Application Components	Graphical Scripting				new	Provides functionality required for building or updating the Blue and the Red ORBAT, to position ORBAT entities and to edit their attributes including holdings, supplies of missiles and communication status, and to script virtual activities.
JEMM	JEMM Application Components	Graphical Scripting	Virtual Activity Manager			new	Manages lifecycle of the virtual activities.
JEMM	JEMM Application Components	JAMM TA Interaction				update	The JEMM Automated Reporting Module provides functionality required for interaction with the systems used by the training audience.
JEMM	JEMM Application Components	JAMM TA Interaction	JAMM Dispatchers			existing	Provides functionality required for dispatching and delivering

System	Application Component Level 1	Application Component Level 2	Application Component Level 3	Application Component Level 4	Application Component Level 5	Application Component Development Status	Description
							information to the systems of the training audience.
JEMM	JEMM Application Components	JAMM TA Interaction	JAMM Dispatchers	JREAP Dispatcher		new	Dispatches tactical data link information using the JREAP protocol.
JEMM	JEMM Application Components	JAMM TA Interaction	JAMM Event Processor			new	Processes events that JAMM subscribes to and triggers response.
JEMM	JEMM Application Components	JAMM TA Interaction	JAMM Formatters			existing	Provides functionality required for producing information to the systems of the training audience in the correct formats.
JEMM	JEMM Application Components	JAMM TA Interaction	JAMM Formatters	Link16 Formatter		update	Provides functionality required for producing tactical datalink data in the Link16 format.
JEMM	JEMM Application Components	JAMM TA Interaction	JAMM Schedulers			existing	Provides functionality required for scheduling the production of information to the systems of the training audience.

System	Application Component Level 1	Application Component Level 2	Application Component Level 3	Application Component Level 4	Application Component Level 5	Application Component Development Status	Description
JEMM	JEMM Application Components	JAMM TA Interaction	JAMM Schedulers	Link16 Scheduler		existing	Provides functionality required for delivering tactical data link data at the right time and pace.
JEMM	JEMM Application Components	JAMM TA Interaction	JAMM TA Message Processor			update	Processes information from Training Audience systems into the required internal representation.
JEMM	JEMM Application Components	JEMM Core				update	Provides the core functionality required for managing the training objectives, MEL/MIL, observations and analysis.
JEMM	JEMM Application Components	JEMM Core	Analysis Manager			update	Provides functionality for preparing the analysis of the achievement of the training objectives of an exercise scenario.
JEMM	JEMM Application Components	JEMM Core	Document Manager			existing	Manages documents uploaded to a JEMM scenario and provides them for download.

System	Application Component Level 1	Application Component Level 2	Application Component Level 3	Application Component Level 4	Application Component Level 5	Application Component Development Status	Description
JEMM	JEMM Application Components	JEMM Core	JEMM Reference Data Manager			update	Provides functionality for preparing the reference set of Training Objectives for recurring exercises.
JEMM	JEMM Application Components	JEMM Core	JEMM Scenario Manager			update	Provides functionality for preparing an exercise scenario.
JEMM	JEMM Application Components	JEMM Core	JEMM Scenario Manager	Scenario Administration		existing	Provides functionality required for configuration and administration of a JEMM scenario.
JEMM	JEMM Application Components	JEMM Core	JEMM Scenario Manager	Scenario Administration	Application Manager	existing	Manages all JEMM applications available to the user.
JEMM	JEMM Application Components	JEMM Core	JEMM Scenario Manager	Scenario Administration	Application Settings Manager	existing	Manages settings of all JEMM applications available to the user.
JEMM	JEMM Application Components	JEMM Core	JEMM Scenario Manager	Scenario Administration	Data Filter Manager	existing	Manages filtering of output data in JEMM.
JEMM	JEMM Application Components	JEMM Core	JEMM Scenario Manager	Scenario Administration	Data Mappings Manager	existing	Manages mapping of available source data to output data in JEMM.

System	Application Component Level 1	Application Component Level 2	Application Component Level 3	Application Component Level 4	Application Component Level 5	Application Component Development Status	Description
JEMM	JEMM Application Components	JEMM Core	JEMM Scenario Manager	Scenario Administration	Data Sources Manager	existing	Manages sources of output data in JEMM.
JEMM	JEMM Application Components	JEMM Core	JEMM Scenario Manager	Scenario Administration	Organization Manager	existing	Manages the organizational structure and which JEMM scenarios each organization owns.
JEMM	JEMM Application Components	JEMM Core	JEMM Scenario Manager	Scenario Administration	Role & Privileges Manager	existing	Manages roles and privileges of users in JEMM.
JEMM	JEMM Application Components	JEMM Core	JEMM Scenario Manager	Scenario Administration	Rules and Pipeline Manager	existing	Provides functionality required to process (validate, filter, modify) data from external systems via JEMMIS and to provide them via configurable data pipelines.
JEMM	JEMM Application Components	JEMM Core	JEMM Scenario Manager	Scenario Administration	Side Manager	existing	Manges sides and their mappings to sides available from the connected simulation systems.
JEMM	JEMM Application Components	JEMM Core	JEMM Scenario Manager	Scenario Administration	Time Manager	existing	Provides functions required to coordinate the scenario time among various internal and external systems

System	Application Component Level 1	Application Component Level 2	Application Component Level 3	Application Component Level 4	Application Component Level 5	Application Component Development Status	Description
							participating in the exercise.
JEMM	JEMM Application Components	JEMM Core	JEMM Scenario Manager	Scenario Administration	User Manager	existing	Manages the list of users that are relevant for a specific scenario.
JEMM	JEMM Application Components	JEMM Core	JEMM Scenario Manager	Scenario Administration	User Notification Manager	existing	Manages notifications provided to users in the context of a specific scenario.
JEMM	JEMM Application Components	JEMM Core	MELMIL Manager			update	Provides functionality for preparing the MEL/MIL of an exercise scenario.
JEMM	JEMM Application Components	JEMM Core	Observation Manager			update	Provides functionality required for managing observation tasks and observations during the exercise.
JEMM	JEMM Application Components	JEMM Core	RFC Manager			existing	Provides functionality required for managing requests for clarification received by the EXCON during the exercise.
JEMM	JEMM Application Components	JEMM Core	TO Manager			update	Provides functionality for preparing the training

System	Application Component Level 1	Application Component Level 2	Application Component Level 3	Application Component Level 4	Application Component Level 5	Application Component Development Status	Description
							objectives of an exercise scenario.
JEMM	JEMM Application Components	JEMM Core	Training Plan Manager			new	Supports the user in managing the training plan.
JEMM	JEMM Application Components	JEMMIS				existing	The JEMM Interoperability Service connects JEMM do external sources of data, for example simulation systems.
JEMM	JEMM Application Components	JEMMIS	JEMMIS Data Collector			existing	Aggregates information available in the configured external sources of data.
JEMM	JEMM Application Components	JEMMIS	JEMMIS Data Connectors			existing	Aggregation of components that provide access to data from external systems.
JEMM	JEMM Application Components	JEMMIS	JEMMIS Data Connectors	JEMMIS AMD Connector		new	Connects JEMM to the source of AMD Simulation data.
JEMM	JEMM Application Components	JEMMIS	JEMMIS Data Connectors	JEMMIS DIS Feedback Connector		update	Connects JEMM to the source of DIS data.
JEMM	JEMM Application Components	JEMMIS	JEMMIS Data Connectors	JEMMIS EXIS Connector		existing	Connects JEMM to the source of EXIS (Exercise Information Service -

System	Application Component Level 1	Application Component Level 2	Application Component Level 3	Application Component Level 4	Application Component Level 5	Application Component Development Status	Description
							predecessor of JEMMIS) data.
JEMM	JEMM Application Components	JEMMIS	JEMMIS Data Connectors	JEMMIS JEMM Connector		update	Connects JEMM to the sources of data owned by JEMM.
JEMM	JEMM Application Components	JEMMIS	JEMMIS Data Connectors	JEMMIS JTLS Connector		existing	Connects JEMM to the source of JTLS data.
JEMM	JEMM Application Components	JEMMIS	JEMMIS Data Connectors	JEMMIS NIRIS Connector		new	Connects JEMM to the source of NIRIS data.
JEMM	JEMM Application Components	JEMMIS	JEMMIS Data Validator			existing	On request validates the data from connected external systems.
JEMM	JEMM Application Components	NIRIS JEMMIS Feedback				new	Provides information from NIRIS.
JEMM	JEMM Application Components	ORBAT Manager				new	Provides functionality required for building or updating the Blue and the Red ORBAT.
JEMM	JEMM Application Components	SST Matrix				new	The SST Matrix (Sensor/Shooter /Threat matrix) is used for defining the intended relationship between threat, sensors and shooters, and for monitoring the actual sensor/shooter/ matrix and

System	Application Component Level 1	Application Component Level 2	Application Component Level 3	Application Component Level 4	Application Component Level 5	Application Component Development Status	Description
							comparing it with the story line intent and with reported situation on the TA systems.
JEMM	JEMM Business Services					existing	Aggregation of JEMM business-specific functionality.
JEMM	JEMM Business Services	JEMM Date Time Mapper				existing	Functionality required to map real time to scenario time in JEMM.
JEMM	JEMM Business Services	JEMM EXCON Reporting				update	Functionality required to produce reports for EXCON in JEMM.
JEMM	JEMM Business Services	JEMM Rules/Validation	JEMM Scenario Validation			existing	Functionality required to validate the configuration and data in a JEMM scenario.
JEMM	JEMM Business Services	JEMM UI				update	Functionality required to produce the user interface of JEMM.
JEMM	JEMM Business Services	JEMM UI	JEMM Map			update	Displays JEMM entities on the map.
JEMM	JEMM Data Access					existing	Aggregation of JEMM database access functionality.

System	Application Component Level 1	Application Component Level 2	Application Component Level 3	Application Component Level 4	Application Component Level 5	Application Component Development Status	Description
JEMM	JEMM Data Access	JEMM Create Scenario				existing	Functionality required to create a new JEMM scenario.
JEMM	JEMM Data Access	JEMM Data Migration Assistant				existing	Functionality required to perform a database update between JEMM versions.
JEMM	JEMM Platform Services					existing	Provides services required to connect JEMM to the hosting platform.
JEMM	JEMM Platform Services	Authorization Policies				existing	Manages authorization policies for all JEMM applications available to the user.
JEMM	JEMM Platform Services	Caching				existing	Manages data caching for all JEMM applications available to the user.
JEMM	JEMM Platform Services	Feature Manager				existing	Manages availability of features in JEMM applications available to the user.
JEMM	JEMM Platform Services	JEMM Identity Service				existing	Provides identity management, authentication and authorization

System	Application Component Level 1	Application Component Level 2	Application Component Level 3	Application Component Level 4	Application Component Level 5	Application Component Development Status	Description
							services to JEMM.
JEMM	JEMM Platform Services	Job Scheduler				existing	Functionality that ensures specific jobs are executed at planned times.
JEMM	JEMM Platform Services	Scheduled Jobs Manager				existing	Provides functionality required to manage a schedule of planned jobs in JEMM.
JEMM	JEMM Platform Services	Service Health				existing	Provides health status information about JEMM and the services it provides.
JEMM	JEMM Platform Services	Status of External Services				existing	Collects status information from connected external systems.

3.2   P1 – Resource Types: Stub Catalogue

This viewpoint provides the list of all provided stubs that represent data and behaviour on the interfaces between the JEMM and the AMD Simulation.

Used by System	Stub Name	Stub Interfaces	Description
JEMM	AMD client for JEMM JEMMIS Data API	AMD JEMMIS Data API client	Provides data and behaviour representing the AMD client for JEMM JEMMIS Data API.
JEMM	AMD data over JEMMIS Data API	AMD JEMMIS Data API	Provides data and behaviour representing the AMD data over JEMMIS Data API.
JEMM	AMD service for AMD Control API	AMD Control API	Provides data and behaviour representing the AMD service for AMD Control API.
JEMM	AMD Virtual Activity forms	AMD Virtual Activity Form view	Provides data and behaviour representing the AMD Virtual Activity forms.
JEMM	DIS data over JEMMIS Data API	DIS Logger JEMMIS Data API	Provides data and behaviour representing the DIS data over JEMMIS Data API.

Used by System	Stub Name	Stub Interfaces	Description
AMD Simulation	JEMM client for AMD Control API	AMD Control API client	Provides data and behaviour representing the JEMM client for AMD Control API.
AMD Simulation	JEMM client for AMD JEMMIS Data API	JEMM JEMMIS Data API Client	Provides data and behaviour representing the JEMM client for AMD JEMMIS Data API.
AMD Simulation	JEMM data over JEMMIS Data API	JEMM JEMMIS Data API	Provides data and behaviour representing the JEMM data over JEMMIS Data API.
AMD Simulation	JEMM Virtual Activity editor form	Edit Virtual Activity view	Provides data and behaviour representing the JEMM Virtual Activity editor form.

3.3   P2 – Resource Structure: Application/ Technology Matrix

3.3.1   Application Technology

This viewpoint provides the list of applied technology for the main application components. The specified technology also applies to their sub-components. The technology in the 'Current Technology' column is applicable at the publication of this document. The technology in the 'Future Technology' column is expected to be applicable at the start of the project. The references are provided in section 4.1.

System	Application Component	Current Technology	Future Technology
AMD Simulation	AMD Command and Virtual Activity Processor	.Net Core 3.1 ASPNet Core 3.1 Bootstrap 4 Edge 80 EF Core 3.1 Firefox 68 ESR Kestrel 3.1 MS Devops Server 2019 git MS LocalDB 2016 MS SQL Server 2016 SP1 OData .Net Core 7 Serilog 2.9 ==Visual Studio Code== Windows 10 Windows Server 2016	.Net 5 (future) ASP.Net 5 (future) Bootstrap 4 Edge 80 EF Core 5 (future) Firefox 68 ESR Kestrel 3.1 MS Devops Server 2019 git MS LocalDB 2016 MS SQL Server 2019 (future) OData .Net Core 7 Serilog 2.9 ==Visual Studio Code== Windows 10 Windows Server 2019 (future)
AMD Simulation	AMD Data Preparation	.Net Core 3.1 ASPNet Core 3.1 Bootstrap 4 DIS EF Core 3.1 FLAMES 18.0 (2019) Kestrel 3.1 MS Devops Server 2019 git OData .Net Core 7 Serilog 2.9 ==Visual Studio Code== Windows Server 2016	.Net 5 (future) ASP.Net 5 (future) Bootstrap 4 DIS EF Core 5 (future) FLAMES 19.0 (2020) (future) Kestrel 3.1 MS Devops Server 2019 git OData .Net Core 7 Serilog 2.9 ==Visual Studio Code== Windows Server 2019 (future)

System	Application Component	Current Technology	Future Technology
AMD Simulation	AMD DIS Interoperability	FLAMES DIS Option	FLAMES DIS Option
AMD Simulation	AMD JEMMIS Feedback	.Net Core 3.1 ASPNet Core 3.1 Bootstrap 4 EF Core 3.1 FLAMES 18.0 (2019) Kestrel 3.1 MS LocalDB 2016 MS Message Queue 10 MS SQL Server 2016 SP1 OData .Net Core 7 Serilog 2.9 Windows Server 2016	.Net 5 (future) ASP.Net 5 (future) Bootstrap 4 EF Core 5 (future) FLAMES 19.0 (2020) (future) Kestrel 3.1 MS LocalDB 2016 RabbitMQ (future) MS SQL Server 2019 (future) OData .Net Core 7 Serilog 2.9 Windows Server 2019 (future)
AMD Simulation	AMD Simulation Engine	FLAMES 18.0 (2019)	FLAMES 19.0 (2020) (future)
AMD Simulation	AMD Simulation Logger	.Net Core 3.1 ASPNet Core 3.1 Bootstrap 4 EF Core 3.1 FLAMES 18.0 (2019) Kestrel 3.1 MS Devops Server 2019 git OData .Net Core 7 Serilog 2.9 Visual Studio Code Windows Server 2016	.Net 5 (future) ASP.Net 5 (future) Bootstrap 4 EF Core 5 (future) FLAMES 19.0 (2020) (future) Kestrel 3.1 MS Devops Server 2019 git OData .Net Core 7 Serilog 2.9 Visual Studio Code Windows Server 2019 (future)
AMD Simulation	DIS Logger and Feedback	.Net Core 3.1 ASPNet Core 3.1 Bootstrap 4 DIS DIS recorder EF Core 3.1 Kestrel 3.1 MS Devops Server 2019 git OData .Net Core 7 Serilog 2.9 Visual Studio Code Windows Server 2016	.Net 5 (future) ASP.Net 5 (future) Bootstrap 4 DIS DIS recorder EF Core 5 (future) Kestrel 3.1 MS Devops Server 2019 git OData .Net Core 7 Serilog 2.9 Visual Studio Code Windows Server 2019 (future)
JEMM	EXCON COP	Angular.JS 1.7 Bootstrap 4 Edge 80 Firefox 68 ESR Leaflet.JS 1.6 MS Devops Server 2019 git Visual Studio Code Windows 10	Angular.JS 1.7 Bootstrap 4 Edge 80 Firefox 68 ESR Leaflet.JS 1.6 MS Devops Server 2019 git Visual Studio Code Windows 10
JEMM	Graphical Scripting	Angular.JS 1.7 Bootstrap 4	Angular.JS 1.7 Bootstrap 4

System	Application Component	Current Technology	Future Technology
		Edge 80 Firefox 68 ESR Leaflet.JS 1.6 MS Devops Server 2019 git Visual Studio Code Windows 10	Edge 80 Firefox 68 ESR Leaflet.JS 1.6 MS Devops Server 2019 git Visual Studio Code Windows 10
AMD Simulation	HLA Logger	HLA recorder HLA RTI	HLA recorder HLA RTI
AMD Simulation	HLA-DIS Bridge	HLA-DIS Bridge	HLA-DIS Bridge
JEMM	JAMM TA Interaction	.Net Core 3.1 ASPNet Core 3.1 Bootstrap 4 Edge 80 EF Core 3.1 Firefox 68 ESR Kestrel 3.1 MS Devops Server 2019 git OData .Net Core 7 Serilog 2.9 Visual Studio Code Windows 10 Windows Server 2016	.Net 5 (future) ASP.Net 5 (future) Bootstrap 4 Edge 80 EF Core 5 (future) Firefox 68 ESR Kestrel 3.1 MS Devops Server 2019 git OData .Net Core 7 Serilog 2.9 Visual Studio Code Windows 10 Windows Server 2019 (future)
JEMM	JEMM Core	.Net Framework 4.6.1 ASP.Net 4.6.1 Cycle2 2.1 Edge 80 Firefox 68 ESR Graph Layout Engine 1.0 IIS 10 IndependentSoft WebDav 1.3 JQuery 3.5 Kendo UI 2020 Log4net 1.2 Moment.js 2.26 MS Devops Server 2019 git MS LocalDB 2016 MS SQL Server 2016 SP1 NetTopologySuite 2 NHibernate 3.2 OWIN 4 SHA256.js Timeline.js Visual Studio Code Windows 10 Windows Event Log Windows Server 2016	.Net 5 (future) ASP.Net 5 (future) Cycle2 2.1 Edge 80 Firefox 68 ESR Graph Layout Engine 1.0 IIS 10 IndependentSoft WebDav 1.3 JQuery 3.5 Kendo UI 2020 Log4net 1.2 Moment.js 2.26 MS Devops Server 2019 git MS LocalDB 2016 MS SQL Server 2019 (future) NetTopologySuite 2 NHibernate 5.2 (future) OWIN 4 SHA256.js Timeline.js Visual Studio Code Windows 10 Windows Event Log Windows Server 2019 (future)
JEMM	JEMM Identity Service	.Net Core 3.1 ASPNet Core 3.1	.Net 5 (future) ASP.Net 5 (future)

System	Application Component	Current Technology	Future Technology
		Bootstrap 4 Edge 80 EF Core 3.1 Firefox 68 ESR Identity Server 4 Kestrel 3.1 MS Devops Server 2019 git MS LocalDB 2016 MS SQL Server 2016 SP1 OData .Net Core 7 Serilog 2.9 ==Visual Studio Code== Windows 10 Windows Server 2016	Bootstrap 4 Edge 80 EF Core 5 (future) Firefox 68 ESR Identity Server 4 Kestrel 3.1 MS Devops Server 2019 git MS LocalDB 2016 MS SQL Server 2019 (future) OData .Net Core 7 Serilog 2.9 ==Visual Studio Code== Windows 10 Windows Server 2019 (future)
JEMM	JEMMIS	.Net Core 3.1 ASPNet Core 3.1 Bootstrap 4 Edge 80 EF Core 3.1 Firefox 68 ESR Kestrel 3.1 MS Devops Server 2019 git OData .Net Core 7 Serilog 2.9 ==Visual Studio Code== Windows 10 Windows Server 2016	.Net 5 (future) ASP.Net 5 (future) Bootstrap 4 Edge 80 EF Core 5 (future) Firefox 68 ESR Kestrel 3.1 MS Devops Server 2019 git OData .Net Core 7 Serilog 2.9 ==Visual Studio Code== Windows 10 Windows Server 2019 (future)
JEMM	NIRIS JEMMIS Feedback	.Net Core 3.1 ASPNet Core 3.1 Bootstrap 4 Edge 80 EF Core 3.1 Firefox 68 ESR Kestrel 3.1 MS Devops Server 2019 git OData .Net Core 7 Serilog 2.9 ==Visual Studio Code== Windows 10 Windows Server 2016	.Net 5 (future) ASP.Net 5 (future) Bootstrap 4 Edge 80 EF Core 5 (future) Firefox 68 ESR Kestrel 3.1 MS Devops Server 2019 git OData .Net Core 7 Serilog 2.9 ==Visual Studio Code== Windows 10 Windows Server 2019 (future)
JEMM	ORBAT Manager	Angular.JS 1.7 Bootstrap 4 Edge 80 Firefox 68 ESR Leaflet.JS 1.6 MS Devops Server 2019 git ==Visual Studio Code== Windows 10	Angular.JS 1.7 Bootstrap 4 Edge 80 Firefox 68 ESR Leaflet.JS 1.6 MS Devops Server 2019 git ==Visual Studio Code== Windows 10

3.3.2 Application Technology in Sprints

This viewpoint provides the list of Sprints and technology used in components developed in each Sprint. The references are provided in section 4.1.

Sprint	Components Developed in Sprint	Current Technology	Future Technology
AMD-Sprint 1.1	AMD Simulation Engine	FLAMES 18.0 (2019)	FLAMES 19.0 (2020) (future)
AMD-Sprint 1.2	AMD Simulation Engine	FLAMES 18.0 (2019)	FLAMES 19.0 (2020) (future)
AMD-Sprint 1.3	AMD Simulation Engine	FLAMES 18.0 (2019)	FLAMES 19.0 (2020) (future)
AMD-Sprint 1.4	AMD Simulation Engine	FLAMES 18.0 (2019)	FLAMES 19.0 (2020) (future)
AMD-Sprint 2.1	AMD JEMMIS Feedback	MS Message Queue 10 FLAMES 18.0 (2019) MS SQL Server 2016 SP1 MS LocalDB 2016 ASPNet Core 3.1 OData .Net Core 7 Windows Server 2016 Kestrel 3.1 EF Core 3.1 Bootstrap 4 .Net Core 3.1 Serilog 2.9	RabbitMQ (future) FLAMES 19.0 (2020) (future) MS SQL Server 2019 (future) MS LocalDB 2016 ASP.Net 5 (future) OData .Net Core 7 Windows Server 2019 (future) Kestrel 3.1 EF Core 5 (future) Bootstrap 4 .Net 5 (future) Serilog 2.9
AMD-Sprint 2.2	AMD JEMMIS Feedback	MS Message Queue 10 FLAMES 18.0 (2019) MS SQL Server 2016 SP1 MS LocalDB 2016 ASPNet Core 3.1 OData .Net Core 7 Windows Server 2016 Kestrel 3.1 EF Core 3.1 Bootstrap 4 .Net Core 3.1 Serilog 2.9	RabbitMQ (future) FLAMES 19.0 (2020) (future) MS SQL Server 2019 (future) MS LocalDB 2016 ASP.Net 5 (future) OData .Net Core 7 Windows Server 2019 (future) Kestrel 3.1 EF Core 5 (future) Bootstrap 4 .Net 5 (future) Serilog 2.9
AMD-Sprint 2.3	AMD JEMMIS Feedback	MS Message Queue 10 FLAMES 18.0 (2019) MS SQL Server 2016 SP1 MS LocalDB 2016 ASPNet Core 3.1 OData .Net Core 7 Windows Server 2016 Kestrel 3.1 EF Core 3.1 Bootstrap 4 .Net Core 3.1 Serilog 2.9	RabbitMQ (future) FLAMES 19.0 (2020) (future) MS SQL Server 2019 (future) MS LocalDB 2016 ASP.Net 5 (future) OData .Net Core 7 Windows Server 2019 (future) Kestrel 3.1 EF Core 5 (future) Bootstrap 4 .Net 5 (future) Serilog 2.9

Sprint	Components Developed in Sprint	Current Technology	Future Technology
AMD-Sprint 3.1	AMD Data Preparation	DIS ASPNet Core 3.1 OData .Net Core 7 Windows Server 2016 Kestrel 3.1 EF Core 3.1 Bootstrap 4 .Net Core 3.1 Serilog 2.9 FLAMES 18.0 (2019) Visual Studio Code MS Devops Server 2019 git	DIS ASP.Net 5 (future) OData .Net Core 7 Windows Server 2019 (future) Kestrel 3.1 EF Core 5 (future) Bootstrap 4 .Net 5 (future) Serilog 2.9 FLAMES 19.0 (2020) (future) Visual Studio Code MS Devops Server 2019 git
AMD-Sprint 3.2	Order Editor AMD JEMMIS Feedback	ASPNet Core 3.1 OData .Net Core 7 Windows Server 2016 Kestrel 3.1 EF Core 3.1 Bootstrap 4 .Net Core 3.1 Serilog 2.9 Firefox 68 ESR Edge 80 Windows 10 Visual Studio Code MS Devops Server 2019 git MS SQL Server 2016 SP1 MS LocalDB 2016 MS Message Queue 10 FLAMES 18.0 (2019)	ASP.Net 5 (future) OData .Net Core 7 Windows Server 2019 (future) Kestrel 3.1 EF Core 5 (future) Bootstrap 4 .Net 5 (future) Serilog 2.9 Firefox 68 ESR Edge 80 Windows 10 Visual Studio Code MS Devops Server 2019 git MS SQL Server 2019 (future) MS LocalDB 2016 RabbitMQ (future) FLAMES 19.0 (2020) (future)
AMD-Sprint 3.3	Order Editor AMD Scenario Validator AMD Command and Virtual Activity Processor SST Matrix Validator	ASPNet Core 3.1 OData .Net Core 7 Windows Server 2016 Kestrel 3.1 EF Core 3.1 Bootstrap 4 .Net Core 3.1 Serilog 2.9 Firefox 68 ESR Edge 80 Windows 10 Visual Studio Code MS Devops Server 2019 git MS SQL Server 2016 SP1 MS LocalDB 2016	ASP.Net 5 (future) OData .Net Core 7 Windows Server 2019 (future) Kestrel 3.1 EF Core 5 (future) Bootstrap 4 .Net 5 (future) Serilog 2.9 Firefox 68 ESR Edge 80 Windows 10 Visual Studio Code MS Devops Server 2019 git MS SQL Server 2019 (future) MS LocalDB 2016
AMD-Sprint 3.4	AMD Command and Virtual Activity Processor	ASPNet Core 3.1 OData .Net Core 7 Windows Server 2016 Kestrel 3.1 EF Core 3.1	ASP.Net 5 (future) OData .Net Core 7 Windows Server 2019 (future) Kestrel 3.1 EF Core 5 (future)

Sprint	Components Developed in Sprint	Current Technology	Future Technology
		Bootstrap 4 .Net Core 3.1 Serilog 2.9 Firefox 68 ESR Edge 80 Windows 10 <mark>Visual Studio Code</mark> MS Devops Server 2019 git MS SQL Server 2016 SP1 MS LocalDB 2016	Bootstrap 4 .Net 5 (future) Serilog 2.9 Firefox 68 ESR Edge 80 Windows 10 <mark>Visual Studio Code</mark> MS Devops Server 2019 git MS SQL Server 2019 (future) MS LocalDB 2016
AMD-Sprint 4.1	AMD Simulation Logger	FLAMES 18.0 (2019) <mark>Visual Studio Code</mark> MS Devops Server 2019 git ASPNet Core 3.1 OData .Net Core 7 Windows Server 2016 Kestrel 3.1 EF Core 3.1 Bootstrap 4 .Net Core 3.1 Serilog 2.9	FLAMES 19.0 (2020) (future) <mark>Visual Studio Code</mark> MS Devops Server 2019 git ASP.Net 5 (future) OData .Net Core 7 Windows Server 2019 (future) Kestrel 3.1 EF Core 5 (future) Bootstrap 4 .Net 5 (future) Serilog 2.9
AMD-Sprint 4.2	AMD Simulation Logger	FLAMES 18.0 (2019) <mark>Visual Studio Code</mark> MS Devops Server 2019 git ASPNet Core 3.1 OData .Net Core 7 Windows Server 2016 Kestrel 3.1 EF Core 3.1 Bootstrap 4 .Net Core 3.1 Serilog 2.9	FLAMES 19.0 (2020) (future) <mark>Visual Studio Code</mark> MS Devops Server 2019 git ASP.Net 5 (future) OData .Net Core 7 Windows Server 2019 (future) Kestrel 3.1 EF Core 5 (future) Bootstrap 4 .Net 5 (future) Serilog 2.9
AMD-Sprint 5.1	DIS Logger and Feedback AMD DIS Interoperability	DIS recorder DIS ASPNet Core 3.1 OData .Net Core 7 Windows Server 2016 Kestrel 3.1 EF Core 3.1 Bootstrap 4 .Net Core 3.1 Serilog 2.9 <mark>Visual Studio Code</mark> MS Devops Server 2019 git FLAMES DIS Option FLAMES 18.0 (2019)	DIS recorder DIS ASP.Net 5 (future) OData .Net Core 7 Windows Server 2019 (future) Kestrel 3.1 EF Core 5 (future) Bootstrap 4 .Net 5 (future) Serilog 2.9 <mark>Visual Studio Code</mark> MS Devops Server 2019 git FLAMES DIS Option FLAMES 19.0 (2020) (future)
AMD-Sprint 5.2	HLA Logger	HLA recorder HLA RTI	HLA recorder HLA RTI

Sprint	Components Developed in Sprint	Current Technology	Future Technology
JEMM-Sprint 1.1	JEMM Reference Data Manager Training Plan Manager TO Manager	Windows Event Log Graph Layout Engine 1.0 Kendo UI 2020 Log4net 1.2 Moment.js 2.26 Cycle2 2.1 Timeline.js NetTopologySuite 2 NHibernate 3.2 OWIN 4 IndependentSoft WebDav 1.3 SHA256.js JQuery 3.5 ASP.Net 4.6.1 .Net Framework 4.6.1 IIS 10 Windows Server 2016 MS SQL Server 2016 SP1 MS LocalDB 2016 Firefox 68 ESR Edge 80 Windows 10 Visual Studio Code MS Devops Server 2019 git	Windows Event Log Graph Layout Engine 1.0 Kendo UI 2020 Log4net 1.2 Moment.js 2.26 Cycle2 2.1 Timeline.js NetTopologySuite 2 NHibernate 5.2 (future) OWIN 4 IndependentSoft WebDav 1.3 SHA256.js JQuery 3.5 ASP.Net 5 (future) .Net 5 (future) IIS 10 Windows Server 2019 (future) MS SQL Server 2019 (future) MS LocalDB 2016 Firefox 68 ESR Edge 80 Windows 10 Visual Studio Code MS Devops Server 2019 git
JEMM-Sprint 1.2	MELMIL Manager JEMM UI	Windows Event Log Graph Layout Engine 1.0 Kendo UI 2020 Log4net 1.2 Moment.js 2.26 Cycle2 2.1 Timeline.js NetTopologySuite 2 NHibernate 3.2 OWIN 4 IndependentSoft WebDav 1.3 SHA256.js JQuery 3.5 ASP.Net 4.6.1 .Net Framework 4.6.1 IIS 10 Windows Server 2016 MS SQL Server 2016 SP1 MS LocalDB 2016 Firefox 68 ESR Edge 80 Windows 10 Visual Studio Code MS Devops Server 2019 git	Windows Event Log Graph Layout Engine 1.0 Kendo UI 2020 Log4net 1.2 Moment.js 2.26 Cycle2 2.1 Timeline.js NetTopologySuite 2 NHibernate 5.2 (future) OWIN 4 IndependentSoft WebDav 1.3 SHA256.js JQuery 3.5 ASP.Net 5 (future) .Net 5 (future) IIS 10 Windows Server 2019 (future) MS SQL Server 2019 (future) MS LocalDB 2016 Firefox 68 ESR Edge 80 Windows 10 Visual Studio Code MS Devops Server 2019 git

Sprint	Components Developed in Sprint	Current Technology	Future Technology
JEMM-Sprint 1.3	JEMM EXCON Reporting Observation Manager Analysis Manager NIRIS JEMMIS Feedback Scenario Administration MELMIL Manager	Windows Event Log Graph Layout Engine 1.0 Kendo UI 2020 Log4net 1.2 Moment.js 2.26 Cycle2 2.1 Timeline.js NetTopologySuite 2 NHibernate 3.2 OWIN 4 IndependentSoft WebDav 1.3 SHA256.js JQuery 3.5 ASP.Net 4.6.1 .Net Framework 4.6.1 IIS 10 Windows Server 2016 MS SQL Server 2016 SP1 MS LocalDB 2016 Firefox 68 ESR Edge 80 Windows 10 Visual Studio Code MS Devops Server 2019 git ASPNet Core 3.1 OData .Net Core 7 Kestrel 3.1 EF Core 3.1 Bootstrap 4 .Net Core 3.1 Serilog 2.9	Windows Event Log Graph Layout Engine 1.0 Kendo UI 2020 Log4net 1.2 Moment.js 2.26 Cycle2 2.1 Timeline.js NetTopologySuite 2 NHibernate 5.2 (future) OWIN 4 IndependentSoft WebDav 1.3 SHA256.js JQuery 3.5 ASP.Net 5 (future) .Net 5 (future) IIS 10 Windows Server 2019 (future) MS SQL Server 2019 (future) MS LocalDB 2016 Firefox 68 ESR Edge 80 Windows 10 Visual Studio Code MS Devops Server 2019 git OData .Net Core 7 Kestrel 3.1 EF Core 5 (future) Bootstrap 4 Serilog 2.9
JEMM-Sprint 2.1	JAMM TA Message Processor Scenario Administration JAMM TA Interaction	ASPNet Core 3.1 OData .Net Core 7 Windows Server 2016 Kestrel 3.1 EF Core 3.1 Bootstrap 4 .Net Core 3.1 Serilog 2.9 Firefox 68 ESR Edge 80 Windows 10 Visual Studio Code MS Devops Server 2019 git Windows Event Log Graph Layout Engine 1.0 Kendo UI 2020 Log4net 1.2 Moment.js 2.26	ASP.Net 5 (future) OData .Net Core 7 Windows Server 2019 (future) Kestrel 3.1 EF Core 5 (future) Bootstrap 4 .Net 5 (future) Serilog 2.9 Firefox 68 ESR Edge 80 Windows 10 Visual Studio Code MS Devops Server 2019 git Windows Event Log Graph Layout Engine 1.0 Kendo UI 2020 Log4net 1.2 Moment.js 2.26

Sprint	Components Developed in Sprint	Current Technology	Future Technology
		Cycle2 2.1 Timeline.js NetTopologySuite 2 NHibernate 3.2 OWIN 4 IndependentSoft WebDav 1.3 SHA256.js JQuery 3.5 ASP.Net 4.6.1 .Net Framework 4.6.1 IIS 10 MS SQL Server 2016 SP1 MS LocalDB 2016	Cycle2 2.1 Timeline.js NetTopologySuite 2 NHibernate 5.2 (future) OWIN 4 IndependentSoft WebDav 1.3 SHA256.js JQuery 3.5 IIS 10 MS SQL Server 2019 (future) MS LocalDB 2016
JEMM-Sprint 2.2	JAMM TA Interaction JAMM Event Processor NIRIS JEMMIS Feedback	ASPNet Core 3.1 OData .Net Core 7 Windows Server 2016 Kestrel 3.1 EF Core 3.1 Bootstrap 4 .Net Core 3.1 Serilog 2.9 Firefox 68 ESR Edge 80 Windows 10 ==Visual Studio Code== MS Devops Server 2019 git	ASP.Net 5 (future) OData .Net Core 7 Windows Server 2019 (future) Kestrel 3.1 EF Core 5 (future) Bootstrap 4 .Net 5 (future) Serilog 2.9 Firefox 68 ESR Edge 80 Windows 10 ==Visual Studio Code== MS Devops Server 2019 git
JEMM-Sprint 2.3	JAMM TA Interaction Scenario Administration	ASPNet Core 3.1 OData .Net Core 7 Windows Server 2016 Kestrel 3.1 EF Core 3.1 Bootstrap 4 .Net Core 3.1 Serilog 2.9 Firefox 68 ESR Edge 80 Windows 10 ==Visual Studio Code== MS Devops Server 2019 git Windows Event Log Graph Layout Engine 1.0 Kendo UI 2020 Log4net 1.2 Moment.js 2.26 Cycle2 2.1 Timeline.js NetTopologySuite 2 NHibernate 3.2 OWIN 4	ASP.Net 5 (future) OData .Net Core 7 Windows Server 2019 (future) Kestrel 3.1 EF Core 5 (future) Bootstrap 4 .Net 5 (future) Serilog 2.9 Firefox 68 ESR Edge 80 Windows 10 ==Visual Studio Code== MS Devops Server 2019 git Windows Event Log Graph Layout Engine 1.0 Kendo UI 2020 Log4net 1.2 Moment.js 2.26 Cycle2 2.1 Timeline.js NetTopologySuite 2 NHibernate 5.2 (future) OWIN 4

Sprint	Components Developed in Sprint	Current Technology	Future Technology
		IndependentSoft WebDav 1.3 SHA256.js JQuery 3.5 ASP.Net 4.6.1 .Net Framework 4.6.1 IIS 10 MS SQL Server 2016 SP1 MS LocalDB 2016	IndependentSoft WebDav 1.3 SHA256.js JQuery 3.5 IIS 10 MS SQL Server 2019 (future) MS LocalDB 2016
JEMM-Sprint 2.4	JEMM UI Scenario Administration JEMM Scenario Manager	Windows Event Log Graph Layout Engine 1.0 Kendo UI 2020 Log4net 1.2 Moment.js 2.26 Cycle2 2.1 Timeline.js NetTopologySuite 2 NHibernate 3.2 OWIN 4 IndependentSoft WebDav 1.3 SHA256.js JQuery 3.5 ASP.Net 4.6.1 .Net Framework 4.6.1 IIS 10 Windows Server 2016 MS SQL Server 2016 SP1 MS LocalDB 2016 Firefox 68 ESR Edge 80 Windows 10 ==Visual Studio Code== MS Devops Server 2019 git	Windows Event Log Graph Layout Engine 1.0 Kendo UI 2020 Log4net 1.2 Moment.js 2.26 Cycle2 2.1 Timeline.js NetTopologySuite 2 NHibernate 5.2 (future) OWIN 4 IndependentSoft WebDav 1.3 SHA256.js JQuery 3.5 ASP.Net 5 (future) .Net 5 (future) IIS 10 Windows Server 2019 (future) MS SQL Server 2019 (future) MS LocalDB 2016 Firefox 68 ESR Edge 80 Windows 10 ==Visual Studio Code== MS Devops Server 2019 git
JEMM-Sprint 3.1	Graphical Scripting ORBAT Manager MELMIL Manager JEMM UI Virtual Activity Manager	Angular.JS 1.7 Leaflet.JS 1.6 Bootstrap 4 Firefox 68 ESR Edge 80 Windows 10 ==Visual Studio Code== MS Devops Server 2019 git Windows Event Log Graph Layout Engine 1.0 Kendo UI 2020 Log4net 1.2 Moment.js 2.26 Cycle2 2.1 Timeline.js NetTopologySuite 2 NHibernate 3.2	Angular.JS 1.7 Leaflet.JS 1.6 Bootstrap 4 Firefox 68 ESR Edge 80 Windows 10 ==Visual Studio Code== MS Devops Server 2019 git Windows Event Log Graph Layout Engine 1.0 Kendo UI 2020 Log4net 1.2 Moment.js 2.26 Cycle2 2.1 Timeline.js NetTopologySuite 2 NHibernate 5.2 (future)

Sprint	Components Developed in Sprint	Current Technology	Future Technology
		OWIN 4 IndependentSoft WebDav 1.3 SHA256.js JQuery 3.5 ASP.Net 4.6.1 .Net Framework 4.6.1 IIS 10 Windows Server 2016 MS SQL Server 2016 SP1 MS LocalDB 2016	OWIN 4 IndependentSoft WebDav 1.3 SHA256.js JQuery 3.5 ASP.Net 5 (future) .Net 5 (future) IIS 10 Windows Server 2019 (future) MS SQL Server 2019 (future) MS LocalDB 2016
JEMM-Sprint 3.2	SST Matrix Scenario Administration	Windows Event Log Graph Layout Engine 1.0 Kendo UI 2020 Log4net 1.2 Moment.js 2.26 Cycle2 2.1 Timeline.js NetTopologySuite 2 NHibernate 3.2 OWIN 4 IndependentSoft WebDav 1.3 SHA256.js JQuery 3.5 ASP.Net 4.6.1 .Net Framework 4.6.1 IIS 10 Windows Server 2016 MS SQL Server 2016 SP1 MS LocalDB 2016 Firefox 68 ESR Edge 80 Windows 10 ==Visual Studio Code== MS Devops Server 2019 git	Windows Event Log Graph Layout Engine 1.0 Kendo UI 2020 Log4net 1.2 Moment.js 2.26 Cycle2 2.1 Timeline.js NetTopologySuite 2 NHibernate 5.2 (future) OWIN 4 IndependentSoft WebDav 1.3 SHA256.js JQuery 3.5 ASP.Net 5 (future) .Net 5 (future) IIS 10 Windows Server 2019 (future) MS SQL Server 2019 (future) MS LocalDB 2016 Firefox 68 ESR Edge 80 Windows 10 ==Visual Studio Code== MS Devops Server 2019 git

3.3.3 Applicable Standards

This viewpoint provides the list of applicable standards for the main application components. The specified standards also apply to their sub-components. The references are provided in section 4.2.

System	Application Component	Applicable Standards
AMD Simulation	AMD Command and Virtual Activity Processor	.Net Standard 2.0 (where applicable) C# 7.3 CSS 3 HTML 5 HTTP/2 JavaScript 6 JEMMIS Data Model

System	Application Component	Applicable Standards
		JSON OData 4 REST Secure OWASP Headers SQL:2016 TLS 1.2 TLS 1.3
AMD Simulation	AMD Data Preparation	.Net Standard 2.0 (where applicable) C 11 C# 7.3 C++ 14 CSS 3 Distributed Interactive Simulation (DIS) FLAMES API FLAMES Script HTML 5 HTTP/2 JavaScript 6 JSON OData 4 REST Secure OWASP Headers TLS 1.2 TLS 1.3
AMD Simulation	AMD DIS Interoperability	Distributed Interactive Simulation (DIS)
AMD Simulation	AMD JEMMIS Feedback	.Net Standard 2.0 (where applicable) C 11 C# 7.3 C++ 14 CSS 3 Distributed Interactive Simulation (DIS) FLAMES API FLAMES Script HTML 5 HTTP/2 JavaScript 6 JEMMIS Data Model JSON OData 4 REST Secure OWASP Headers SQL:2016 TLS 1.2 TLS 1.3
AMD Simulation	AMD Simulation Engine	C 11 C++ 14 Distributed Interactive Simulation (DIS) FLAMES API FLAMES Script

System	Application Component	Applicable Standards
AMD Simulation	AMD Simulation Logger	.Net Standard 2.0 (where applicable) C 11 C# 7.3 C++ 14 CSS 3 Distributed Interactive Simulation (DIS) FLAMES API FLAMES Script HTML 5 HTTP/2 JavaScript 6 JSON OData 4 REST Secure OWASP Headers TLS 1.2 TLS 1.3
AMD Simulation	DIS Logger and Feedback	.Net Standard 2.0 (where applicable) C# 7.3 CSS 3 HTML 5 HTTP/2 JavaScript 6 JEMMIS Data Model JSON OData 4 REST Secure OWASP Headers TLS 1.2 TLS 1.3
JEMM	EXCON COP	CSS 3 HTML 5 HTTP/2 JavaScript 6 JSON REST Secure OWASP Headers TLS 1.2 TLS 1.3 WFS 1.1 WMS 1.1
JEMM	Graphical Scripting	CSS 3 HTML 5 HTTP/2 JavaScript 6 JSON REST Secure OWASP Headers TLS 1.2 TLS 1.3

System	Application Component	Applicable Standards
		WFS 1.1 WMS 1.1
AMD Simulation	HLA Logger	High Level Architecture (HLA) Real-time Platform Reference Federation Object Model (RPR-FOM)
AMD Simulation	HLA-DIS Bridge	High Level Architecture (HLA) Real-time Platform Reference Federation Object Model (RPR-FOM)
JEMM	JAMM TA Interaction	.Net Standard 2.0 (where applicable) C# 7.3 CSS 3 Extensible Messaging and Presence Protocol (XMPP): Address Format Extensible Messaging and Presence Protocol (XMPP): Core Extensible Messaging and Presence Protocol (XMPP): Instant Messaging and Presence HTML 5 HTTP/2 JavaScript 6 JEMMIS Data Model Joint Range Extension Applications Protocol JREAP JSON OData 4 REST Secure OWASP Headers Simple Mail Transfer Protocol (SMTP) Tactical Data Exchange - Link16 TCP TLS 1.2 TLS 1.3 UDP
JEMM	JEMM Core	.Net Standard 2.0 (where applicable) C# 7.3 CSS 3 HTML 5 HTTP/2 JavaScript 6 JSON OData 4 REST Secure OWASP Headers SQL:2016 TLS 1.2 TLS 1.3 WFS 1.1 WMS 1.1
JEMM	JEMM Identity Service	.Net Standard 2.0 (where applicable) C# 7.3 CSS 3 HTML 5

System	Application Component	Applicable Standards
		HTTP/2
		JavaScript 6
		JSON
		JWT
		OData 4
		OIDC 1
		REST
		Secure OWASP Headers
		SQL:2016
		TLS 1.2
		TLS 1.3
JEMM	JEMMIS	.Net Standard 2.0 (where applicable)
		C# 7.3
		CSS 3
		HTML 5
		HTTP/2
		JavaScript 6
		JEMMIS Data Model
		JSON
		OData 4
		REST
		Secure OWASP Headers
		TLS 1.2
		TLS 1.3
JEMM	NIRIS JEMMIS Feedback	.Net Standard 2.0 (where applicable)
		C# 7.3
		CSS 3
		HTML 5
		HTTP/2
		JavaScript 6
		JEMMIS Data Model
		JSON
		NIRIS Light Track Format (LTF) SID
		OData 4
		REST
		Secure OWASP Headers
		TLS 1.2
		TLS 1.3
JEMM	ORBAT Manager	CSS 3
		HTML 5
		HTTP/2
		JavaScript 6
		JSON
		REST
		Secure OWASP Headers
		TLS 1.2
		TLS 1.3
		WFS 1.1
		WMS 1.1

3.4 P4 – Resource Functions

This viewpoint provides the complete list of application functions, the requirements they realize, to which component they are assigned, application interfaces used, and what data the functions access and how. It also shows allocation of functions to the planned Sprints. The table is sorted by the Sprint, System and Application Component.

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
AMD-Sprint 1.1	AMD-1.1 Understand all models, develop sensor and comms models	02.06 GT-Ground Truth Battlespace Object Service	AMD-GT-04 (ID: ETEE-FS-118)	AMD Simulation	AMD Simulation Engine	Model, configure, simulate and accept orders for specified Networks	new	• FLAMES FORGE UI (existing)	• AMD Models (Read) • AMD Order Script (Read) • AMD Runtime Data (Write)
AMD-Sprint 1.1	AMD-1.1 Understand all models, develop sensor and comms models	02.06 GT-Ground Truth Battlespace Object Service	AMD-GT-01 (ID: ETEE-FS-115)	AMD Simulation	AMD Simulation Engine	Model, configure, simulate and accept orders for specified Sensors	new	• FLAMES FORGE UI (existing)	• AMD Models (Read) • AMD Order Script (Read) • AMD Runtime Data (Write)
AMD-Sprint 1.1	AMD-1.1 Understand all models, develop sensor and comms models	02.06 GT-Ground Truth Battlespace Object Service	AMD-GT-03 (ID: ETEE-FS-117)	AMD Simulation	AMD Simulation Engine	Report all BM tracks that each sensor detects and specify the sensor as its source (without automatic track correlation)	new		• AMD Simulation Entity State (Read) • AMD Feedback (Write)
AMD-Sprint 1.2	AMD-1.2 Extend with threat and	02.06 GT-Ground Truth Battlespace	AMD-GT-05 (ID: ETEE-FS-119)	AMD Simulation	AMD Simulation Engine	Model, configure, simulate and accept orders for specified Threats and Debris	new	• FLAMES FORGE UI (existing)	• AMD Models (Read) • AMD Order Script (Read)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
	debris models	Object Service							• AMD Runtime Data (Write)
AMD-Sprint 1.3	AMD-1.3 Extend with shooter	02.06 GT-Ground Truth Battlespace Object Service	AMD-GT-06 (ID: ETEE-FS-120)	AMD Simulation	AMD Simulation Engine	Model, configure, simulate and accept orders for specified Shooters	new	• FLAMES FORGE UI (existing)	• AMD Models (Read) • AMD Order Script (Read) • AMD Runtime Data (Write)
AMD-Sprint 1.4	AMD-1.4 Extend with Interactions	02.06 GT-Ground Truth Battlespace Object Service	AMD-GT-02 (ID: ETEE-FS-116)	AMD Simulation	AMD Simulation Engine	Accept unit-related orders and behave and interact accordingly	new		• AMD Models (Read) • AMD Order Script (Read)
AMD-Sprint 1.4	AMD-1.4 Extend with Interactions	02.06 GT-Ground Truth Battlespace Object Service	AMD-GT-07 (ID: ETEE-FS-121)	AMD Simulation	AMD Simulation Engine	Model, configure and simulate interactions for the sensors, air defence systems and Missiles and Ballistic Missiles	new	• FLAMES FORGE UI (existing)	• AMD Models (Read) • AMD Order Script (Read) • AMD Runtime Data (Write)
AMD-Sprint 2.1	AMD-2.1 Extract data	02.05 BI-Battlespace Information Service	AMD-BI-03 (ID: ETEE-FS-110)	AMD Simulation	AMD JEMMIS Feedback	Extract information about Entity actual and perceived State, Activities and Interactions	new		• AMD Battlespace Event (Read) • AMD Simulation Entity State (Read) • Order Status Message (Read)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
AMD-Sprint 2.2	AMD-2.2 Expose data	02.05 BI-Battlespace Information Service	AMD-BI-02 (ID: ETEE-FS-109)	AMD Simulation	AMD JEMMIS Feedback	Transform information about Entity actual and perceived State, Activities and Interactions	new		• AMD Battlespace Event (ReadWrite) • AMD Simulation Entity State (ReadWrite) • Order Status Message (ReadWrite)
AMD-Sprint 2.3	AMD-2.3 Feedback requests	02.05 BI-Battlespace Information Service	AMD-BI-01 (ID: ETEE-FS-108)	AMD Simulation	AMD JEMMIS Feedback	Provide feedback about Entity actual and perceived State, Activities and Interactions	new	• AMD JEMMIS Data API (new)	• AMD Feedback (Write)
AMD-Sprint 3.1	AMD-3.1 Data Preparation	02.01 BS-BMD Battlespace Simulation	AMD-BS-02 (ID: ETEE-FS-112)	AMD Simulation	AMD Data Preparation	Define entity mapping to models	update	• AMD Entity Mapping UI (existing)	• AMD Models (Read) • ORBAT (Read) • Entity Mapping (ReadWrite)
AMD-Sprint 3.1	AMD-3.1 Data Preparation	02.01 BS-BMD Battlespace Simulation	AMD-BS-04 (ID: ETEE-FS-114)	AMD Simulation	AMD Data Preparation	Initiate the AMD simulation initialization from files	new	• AMD Initialization UI (new)	• AMD Simulation State (Write)
AMD-Sprint 3.1	AMD-3.1 Data Preparation	02.01 BS-BMD Battlespace Simulation	AMD-BS-03 (ID: ETEE-FS-113)	AMD Simulation	AMD Data Preparation	Receive STARTEX Situation and generate AMD Scenario	new	• AMD Initialization UI (new)	• Entity Mapping (Read) • STARTEX situation (Read) • AMD Scenario Data Set (Write)
AMD-Sprint 3.2	AMD-3.2 ORBAT Editor and	02.03 SCL-Simulation	AMD-SCL-02 (ID: ETEE-FS-125)	AMD Simulation	AMD JEMMIS Feedback	Provide virtual activities in JEMMIS format	new	• AMD JEMMIS	• Virtual Activity (ReadWrite)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
	Scenario Verification	Control Service						Data API (new)	
AMD-Sprint 3.2	AMD-3.2 ORBAT Editor and Scenario Verification	02.03 SCL-Simulation Control Service	AMD-SCL-03 (ID: ETEE-FS-126)	AMD Simulation	Order Editor	Modify Virtual Activity in a form	new	• AMD Virtual Activity Form view (new)	• Virtual Activity Form (Read) • Virtual Activity (ReadWrite)
AMD-Sprint 3.2	AMD-3.2 ORBAT Editor and Scenario Verification	02.03 SCL-Simulation Control Service	AMD-SCL-01 (ID: ETEE-FS-124)	AMD Simulation	Order Editor	Provide categorised list of supported virtual activities	new	• AMD JEMMIS Data API (new)	• Supported Virtual Activities (Write)
AMD-Sprint 3.2	AMD-3.2 ORBAT Editor and Scenario Verification	02.03 SCL-Simulation Control Service	AMD-SCL-07 (ID: ETEE-FS-130)	AMD Simulation	Order Editor	Provide categorised list of supported virtual activities for an Entity	new	• AMD JEMMIS Data API (new)	• Supported Virtual Activities (Write)
AMD-Sprint 3.2	AMD-3.2 ORBAT Editor and Scenario Verification	02.03 SCL-Simulation Control Service	AMD-SCL-01 (ID: ETEE-FS-124)	AMD Simulation	Order Editor	Provide forms for virtual activities	new	• AMD Virtual Activity Form view (new)	• Virtual Activity (Read) • Virtual Activity Form (Write)
AMD-Sprint 3.2	AMD-3.2 ORBAT Editor and Scenario Verification	02.03 SCL-Simulation Control Service	AMD-SCL-04 (ID: ETEE-FS-127)	AMD Simulation	Order Editor	Provide the geospatial/time/ORBAT representation of each virtual activity	new	• AMD JEMMIS Data API (new)	• AMD Models (Read) • Virtual Activity (Read) • Virtual Activity (Write)
AMD-Sprint 3.3	AMD-3.3 Scenario Validation	02.03 SCL-Simulation	AMD-SCL-06 (ID: ETEE-FS-129)	AMD Simulation	AMD Command and Virtual	Execute Virtual Activity	new	• AMD JEMMIS	• AMD Order Script (Read) • Virtual Activity (Read)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
	and Order Execution	Control Service			Activity Processor			Data API (new)	• Order Status Message (Write)
AMD-Sprint 3.3	AMD-3.3 Scenario Validation and Order Execution	02.03 SCL-Simulation Control Service	AMD-SCL-05 (ID: ETEE-FS-128)	AMD Simulation	AMD Scenario Validator	Execute scenario validation for Scenario or MELMIL Event	new	• AMD Control API (new)	• AMD Models (Read) • STARTEX situation (Read) • Virtual Activity (Read) • AMD Feedback (Write)
AMD-Sprint 3.3	AMD-3.3 Scenario Validation and Order Execution	02.01 BS-BMD Battlespace Simulation	AMD-BS-01 (ID: ETEE-FS-111)	AMD Simulation	Order Editor	Verify virtual activities	new	• AMD JEMMIS Data API (new)	• Virtual Activity (Read) • Virtual Activity Verification Report (Write)
AMD-Sprint 3.3	AMD-3.3 Scenario Validation and Order Execution	02.03 SCL-Simulation Control Service	AMD-SCL-05 (ID: ETEE-FS-128)	AMD Simulation	SST Matrix Validator	Execute SST Matrix validation	new		• SST Matrix (Read) • SST Matrix Validation Results (Write)
AMD-Sprint 3.4	AMD-3.4 Runtime Control	02.03 SCL-Simulation Control Service	AMD-SCL-08 (ID: ETEE-FS-131)	AMD Simulation	AMD Command and Virtual Activity Processor	Pause simulation	new	• AMD Control API (new) • AMD Control Command view (new)	• Simulation Control Order (Read) • Command Order Script (Write)
AMD-Sprint 3.4	AMD-3.4 Runtime Control	02.03 SCL-Simulation Control Service	AMD-SCL-08 (ID: ETEE-FS-131)	AMD Simulation	AMD Command and Virtual Activity Processor	Receive commands and execute the simulation control orders	new	• AMD Control API (new)	• Simulation Control Order (Read)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
								• AMD Control Command view (new)	• Command Order Script (Write)
AMD-Sprint 3.4	AMD-3.4 Runtime Control	02.03 SCL-Simulation Control Service	AMD-SCL-08 (ID: ETEE-FS-131)	AMD Simulation	AMD Command and Virtual Activity Processor	Restore from checkpoint	new	• AMD Control API (new) • AMD Control Command view (new)	• Simulation Control Order (Read) • Command Order Script (Write)
AMD-Sprint 3.4	AMD-3.4 Runtime Control	02.03 SCL-Simulation Control Service	AMD-SCL-08 (ID: ETEE-FS-131)	AMD Simulation	AMD Command and Virtual Activity Processor	Resume simulation	new	• AMD Control API (new) • AMD Control Command view (new)	• Simulation Control Order (Read) • Command Order Script (Write)
AMD-Sprint 3.4	AMD-3.4 Runtime Control	02.03 SCL-Simulation Control Service	AMD-SCL-08 (ID: ETEE-FS-131)	AMD Simulation	AMD Command and Virtual Activity Processor	Start simulation	new	• AMD Control API (new) • AMD Control Command view (new)	• Simulation Control Order (Read) • Command Order Script (Write)
AMD-Sprint 3.4	AMD-3.4 Runtime Control	02.03 SCL-Simulation Control Service	AMD-SCL-08 (ID: ETEE-FS-131)	AMD Simulation	AMD Command and Virtual Activity Processor	Stop simulation	new	• AMD Control API (new) • AMD Control	• Simulation Control Order (Read) • Command Order Script (Write)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
								Command view (new)	
AMD-Sprint 3.4	AMD-3.4 Runtime Control	02.03 SCL-Simulation Control Service	AMD-SCL-08 (ID: ETEE-FS-131)	AMD Simulation	AMD Command and Virtual Activity Processor	Take checkpoint	new	• AMD Control API (new) • AMD Control Command view (new)	• Simulation Control Order (Read) • Command Order Script (Write)
AMD-Sprint 4.1	AMD-4.1 Logging: Consume Data	02.07 LOG-Logging Service	AMD-LOG-01 (ID: ETEE-FS-122)	AMD Simulation	AMD Simulation Logger	Store Entity actual and perceived State changes, Activities and Interactions with a timestamp	new		• AMD Battlespace Event (Read) • AMD Simulation Entity State (Read) • Order Status Message (Read) • AMD Simulation Logs (Write)
AMD-Sprint 4.2	AMD-4.2 Logging: Expose Data	02.07 LOG-Logging Service	AMD-LOG-02 (ID: ETEE-FS-123)	AMD Simulation	AMD Simulation Logger	Provide Entity actual or perceived State changes, Activities and Interactions for a specific period of time	new	• AMD JEMMIS Data API (new)	• AMD Simulation Logs (Read) • AMD Feedback (Write)
AMD-Sprint 5.1	AMD-5.1 DIS	02.04 SCN-Simulation Composition Service	AMD-SCN-02 (ID: ETEE-FS-133)	AMD Simulation	AMD DIS Interoperability	Define DIS properties for simulation entities and interactions	existing	• AMD DIS Entity editor view (existing)	• AMD Entity Model (Read) • DIS Entity Type (ReadWrite)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
AMD-Sprint 5.1	AMD-5.1 DIS	02.04 SCN-Simulation Composition Service	AMD-SCN-01 (ID: ETEE-FS-132)	AMD Simulation	DIS Logger and Feedback	Interpret the DIS PDUs and store them as Entity State and Events with a time stamp	new		• External DIS PDU (Read) • DIS Log (Write)
AMD-Sprint 5.1	AMD-5.1 DIS	02.04 SCN-Simulation Composition Service	AMD-SCN-01 (ID: ETEE-FS-132)	AMD Simulation	DIS Logger and Feedback	Provide feedback about DIS Entity State and Events over a specific time period	new	• DIS Logger JEMMIS Data API (new)	• DIS Log (Read) • DIS Feedback (Write)
AMD-Sprint 5.1	AMD-5.1 DIS	02.04 SCN-Simulation Composition Service	AMD-SCN-01 (ID: ETEE-FS-132)	AMD Simulation	DIS Logger and Feedback	Record and Replay DIS traffic	new	• DIS Record/Replay view (new)	• DIS Log (ReadWrite) • External DIS PDU (ReadWrite)
AMD-Sprint 5.2	AMD-5.2 HLA	02.04 SCN-Simulation Composition Service	AMD-SCN-03 (ID: ETEE-FS-134)	AMD Simulation	HLA Logger	Record and Replay HLA traffic	new		• HLA Log (ReadWrite) • HLA Message (ReadWrite)
JEMM-Sprint 1.1	JEMM-1.1 Objectives	01.01 TO-Objective Mgt	JEMM-TO-01 (ID: ETEE-FS-267)	JEMM	JEMM Reference Data Manager	Associate Reference Storyline with reference TO	new	• Reference TO-SL tree view (new)	• Reference TO (Read) • Reference Storyline (Write)
JEMM-Sprint 1.1	JEMM-1.1 Objectives	01.01 TO-Objective Mgt	JEMM-TO-01 (ID: ETEE-FS-267)	JEMM	JEMM Reference Data Manager	Manage Reference Storylines	new	• Reference TO-SL tree view (new)	• Reference Storyline (ReadWrite)
JEMM-Sprint 1.1	JEMM-1.1 Objectives	01.01 TO-Objective Mgt	JEMM-TO-03 (ID: ETEE-FS-269)	JEMM	TO Manager	Create TOs from reference TA's TOs	new	• Create TO view (update)	• Reference TO (Read) • TA Type (Read) • Training Objective (Write)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
JEMM-Sprint 1.1	JEMM-1.1 Objectives	01.01 TO-Objective Mgt	JEMM-TO-04 (ID: ETEE-FS-270)	JEMM	TO Manager	View TA and related Events	update	• TO Display view (update)	• MELMIL Event (Read) • Training Audience (Read)
JEMM-Sprint 1.1	JEMM-1.1 Objectives	01.01 TO-Objective Mgt	JEMM-TO-02 (ID: ETEE-FS-268)	JEMM	Training Plan Manager	Manage TO assignment to Events	new	• TA/Event matrix view with cell containing assigned TO (new) • TO/Event matrix view with filter on TA (new)	• Training Objective (Read) • MELMIL Event (ReadWrite)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-ADM-11 (ID: ETEE-FS-183)	JEMM	JEMM UI	In BMD Profile, provide access to all the simulation functionalities and to creating virtual activities	new	• JEMM UI (update)	• Scenario Profile (Read)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-ADM-04 (ID: ETEE-FS-176)	JEMM	JEMM UI	Limits the access to functionalities depending on the scenario state	new	• JEMM UI (update)	• Scenario State (Read)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-30 (ID: ETEE-FS-224)	JEMM	MELMIL Manager	Automatically schedule 'Conditionally scheduled' encouraging items when ISO not achieved	new		• Intended Storyline Outcome (Read) • MELMIL Action (ReadWrite)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
									• MELMIL Injection (ReadWrite)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-30 (ID: ETEE-FS-224)	JEMM	MELMIL Manager	Automatically schedule 'Conditionally scheduled' rewarding items when ISO is achieved	new		• Intended Storyline Outcome (Read) • MELMIL Action (ReadWrite) • MELMIL Injection (ReadWrite)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-27 (ID: ETEE-FS-221)	JEMM	MELMIL Manager	Create ISO based on a primary TO	new	• Create ISO view (update)	• Training Objective (Read) • Intended Storyline Outcome (Write)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-05 (ID: ETEE-FS-200)	JEMM	MELMIL Manager	Create Storyline from reference	new	• Create Storyline view (update)	• Reference Storyline (Read) • MELMIL Storyline (Write)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-08 (ID: ETEE-FS-203) JEMM-MM-16 (ID: ETEE-FS-211) JEMM-MM-18 (ID: ETEE-FS-213)	JEMM	MELMIL Manager	Create time dependencies between Injection, Action, Return and ISO	update	• Edit MELMIL Entity view (update)	• Dependent Object (Read) • Intended Storyline Outcome (Write) • MELMIL Action (Write) • MELMIL Injection (Write) • Return (Write)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
			JEMM-MM-20 (ID: ETEE-FS-215)						
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-01 (ID: ETEE-FS-196)	JEMM	MELMIL Manager	Default date/time selection for event elements set to start time of the event	update	• JEMM UI (update)	• MELMIL Event (Read)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-11 (ID: ETEE-FS-206)	JEMM	MELMIL Manager	Display the ISO start and end time in SL Chart	new	• JEMM SL Chart view (update)	• SL Chart View data (ReadWrite)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-13 (ID: ETEE-FS-208)	JEMM	MELMIL Manager	Display the ISO start and end time in SL Dependency	new	• JEMM SL Dependency view (update)	• SL Dependency View data (ReadWrite)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-12 (ID: ETEE-FS-207)	JEMM	MELMIL Manager	Display the ISO start and end time in SL Timeline	new	• JEMM SL Timeline view (update)	• SL Timeline View data (ReadWrite)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-03 (ID: ETEE-FS-198)	JEMM	MELMIL Manager	Display TO/TA as matrix with SL	new	• Event TO/TA matrix view with identified Storyline (new)	• MELMIL Event (Read) • MELMIL Storyline (Read) • Training Audience (Read) • Training Objective (Read)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-02 (ID: ETEE-FS-197)	JEMM	MELMIL Manager	Duplicate event	new	• MELMIL Event view (update)	• MELMIL Event (ReadWrite)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-19 (ID: ETEE-FS-214)	JEMM	MELMIL Manager	Export Injection	update	• Injection view (existing)	• MELMIL Injection (Read) • Exported Injection (Write)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-21 (ID: ETEE-FS-216)	JEMM	MELMIL Manager	Export Return	update	• Return view (existing)	• Return (Read) • Exported Return (Write)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-17 (ID: ETEE-FS-212)	JEMM	MELMIL Manager	Import/Export Action	update	• Action view (update) • Storyline view (update)	• MELMIL Action (Read) • Exported Action (Write)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-02 (ID: ETEE-FS-197)	JEMM	MELMIL Manager	Manage Event	update	• MELMIL Event view (update)	• MELMIL Event (ReadWrite)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-06 (ID: ETEE-FS-201)	JEMM	MELMIL Manager	Manage ISO time dependency	new	• Edit ISO view (update)	• Dependent Object (Read) • Intended Storyline Outcome (ReadWrite)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-23 (ID: ETEE-FS-218)	JEMM	MELMIL Manager	Produce exercise script report	update	• JEMM EBT Report view (update)	• MELMIL (Read) • Exercise Script Report View data (ReadWrite)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-02 (ID: ETEE-FS-197)	JEMM	MELMIL Manager	Reset event	new	• MELMIL Event view (update)	• MELMIL Event (ReadWrite)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-07 (ID: ETEE-FS-202) JEMM-MM-16 (ID: ETEE-FS-211)	JEMM	MELMIL Manager	Set Action category (was: type)	update	• Edit Action view (update)	• MELMIL Action (Write)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-07 (ID: ETEE-FS-202) JEMM-MM-16 (ID: ETEE-FS-211)	JEMM	MELMIL Manager	Set Action type	new	• Edit Action view (update)	• MELMIL Action (Write)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-15 (ID: ETEE-FS-210)	JEMM	MELMIL Manager	Storyline import/export	update	• MELMIL Event view (update) • Storyline view (update)	• Exported Storyline (ReadWrite) • MELMIL Storyline (ReadWrite)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-02 (ID: ETEE-FS-197)	JEMM	MELMIL Manager	Time-shift event	new	• MELMIL Event view (update)	• MELMIL Event (ReadWrite)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-14 (ID: ETEE-FS-209)	JEMM	MELMIL Manager	Time-shift of Storyline	update	• Storyline view (update)	• MELMIL Storyline (ReadWrite)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-03 (ID: ETEE-FS-198)	JEMM	MELMIL Manager	Update associated TO/TA in Event	new	• MELMIL Event view (update)	• Training Audience (Read) • Training Objective (Read)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
									• MELMIL Event (ReadWrite)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-22 (ID: ETEE-FS-217)	JEMM	MELMIL Manager	View exercise script	update	• JEMM Exercise Script view (update)	• MELMIL (Read) • Exercise Script Filter data (ReadWrite) • Exercise Script View data (ReadWrite)
JEMM-Sprint 1.2	JEMM-1.2 MEL/MIL	01.02 MM-MEL/MIL Mgt	JEMM-MM-29 (ID: ETEE-FS-223)	JEMM	MELMIL Manager	View ISOs in the MEL/MIL script and update their states	new	• JEMM Exercise Script view (update)	• Intended Storyline Outcome (ReadWrite)
JEMM-Sprint 1.3	JEMM-1.3 Observation, Assessment and Logging	01.05 AS-Assessment Mgt	JEMM-AS-01 (ID: ETEE-FS-192)	JEMM	Analysis Manager	Draft analysis and describe remedial actions	existing	• OPCAR Analysis view (update)	• Analysis (ReadWrite) • OPCAR Analysis View data (ReadWrite)
JEMM-Sprint 1.3	JEMM-1.3 Observation, Assessment and Logging	01.05 AS-Assessment Mgt	JEMM-AS-03 (ID: ETEE-FS-194)	JEMM	Analysis Manager	Filter on Date in the analysis	update	• OPCAR Analysis view (update)	• OPCAR Analysis Filter data (ReadWrite)
JEMM-Sprint 1.3	JEMM-1.3 Observation, Assessment and Logging	01.05 AS-Assessment Mgt	JEMM-AS-02 (ID: ETEE-FS-193)	JEMM	Analysis Manager	Generate part of the initial Lessons Identified Action List	new	• OPCAR Analysis view (update)	• Training Objective Observation Report View data (ReadWrite) • Exported Training Objective Observation Report (Write)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
JEMM-Sprint 1.3	JEMM-1.3 Observation, Assessment and Logging	01.02 MM-MEL/MIL Mgt	JEMM-MM-04 (ID: ETEE-FS-199)	JEMM	JEMM EXCON Reporting	Display TO/TA association in EBT	new	• JEMM EBT Report view (update)	• MELMIL Event (Read) • MELMIL Storyline (Read) • Training Audience (Read) • Training Objective (Read) • SL by TA versus Event EBT Report View data (ReadWrite)
JEMM-Sprint 1.3	JEMM-1.3 Observation, Assessment and Logging	01.02 MM-MEL/MIL Mgt	JEMM-MM-30 (ID: ETEE-FS-224)	JEMM	MELMIL Manager	Trigger Observation on ISO state change	new	• Create Observation view (update)	• Intended Storyline Outcome (Read) • Observation Plan (Read) • Observation (Write)
JEMM-Sprint 1.3	JEMM-1.3 Observation, Assessment and Logging	01.06 LOG-Logging Mgt	JEMM-LOG-02 (ID: ETEE-FS-195)	JEMM	NIRIS JEMMIS Feedback	Provide Link16 State and Events related to a specific source (JU number) over a specific time period	new	• NIRIS JEMMIS Data API (new)	• Link16 Log (Read) • NIRIS Link16 Feedback (Write)
JEMM-Sprint 1.3	JEMM-1.3 Observation, Assessment and Logging	01.04 OB-Observation Mgt	JEMM-OB-01 (ID: ETEE-FS-225)	JEMM	Observation Manager	Generate Storyline Observation Tasks for all the Storylines included in Event	new	• MELMIL Event view (update) • OPCAR Tasking view (update)	• Intended Storyline Outcome (Read) • MELMIL Storyline (Read) • Observer/Observation Team (Read)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
									• Observation Plan (Write)
JEMM-Sprint 1.3	JEMM-1.3 Observation, Assessment and Logging	01.04 OB-Observation Mgt	JEMM-OB-02 (ID: ETEE-FS-226)	JEMM	Observation Manager	The observation task list view displays the TA in a column	update	• Observation Task List view (update)	• Observation Task List view data (ReadWrite)
JEMM-Sprint 1.3	JEMM-1.3 Observation, Assessment and Logging	01.05 AS-Assessment Mgt	JEMM-ADM-10 (ID: ETEE-FS-182)	JEMM	Scenario Administration	Specify ISO state that triggers Encouraging and Rewarding Injection and Action activation	new	• JEMM Scenario Administration view (update)	• ISO state that triggers Encouraging and Rewarding Injection and Action activation (ReadWrite)
JEMM-Sprint 1.3	JEMM-1.3 Observation, Assessment and Logging	01.04 OB-Observation Mgt	JEMM-ADM-13 (ID: ETEE-FS-185)	JEMM	Scenario Administration	Specify which ISO state automatically triggers an observation	new	• JEMM Scenario Administration view (update)	• ISO state automatically triggers an observation (ReadWrite)
JEMM-Sprint 2.1	JEMM-2.1 Defence Design Import	01.03 TI-TA Interaction	JEMM-TI-21 (ID: ETEE-FS-264)	JEMM	JAMM TA Interaction	Import OPTASK	existing	• JAMM UI (update)	• OPTASK LINK (Read) • OPTASK LINK Representation (Write)
JEMM-Sprint 2.1	JEMM-2.1 Defence Design Import	01.03 TI-TA Interaction	JEMM-TI-20 (ID: ETEE-FS-263) JEMM-TI-21 (ID: ETEE-FS-264)	JEMM	JAMM TA Message Processor	Import Defence Design APP-11 and NVG files	new	• JAMM UI (update)	• Defence Design NVG (Read) • Defence Design XML (Read) • Defence Design Representation (Write)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
JEMM-Sprint 2.1	JEMM-2.1 Defence Design Import	01.03 TI-TA Interaction	JEMM-ADM-16 (ID: ETEE-FS-188)	JEMM	Scenario Administration	Configure the CAX environment	update	• CAX configuration editor (new)	• CAX Network configuration (ReadWrite)
JEMM-Sprint 2.2	JEMM-2.2 Link 16 Output and Response	01.03 TI-TA Interaction	JEMM-TI-31 (ID: ETEE-FS-266)	JEMM	JAMM Event Processor	Process incoming J7.1 Link16 Notification and provide an extended J3.6 message	new		• AMD Feedback (Read) • NIRIS Link16 J7.1 Notification (Read) • OPTASK LINK Representation (Read) • Extended Link16 J3.6 Message (Write)
JEMM-Sprint 2.2	JEMM-2.2 Link 16 Output and Response	01.03 TI-TA Interaction	JEMM-TI-17 (ID: ETEE-FS-260)	JEMM	JAMM TA Interaction	Generate BM launch detection SEW messages	new	• SEW interface (new)	• AMD Feedback (Read) • SEW Message (Write)
JEMM-Sprint 2.2	JEMM-2.2 Link 16 Output and Response	01.03 TI-TA Interaction	JEMM-TI-18 (ID: ETEE-FS-261)	JEMM	JAMM TA Interaction	Generate Link16 messages	update		• AMD Feedback (Read) • Extended Link16 J3.6 Message (Write) • Link16 Message (Write)
JEMM-Sprint 2.2	JEMM-2.2 Link 16 Output and Response	01.03 TI-TA Interaction	JEMM-TI-30 (ID: ETEE-FS-265)	JEMM	JAMM TA Interaction	Generate Link16 messages for each simulated sensor	new		• AMD Feedback (Read) • OPTASK LINK Representation (Read) • Link16 Message (Write)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
JEMM-Sprint 2.2	JEMM-2.2 Link 16 Output and Response	01.03 TI-TA Interaction	JEMM-TI-19 (ID: ETEE-FS-262)	JEMM	JAMM TA Interaction	Send Link16 messages over JREAP-C protocol	new	• TDL Link16 interface (update)	• Link16 Message (Read) • JREAP-C Link16 Message (Write)
JEMM-Sprint 2.2	JEMM-2.2 Link 16 Output and Response	01.03 TI-TA Interaction	JEMM-TI-31 (ID: ETEE-FS-266)	JEMM	NIRIS JEMMIS Feedback	Provide Link16 J7.1 Notification	new	• JEMMIS Notification interface (new)	• NIRIS Link16 J7.1 Event (TITO TrackEvent) (Read) • NIRIS Link16 J7.1 Notification (Write)
JEMM-Sprint 2.3	JEMM-2.3 Message-based Interoperability	01.03 TI-TA Interaction	JEMM-TI-10 (ID: ETEE-FS-257)	JEMM	JAMM TA Interaction	Feed E-mail	new	• E-mail interface (new)	• Attached E-Mail Message (Read) • MELMIL Injection (Read) • E-mail Message (Write)
JEMM-Sprint 2.3	JEMM-2.3 Message-based Interoperability	01.03 TI-TA Interaction	JEMM-TI-12 (ID: ETEE-FS-259)	JEMM	JAMM TA Interaction	Feed INTEL-FS	new	• INTEL-FS interface (new)	• Attached INTEL-FS (file) (Read) • MELMIL Injection (Read) • INTEL-FS Update (file) (Write)
JEMM-Sprint 2.3	JEMM-2.3 Message-based	01.03 TI-TA Interaction	JEMM-TI-11 (ID: ETEE-FS-258)	JEMM	JAMM TA Interaction	Feed XMPP chat	new	• XMPP Interface (new)	• Attached XMPP Message (Read) • MELMIL Injection (Read)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
	Interoperability								• XMPP Message (Write)
JEMM-Sprint 2.3	JEMM-2.3 Message-based Interoperability	01.03 TI-TA Interaction	JEMM-TI-09 (ID: ETEE-FS-256)	JEMM	Scenario Administration	Configure TA Interaction for chat, e-mail, INTEL-FS, JREAP for NIRIS	update	• Service Configuration view (update)	• TA Interaction Configuration (ReadWrite)
JEMM-Sprint 2.4	JEMM-2.4 JEMM Integration with AMD	01.03 TI-TA Interaction	JEMM-ADM-14 (ID: ETEE-FS-186)	JEMM	JEMM Scenario Manager	Initiate scenario control commands	new	• Simulation control view (new)	• Simulation Control Order (Read)
JEMM-Sprint 2.4	JEMM-2.4 JEMM Integration with AMD	01.03 TI-TA Interaction	JEMM-ADM-08 (ID: ETEE-FS-180)	JEMM	JEMM Scenario Manager	Specify the Exercise Mode for each event	new	• MELMIL Event view (update)	• Exercise Mode of Event (ReadWrite)
JEMM-Sprint 2.4	JEMM-2.4 JEMM Integration with AMD	01.03 TI-TA Interaction	JEMM-ADM-09 (ID: ETEE-FS-181)	JEMM	JEMM UI	Limits the access to functionalities and data depending on the exercise mode specified for the event	new	• JEMM UI (update)	• Exercise Mode of Event (Read)
JEMM-Sprint 2.4	JEMM-2.4 JEMM Integration with AMD	01.03 TI-TA Interaction	JEMM-ADM-02 (ID: ETEE-FS-174)	JEMM	JEMM UI	Limits the access to functionalities depending on the exercise mode specified for the scenario	update	• JEMM UI (update)	• Exercise Mode of Scenario (Read)
JEMM-Sprint 2.4	JEMM-2.4 JEMM	01.03 TI-TA Interaction	JEMM-ADM-19 (ID: ETEE-FS-191)	JEMM	Scenario Administration	Monitor the state of all AMD services for a particular scenario	new	• Service Monitor view (new)	• AMD Feedback (Read) • AMD Simulation State (Read)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
	Integration with AMD								• AMD Services Dashboard View data (ReadWrite)
JEMM-Sprint 2.4	JEMM-2.4 JEMM Integration with AMD	01.03 TI-TA Interaction	JEMM-ADM-18 (ID: ETEE-FS-190)	JEMM	Scenario Administration	Monitor the state of all JEMM services for a particular scenario	new	• Service Monitor view (new)	• JEMM Services status (Read) • JEMM Services Dashboard View data (ReadWrite)
JEMM-Sprint 2.4	JEMM-2.4 JEMM Integration with AMD	01.03 TI-TA Interaction	JEMM-ADM-01 (ID: ETEE-FS-173)	JEMM	Scenario Administration	Specify Exercise Mode of scenario	update	• JEMM Scenario Administration view (update)	• Exercise Mode of Scenario (ReadWrite)
JEMM-Sprint 2.4	JEMM-2.4 JEMM Integration with AMD	01.03 TI-TA Interaction	JEMM-ADM-01 (ID: ETEE-FS-173)	JEMM	Scenario Administration	Specify scenario state	new	• JEMM Scenario Administration view (update)	• Scenario State (ReadWrite)
JEMM-Sprint 2.4	JEMM-2.4 JEMM Integration with AMD	01.03 TI-TA Interaction	JEMM-ADM-01 (ID: ETEE-FS-173)	JEMM	Scenario Administration	Specify the exercise profile of scenario	new	• JEMM Scenario Administration view (update)	• Scenario Profile (ReadWrite)
JEMM-Sprint 2.4	JEMM-2.4 JEMM Integration with AMD	01.03 TI-TA Interaction	JEMM-ADM-12 (ID: ETEE-FS-184)	JEMM	Scenario Administration	Specify the simulation order execution service where the virtual activities will be sent	new	• CAX configuration editor (new)	• Simulation order execution service where the virtual activities will be sent (ReadWrite)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
JEMM-Sprint 2.4	JEMM-2.4 JEMM Integration with AMD	01.03 TI-TA Interaction	JEMM-ADM-12 (ID: ETEE-FS-184)	JEMM	Scenario Administration	Specify the state of the action based on state returned by the simulation order execution service	new	• JEMM Scenario Administration view (update)	• State of the action based on state returned by the simulation order execution service (ReadWrite)
JEMM-Sprint 2.4	JEMM-2.4 JEMM Integration with AMD	01.03 TI-TA Interaction	JEMM-ADM-17 (ID: ETEE-FS-189)	JEMM	Scenario Administration	Visualize CAX environment configuration as dashboard	new	• CAX configuration dashboard view (new)	• CAX Network configuration (Read) • TA Interaction Configuration (Read) • CAX Environment Dashboard View data (ReadWrite)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-36 (ID: ETEE-FS-252)	JEMM	Graphical Scripting	Control simulation and simulated Entities	new	• ORBAT view (new)	• Supported Control Orders (Read) • Simulation Control Order (Write)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-21 (ID: ETEE-FS-241)	JEMM	Graphical Scripting	Display Actions and Injections from selected Storylines on the map and time line	new	• JEMM Map view (update) • JEMM SL Timeline view (update)	• MELMIL Action (Read) • MELMIL Injection (Read) • Map View data (ReadWrite) • Timeline View data (ReadWrite)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-22 (ID: ETEE-FS-242)	JEMM	Graphical Scripting	Display and highlight Elements associated	new	• JEMM SL Timeline	• ORBAT Entity (Read)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
						with selected ORBAT entity on the time line		view (update)	• Timeline View data (ReadWrite)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-22 (ID: ETEE-FS-242)	JEMM	Graphical Scripting	Display and highlight selected ORBAT entity on map	new	• JEMM Map view (update)	• ORBAT (Read) • Map View data (ReadWrite)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-20 (ID: ETEE-FS-240)	JEMM	Graphical Scripting	Display and manage Actions and Injections on the map and timeline	new	• JEMM Map view (update) • JEMM SL Timeline view (update)	• MELMIL Action (Read) • MELMIL Injection (Read) • Map View data (ReadWrite) • Timeline View data (ReadWrite)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-24 (ID: ETEE-FS-244)	JEMM	Graphical Scripting	Display geospatial representation of Virtual Activities on map	new	• JEMM Map view (update)	• Virtual Activity (Read) • Map View data (ReadWrite)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-22 (ID: ETEE-FS-242)	JEMM	Graphical Scripting	Display ORBAT in a tree	update	• JEMM ORBAT tree view (update)	• ORBAT (Read) • JEMM ORBAT Tree view data (ReadWrite) • ORBAT View data (ReadWrite)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-18 (ID: ETEE-FS-238)	JEMM	Graphical Scripting	Display representation of Defence Design from attachment	new	• JEMM Map view (update)	• Defence Design Representation (Read)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
									• Defence Design View data (ReadWrite)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-19 (ID: ETEE-FS-239)	JEMM	Graphical Scripting	Display representation of Defence Design from file	new	• JEMM Map view (update)	• Defence Design Representation (Read) • Defence Design View data (ReadWrite)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-26 (ID: ETEE-FS-246)	JEMM	Graphical Scripting	Display the ORBAT representation involved in a Virtual activity	new	• JEMM ORBAT tree view (update)	• Virtual Activity (Read) • ORBAT View data (ReadWrite)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-25 (ID: ETEE-FS-245)	JEMM	Graphical Scripting	Display time representation of Virtual Activities on timeline	new	• JEMM SL Timeline view (update)	• Virtual Activity (Read) • Timeline View data (ReadWrite)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.02 MM-MEL/MIL Mgt	JEMM-MM-26 (ID: ETEE-FS-220)	JEMM	Graphical Scripting	Initiate the AMD simulation initialization for a specific scenario or event	new	• Simulation control view (new)	• STARTEX situation (Read) • Simulation Control Order (Write)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-34 (ID: ETEE-FS-250)	JEMM	Graphical Scripting	Schedule Action with Virtual Activity	new	• ORBAT view (new)	• MELMIL Action (Write)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-33 (ID: ETEE-FS-249)	JEMM	Graphical Scripting	Select a unit and add an action with a virtual activity	new	• ORBAT view (new)	• AMD Dynamic Simulation Entity (Read) • ORBAT Entity (Read)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
									• Supported Virtual Activities (Read) • Virtual Activity Form (Read) • Virtual Activity Initial Parameters (ReadWrite) • MELMIL Action (Write) • Virtual Activity (Write)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-37 (ID: ETEE-FS-253)	JEMM	Graphical Scripting	Switch an ORBAT entity from live to simulated	new	• ORBAT view (new)	• Simulation Control Order (Write)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-37 (ID: ETEE-FS-253)	JEMM	Graphical Scripting	Update Link16 source and track blocks assignments	new	• ORBAT view (new)	• OPTASK LINK Representation (Read) • ORBAT Entity (Write)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-27 (ID: ETEE-FS-247)	JEMM	Graphical Scripting	Update ORBAT Entities using OPTASK	new	• ORBAT view (new)	• OPTASK LINK Representation (Read) • Entity STARTEX (ReadWrite)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-39 (ID: ETEE-FS-255)	JEMM	Graphical Scripting	Validate ORBAT for Link16	new	• ORBAT view (new)	• ORBAT (Read)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-35 (ID: ETEE-FS-251)	JEMM	Graphical Scripting	View feedback from AMD simulation, DIS and Link16	new	• Entity event log view (new)	• AMD Feedback (Read) • DIS Feedback (Read) • NIRIS Link16 Feedback (Read)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
								• JEMM Map view (update)	• Entity Event Log Filter data (ReadWrite) • Entity event log view data (ReadWrite) • Map View data (ReadWrite)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-34 (ID: ETEE-FS-250)	JEMM	Graphical Scripting	View state of Entities	new	• ORBAT view (new)	• AMD Feedback (Read)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-ADM-03 (ID: ETEE-FS-175)	JEMM	JEMM UI	Limits the access to functionalities depending on the scenario profile	new	• JEMM UI (update)	• Scenario Profile (Read)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-14 (ID: ETEE-FS-234)	JEMM	MELMIL Manager	Attach Defence Design to JEMM Scenario or MELMIL Event	new	• JEMM Scenario view (update) • MELMIL Event view (update)	• Defence Design NVG (Read) • Defence Design XML (Read) • Attached Defence Design (Write) • MELMIL Event (Write)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.02 MM-MEL/MIL Mgt	JEMM-MM-28 (ID: ETEE-FS-222)	JEMM	MELMIL Manager	Initiate execution of Virtual Activity and reflect feedback in Action	new	• AMD Control API client (new)	• AMD Feedback (Read) • MELMIL Action (ReadWrite) • Virtual Activity (ReadWrite)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-17 (ID: ETEE-FS-237)	JEMM	MELMIL Manager	Save STARTEX situation as attachment	new	• JEMM Scenario view (update) • MELMIL Event view (update)	• STARTEX situation (Read) • Attached STARTEX (Write) • JEMM Scenario (Write) • MELMIL Event (Write)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.02 MM-MEL/MIL Mgt	JEMM-MM-10 (ID: ETEE-FS-205)	JEMM	MELMIL Manager	Store an AMD Order Script with a Virtual Activity	new		• AMD Order Script (Read) • Virtual Activity (Write)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-13 (ID: ETEE-FS-233)	JEMM	ORBAT Manager	Augment ORBAT and update STARTEX from Defence Design	new	• ORBAT view (new)	• Defence Design Representation (Read) • ORBAT (ReadWrite) • STARTEX situation (Write)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-12 (ID: ETEE-FS-232)	JEMM	ORBAT Manager	Have a single ORBAT per scenario	new	• ORBAT view (new)	• ORBAT (Read) • JEMM Scenario (Write)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-15 (ID: ETEE-FS-235)	JEMM	ORBAT Manager	Manage Blue and Red sides of ORBAT	new	• ORBAT view (new)	• ORBAT (ReadWrite)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-16 (ID: ETEE-FS-236)	JEMM	ORBAT Manager	Manage STARTEX situation	new	• STARTEX view (new)	• STARTEX situation (ReadWrite)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-28 (ID: ETEE-FS-248)	JEMM	ORBAT Manager	Manage the list of available weapon systems and supplies and their characteristics	new	• ORBAT view (new)	• Available systems and supplies, and their required characteristics (ReadWrite)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.02 MM-MEL/MIL Mgt 01.07 RP-Recognised Picture	JEMM-MM-09 (ID: ETEE-FS-204) JEMM-MM-16 (ID: ETEE-FS-211) JEMM-RP-23 (ID: ETEE-FS-243)	JEMM	Virtual Activity Manager	Manage Virtual Activities related to Actions	new	• Action view (update) • Edit Virtual Activity view (new)	• MELMIL Action (Read) • Virtual Activity Form (Read) • Virtual Activity (ReadWrite) • Virtual Activity Initial Parameters (ReadWrite)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.02 MM-MEL/MIL Mgt	JEMM-MM-25 (ID: ETEE-FS-219)	JEMM	Virtual Activity Manager	Verify all virtual activities in scenario or event	new	• Verification Report view (new)	• Virtual Activity Verification Report (Read) • Virtual Activity Verification Report View data (ReadWrite)
JEMM-Sprint 3.1	JEMM-3.1 Graphical Scripting	01.07 RP-Recognised Picture	JEMM-RP-34 (ID: ETEE-FS-250)	JEMM	Virtual Activity Manager	Verify virtual activity	new	• ORBAT view (new)	• Virtual Activity (Read) • Virtual Activity Verification Report (Read) • Virtual Activity Verification Report View data (ReadWrite)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
JEMM-Sprint 3.2	JEMM-3.2 SST Matrix	01.07 RP-Recognised Picture	JEMM-ADM-15 (ID: ETEE-FS-187)	JEMM	Scenario Administration	Specify for the scenario the types of virtual activities shown in the SST Matrix	new	• JEMM Scenario Administration view (update)	• Types of virtual activities shown in the SST Matrix (ReadWrite)
JEMM-Sprint 3.2	JEMM-3.2 SST Matrix	01.07 RP-Recognised Picture	JEMM-RP-01 (ID: ETEE-FS-227)	JEMM	SST Matrix	Associate ORBAT Entity with Virtual Activity	new	• SST Matrix table view (new)	• SST Matrix (ReadWrite) • SST Matrix Assignment (ReadWrite) • SST Matrix Battle Assignment Annotation (ReadWrite)
JEMM-Sprint 3.2	JEMM-3.2 SST Matrix	01.07 RP-Recognised Picture	JEMM-RP-04 (ID: ETEE-FS-230)	JEMM	SST Matrix	Display SST feedback in Trajectory View	new	• SST Matrix Trajectory view (new)	• AMD Feedback (Read) • NIRIS Link16 Feedback (Read) • Trajectory View data (ReadWrite)
JEMM-Sprint 3.2	JEMM-3.2 SST Matrix	01.07 RP-Recognised Picture	JEMM-RP-05 (ID: ETEE-FS-231)	JEMM	SST Matrix	Display SST feedback on the map	new	• JEMM Map view (update)	• AMD Feedback (Read) • NIRIS Link16 Feedback (Read) • Map View data (ReadWrite)
JEMM-Sprint 3.2	JEMM-3.2 SST Matrix	01.07 RP-Recognised Picture	JEMM-RP-01 (ID: ETEE-FS-227)	JEMM	SST Matrix	Manage SST Matrix	new	• SST Matrix table view (new)	• SST Matrix (ReadWrite)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
									• SST Matrix Table view data (ReadWrite) • SST View Filter data (ReadWrite)
JEMM-Sprint 3.2	JEMM-3.2 SST Matrix	01.07 RP-Recognised Picture	JEMM-RP-38 (ID: ETEE-FS-254)	JEMM	SST Matrix	Replay exercise execution	new	• Scenario Replay UI (new)	• AMD Feedback (Read) • DIS Feedback (Read) • NIRIS Link16 Feedback (Read) • Scenario Replay view data (ReadWrite) • SST Matrix Execution Situation (Write)
JEMM-Sprint 3.2	JEMM-3.2 SST Matrix	01.07 RP-Recognised Picture	JEMM-RP-03 (ID: ETEE-FS-229)	JEMM	SST Matrix	Update SST situation for the specified time period	new	• SST Matrix table view (new)	• AMD Feedback (Read) • NIRIS Link16 Feedback (Read) • SST Matrix Execution Situation (Write)
JEMM-Sprint 3.2	JEMM-3.2 SST Matrix	01.07 RP-Recognised Picture	JEMM-RP-02 (ID: ETEE-FS-228)	JEMM	SST Matrix	Validate SST Matrix	new	• SST Matrix table view (new)	• SST Matrix (ReadWrite)
JEMM-Sprint 3.2	JEMM-3.2 SST Matrix	01.07 RP-Recognised Picture	JEMM-RP-02 (ID: ETEE-FS-228)	JEMM	SST Matrix	View SST Matrix validation results	new	• SST Matrix table view (new)	• SST Matrix Validation Results (Read) • Map View data (ReadWrite) • Trajectory View data (ReadWrite)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
									• SST Matrix (Write)

3.5   P8 – Resource Constraints: Non-functional requirements

This viewpoint provides the categorised list of non-functional requirements and the systems or specific application components the requirement applies to.

ID	Applies to JEMM System/ Application Component	Applies to AMD Simulation System/ Application Component	Category	Requirement
ETEE-FS-46	JEMM	AMD Simulation	adaptability	The System SHALL be able to adapt immediately to changes in resource Capacity due to changing priorities (e.g. shrinking RAM).
ETEE-FS-45	JEMM		adaptability	Shall provide the possibility to modify terminology visible in the UI with a language file.
ETEE-FS-47	JEMM	AMD Simulation	adaptability	The System SHALL be able to provide services if interconnections are over degraded networks.
ETEE-FS-48	JEMM	AMD Simulation	adaptability	The System SHALL not have any direct dependency on the physical parameters of the storage environment (such as disk type, connection type, SAN topology, SAN protocol).
ETEE-FS-49	JEMM	AMD Simulation	adaptability	The System SHOULD be resource consumption aware to minimize consumption of CPU, memory, network input/output (I/O) and storage I/O.
ETEE-FS-50	JEMM	AMD Simulation	adaptability	The System software SHALL not have any hard coded: URL, DNS or IP Address settings. UNC, File Path, Drive Letter or similar storage location settings.
ETEE-FS-51	JEMM	AMD Simulation	availability	The System shall be able to handle all System services concurrently, using the defined information product for each of them, without any Fault/Error or timeout, for at least 99.5% of its Operational time.
ETEE-FS-52	JEMM	AMD Simulation	availability	The System SHALL be able to handle any or all of its designed System services when the maximum number of concurrent Users are using the System, without any Fault/Error or timeout, for at least 99.5% of its Operational time.
ETEE-FS-53	JEMM	AMD Simulation	availability	The System SHALL be able to handle any or all of its designed System services with the

				maximum amount of allowed data, without any Fault/Error or timeout, for at least 99.5% of its Operational time.
ETEE-FS-54	JEMM	AMD Simulation	availability	When a maintenance action is required on a software Component of the System, this action SHALL not cause any possible Fault/Error in other Components of the system, at least 99.9% of the time.
ETEE-FS-55		AMD Simulation Engine	capacity	Shall be able to handle at least 1 scenario at a time. Each scenario shall support at least 5000 unit components, 1200 interactions per minute, with DTED level 1 terrain.
ETEE-FS-56	JEMM		capacity	Shall be able to handle at least 100 scenarios. Each scenario shall support at least 5000 MEL/MIL elements and 5000 ORBAT entities.
ETEE-FS-57	JEMM	AMD Simulation	compatibility	The System SHALL support the IPv6 protocol.
ETEE-FS-58	JEMM	AMD Simulation	compatibility	The client-side of the System SHALL be compatible with the NATO desktop baseline including: MS Windows Operating system; MS Office Professional Plus; MS Internet Explorer; MS Silverlight; Adobe Acrobat Reader; Java Virtual Machine; Email security classification Labelling client; McAfee Anti-Virus and Data Loss Prevention (DLP) agent; NCIRC desktop Host-based Intrusion Detection System (HIDS) and Forensics analysis based agents; VPN client for Protected Business Network (PBN) mobile client devices; and Disk encryption for PBN mobile client devices.
ETEE-FS-59	JEMM	AMD Simulation	compatibility	The server-side of the System SHALL be compatible with the NATO server baseline: Microsoft Windows Server.
ETEE-FS-60	JEMM	AMD Simulation	compatibility	The supplied software SHALL be compatible with the NATO Anti-Virus management centre and approved by the Purchaser.
ETEE-FS-61	JEMM	AMD Simulation	compatibility	The System SHALL be compatible with the x86-64 architecture (64 bit for server side-components and 32-64 bit for client applications).

ETEE-FS-62	JEMM	AMD Simulation	compatibility	The System SHALL support multiple browsers, including as a minimum: MS browser, and Firefox.
ETEE-FS-63	JEMM	AMD Simulation	compatibility	The System SHALL work correctly and not adversely impact other applications when Bi-SC AIS standard Anti-Virus software is applied.
ETEE-FS-64	JEMM	AMD Simulation	compatibility	The System SHOULD not use plug-ins and runtime environments (e.g. Flash plug-in, Silverlight). The use of Hypertext Mark-up Language (HTML) 5 and AJAX is strongly recommended.
ETEE-FS-65	JEMM	AMD Simulation	compatibility	The System will be able to run with NATO Standard Malware Detection Services and anti-virus software.
ETEE-FS-66	JEMM	AMD Simulation	deployment	The System SHALL be deployable in both MS Hyper-V and VMWare virtualised environments.
ETEE-FS-67	JEMM	AMD Simulation	disaster recovery	Archived data is searchable/readable and the System SHALL provide mechanisms for restoring it to a specified repository as required.
ETEE-FS-68	JEMM	AMD Simulation	disaster recovery	The System SHALL allow for backups all its data to occur automatically at a configurable frequency.
ETEE-FS-69	JEMM	AMD Simulation	disaster recovery	The System SHALL be able to perform full and incremental backups (i.e. snapshots) of data and software without impacting system Availability and Performance.
ETEE-FS-70	JEMM	AMD Simulation	internationalization	Shall provide user interfaces in the English language.
ETEE-FS-71	JEMM		interoperability	The System SHALL comply with Bi-SC AIS E-mail services and protocols.
ETEE-FS-72	JEMM	AMD Simulation	interoperability	The System SHALL expose an API using open standards or widely accepted industry standards.
ETEE-FS-73	JEMM		interoperability	The System SHALL interface with the Bi-SC AIS E-mail Services based on MS Exchange.
ETEE-FS-74	JEMM	AMD Simulation	interoperability	The System SHALL use standard internet addressing, Universal Resource Locator and Universal Resource Identifier.
ETEE-FS-75	JEMM	AMD Simulation	licensing	Any System Components based on Free and open-source

				software (FOSS) SHALL be provided with the source code for the FOSS.
ETEE-FS-76	JEMM	AMD Simulation	licensing	Free and open-source software (FOSS) Components in the System SHALL comply with the NATO strategy on the use of Open Source Software in NATO systems.
ETEE-FS-77	JEMM	AMD Simulation	licensing	The System SHALL not bear additional licenses and charges for deployment of the System Product if used in a NATO context (exercise, mission, static and deployable commands, NRF).
ETEE-FS-78	JEMM	AMD Simulation	licensing	Use of a Free and open-source software (FOSS) Component SHALL not limit the deployment or use of the System in any way and SHALL not require the release of code developed for the System.
ETEE-FS-79	JEMM	AMD Simulation	maintainability	The System services SHALL comply with the C3 Classification Taxonomy [NC3B AC/322-N(2016)0021-AS1, 2016], and applicable Service Interface Profiles.
ETEE-FS-80	JEMM	AMD Simulation	maintainability	The System SHALL be compliant with the standards given in the section "Applicable Standards". Any proposed deviation SHALL be approved by the Purchaser.
ETEE-FS-81	JEMM	AMD Simulation	maintainability	The System SHALL be composed of discrete Components such that a change to one Component has minimal impact on other Components.
ETEE-FS-82	JEMM	AMD Simulation	maintainability	The System SHALL not use DCOM, COM, ActiveX and/or COM+ unless specifically authorised in advance by the Purchaser.
ETEE-FS-83	JEMM	AMD Simulation	performance	JEMMIS and feedback services Shall be able to handle at least 1000 requests per minute.
ETEE-FS-84	JEMM		performance	Shall be able to handle at least 1000 concurrent users.
ETEE-FS-85	JEMM	AMD Simulation	performance	Shall be able to handle at least 1500 requests per minute.
ETEE-FS-86	JEMM		performance	Shall be able to handle automated reporting for at least 10 concurrent scenarios.
ETEE-FS-87	JEMM	AMD Simulation	reliability	Shall have Mean Time To Failure (MTTF) of 2190 hours.

ETEE-FS-88	JEMM	AMD Simulation	scalability	The System SHALL be able to support a throughput increase of 10% every year with no degradation of the maximum latency.
ETEE-FS-89	JEMM	AMD Simulation	security	The System SHALL support usage of different access control modes, best suited for a given resource, including: Discretionary Access Control (DAC), Role-Based Access Control (RBAC), Attribute-Based Access Control (ABAC), Context-Aware Access Control.
ETEE-FS-90	JEMM	AMD Simulation	security	The System Shall use configurable request limiter.
ETEE-FS-91	JEMM	AMD Simulation	security	The System Shall use CSRF token for form POSTs.
ETEE-FS-92	JEMM	AMD Simulation	security	The System Shall use Implicit Flow and a JWT token for authorization.
ETEE-FS-93	JEMM	AMD Simulation	security	The System Shall use OIDC Authorization Code Flow or Hybrid Flow and a cookie for authorization.
ETEE-FS-94	JEMM		security	The System Shall use policy-based authorization based on roles and privileges.
ETEE-FS-95	JEMM		security	The System Shall use secure headers.
ETEE-FS-96	JEMM	AMD Simulation	security	The System Shall use transport level security.
ETEE-FS-97	JEMM	AMD Simulation	supportability	The System design process SHALL balance design implementation with cost for implementation and support to minimize life cycle cost. The System design SHALL take into account the technical, support and cost impacts for NATO.
ETEE-FS-98	JEMM	AMD Simulation	supportability	The System logs SHALL include: Event type; Time stamp from a reliable source; Severity level of the Event, if applicable; Service(s) involved in the Event, if applicable; The Identity of the User that caused the Event (if applicable); Status of the Event; A description of the Event.
ETEE-FS-99	JEMM	AMD Simulation	supportability	The System SHALL be able to export logging information to the format agreed with the Purchaser.
ETEE-FS-100	JEMM	AMD Simulation	testability	80% of the software Components of the System shall be

				Controllable, using automatic test procedures.
ETEE-FS-101	JEMM	AMD Simulation	testability	90% of the software Components of the System shall be Observable, using automatic test procedures.
ETEE-FS-102	JEMM	AMD Simulation	usability	The icons included in the System SHALL be compliant with the ISO 18152 standard series.
ETEE-FS-103	JEMM	AMD Simulation	usability	The System SHALL be compliant with the ISO 9241 standard series for software usability.
ETEE-FS-104	JEMM	AMD Simulation	usability	The System SHALL follow the recommendations and guidelines of the Human Machine Interface (HMI) Style Guide for C4ISR Rich Applications [NCIA HMI Style Guide, 2015] regarding to windows and layouts, User interactions, User support and feedback, common User interface Components design, visual design and text use.
ETEE-FS-105	JEMM	AMD Simulation	usability	The System visual design SHALL follow the recommendations and guidelines stated in the following Documents: NATO Visual Identity Guidelines [NATO Visual Identity Guidelines, 2016]; NCIA Visual Identity Guidelines [NCIA Visual Identity Guidelines, 2013].

4 Supporting viewpoints that provide additional details

The viewpoints in this section contain supporting information. The purpose is to provide additional details that help in understanding the required functionality and logical data structures.

> *Disclaimer: The information presented in this section may not be complete and may not be completely accurate. The Purchaser expects that it will be further developed until contract award and also during the project execution as part of the Agile software development process.*

4.1 P1 – Resource Types: Technology Portfolio Catalogue

This viewpoint provides information about the technology used. The technology in the 'Current Technology' column is applicable at the time of publication of this document. The technology in the 'Future Technology' column is expected to be applicable at project start date.

Category	Current Technology	Future Technology	Reference
Application Runtime Library	.Net Core 3.1	.Net 5	https://devblogs.microsoft.com/dotnet/announcing-net-core-3-1/ https://devblogs.microsoft.com/dotnet/introducing-net-5/
Application Runtime Library	.Net Framework 4.6.1	.Net 5	https://dotnet.microsoft.com/learn/dotnet/what-is-dotnet-framework https://devblogs.microsoft.com/dotnet/introducing-net-5/
Application Runtime Library	DIS		DIS technology and library that supports the required DIS standard.
Client Operating System	Windows 10		https://www.microsoft.com/en-us/windows/get-windows-10
Client-side Web Library	Angular.JS 1.7		https://angularjs.org/
Client-side Web Library	Bootstrap 4		https://getbootstrap.com/docs/4.0/getting-started/introduction/
Client-side Web Library	Cycle2 2.1		http://jquery.malsup.com/cycle2/
Client-side Web Library	JQuery 3.5		https://jquery.com/
Client-side Web Library	Kendo UI 2020		https://www.telerik.com/kendo-ui

Category	Current Technology	Future Technology	Reference
Client-side Web Library	Leaflet.JS 1.6		https://leafletjs.com/2019/11/17/leaflet-1.6.0.html
Client-side Web Library	Moment.js 2.26		https://momentjs.com/
Client-side Web Library	SHA256.js		Legacy component.
Client-side Web Library	Timeline.js		Legacy component
Data Recording	DIS recorder		COTS application; needs to be selected.
Data Recording	HLA recorder		
DBMS	MS LocalDB 2016		https://docs.microsoft.com/en-us/sql/database-engine/configure-windows/sql-server-express-localdb?view=sql-server-ver15
DBMS	MS SQL Server 2016 SP1	MS SQL Server 2019	https://www.microsoft.com/en-us/sql-server/sql-server-2016 https://www.microsoft.com/en-us/sql-server/sql-server-2019
Development Environment	MS Devops Server 2019 git		https://azure.microsoft.com/en-us/services/devops/server/
Development Environment	Visual Studio Code		https://code.visualstudio.com/
HLA Runtime	HLA RTI		
HLA Runtime	HLA-DIS Bridge		COTS application; needs to be selected.
Logging	Log4net 1.2		https://logging.apache.org/log4net/
Logging	Serilog 2.9		https://serilog.net/
Logging	Windows Event Log		https://docs.microsoft.com/en-us/windows/win32/wes/windows-event-log
Messaging	MS Message Queue 10	RabbitMQ	https://docs.microsoft.com/en-us/previous-versions/windows/desktop/legacy/ms711472(v%3Dvs.85) https://www.rabbitmq.com/
Object Relational Mapping Framework	EF Core 3.1	EF Core 5	https://docs.microsoft.com/en-us/ef/ https://docs.microsoft.com/en-us/ef/core/what-is-new/ef-core-5.0/whatsnew
Object Relational	NHibernate 3.2	NHibernate 5.2	https://nhibernate.info/

Category	Current Technology	Future Technology	Reference
Mapping Framework			
Security Library	Identity Server 4		https://identityserver4.readthedocs.io/en/latest/
Security Library	OWIN 4		https://github.com/aspnet/AspNetKatana/
Server Operating System	Windows Server 2016	Windows Server 2019	https://docs.microsoft.com/en-us/windows-server/get-started/server-basics https://www.microsoft.com/en-us/cloud-platform/windows-server
Server-side Web Library	ASP.Net 4.6.1	ASP.Net 5	https://dotnet.microsoft.com/apps/aspnet https://devblogs.microsoft.com/dotnet/introducing-net-5/
Server-side Web Library	ASPNet Core 3.1	ASP.Net 5	https://dotnet.microsoft.com/learn/aspnet/what-is-aspnet-core https://devblogs.microsoft.com/dotnet/introducing-net-5/
Server-side Web Library	Graph Layout Engine 1.0		Legacy component
Server-side Web Library	IndependentSoft WebDav 1.3		https://www.independentsoft.de/webdav/
Server-side Web Library	NetTopologySuite 2		https://github.com/NetTopologySuite/NetTopologySuite
Simulation	FLAMES 18.0 (2019)	FLAMES 19.0 (2020)	https://www.ternion.com/product-releases/
Simulation	FLAMES DIS Option		https://www.ternion.com/distributed-interactive-simulation/
Web Browser	Edge 80		https://www.microsoft.com/en-us/edge
Web Browser	Firefox 68 ESR		https://www.mozilla.org/en-US/firefox/68.0esr/releasenotes/
Web Server	IIS 10		https://docs.microsoft.com/en-us/iis/get-started/whats-new-in-iis-10/new-features-introduced-in-iis-10
Web Server	Kestrel 3.1		https://docs.microsoft.com/en-us/aspnet/core/fundamentals/servers/kestrel?view=aspnetcore-3.1
Web Services	OData .Net Core 7		https://docs.microsoft.com/en-us/odata/

4.2   P1 – Resource Types: Technology Standards Catalogue

This viewpoint provides information about the applied standards.

Category	Standard	Reference
API	OData 4	ISO/IEC 20802-1:2016 and ISO/IEC 20802-2:2016 http://www.iso.org/iso/catalogue_detail.htm?csnumber=69208 http://www.iso.org/iso/catalogue_detail.htm?csnumber=69209
API	REST	https://www.w3.org/2001/sw/wiki/REST
C2 Domain	Allied Data Publication 3 (ADatP-3)	STANAG 5500 Ed4, Ed5, Ed6, Ed7 ADatP-3 baselines 10, 11C, 11F, 12, 12.2, 12.2 MAP, 13.1, 14, 15
C2 Domain	Joint Range Extension Applications Protocol JREAP	STANAG 5518 Ed2
C2 Domain	NATO Message Catalogue APP-11	STANAG 7149 Ed1, Ed2, Ed3, Ed4, Ed5, Ed6 APP-11, APP-11(A), APP-11(B), APP-11(C), APP-11(C) ch 1, APP-11(D)(1)
C2 Domain	NATO Vector Graphics (NVG) Protocol version 1.5:2010	http://tide.act.nato.int/mediawiki/index.php/NATO_Vector_Graphics_(NVG)_Protocol
C2 Domain	NIRIS Light Track Format (LTF) SID	NIRIS Light Track Format (LFT) System Implementation Document (SID) by NCI Agency
C2 Domain	SEW ICD	SEW ICD v1.1 (19 Dec 2017) by NC3A
C2 Domain	Tactical Data Exchange - Link16	STANAG 5516 Ed8
Compatibility	.Net Standard 2.0 (where applicable)	https://github.com/dotnet/standard
Data Serialization	eXtensible Markup Language (XML) 1.0	eXtensible Markup Language (XML) version 1.0 (Fifth Edition) http://www.w3.org/TR/2008/REC-xml-20081126/
Data Serialization	JSON	ISO/IEC 21778:2017 http://www.iso.org/cms/render/live/en/sites/isoorg/contents/data/standard/07/16/71616.html https://tools.ietf.org/html/rfc8259
Database	SQL:2016	ISO/IEC 9075:2016 https://www.iso.org/standard/63555.html
Distributed Simulation	Distributed Interactive Simulation (DIS)	DIS 5, 6, 7 IEEE 1278.1-1995 https://standards.ieee.org/reading/ieee/updates/errata/1278.1-1995.pdf
Distributed Simulation	High Level Architecture (HLA)	STANAG 4603 IEEE 1516-2010 http://standards.ieee.org/downloads/1516/
Distributed Simulation	Real-time Platform Reference Federation Object Model (RPR-FOM)	SISO-STD-001.1-2015 https://www.sisostds.org/DesktopModules/Bring2mind/DMX/API/Entries/Download?Command=Core_Download&EntryId=30823&PortalId=0&TabId=105

Category	Standard	Reference
ETEE Domain	JEMMIS Data Model	OData metadata (JEMMIS_OData4_API_v4.0_draft01.xml) or downloadable from JEMMIS
FLAMES Scripting	FLAMES Script	https://www.ternion.com/flames-development-suite/
Messaging	Extensible Messaging and Presence Protocol (XMPP): Address Format	IETF RFC 3922 https://www.ietf.org/rfc/rfc6122.txt
Messaging	Extensible Messaging and Presence Protocol (XMPP): Core	IETF RFC 3920 https://www.ietf.org/rfc/rfc3920.txt
Messaging	Extensible Messaging and Presence Protocol (XMPP): Instant Messaging and Presence	IETF RFC 3921 https://www.ietf.org/rfc/rfc3921.txt
Messaging	Simple Mail Transfer Protocol (SMTP)	https://tools.ietf.org/html/rfc5321
Programming Language	C 11	ISO/IEC 9899:2011 https://www.iso.org/standard/57853.html
Programming Language	C# 7.3	https://docs.microsoft.com/en-us/dotnet/csharp/language-reference/
Programming Language	C++ 14	ISO/IEC 14882 https://www.iso.org/standard/68564.html
Programming Language	JavaScript 6	ECMA-262 http://www.ecma-international.org/ecma-262/6.0/
Security	JWT	https://tools.ietf.org/html/rfc7519
Security	OIDC 1	https://openid.net/connect/
Security	Secure OWASP Headers	https://owasp.org/www-project-secure-headers/
Security	TLS 1.2	IETF RFC 5246 https://tools.ietf.org/html/rfc5246
Security	TLS 1.3	IETF RFC 8446 https://tools.ietf.org/html/rfc8446
Transport	HTTP/2	IETF RFC 7540 https://tools.ietf.org/html/rfc7540
Transport	TCP	IETF RFC 793 https://tools.ietf.org/html/rfc793
Transport	UDP	IETF RFC 768 https://tools.ietf.org/html/rfc768
Web Mapping Services	WFS 1.1	OGC WFS 1.1.0 http://docs.opengeospatial.org/is/04-094r1/04-094r1.html
Web Mapping Services	WMS 1.1	OGC WMS 1.1.0 http://portal.opengeospatial.org/files/?artifact_id=1058
Web Technology	CSS 3	https://www.w3.org/Style/CSS/specs.en.html

Category	Standard	Reference
Web Technology	HTML 5	https://www.w3.org/TR/html52/

4.3   P3 – Resource Connectivity: Application Interaction Matrix

This viewpoint provides information about interactions between the main Systems.

Source System	Data Object	Destination System
AirC2IS	Defence Design NVG	**JEMM**
AirC2IS	Defence Design XML	**JEMM**
AMD Simulation	AMD Feedback	**JEMM**
AMD Simulation	AMD Order Script	**JEMM**
AMD Simulation	AMD Simulation State	**JEMM**
AMD Simulation	DIS Feedback	**JEMM**
AMD Simulation	SST Matrix Validation Results	**JEMM**
AMD Simulation	Supported Control Orders	**JEMM**
AMD Simulation	Supported Virtual Activities	**JEMM**
AMD Simulation	Virtual Activity Form	**JEMM**
AMD Simulation	Virtual Activity Verification Report	**JEMM**
AMD Simulation	Virtual Activity	**JEMM**
External Simulation	External DIS PDU	**AMD Simulation**
External Simulation	HLA RPR-FOM Update	**HLA-DIS Bridge**
HLA-DIS Bridge	External DIS PDU	**AMD Simulation**
INTEL-FS	INTEL-FS Update (file)	**JEMM**
JEMM	E-mail Message	**E-Mail Server**
JEMM	Exported Training Objective Observation Report	**Training Objective Observation Report Consumer**
JEMM	INTEL-FS Update (file)	**INTEL-FS**
JEMM	JREAP-C Link16 Message	**NIRIS**
JEMM	ORBAT	**AMD Simulation**
JEMM	SEW Message	**SEW Consumer**
JEMM	Simulation Control Order	**AMD Simulation**
JEMM	SST Matrix	**AMD Simulation**
JEMM	STARTEX situation	**AMD Simulation**
JEMM	Virtual Activity	**AMD Simulation**
JEMM	XMPP Message	**JCHAT**
NIRIS	NIRIS Link16 J7.1 Event (TITO TrackEvent)	**JEMM**
OPTASK LINK Producer	OPTASK LINK	**JEMM**

The following figures provide further information about the interactions.
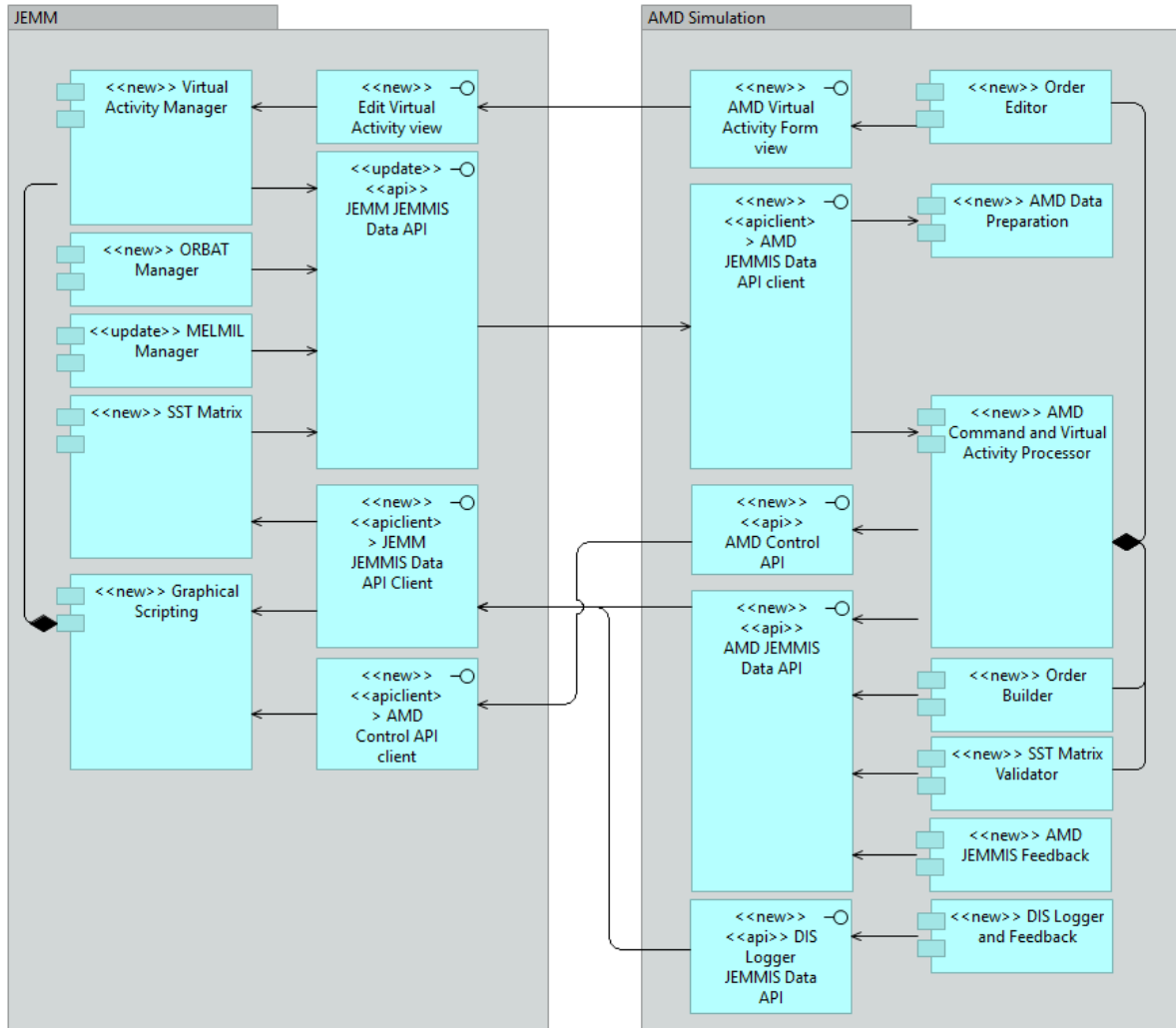
Figure 3: Interactions between JEMM and AMD Simulation, and interfaces used
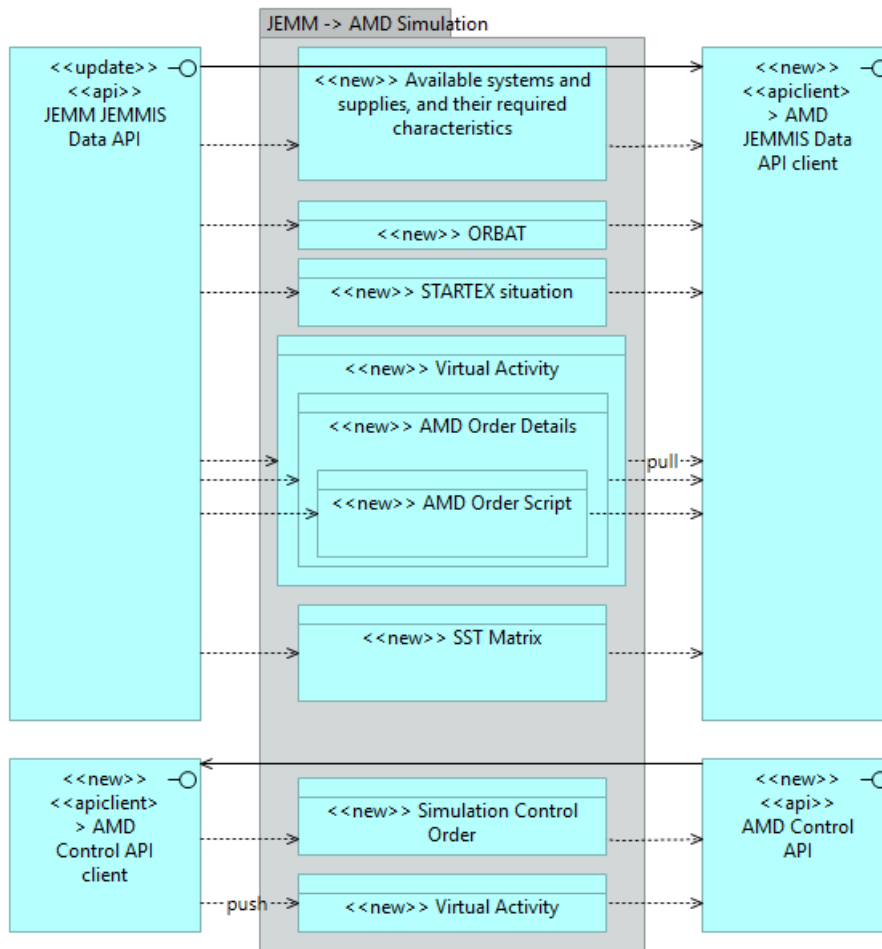
Figure 4: Data exchanged between JEMM and AMD Simulation
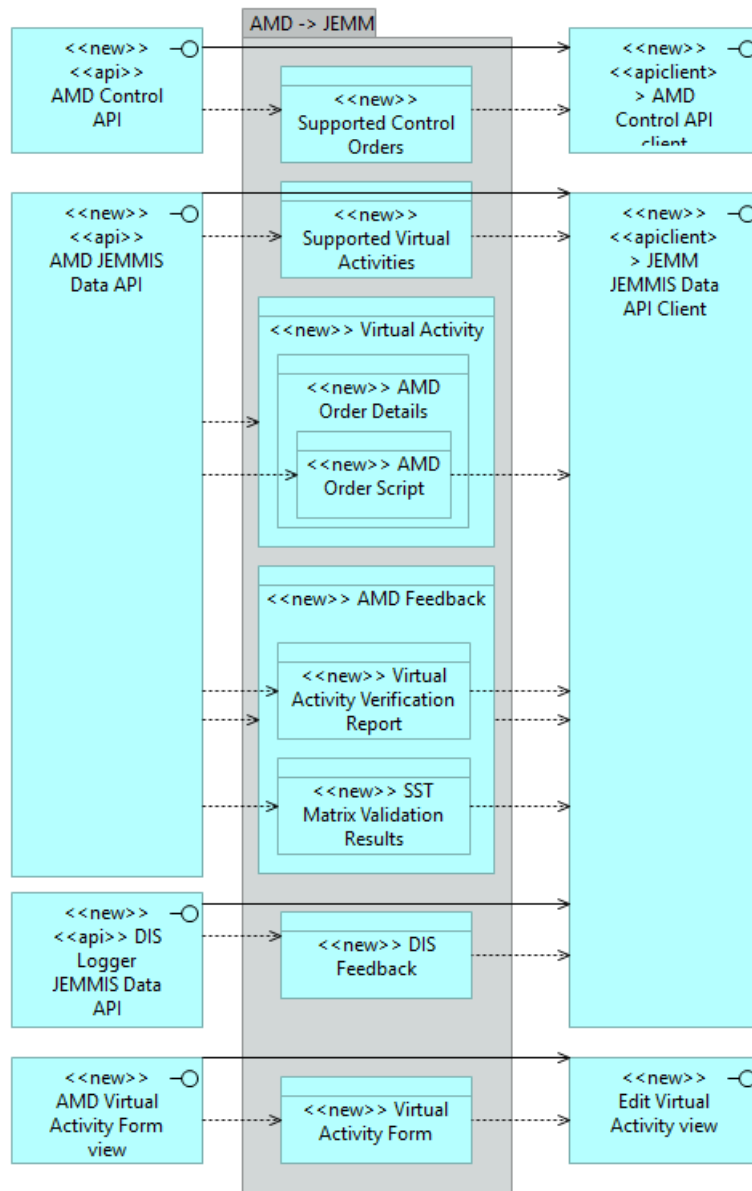
Figure 5: Data exchanged between JEMM and AMD Simulation
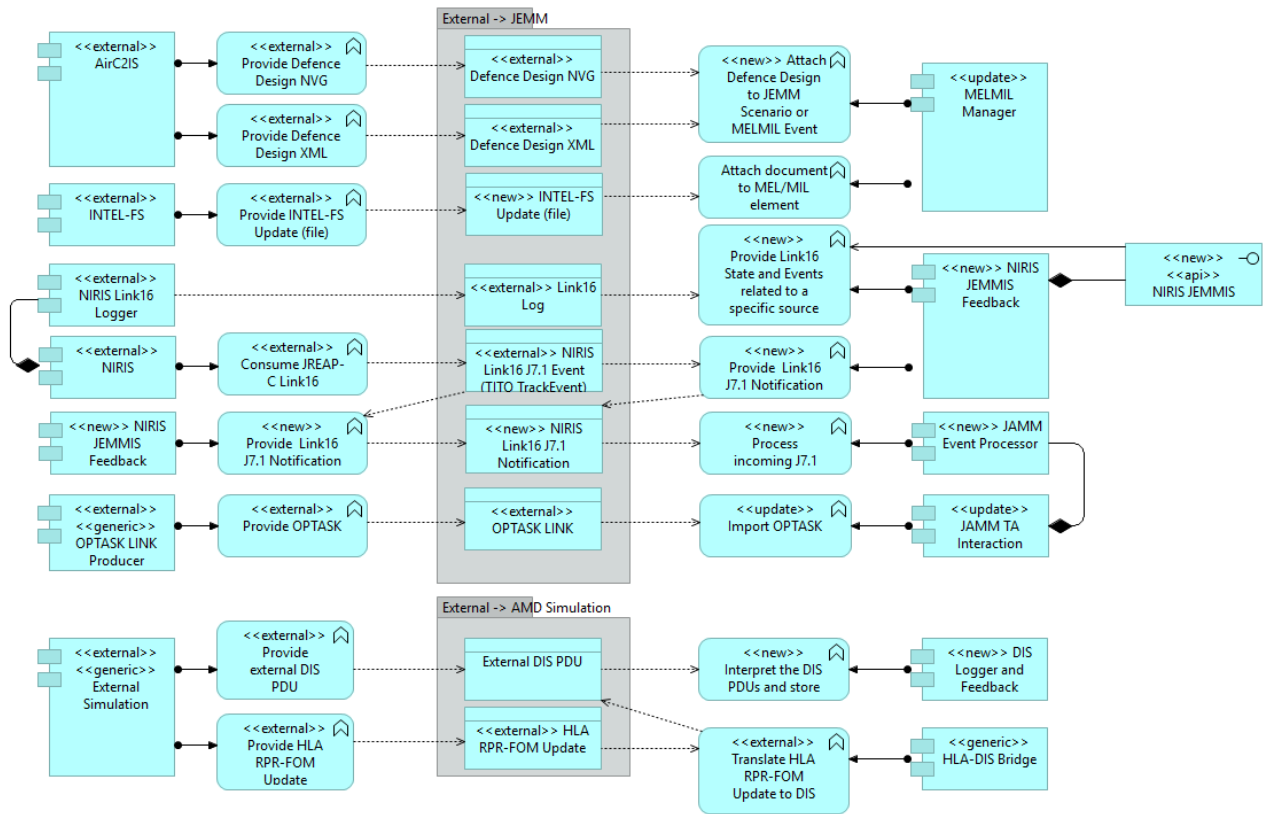
Figure 6: Data received from external systems by JEMM and AMD Simulation
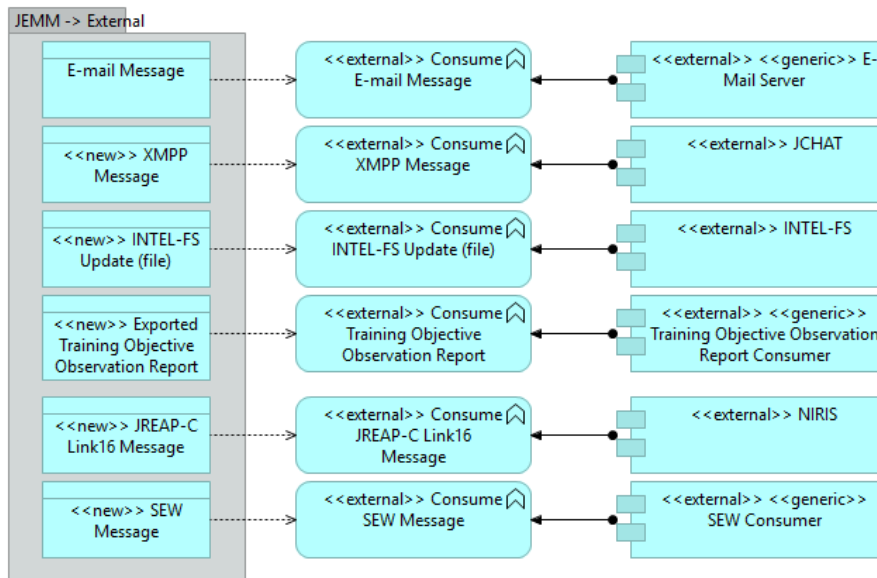
Figure 7: Data sent to external systems by JEMM

4.4 P3 – Resource Connectivity: Process/ Application Realization Diagram

This viewpoint provides diagrams of main new functionality provided by the systems or collaboration of systems.

4.4.1 Build AMD Simulation Scenario

Building an AMD scenario includes building and ORBAT, adding a STARTEX situation, mapping entities to models, and building the scenario dataset.
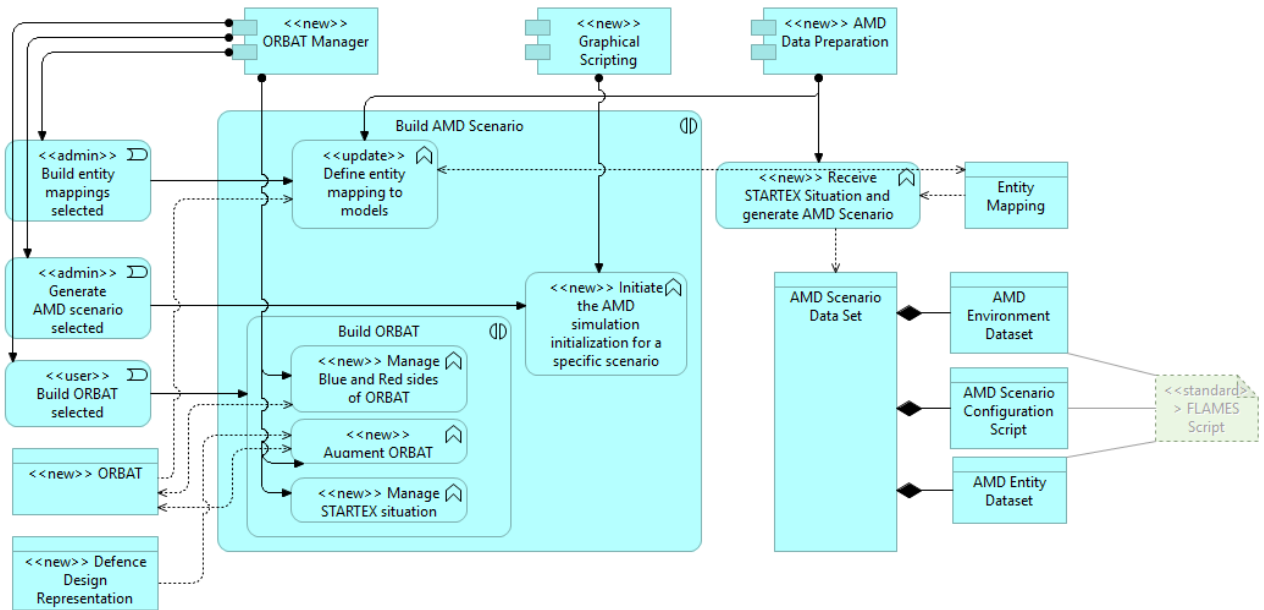
Figure 8: Build AMD Simulation Scenario

4.4.2 Manage Virtual Activity

Managing a Virtual Activity includes the selection from available virtual activities, showing the corresponding form with existing information (if available), modifying the

information in the form, verification of the Virtual Activity and submitting it, which generates a JEMMIS representation of the Virtual Activity.
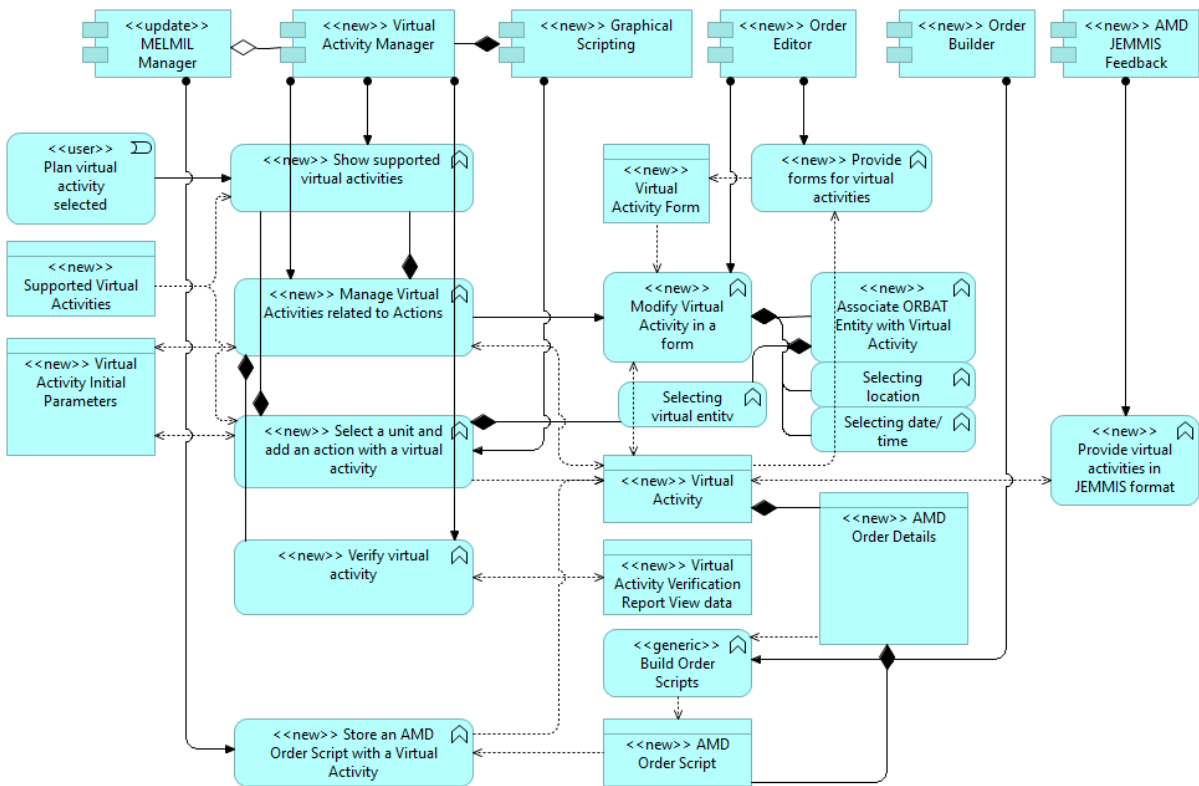
Figure 9: Manage Virtual Activity

4.4.3 Execute Virtual Activity

Executing a Virtual Activity includes processing the request, sending the order for execution, executing the order, collecting the feedback and sending it back.
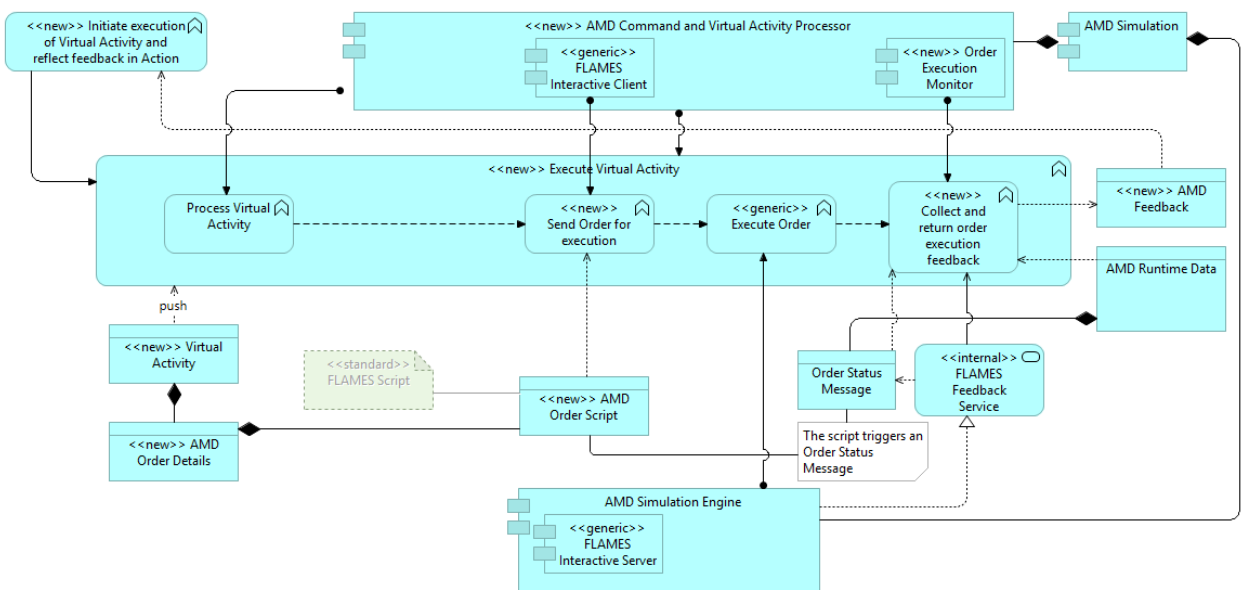
Figure 10: Execute Virtual Activity

4.4.4 Feed Systems used by the Training Audience

Feeding information to systems used by the training audience (TA) includes preparation of the message or file and sending it to the specific service exposed by the TA system. Where required, the injection state will be automatically updated.
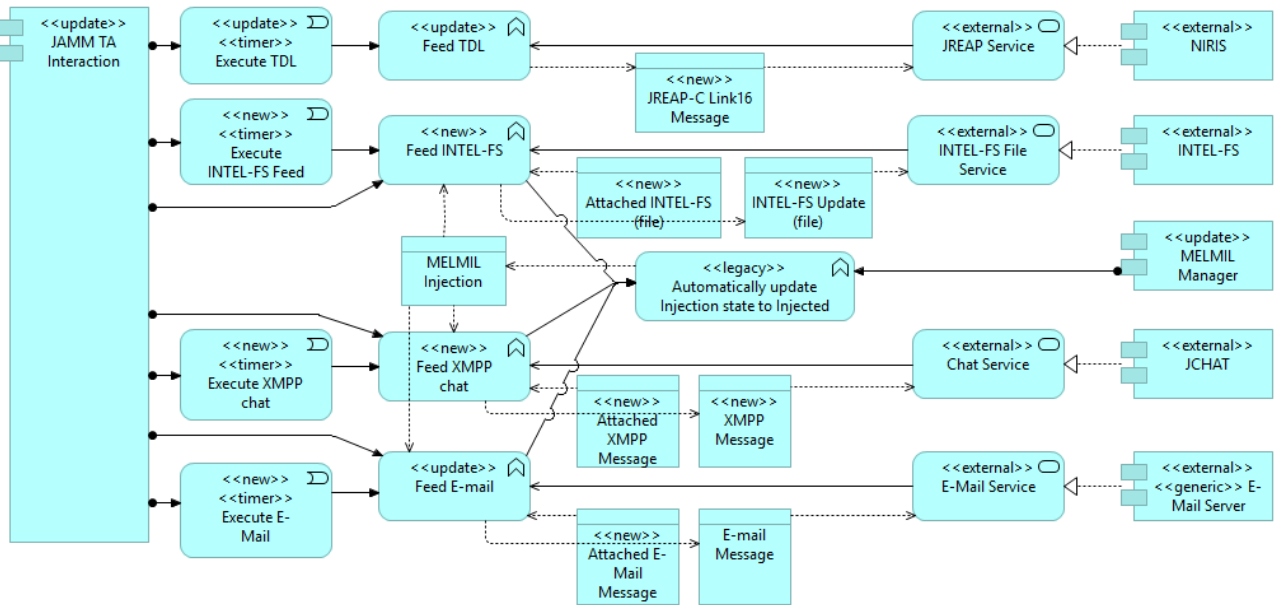
Figure 11: Feed Systems used by the Training Audience

4.4.5 Process incoming J7.1 Link16 Message

Processing the J7.1 Link 16 message includes a trigger from NIRIS, translating the trigger to an internal notification, handling that notification and producing the required

J3.6 response. If requested in the J7.1 message, the J3.6 message is then generated periodically.
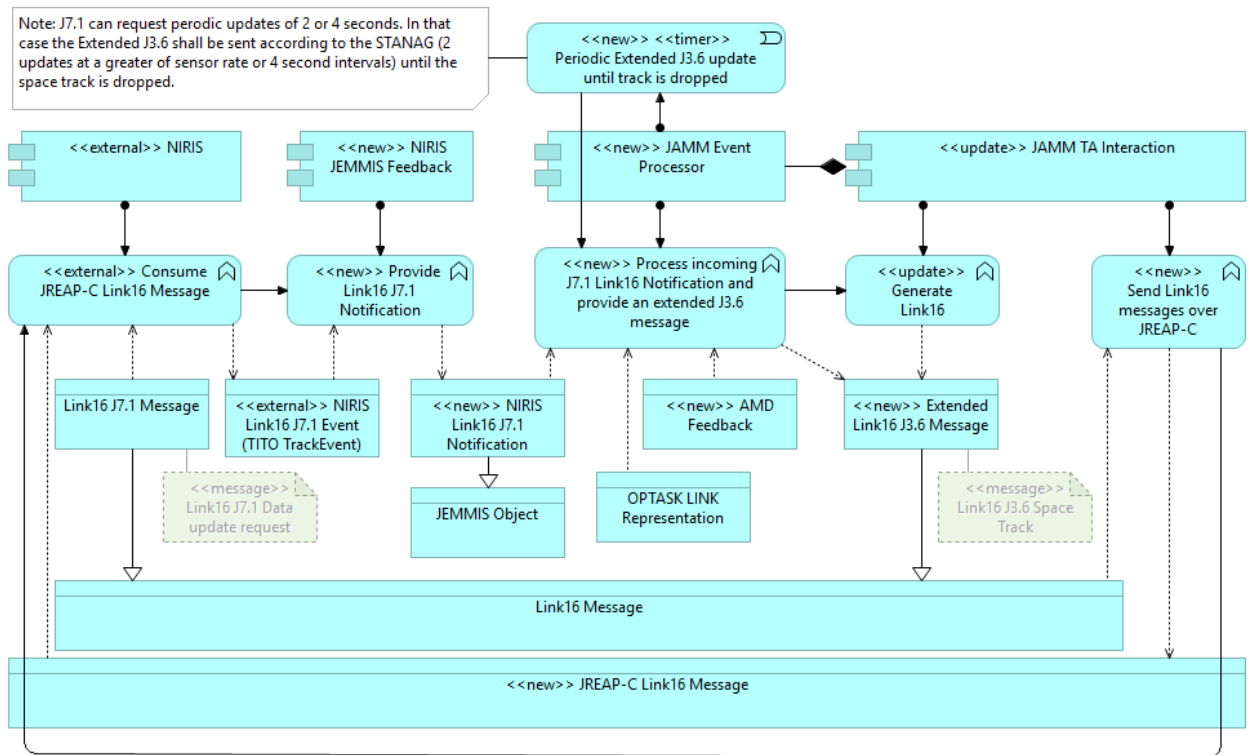
Figure 12: Process incoming J7.1 Link16 Message
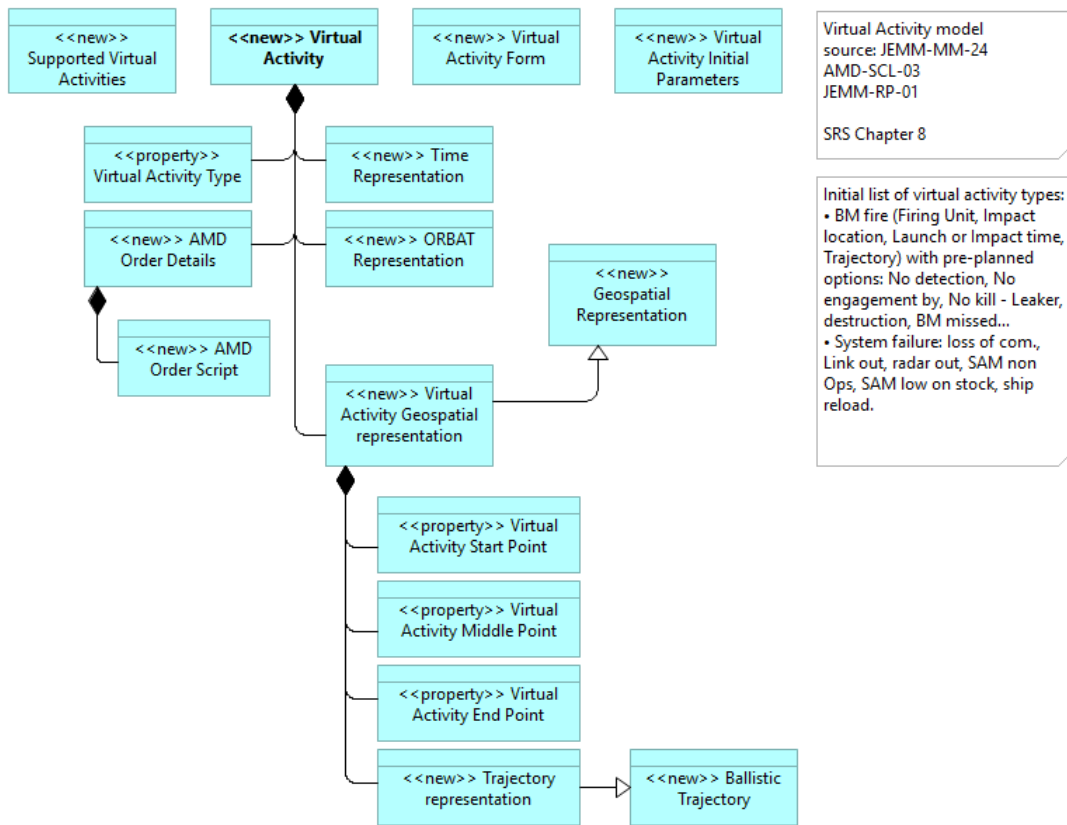
4.5   P7 – Physical Data Model: Logical Data Diagram

This viewpoint provides information about the structures and relationships of the selected main logical data objects.

Figure 13: ORBAT data model

Figure 14: STARTEX data model

Figure 15: Virtual Activity data model
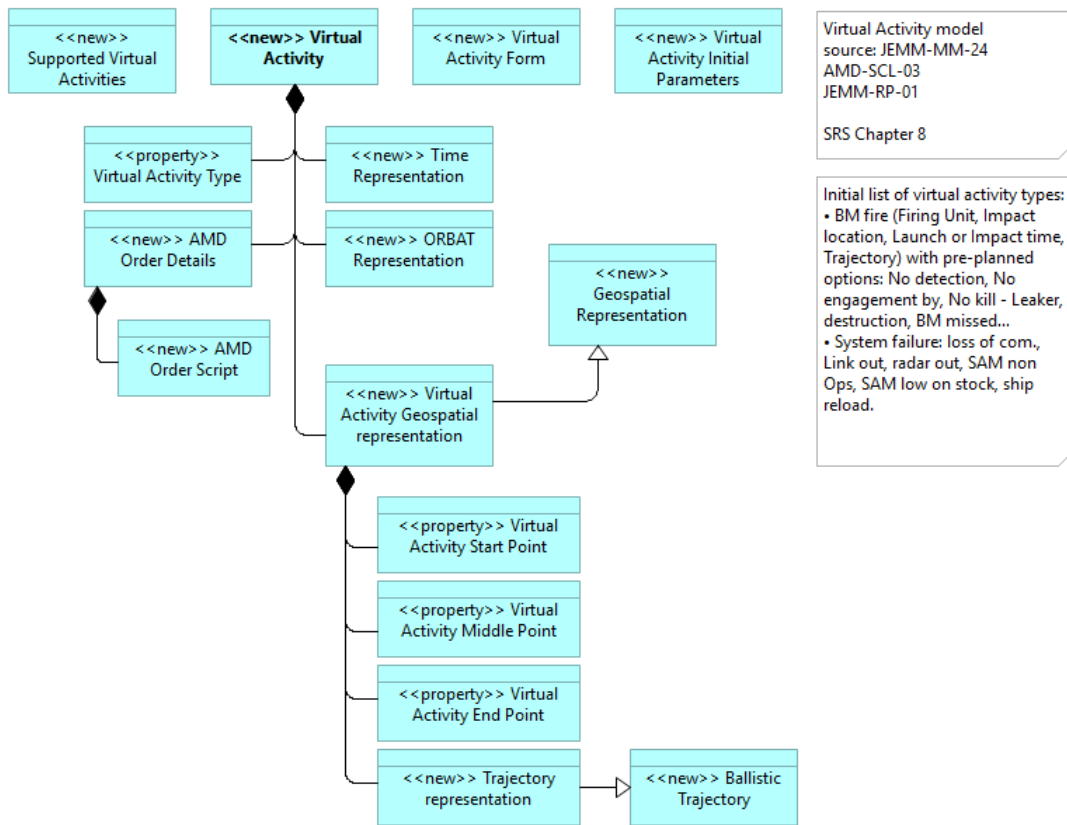
Figure 16: SST Matrix data model
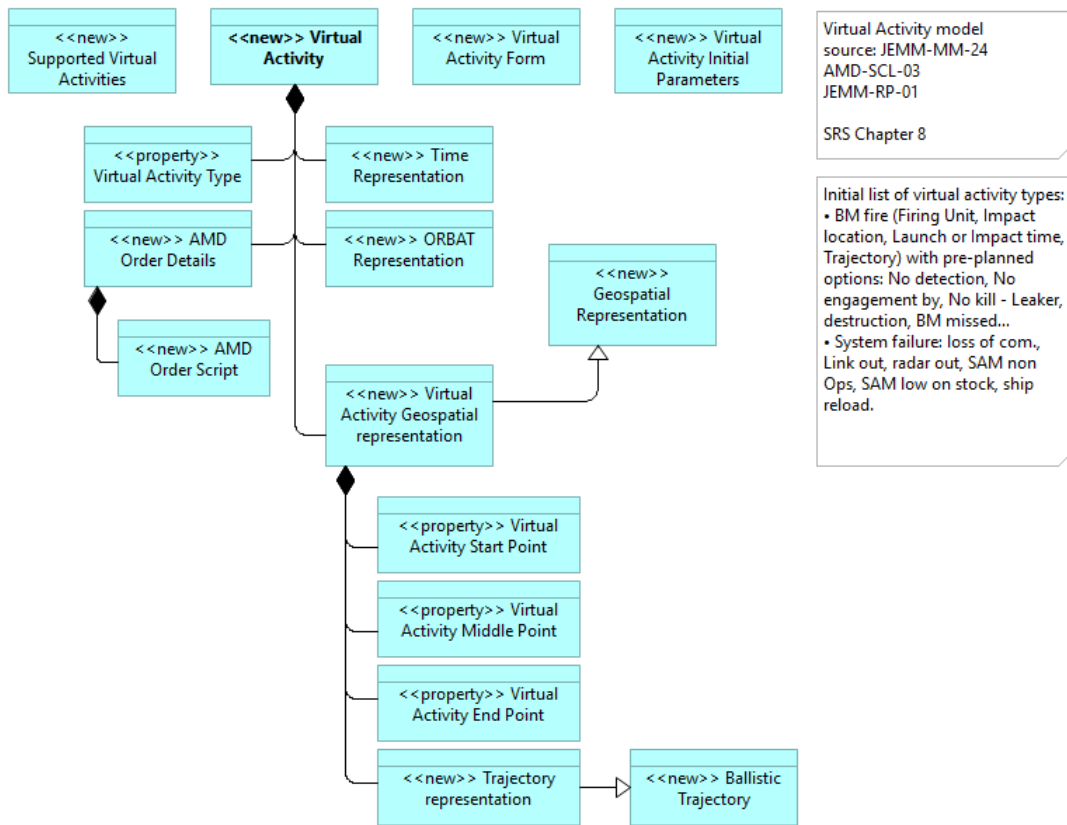
Figure 17: SST Matrix Execution Situation data model
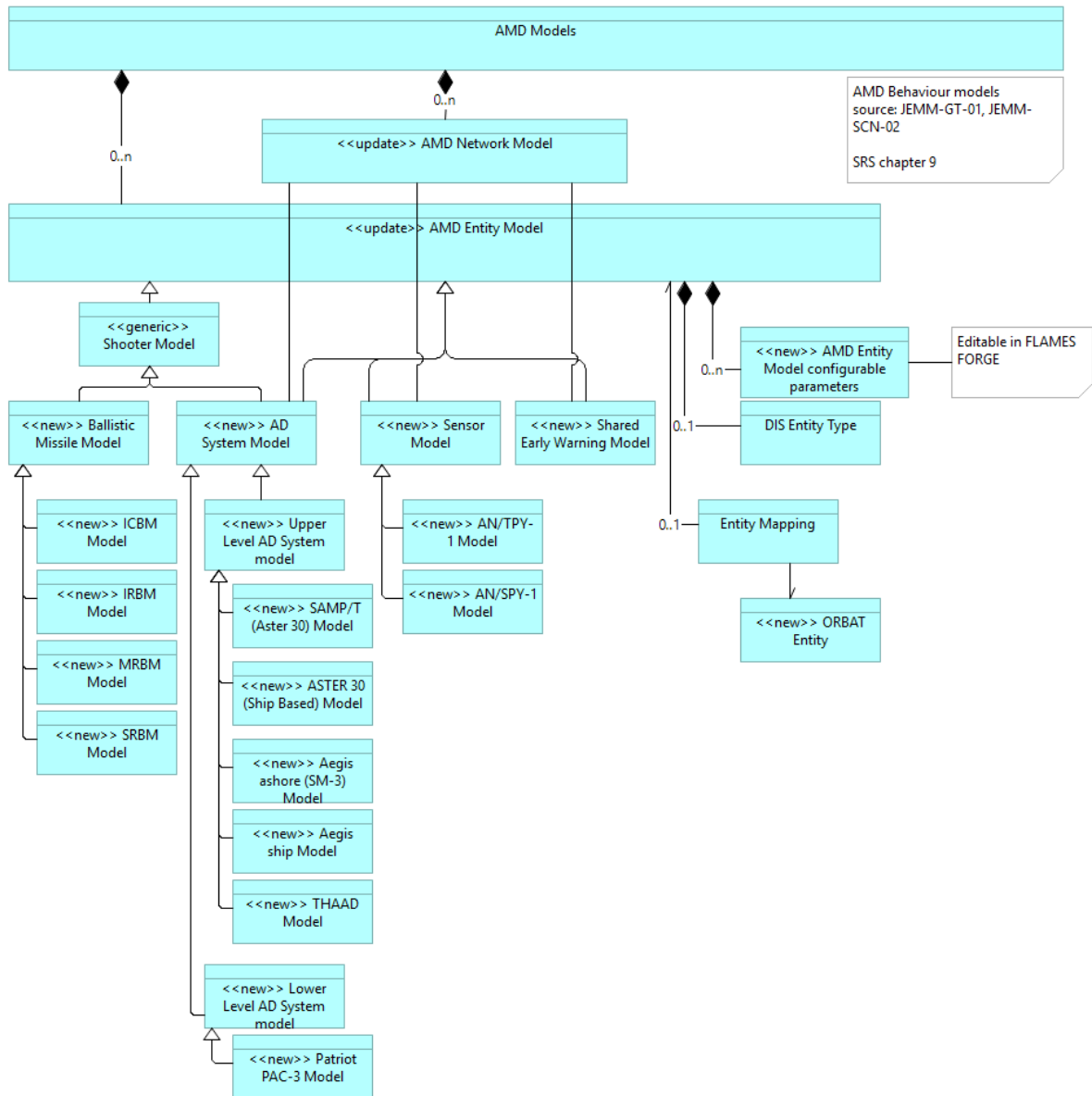
Figure 18: AMD Models
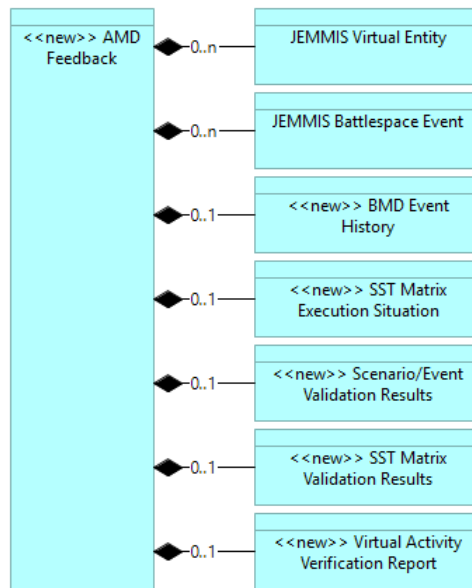
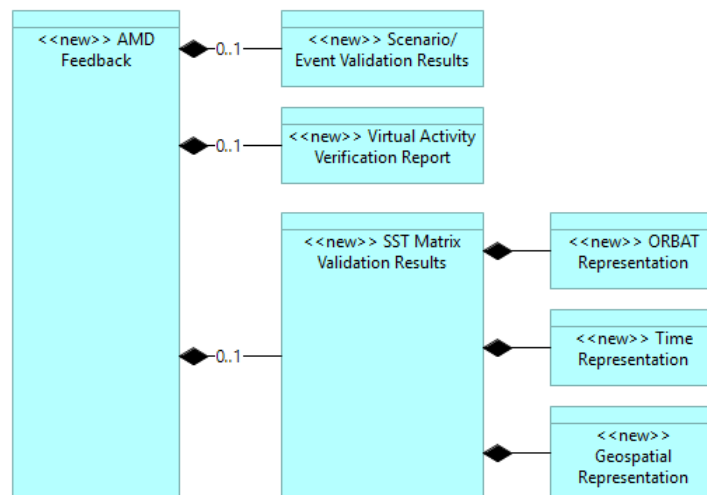*Figure 19: AMD Feedback data model for scenario verification and validation*

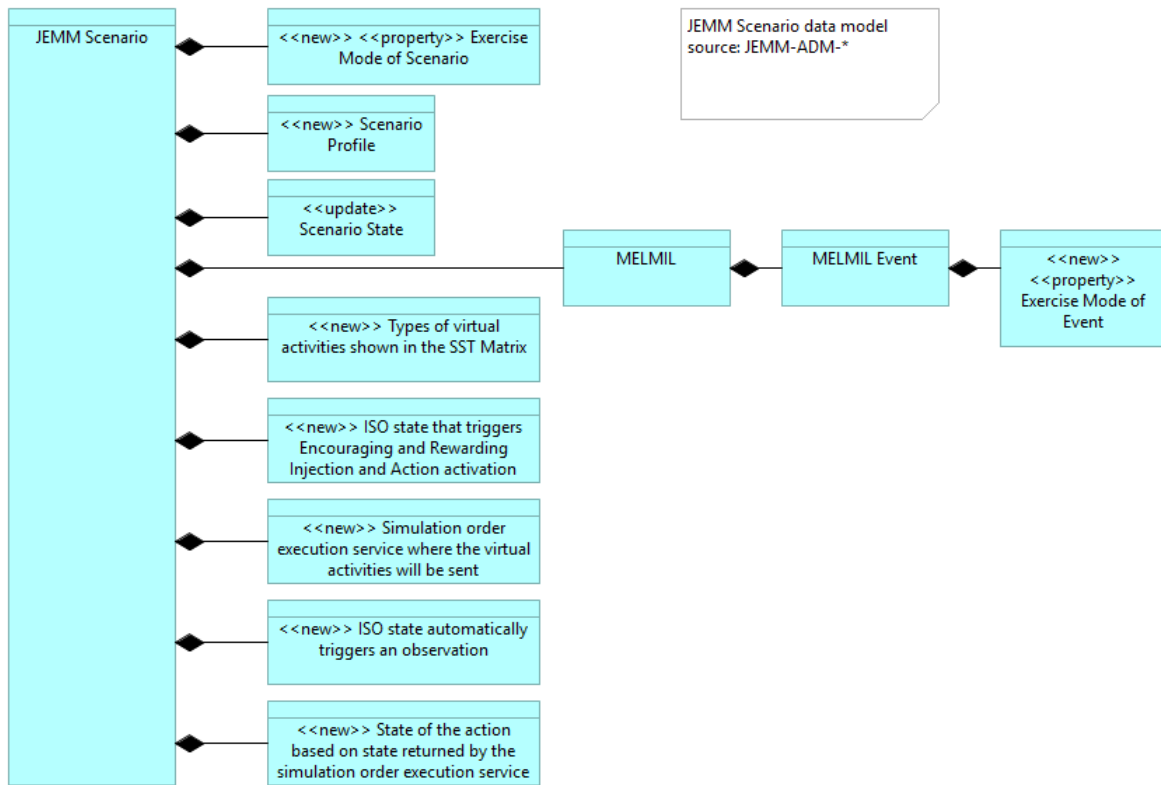*Figure 20: AMD Feedback data model*

Figure 21: JEMM Scenario Administration data model

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

PROVIDE ENHANCEMENT OF JOINT EXERCISE MANAGEMENT MODULE (JEMM) WITHIN BALLISTIC MISSILE DEFENCE (BMD) FUNCTIONS IN EDUCATION, TRAINING, EXERCISE AND EVALUATION (ETEE) FUNCTIONAL SERVICES (FS)

IFB-CO-115112-ETEE JEMM

BOOK II – PART IV

STATEMENT OF WORK

Annex D: Purchaser Furnished Property

Annex D: Purchaser Furnished Property

1 Introduction

1.1 This annex contains a summary of the Purchaser Furnished Property (PFP) made available to the Contractor for the execution of the Contract.

2 Purchaser Furnished Property

2.1 The table below list the PFPs with a reference to the relevant section(s) of the SOW.

PFP	SOW section	Provided NLT	Provided until
Virtual Development environment inside the NATO Software Factory	3.8.7	At start of the first Sprint	12 month after Final Delivery Acceptance
Development branches	3.9.2 and 3.9.3	At the start of each Iteration.	Completion of the integration of the iteration.
Temporary office environment for Contractor personnel at Purchaser's location if requested by the Contractor and approved by the Purchaser	3.8.2	At start of the agreed period.	End of the agreed period.