ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Μόνιμη Αντιπροσωπεία της Ελλάδος
στο ΝΑΤΟ

Aikaterini Nikaki
31.05.2022 18:30

ΑΔΙΑΒΑΘΜΗΤΟ
ΚΑΝΟΝΙΚΟ

Αρμόδιος: Ασμχος (ΜΕ) Δημήτριος Κανταρτζόγλου
Τηλ.: +32 2 707 6734
e-mail: d.kantartzoglou@grdel-nato.be

Βρυξέλλες, 31 Μαΐου 2022
Α.Π.: 2983

ΠΡΟΣ: **ΥΠΟΥΡΓΕΙΟ ΕΘΝΙΚΗΣ ΑΜΥΝΑΣ**
- ΓΔΑΕΕ/ΔΑΕΤΕ *(μ.η.)*

ΚΟΙΝ.: **ΥΠΟΥΡΓΕΙΟ ΕΞΩΤΕΡΙΚΩΝ**
- κ. Δ' Γενικό Διευθυντή
- Δ2 Διεύθυνση

ΥΠΟΥΡΓΕΙΟ ΑΝΑΠΤΥΞΗΣ
- Γενική Γραμματεία Εμπορίου *(μ.η.)*
- Γενική Γραμματεία Βιομηχανίας/ Διεύθυνση Διεθνών Βιομηχανικών Σχέσεων *(μ.η.)*

ΤΕΧΝΙΚΟ ΕΠΙΜΕΛΗΤΗΡΙΟ ΕΛΛΑΔΟΣ
- Διεύθυνση Επαγγελματικής Δραστηριότητας *(μ.η.)*

ΓΕΕΘΑ
- Γ2 Διεύθυνση

ΘΕΜΑ: Αίτηση Υποβολής Προσφορών RFQ-CO-115625-ETEE, Διαγωνιστικής Διαδικασίας: "Provision Of Operational Assurance, Hand Over, Training and Mentoring capability within Education, Training, Exercise and Evaluation (ETEE) Functional Services (FS)"

Διαβιβάζεται, συνημμένως, Ειδοποίηση Εκδήλωσης Ενδιαφέροντος (Notification of Intent/NOI), εν θέματι διαγωνιστικής διαδικασίας Basic Ordering Agreement, εκ μέρους NCIA, ως φιλοξενούντος έθνους.

Καταληκτική ημερομηνία υποβολής προσφορών για τυχόν BOA ενδιαφερομένους ορίζεται η **11η Ιουλίου τ.έ, 12:00 τ.ώ.**

Ενδιαφερόμενοι δύνανται αναζητήσουν πληροφορίες μέσω καθοριζομένων σημείων επαφής (Point of Contact/POC, βλ. παρ. 10 αιτήσεως).

Παρακαλούμε για τις ενέργειές σας.

ΛΑΜΠΡΙΔΗΣ

Συν. σελ.: 299

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

Acquisition
Peter.Kowalski@ncia.nato.int

NCIA/ACQ/2022/6722
25 May 2022

To: See Distribution List

From: The Director of Acquisition, NCI Agency

Subject: **REQUEST FOR QUOTATION RFQ-CO-115625-ETEE**
"*Provision Of Operational Assurance, Hand Over, Training and Mentoring capability within Education, Training, Exercise and Evaluation (ETEE) Functional Services (FS)*"

Reference(s) **:**
A. AC/4-D(2019)0004 (INV)
B. AC/4/(PP)D/27804-ADD1 (INV)
C. AC/4-DS(2020)0022
D. AC/4/(PP)D/27804-ADD4 (INV)
E. AC/4-DS(2022)0011

Dear Sir/Madam,

1. Your firm is hereby invited to participate in a Request for Quotation under Basic Ordering Agreement (BOA) procedures for the provision of **"Operational Assurance, Hand Over, Training and Mentoring Capability within BMD Functions in Education, Training, Exercise and Evaluation Functional Services (ETEE FS)".**

2. With the aim to prevent an organizational conflict of interest in industrial roles under the BMD Increment 1 Functions in ETEE FS project, Bidders participating in this RFQ and their prospective Sub-Contractors shall be excluded from participation in the companion NCI Agency ETEE FS projects conducted under solicitations IFB-CO-115112-ETEE (BMD Enhanced JEMM System), IFB-CO-115113-ETEE (AMD Simulation System), and RFQ-CO-115114-ETEE (BMD Exercise IM Portal).

3. The award will be based on the proposal evaluated as the lowest price, technically compliant in accordance with the selection criteria set forth in the Bidding Instructions.

4. **THE CLOSING TIME FOR ELECTRONIC SUBMISSION OF BIDS IN RESPONSE TO THIS REQUEST FOR QUOTATION IS 12:00 HOURS (BRUSSELS TIME) ON 11 July 2022.**

NATO Communications and Information Agency
Agence OTAN d'information et de communication
Boulevard Leopold III
1110 Brussels, Belgium
www.ncia.nato.int

5. This Request for Quotation consists of the Bidding Instructions (Book I) and the Prospective Contract (Book II). The Prospective Contract contains the Schedule of Supplies and Services (Part I), Contract Special Provisions (Part II), and the Statement of Work (Part III). The Statement of Work and the Annexes thereto set forth detailed specifications governing the performance requirements of the contract.

6. The overall security classification of this Request for Quotation is "NATO UNCLASSIFIED". This Request for Quotation remains the property of the NCI Agency and shall be protected in accordance with the applicable national security regulations.

7. The Bidders have the right to request RFQ clarifications as outlined in section 2.6 of the Bidding Instructions (Book I).

8. You are requested to complete and return the enclosed acknowledgement of receipt within 5 days of receipt of this RFQ, informing NCI Agency of your intention to bid/not to bid. Your firm is not bound by its initial decision, and if you decide to reverse your stated intention at a later date, you are requested to advise us by a separate letter.

9. Prospective Bidders are advised that the NCI Agency reserves the right to cancel this RFQ 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.

10. The The NCI Agency points of contact for all information concerning this RFQ are Mr. Peter Kowalski, Senior Contracting Officer, and Ms. Dorina Cani, Principal Contracting Assistant, who may be reached at Peter.Kowalski@ncia.nato.int and Dorina.Cani@ncia.nato.int.

FOR THE DIRECTOR OF ACQUISITION:

[Original Signed By]

Gael Craver
Principal Contracting Officer

Enclosures:

Attachment A: Acknowledgement of Receipt of Request for Quotation

Distribution List

All 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

Embassies in Brussels (Attn: Commercial Attaché):

Albania	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 (electronic copy to **brussels.office.box@mail.doc.gov**)	1
Belgian Ministry of Economic Affairs	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

Chief of Acquisition	1
Deputy Chief of Acquisition	1
Contract Award Board Administrator	1

Principal Contracting Officer	1
Princial Contracting Assistant	1
Director AMDC2	1
Chief C2 Centre	1
C2 Centre – Senior Supplier	1
C2 Centre – Project Manager	1
C2 Centre – Technical Lead	1
Liaison Officer to the Investment Committee	1
Legal Office	1

Attachment A

Acknowledgement of Receipt of Request for Quotation

RFQ-CO-115625-ETEE

Please complete, sign and return by email (scanned to PDF) within 14 days to: Peter.Kowalski@ncia.nato.int **and** Dorina.Cani@ncia.nato.int.

We hereby advise that we have received Request for Quotation RFQ-CO-115625-ETEE

on ....., together with all enclosures listed in the Table of Contents.

CHECK ONE

{ } As of this date and without commitment on our part, we do intend to submit a bid.

{ } We do not intend to submit a bid.

{ } We are reviewing the requirements of the RFQ and will notify you of our decision as soon as possible.

Signature: _____

Printed Name: _____

Title: _____

Company: _____

Address: _____

REQUEST FOR QUOTATION

RFQ-CO-115625-ETEE

PROVISION OF OPERATIONAL ASSURANCE, HAND OVER, TRAINING AND MENTORING CAPABILITY WITHIN BALLISTIC MISSILE DEFENCE (BMD) FUNCTIONS IN EDUCATION, TRAINING, EXERCISE AND EVALUATION (ETEE) FUNCTIONAL SERVICES (FS)

AUTHORISATION/SERIAL NO.
2013/0IS03074-05/58/59

GENERAL INDEX

BOOK I - THE BIDDING INSTRUCTIONS

Section I Introduction
Section II General Bidding Information
Section III Bid Preparation Instructions
Section IV Bid Evaluation
Annex A Bidding Sheets
Annex B Bidding Sheets - Instructions
Annex C Certificates
Annex D Cross Reference/Compliance Table
Annex E Clarification Requests forms
Annex F RESERVED

BOOK II - THE PROSPECTIVE CONTRACT

Signature Sheet
Part I Schedule of Supplies and Services
Part II Contract Special Provisions
Part III Statement of Work

RFQ-CO-115625-ETEE

BOOK I

BIDDING INSTRUCTIONS

CONTENTS

1. INTRODUCTION 2
1.1. PURPOSE AND SCOPE 2
1.2. OVERVIEW OF THE PROSPECTIVE CONTRACT 3
1.3. GOVERNING RULES, ELIGIBILITY, AND EXCLUSION PROVISIONS 3
1.4. SECURITY 4
1.5. DOCUMENTATION 4

2. GENERAL BIDDING INFORMATION 6
2.1. DEFINITIONS 6
2.2. ELIGIBILITY 6
2.3 BID DELIVERY AND BID CLOSING 7
2.4 REQUESTS FOR EXTENSION OF BID CLOSING DATE 8
2.5 PURCHASER POINTS OF CONTACT 8
2.6 REQUESTS FOR RFQ CLARIFICATIONS 9
2.7 REQUESTS FOR WAIVERS AND DEVIATIONS 10
2.8 AMENDMENT OF THE REQUEST FOR QUOTATION 10
2.9 MODIFICATION AND WITHDRAWAL OF BIDS 10
2.10 BID VALIDITY 11
2.11 BID GUARANTEE 12
2.12 CANCELLATION OF REQUEST FOR QUOTES 12
2.13 ELECTRONIC TRANSMISSION OF INFORMATION AND DATA 12
2.14 NOTICE TO BIDDERS OF CONTRACT DISTRIBUTION AND DISCLOSURE OF INFORMATION 12

3 BID PREPARATION INSTRUCTIONS 13
3.1 GENERAL 13
3.2 PREPARATION OF THE ADMINISTRATIVE PACKAGE (PART 1) 14
3.3 PREPARATION OF THE PRICE QUOTATION (PART 2) 16
3.4 PREPARATION OF THE TECHNICAL PROPOSAL (PART 3) 18
3.5 PACKAGING AND MARKING OF BIDS 24

4 BID EVALUATION 25
4.1 GENERAL 25
4.2 ADMINISTRATIVE CRITERIA 26
4.3 PRICE CRITERIA 26
4.4 TECHNICAL CRITERIA 30

ANNEX A – BIDDING SHEETS 33

ANNEX B - INSTRUCTIONS FOR THE PREPARATION OF BIDDING SHEETS 34

ANNEX C – CERTIFICATES 35

ANNEX D – Bid-Requirements Cross Reference Matrix (BRCM) 44

ANNEX E – Clarification Request Forms 46

ANNEX F – RESERVED 49

1. INTRODUCTION

1.1. PURPOSE AND SCOPE

1.1.1. This project will contribute to the successful delivery of the ETEE FS Ballistic Missile Defence (BMD) capability by providing support for:

1.1.1.1. The testing and validation of the BMD enhanced Joint Exercise Management Module (JEMM) system in synchronization with the agile development of the system.

1.1.1.2. The testing and validation of the Air and Missile Defence (AMD) simulation system in synchronization with the agile development of the system.

1.1.1.3. The testing and validation of the BMD Information Management (IM) portal template system in synchronization with the iterative development of the system.

1.1.1.4. Contribute to the production of the necessary documentation for the enhanced JEMM system and the AMD simulation system to achieve Approved Fielded Products List (AFPL) approval.

1.1.1.5. The production of user training materials.

1.1.1.6. The hand-over of the ETEE FS BMD capability to the operational user community including training and mentoring during its initial utilisation.

1.1.2. This project will develop the necessary test plans and test cases to support the testing of each of the steps of the agile development process for the three systems mentioned in the introduction based on functionality that needs to be delivered during each step of the development process. This project will develop the associated test data, support the execution of the tests and assist in capturing and documenting test results.

1.1.3. The project will consist of two phases of approximately twelve (12) to eighteen (18) months each, both resulting in a baseline delivery for each of the three systems. For the two baseline deliveries that are planned for the ETEE FS for BMD, this project will develop the necessary test plans and test cases to support the integration and acceptance testing of each of the baselines for the three systems mentioned in the introduction. The project will support the execution of the tests and assist in capturing and documenting test results. This project will also produce the necessary documentation to achieve AFPL approval.

1.1.4. The project will produce the necessary training materials for the ETEE FS BMD baselines. For both deliveries, the project will assist in the hand-over, training and mentoring of the operational users in their initial usage of the delivered system baselines.

1.1.5. The project scope includes:

1.1.5.1. Project Management

1.1.5.2. Test plan, Test case and data development

1.1.5.3. Test execution and results documentation

1.1.5.4. AFPL documentation production

1.1.5.5. Production of training materials

1.1.5.6. Hand-over, training and mentoring support for the operational users

1.1.6. The majority of the project activities performed by the Contractor will be performed at the Contractor's site and via collaborative on-line environments. The execution of the major baseline integration and acceptance testing will be conducted at the Purchaser location.

1.1.7. The purpose and scope of the Contract are further refined in the Statement of Work (SoW), Book II, Part III 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 scope identified in Section 1.1 above. The Contractor shall perform all activities required as per Book II Part III (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 III according to the schedule defined in the SOW. The contract is scheduled for two (2) phases of eighteen (18) months each, both resulting in a baseline delivery for each of the three systems (JEMM, AMD & IM Portal).

1.2.2. The Contract will be governed by the provisions as stated in the Book II, prospective contract.

1.3. GOVERNING RULES, ELIGIBILITY, AND EXCLUSION PROVISIONS

1.3.1. This RFQ is issued and shall be conducted under the revised NATO Procedure: "Procedure Governing the Use of Basic Ordering Agreements concluded by the NATO Communications and Information Agency – 2019 version", Ref: AC/4-D(2019)0004 (INV).

1.3.2. The security classification of this RFQ is "NATO UNCLASSIFIED".

1.3.3. 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 the

solicitations IFB-CO-115112-ETEE (BMD Enhanced JEMM System), IFB-CO-115113-ETEE (AMD Simulation System) and RFQ-CO-115114-ETEE (BMD Exercise IM Portal).

1.3.4. Basis of Award: The contract resulting from this RFQ shall be awarded to the lowest priced technically compliant offer.

1.3.5. The Bidder shall refer to the Purchaser all queries for a resolution of conflicts found in information contained in this document in accordance with the procedures set forth in §2.6 of the Bidding Instructions entitled "Requests for RFQ Clarifications".

1.3.6. The target date for Contract Award is November 2022.

1.4. SECURITY

1.4.1. Contractor will be required to handle and store classified material to the level of "NATO RESTRICTED". The Contractor shall have the appropriate facility and personnel clearances for all personnel involved in the handling of the classififed material and all personnel required to have access to the classified material in order to perform the work. Should a Contractor be unable to perform the contract due to the fact that the facility and personnel clearances have not been provided by their respective national security agency, this lack of clearance cannot be the basis for a claim of adjustment or an extension of schedule, nor the lack of clearance be considered a mitigating circumstance in the case of an assessment of Liquidated Damages or a determination of Termination For Default by the Purchaser.

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.

1.5. DOCUMENTATION

1.5.1. All documentation, including the RFQ 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 RFQ. 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. The term “Assembly” as used herein means an item forming a portion of equipment that can be provisioned and replaced as an entity and which normally incorporates replaceable parts or groups of parts.

2.1.2. The term “Bidder” as used herein refers to a firm, consortium, or joint venture which submits an offer in response to this solicitation.

2.1.3. The term “Compliance” as used herein means strict conformity to the requirements and standards specified in this Request for Quote.

2.1.4. The term “Contractor” refers to a firm of a participating country which has signed a Contract under which it will perform a service, manufacture a product, or carry out work for NATO.

2.1.5. The term “Participating Country” as used herein means one of the contributory NATO nations in the project, namely, (in alphabetical order):

2.1.6. ALBANIA, BELGIUM, BULGARIA, CANADA, CROATIA, CZECH REPUBLIC, DENMARK, ESTONIA, FRANCE, GERMANY, GREECE, HUNGARY, ICELAND, ITALY, LATVIA, LITHUANIA, LUXEMBOURG, MONTENEGRO, NETHERLANDS, NORWAY, POLAND, PORTUGAL, ROMANIA, SLOVAKIA, SLOVENIA, SPAIN, TURKEY, UNITED KINGDOM, UNITED STATES OF AMERICA.

2.1.7. The term “Purchaser” refers to the authority issuing the RFQ and/or awarding the Contract (the NATO Communications and Information Agency, NCIA).

2.1.8. The term “Sub-Assembly” as used herein refers to a portion of an assembly consisting of two or more parts that can be provisioned and replaced as an entity. The definition purposely excludes components and/or parts.

2.2. ELIGIBILITY

2.2.1. Only firms which hold an active BOA stipulated with the NCI Agency are eligible to take part in this RFQ. In addition, all contractors, sub-contractors and manufacturers, at any tier, must be from Participating Countries.

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

2.2.3. 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.

2.2.4. The intellectual property rights to all design documentation and related system operating software shall reside in NATO member countries, and no license fee, or royalty charges shall be paid by the Contractor to firms, individuals or governments other than within the NATO member countries.

2.2.5. 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 "Prime Contractor", shall represent all members of the consortium with the NCI Agency and/or NATO. The "Prime 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 "Prime Contractor" by all members associated with the consortium. Evidence of authority to act on behalf of the consortium by the "Prime 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.

2.3 BID DELIVERY AND BID CLOSING

2.3.1. All Quotations shall be in the possession of the Purchaser at the e-mail address given below in Paragraph 2.3.2 below before **12:00 Hours (BRUSSELS TIME) on Monday, 11 JULY 2022** at which time and date Quotations shall be closed.

2.3.2. Offerors are requested to submit their quotation electronically **solely and only** to the following email address:

Email: RFQCO115625ETEEWP4@ncia.nato.int

2.3.3. The Quotation shall consist of three (3) separate subject emails:

2.3.3.1. For the **first e-mail** the subject line shall read: "**RFQ-CO-115625-ETEE – Official Bid for [*company name*] – Part 1 - Administrative Envelope".** The e-mail content shall be as described in Paragraph 3.1.4 (a) below, with no password or encryption protection to the file and shall be not larger than 10MB total.

2.3.3.2. For the **second e-mail** the subject line shall read: "**RFQ-CO-115625-ETEE – Official Bid for [*company name*] – Part 2 - Price Quotation**". The e-mail content shall be as described in Paragraph 3.1.4 (b) below, with no password protection or encryption to the file, and shall be not larger than 10MB total.

2.3.3.3. For the **third e-mail** the subject line shall read: "**RFQ-CO-115625-ETEE – Official Bid for [*company name*] – Part 3 – Technical Proposal**". The e-mail content shall be as described in Paragraph 3.1.4 (c) below, with no

password protection to the file, and shall be not larger than 10MB total per e-mail. For large Technical Proposals, multiple e-mails may be required and are allowed to submit the entire package. In such case, Bidders shall clearly indicate the correct order in the e-mail subject line.

2.3.4. Quotations 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.

2.3.5. It is the responsibility of the Offeror to ensure that the quotation submission is duly completed by the specified quotation closing time and date. If a quotation received at the NCI Agency’s facility by electronic submission is unreadable to the degree that conformance to the essential requirements of the solicitation cannot be ascertained, the Purchaser will immediately notify the Offeror that the quotation will be rejected unless the Offeror provides clear and convincing evidence:

(a) Of the content of the Quotation as originally submitted; and,

(b) That the unreadable condition of the quotation was caused by Purchaser software or hardware error, malfunction, or other Purchaser mishandling.

2.3.6. Consideration of Late Bid. It is the responsibility of the Bidder to ensure that the bid submission is duly completed by the specified bid closing time. A late bid shall only be considered for award under the following circumstances:

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

2.3.6.2. The bid was sent **only** to the correct email specified in Section address specified in Section 2.3.2 (RFQCO115625ETEEWP4@ncia.nato.int) and the delay was due solely to the fault of the Purchaser.

2.4 REQUESTS FOR EXTENSION OF BID CLOSING DATE

2.4.1. The Purchaser does not accept, except in exceptional cases, Bidder requests to extend the Bid Closing Date. In any event, all questions and requests for extension of bid closing date must be submitted in writing by fax or e-mail. Such questions shall be forwarded to the Point of Contact specified in § 2.5 and shall arrive **no later than fourteen (14) calendar days** prior to the established Bid closing date. The Purchaser is under no obligation to consider or answer requests submitted after this time. Extensions to the Bid Closing Date are at the sole discretion of the Purchaser.

2.5 PURCHASER POINTS OF CONTACT

2.5.1. The Purchaser Points of Contact (POC) for all information and questions/clarification requests concerning this RFQ is:

Mr. Peter Kowalski, Senior Contracting Officer

Acquisition

E-mail: peter.kowalski@ncia.nato.int

With a Copy to:

Ms. Dorina Cani, Principal Contracting Assistant

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 REQUESTS FOR RFQ 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 RFQ.

2.6.2. All questions and requests for clarification must be submitted in writing using the format in Annex E, All questions and requests must reference the Section(s) in the RFQ subject for clarifications. The questions and/or requests shall be forwarded to the POC specified in § 2 . 5 and shall arrive **not later than 30 days after RFQ release date.** The Purchaser is under no obligation to answer questions submitted after this time. Requests for clarification must address the totality of the concerns of the Bidder for any given area, as the Bidder will generally not be permitted to revisit areas of the RFQ for additional clarification as noted in §2.6.3.

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. Bidders are advised that subsequent questions and/or requests for clarification included in a bid shall neither be answered nor considered for evaluation and may be grounds for a determination of non-compliance.

2.6.5. Except as provided above, all questions will be answered by the Purchaser and the questions and answers (anonomized to remove the

identity of the questioner) shall be issued in writing to all prospective bidders.

2.6.6. The published answers issued by the Purchaser shall be regarded as the authoritative interpretation of the RFQ, and may lead to a formal amendment to the RFQ. Such amendment may also contain changes to the language, terms, conditions and/or specifications of the RFQ. Amendments to the language of the RFQ included in the answers, and/or the formal RFQ amendment, shall be incorporated by the Bidder in its offer.

2.7 REQUESTS FOR WAIVERS AND DEVIATIONS

2.7.1. Bidders are informed that requests for alteration to, waivers of, or deviations from the Schedules, the Special Contract Provisions, the Technical Specifications, the Statement of Work and any other Terms and Conditions of the Prospective Contract shall not be considered after the closing date and time for Requests for Clarification from bidders.

2.7.2. Requests for alterations to the other requirements, terms or conditions of the Request for Quote or the Prospective Contract may only be considered as part of the clarification process set forth in §2.6. 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 REQUEST FOR QUOTATION

2.8.1. The Purchaser may revise, amend or correct the terms, conditions and/or specifications and provisions of the RFQ documents at any time prior to the date set for the Bid Closing. Any and all modifications will be transmitted to all prospective bidders by an official amendment designated as such and issued by the Contracting Authority. Such amendment shall be recorded in the Acknowledgement of Receipt (Annex C-6) which the bidder shall complete and enclose as part of its bid. This process may be part of the clarification procedures set forth in §2.6 or may be an independent action on the part of the Purchaser.

2.8.2. The Purchaser may 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 shall be set forth in the amendment document.

2.8.3. In no case, however, shall the closing date for receipt of bids be less than seven (7) days from the date of issuance of any amendment to the RFQ.

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 RFQ, 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 shall be considered as “Late Modifications” and shall be processed in accordance with the procedure set forth above concerning “Late Bids”, except that unlike a “Late Bid”, the Purchaser shall retain the modification until a selection is made. A modification to a bid which is determined to be late shall 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.

2.10 BID VALIDITY

2.10.1. Bidders shall be bound by the term of their bids for a period of nine (9) months starting from the Bid Closing Date specified in §2.3.1.

2.10.2. In order to comply with this requirement, the Bidder shall complete the Certificate of Bid Validity set forth in Annex C-3 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 in §2.10.1. 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:

(a) 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 Certificate of Bid Validity extended accordingly; or

(b) refuse this extension of time and withdraw the bid 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. Responses against this Request for Quotation do not require the submission of a Bid Guarantee.

2.12 CANCELLATION OF REQUEST FOR QUOTES

2.12.1. The Purchaser may cancel, suspend or withdraw for re-issue at a later date this RFQ 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 shall 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 RFQ.

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 RFQ to the prospective bidders by the fastest means possible, including the use of e-mail where the firms have forwarded the necessary address information. All bidders are consequently strongly encouraged to provide accurate email addressing information and notify the Purchaser at the earliest practicable date should any changes occur.

2.13.2. Bidders are cautioned that the Purchaser will normally rely exclusively on electronic mail to manage all correspondence, amendments, etc., related to this RFQ.

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

2.14 NOTICE TO BIDDERS OF CONTRACT DISTRIBUTION AND DISCLOSURE OF INFORMATION

2.14.1. The resulting Contract is subject to release to the applicable NATO Resource Committee through the NATO Office of Resources (NOR).

2.14.2. The resulting Contract may be subject to release to (i) NATO Resource Committees for audit purposes (including audits carried out using third party companies- See Book II, Special Provisions Article entitled, “Notice of Authorized Disclosure of Information for Mandated NATO Third Party Audits by Resource Committees”; and (ii) to the customer holding a Service Level Agreement with the Agency related to this requirement, upon request from that customer.

3 BID PREPARATION INSTRUCTIONS

3.1 GENERAL

3.1.1. Bids shall be prepared in accordance with the instructions set forth herein. Failure to comply with these instructions may result in the Bid being declared non-compliant.

3.1.2. Bidders shall prepare a complete bid which comprehensively addresses all requirements stated herein. The Bid shall demonstrate the Bidder's understanding of the RFQ and its ability to provide all the deliverables and services listed in the Schedule of Supplies and Services. Bids which are not complete may be declared non-compliant.

3.1.3. The Bidder shall not restate the RFQ requirements in confirmatory terms only. The Bidder must clearly describe what is being offered and exactly how the Bidder will meet all RFQ requirements. Statements in confirmatory terms only shall be sufficient grounds for determining the bid to be non-compliant.

3.1.4. Bidders shall prepare their bid in 3 parts in the following quantities

(a) Administrative Package (Part 1):	Electronic: Scanned PDF copies of the certificates with physical (non-digital) signatures of the prescribed certifications detailed in §3.2. **No** password protection or encryption.
(b) Price Quotation (Part 2):	Electronic: The Price Quotation shall contain one (1) ZIP file containing one (1) electronic copy in Microsoft Excel (readable and searchable) of the completed Schedule of Supplies and Services and one (1) PDF copy of the completed Schedule of Supplies and Services as detailed in § 3.3. **No** password protection or encryption.
(c) Technical Proposal (Part 3):	Electronic: The Technical Proposal shall be contain one (1) ZIP file containing separate files for each of the Volumes as named and described in Section §3.4. **No** password protection or encryption.

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

3.1.6. Documents submitted in accordance with §3.1.4 shall be classified no higher than “NATO UNCLASSIFIED”.

3.1.7. Partial Bids and/or bids containing conditional statements may be declared non-compliant.

3.1.8. Where a PDF format is mandated in these instructions, electronic bid documentation shall be delivered in PDF format without limitations of printing or “copy & paste”. The Purchaser reserves the right to request native formats electronic files of the proposal to facilitate the evaluation process.

3.1.9. Bidders are advised that the Purchaser reserves the right to incorporate the Bidders Technical Proposal in whole or in part in the resulting Contract.

3.1.10. All bidding documents submitted shall be only in the English language.

3.2 PREPARATION OF THE ADMINISTRATIVE PACKAGE (PART 1)

3.2.1. The Bid Administrative Package shall include in accordance with § 3.1.4(a) one ZIP file submitted by email comprised of the required documents.

3.2.2. The Package shall include the Certificates set forth in Annexes to these Bidding Instructions, signed in the original by an authorised representative of the Bidder. Within the Package the bidder shall also include the signed electronic copies of the **certifications** – with physical, not electronic signatures - **set forth in Annex C** hereto, specifically:

(a) C-1 Certificate of Legal Name of Bidder

(b) C-2 Certificate of Independent

(c) C-3 Certificate of Bid Validity

(d) C-4 Certificate of Understanding

(e) C-5 Certificate of Exclusion of Taxes, Duties and Charges

(f) C-6 Acknowledgement of Receipt of RFQ Amendments

(g) C-7 Disclosure of Requirements for NCI Agency Execution of Supplemental Agreements

(h) C-8 Certification of NATO Member Country of Origin of Delivered Equipment, Services, Material and Intellectual Property Rights

(i) C-9 Comprehension and Acceptance of Contract Special Provisions and BOA Provisions

(j) C-10 List of Prospective Sub-Contractors / Consortium members

(k) C-11 Certificate of AQAP 2110 or ISO-9001:2015 Compliance.

(l) C-12 List of Key Personnel with Security Clearance Information

(m) C-13 Disclosure of Involvement of Former NCI Agency Employment

(n) C-14 Contractor and Sub-Contractor Non-COTS Background IPR

(o) C-15 List of Non-COTS 3rd Party IPR

3.2.3. Concerning Certificate C-10, the Contractor shall identify by name, project role, and country of origin, all sub-contractors whose sub-contract value is expected to equal or exceed EUR 125,000, if any. A list of consortium members shall also be completed and included. If there are no sub- contractors/consortium members involved, the Bidder shall state this separately. **The subcontractors listed in this certificate shall be traceable in the Price Bidding Sheets.**

3.2.4. Concerning Certificate C-7, Disclosure of Requirements for NCI Agency Execution of Supplemental Agreements, Bidders shall note especially the following:

3.2.4.1. If supplemental agreements, such as End-User Certificates or Technical Assistance Agreements, are required by national regulations, these must be submitted with the Bidders Bid. Supplemental agreements submitted after the Bid Closing Date shall not be considered.

3.2.4.2. The terms of supplemental agreements, if necessary, are the Bidders / Contractors responsibility and shall be totally consistent with the terms of the (Prospective) Contract, and shall not duplicate, negate, or further interpret any provisions of this Contract. The terms of the (Prospective) Contract shall take precedence over the Supplemental Agreement.

3.2.4.3. A problem with the supplemental agreement in any of the areas mentioned previously in this provision may result in a determination that the Bid is not compliant with the terms of the RFQ, and in rejection of the Bid, or termination for default of the Contract if the supplemental agreement is submitted after Contract award.

3.2.5. The Bidder shall include 1 (one) additional copy of the Technical Proposal Cross-Reference/Compliance Table (see §3.4.4) in the Administrative Package. A copy shall also be included in the Technical Proposal.

3.3 PREPARATION OF THE PRICE QUOTATION (PART 2)

3.3.1. Bidders shall prepare their Price Proposal in accordance with § 3.1.4(b) by submitting one (1) ZIP file containing the completed electronic copy of the Bidding Sheets (Excel) provided with this RFQ under Book I, Annex A and B. The Bidder shall propose an accurate and complete price quotation in completing the Schedule of Supplies and Services as defined in these Bidding Instructions. No alteration of the form and pre-filled content of the Bidding Sheets is allowed, unless otherwise specified in these instructions.

3.3.2. The prices provided shall be intended as the comprehensive total price offered for the fulfilment of all requirements as expressed in the RFQ documentation including but not limited to those expressed in the SOW.

3.3.3. 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.

3.3.4. Bidders shall prepare their Price Quotation by completing the yellow highlighted sections of the Bidding Sheets in accordance with the instructions specified in Annex B.

3.3.5. Bidders shall quote in their own national currency or in EUR, the host nation currency. Bidders may also submit bids in multiple currencies including other NATO member states' currencies under the following conditions:

(a) the currency is of a "Participating Country" in the project, and

(b) 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 sub-contracts and their approximate anticipated value should be listed on a separate sheet and included with the Price Quotation.

3.3.6. The Purchaser, by virtue of its status under the terms of Article IX and X of the Ottawa Agreement, is exempt from all direct taxes (incl.

VAT) and all customs duties on merchandise imported or exported. The Contractor, therefore, shall certify that the prices stipulated in this Contract do not include amounts to cover such direct taxes or customs duties.

3.3.7. The Contractor shall be responsible for ensuring that its respective Sub-contractors are aware that the Purchaser is exempt from taxes and customs duties. The Contractor (and its respective Sub-contractors) shall be responsible for complying with all applicable national and local legal and administrative procedures to ensure that authorities do not attempt to assess taxes and customs duties on goods and property imported or exported through NATO member nation frontiers under this Contract nor assess direct taxation (VAT) on goods sold to the NCI Agency under this Contract. Bidders are reminded of the requirement to complete the certification to this effect in Annex C-5.

3.3.8. Unless otherwise specified in the instructions for the preparation of bidding sheets, all prices quoted in the proposal shall be DDP (Delivered Duty Paid) to specified destination, in accordance with the International Chamber of Commerce INCOTERMS 2020 and shall also cover all packaging, packing, preservation, insurance and transportation charges. Prices quoted shall include all costs for items supplied and delivered to final destination.

3.3.9. The Bidder's attention is directed to the fact that their Price Quotation shall contain no document and/or information other than the priced copies of the Bidding Sheets. Any other document of a contractual or technical nature will not be considered for evaluation and may be cause for a determination of non-compliance by the Purchaser.

3.3.10. When completing the Bidding Sheets, a unit price and total firm fixed price for each proposed element must be supplied on each and every CLIN line item **including all options provided for this RFQ, if any.** Prices should not be grouped. The prices and quantities entered on the document shall reflect the amount of the total items required to meet the contractual requirements. Partial quotations shall be rejected. 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. The accuracy of the inputs of the Bidding Sheets is the responsibility of the Bidder. The Purchaser in its favour may resolve ambiguous computation of prices.

3.3.11. The Bidding Sheets shall clearly illustrate the totals per CLIN and the grand total price of the bid in accordance with the format set out in the Annex A of these Bidding Instructions.

3.3.12. The Bidder shall furnish firm fixed price quotations, for all proposed items. Partial and/or contingent quotations shall be rejected. See Section 1, Para 1.5 through 1.7.

3.3.13. The Bidder understands that there is no obligation under this Contract for the Purchaser to exercise any part of the contract designated as an Option. The Purchaser bears no liability should it decide not to exercise such options.

3.3.14. The Contractor shall be fully liable for all other taxes, assessments, fees, licenses, work permits, administrative charges or other Government assessments or charges which are applicable to the performance of this Contract. It is the Contractor's responsibility to inform itself of its liability in each country where such liability may arise. The Purchaser does not provide, sponsor, or arrange for any privlidges or immunities for the Contractor or the Contractor's staff in the nation(s) where the work under this RFQ is to be performed.

3.3.15. Price Proposals specifying delivery or performance dates in variance dates exceeding the deadlines for completion of works indicated in the Schedule of Supplies and Services may be declared non-compliant. Price Proposals that are offered as contingent may be deemed to be non-compliant (see Para 1.5).

3.3.16. The Bidder shall identify for each CLIN all significant sub-contractors and provide required information about their prospective sub-contractors whose estimated value of the subcontract is expected to equal or exceed EUR 125,000 using the "List of Prospective Sub-Contractors" form attached to Book I Annex C-10.

3.4 PREPARATION OF THE TECHNICAL PROPOSAL (PART 3)

3.4.1. Bidders shall submit their **Technical Proposal** in an electronic package with separate documents in PDF or MS Office formats as required, containing all the information addressing the technical specifications and requirements of the **Statement of Work (SOW)**. The Technical Proposal shall have a confirmation that all requirements in SOW, Book II Part III are included in the proposed solution.

3.4.2. 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:

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

3.4.2.2. Volume 2 – Software Testing and Training – covering the requirements from Section 3 of the SOW; and,

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

3.4.3. The Technical Proposal package shall not exceed 100 pages when printed on A4 paper.

3.4.4. “Times New Roman” fonts in size 12 shall be used for normal text, and “Arial Narrow” fonts not smaller than size 10 for tables and graphics.

3.4.5. Bid-Requirements Cross-Reference Matrix (BRCM). The Bidder shall include a completed BRCM according to the format described at Annex D of Book I.

3.4.6. Volume 1 – Project Management

3.4.6.1. This Volume will address the following elements:

3.4.6.2. Bidder Project Management Qualifications

3.4.6.3. Bidder Project Management Key Personnel Qualifications

3.4.6.4. An initial Risk Register (RR) describing risks and mitigation measures related to maintaining the project schedule and resourcing of the project tasks. The mitigation measures to maintain the project schedule should contain the use of surge capacity and/or parallel teams. The mitigation measures related to resourcing should contain activities for measuring project team performance and implementing lessons identified.

3.4.6.5. Table of Contents for the whole Technical Proposal

3.4.6.6. Bid-Requirements Cross-Reference Matrix (BRCM)

3.4.6.7. Bidder Project Management Qualifications

3.4.6.8. The Bidder shall demonstrate in detail the ability to perform agile development testing by providing a list of two (2) software development, test or validation projects applying an agile development methodology that the Bidder has managed over the past five (5) years with a description of the project and of the various test and/or validation roles fulfilled by the Bidder’s project members and of their average assignment time to the project. A project qualifies as a valid reference if the testing and/or validation component exceeds either four (4) person-years of effort or one (1) years of duration of the test effort.

3.4.6.9. Bidder Project Management Key Personnel Qualifications

3.4.6.10. The Bidder shall provide the information described in the Sections 3.4.6.3.2 to 3.4.6.3.4 for the proposed Project Management Key Personnel and in addition for one (1) alternative Project Manager that the Bidder has access to.

3.4.6.11. The Bidder shall provide evidence that the Project Management Key Personnel meet the required essential qualifications described in Section 2.3 of the SOW by specifying the Key Personnel university qualification(s) and by describing per agile software development or validation 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 software has been implemented using a service oriented architecture, if applicable which service oriented approach was used, if applicable which requirement traceability and test technologies were employed for the validation. The information shall be presented in a tabular format in descending chronological order.

3.4.6.12. 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.

3.4.6.13. The Bidder may provide additional information to demonstrate that the Project Management Key Personnel meet the qualifications described in Section 2.3.4 of the SOW.

3.4.6.14. An initial Risk Register (RR) and mitigation measures

3.4.6.15. The initial Risk Register and mitigation measures shall demonstrate the ability to perform effective project activity resourcing 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.

3.4.6.16. The draft mitigation measures 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.

3.4.6.17. Table of Contents

3.4.6.18. 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.

3.4.6.19. Bid-Requirements Cross-Reference Matrix (BRCM)

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

3.4.7. Volume 2 – Software Testing and Training

3.4.7.1. This Volume should address the software testing and training requirements specified in Section 3 of the SOW for the two (2) delivery phases described in Tables 1-1 through 1-7 of the SOW.

3.4.7.2. 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 validated by each Work Package, Focus Area and Sprint defined in Table 1-1, Table 1-3 and the Sections 3.6.1 through 3.6.3 of the SOW. For each table entry, the Bidder shall identify the proposed Lead Test Engineer, the proposed Lead BMD SME and other Test 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 validate the products of a Sprint defined in the SOW according to the software testing methodology defined in Section 3.6.1 to 3.6.3 of the SOW and that meet the acceptance criteria defined in Sections 3.10.16 and 3.10.17 of the SOW. The Bidder shall specify the number of virtual test machines required to perform the validation activities per each table entry.

3.4.7.3. The Bidder shall provide for the intermediate delivery phase a Detailed Delivery Plan (DDP) as a tabular description of the Factory Acceptance Test (FAT) and System Integration Test (SIT) activities of each Work Package defined in Table 1-1, Table 1-3 and Table 1-5 of the SOW. For each table entry, the Bidder shall identify the proposed Lead Test Engineer, the proposed Lead BMD SME and other Test 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 validate the intermediate delivery that meets the acceptance criteria defined in Sections 3.10.21 and 3.10.22 of the SOW.

3.4.7.4. The Bidder shall provide for the intermediate delivery phase a Detailed Delivery Plan as a tabular description of the User Acceptance Test (UAT) and Site Acceptance Test (SAT) activities defined in Table 1-7 of the SOW. For each table entry, the Bidder shall identify the proposed Lead Test Engineer, the proposed Lead BMD SME and other Test 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 prepare, conduct and report on

the tests that meets the acceptance criteria defined in Section 3.10.24 of the SOW.

3.4.7.5. The Bidder shall provide for the final delivery phase a Detailed Delivery Plan as a tabular description for each activity per Work Package defined in Table 1-2 and Table 1-4. For each table entry, the Bidder shall identify the proposed Lead Test Engineer if required, the proposed Lead BMD SME and other Test 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 scope defined in Sections 3.3.5.2 and 3.12 of the SOW. The Bidder shall specify the number of virtual test machines required to perform each activity.

3.4.7.6. 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, Table 1-4 and Table 1-6 of the SOW. For each table entry, the Bidder shall identify the proposed Lead Test Engineer, the proposed Lead BMD SME and other Test 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 validate the final delivery that meets the acceptance criteria defined in Sections 3.10.21 and 3.10.22 of the SOW.

3.4.7.7. The Bidder shall provide for the final delivery phase a Detailed Delivery Plan as a tabular description of the User Acceptance Test (UAT) and Site Acceptance Test (SAT) activities defined in Table 1-7 of the SOW. For each table entry, the Bidder shall identify the proposed Lead Test Engineer, the proposed Lead BMD SME and other Test 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 prepare, conduct and report on the tests that meets the acceptance criteria defined in Section 3.10.24 of the SOW.

3.4.7.8. The Bidder shall provide evidence that each of the Lead Test Engineer personnel proposed in the Detailed Delivery Plan Tables described above meet the required essential qualifications specified in Section 3.3.4 of the SOW by describing per software development or validation 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 prepare, execute and report on the software tests and the software test environment. The information shall be presented in a tabular format in descending chronological order.

3.4.7.9. The Bidder shall provide evidence that the Lead BMD SME personnel proposed in the Detailed Delivery Plan Tables described above meet the required essential qualifications specified in Section 3.3.8 of the

SOW by describing per project that they have worked on within the past 7 years: a short, less than 240 words, description of the project including the BMD subject matter expertise required to deliver the project outcome, their role, their time assigned to the project, their contribution to the BMD operations and their usage of the BMD information products like tactical data link messages. The information shall be presented in a tabular format in descending chronological order.

3.4.7.10. The Bidder shall provide evidence that the Test Team member profiles can be fulfilled by Contractor personnel that meet the required essential qualification specified in Section 3.3.7 of the SOW by describing per person the profile that they match, the software development or validation 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 validate the project outcome, their role, their time assigned to the project, the technologies employed to validate the software, the software test environment, their usage of test tools and their role in designing test cases, preparing test data, executing tests and documenting test results. The information shall be presented in a tabular format in descending chronological order.

3.4.7.11. The Bidder shall provide evidence, for example via TOEFL certificate, that the software testing and training Key Personnel meet the English language proficiency requirement described in Sections 3.3.4 and 3.3.8 of the SOW.

3.4.8. Volume 3 - Integrated Support

3.4.8.1. This Volume shall contain a draft Integrated Support Plan (ISP) with appropriate sections covering the Initial Operations Support (IOS) 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, 4.2.3, 4.2.5 and 4.2.7 will be met.

3.4.8.2. The Bidder shall provide as an annex to the ISP, for each of the mentoring activities defined in Table 1-7 of the SOW, a tabular description of the proposed Lead BMD SME and estimated number of team members and 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 prepare and conduct the mentoring activity and to evaluate the success of the mentoring activity.

3.4.8.3. The Bidder shall provide as an annex to the ISP, a draft Mentoring Plan as specified in Section 4.2.6 of the SOW for the initial mentoring session.

3.4.8.4. The Bidder shall provide evidence that at least one member of the mentoring team meets the required essential qualification specified in Section 4.2.4 of the SOW by describing:

3.4.8.5. For each of the training materials developed: a short description of the system to be trained, the objectives of the training, their role, their time assigned to the development and their contribution to the training materials.

3.4.8.6. For each of the training classes delivered: a short description of the training content, the learning objectives of the training, their role, their time assigned and their contribution to the conduct.

3.4.9. Additional materials such as brochures, sales literature, product endorsements and unrelated technical or descriptive narratives shall not be included in the Technical Proposal.

3.5 PACKAGING AND MARKING OF BIDS

3.5.1. The Administrative Package, Price Quotation and the Technical Proposal shall be segregated and **not password protected or encrypted**. Three separate emails shall be sent in accordance to § 2.3.3 of Book I.

4 BID EVALUATION

4.1 GENERAL

4.1.1. The evaluation of bids shall be made by the Purchaser solely on the basis of the requirements in this RFQ. Failure to address any of the bidding requirements in this RFQ or omission of the critical information may result in a determination of non-compliance for the entire Bid.

4.1.2. The evaluation of bids and the determination as to the compliance or technical adequacy of the supplies and services offered shall 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 which is not included in the bid.

4.1.3. The information provided shall be to a level of detail necessary for the Purchaser to determine exactly what the Bidder proposes to furnish and whether the offer meets the technical, administrative and contractual requirements of this RFQ.

4.1.4. 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 determination based upon the facts. The purpose of such clarifications shall be to resolve ambiguities in the bid and to permit the Bidder to state its intentions regarding certain statements contained therein. 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.

4.1.5. The Bidder’s prompt response to the Purchaser’s RFQ clarification requests is important and therefore failure to provide the requested clarifications within the time-limits set forth in the specific Clarification Requests may cause the bid to be deemed non-compliant.

4.1.6. The evaluation will be conducted in accordance with the Procedure Governing the Use of Basic Ordering Agreements concluded by the NATO Communications and Information Agency – 2019 version set forth in the NATO document AC/4-D(2019)0004 (INV), or in accordance with any variation specifically authorized by the relavent NATO authority for this acquisition.

4.1.7. The administrative compliance of the Bids will be evaluated first. Bids that are declared administratively non-compliant may be rejected without further evaluation. Following evaluation for administrative compliance, evaluation will be carried out in the following two areas: Part 2 - Price, Part 3 - Technical.

4.1.8. All administrative compliant Bids shall be reviewed for price compliancy. The Contract resulting from this RFQ shall be awarded to the bidder whose offer, as evaluated by the Purchaser, is the lowest priced bid and compliant with the requirements of this RFQ.

4.2 ADMINISTRATIVE CRITERIA

4.2.1. Prior to commencement of the Price and Technical evaluation, Bids shall be reviewed for compliance with the Bid Submission Requirements of this RFQ. These are as follows:

(a) The Bid was received by the Bid Closing Date and Time,

(b) The Bid was packaged and marked properly (as per §3.5).

(c) The Administrative Package contains all the requested signed originals of the required Certificates in Annex C hereto.

4.2.2. A Bid that fails to conform to the above requirements may be declared non-compliant and may not be evaluated further by the Purchaser.

4.2.3. If it is discovered, during either the Price or Technical evaluation, that the Bidder has taken exception to the Terms and Conditions of the Prospective Contract, or has qualified and/or otherwise conditioned its offer on a modification or alteration of the Terms and Conditions or the language of the Statement of Work, the Bidder may be determined to have submitted a non-compliant bid.

4.3 PRICE CRITERIA

4.3.1. The Bidder's Price Quotation

4.3.1.1. The Bidder's Price Quotation shall be first assessed for compliance against the standards detailed in the following paragraphs. A bid which fails to meet the compliance standards defined in this section may be declared non-compliant and may not be evaluated further by the Purchaser.

4.3.1.2. The Price Quotation meets the requirements for preparation and submission of the Price Quotation set forth in the Bid Preparation Section (§3) and the Instructions for Contractor's Bidding Sheets (Annex B hereto), in particular:

a. The Bidder has prepared the Price Proposal in the form of the Bidding Sheets provided under Annex A of these Bidding Instructions, by completing the yellow highlighted sections in accordance with the instructions specified in Annex B.

b. The Bidder has furnished Firm Fixed Prices for all items listed.

c. All pricing data, i.e., quantities, unit prices, has been provided as reflected in the Bidding Sheets.

d. Bid prices include all costs for items supplied, delivered, and supported.

e. All prices have been accurately entered into appropriate columns, and accurately summed up.

f. The Bidder has provided accurate unit price, and total price for each line item and sub-item (if any). The prices of the sub-items (if any) total the price of the major item of which they constitute a part.

g. The totals per CLIN and the bid grand total are accurate.

h. The currency of all line items has been clearly indicated. Line items with multiple currencies contain as many totals on that line item as there are identified currencies.

i. The Bidder has quoted in its own national currency or in the Host Nation currency, Euros. Where multiple currencies including other NATO member states' currencies are quoted, the conditions of §3.3.4 are met.

j. The Bidder has indicated that in accordance with the treaties governing the terms of business with NATO, it excluded from its prices all taxes, duties and customs charges from which the Purchaser has been exempted.

k. Price quotes for each individual item(s) and totalled prices are accurate, realistic (based on historic data, and/or market and competitive trends in the specified industrial sector(s)), adequate and traceable.

4.3.1.3. Price Quotation does not contain any document and/or information other than the priced copies of the Bidding Sheets. Any other document of a contractual or technical nature will not be considered for evaluation and may be cause for a determination of non-compliance by the Purchaser.

4.3.1.4. The Price Quotation meets requirements for price realism as described in §4.3.4.

4.3.1.5. Completed Bidding Sheets shall show that the offered delivery schedule meets the mandatory delivery requirements of the Prospective Contract.

4.3.2. Basis of Price Comparison and Award(s)

4.3.2.1. The Purchaser shall convert all prices quoted into EURO for purposes of comparison and computation of price scores. The exchange rate to be utilised by the Purchaser shall 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.

4.3.2.2. Basis of Award: The contract shall be awarded to the Bidder with the proposal evaluated as offering the lowest priced technically compliant offer.

4.3.3. Inconsistencies and discrepancies in bid price quotation

4.3.3.1. In case of inconsistencies, discrepancies and/or contradictory pricing information in the different parts of the bid price submission and notwithstanding the possibility for the Purchaser, at its sole discretion to obtain clarification from the bidder, for the purpose of determining the total price of the Bid, the following order of precedence shall apply:

a. Bidding Sheet Total to be Evaluated Bid Price as indicated by the Bidder,
b. Total of the Bid calculated from the indicated Total Prices(s) indicated per CLIN(s).

4.3.4. Price Realism

4.3.4.1. Otherwise successful Bidders that submit a price quotation so low that it is not a realistic reflection of the objective cost of performance of the associated technical proposal may be considered by the Purchaser to have submitted an unrealistic offer and that offer may be determined to be non-compliant.

4.3.4.2. Indicators of an unrealistically low bid may be the following, amongst others:

a. Labour Costs that, when amortised over the expected or proposed direct labour hours, indicate average labour rates far below those prevailing in the Bidders locality for the types of labour proposed.

b. Direct Material costs that are considered to be too low for the amounts and types of material proposed, based on prevailing market prices for such material.

c. Numerous Line Item prices for supplies and services that are provided at no cost or at nominal prices.

4.3.4.3. If the Purchaser has reason to suspect that a Bidder has artificially debased its prices in order to secure contract award, the Purchaser will request clarification of the bid in this regard and the Bidder shall provide explanation on one of the following bases:

a. An error was made in the preparation of the Price Quotation. In such a case, the Bidder must document the nature of the error and show background documentation concerning the preparation of the Price Quotation that makes a convincing case that a mistake was made by the Bidder. In such a case, the Bidder shall petition the Purchaser to both remain in the competition and accept the Contract at the offered price, or to withdraw from the competition.

b. The Bidder has a competitive advantage due to prior experience or industrial/technological processes that demonstrably reduce the costs of Bidder performance and therefore the price offered is realistic. Such an argument must support the technical proposal offered and convincingly and objectively describe the competitive advantage and the net savings achieved by this advantage over standard market practices and technology.

c. The Bidder recognises that the submitted Price Quotation is unrealistically low compared to its cost of performance and, for business reasons, the Bidder is willing to absorb such a loss. Such a statement can only be made by the head of the business unit submitting the Bid and will normally be made at the level of Chief Operating Officer or Chief Executive Officer. In such a case, the Bidder shall estimate the potential loss and show that the financial resources of the Bidder are adequate to withstand such reduction in revenue.

4.3.4.4. If a Bidder fails to submit a comprehensive and compelling response on one of the bases above, the Purchaser may determine the Bid submitted as non-compliant. If the Bidder responds on the basis of a) above and requests to withdraw from the competition, the Purchaser may, depending on the nature and gravity of the mistake, allow the Bidder to withdraw.

4.3.4.5. If the Purchaser accepts the Bidder's explanation of mistake in §4 . 3 . 4 . 3 (a) and allows the Bidder to accept the Contract at the offered price, or the Purchaser accepts the Bidder's explanation pursuant to §4 . 3 . 4 . 3 (c), the Bidder shall agree that the supporting pricing data submitted with its Bid may be incorporated by reference in the resultant Contract. The Bidder shall agree as a condition of Contract signature, that the pricing data will be the basis of determining fair and reasonable pricing for all subsequent

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

4.3.4.6. If the Bidder presents a convincing rationale pursuant to §4.3.4.3(b), no additional action may be warranted. The Purchaser, however, reserves its right to reject such an argument if the rationale, in the Purchaser's opinion, is not compelling or capable of objective analysis. In such a case the Bid may be determined to be non-compliant.

4.4 TECHNICAL CRITERIA

4.4.1. Upon determination of the lowest-priced Bid as described above, the Bid shall be evaluated to confirm compliance with the criteria in Table 1 associated with the respective sections of the Technical Proposal.

EVALUATION CRITERIA	RFQ REFERENCE
Provided proof through project references of the overall ability of the Contractor to meet the Purchaser's Project Management requirements.	Book I 3.4.6.2 SOW 2
Provided proof that the proposed Project Management Key Personnel fulfils all essential qualifications listed in the SOW Section 2.3.4	Book I 3.4.6.3 SOW 2.3.4
Provided proof that the alternate Project Manager, that the Bidder has access to, fulfils all essential qualifications listed in the SOW Section 2.3.4	Book I 3.4.6.3 SOW 2.3.4
Completeness of the provided initial Risk Register (RR) and mitigation measures regarding the schedule related risks	Book I 3.4.6.4 SOW 2.1.3
Completeness of the provided initial Risk Register (RR) and mitigation measures regarding the resourcing related risks	Book I 3.4.6.4 SOW 2.1.3
Completeness of the provided initial Risk Register (RR) and mitigation measures regarding the resource performance related risks	Book I 3.4.6.4 SOW 2.1.3
Completeness of the Detailed Delivery Plan (DDP) for the Sprint test events of the intermediate delivery phase	Book I 3.4.7.2 SOW 3
Completeness of the Detailed Delivery Plan (DDP) for the FAT and SIT of the intermediate delivery phase	Book I 3.4.7.3 SOW 3
Completeness of the Detailed Delivery Plan (DDP) for the UAT and SAT of the intermediate delivery phase	Book I 3.4.7.4 SOW 3
Completeness of the Detailed Delivery Plan (DDP) for the Sprint test events of the final delivery phase	Book I 3.4.7.5 SOW 3
Completeness of the Detailed Delivery Plan (DDP) for the FAT and SIT of the final delivery phase	Book I 3.4.7.6 SOW 3
Completeness of the Detailed Delivery Plan (DDP) for the UAT and SAT of the final delivery phase	Book I 3.4.7.7 SOW 3
Provided proof that the proposed Lead Test Engineer Key Personnel for WP1 fulfils all essential qualifications listed in the SOW Section 3.3.4	Book I 3.4.7.8, 3.4.7.11 SOW 3.3.4
Provided proof that the proposed Lead Test Engineer Key Personnel for WP2 fulfils all essential qualifications listed in the SOW Section 3.3.4	Book I 3.4.7.8, 3.4.7.11 SOW 3.3.4
Provided proof that the proposed Lead Test Engineer Key Personnel for WP3 fulfils all essential qualifications listed in the SOW Section 3.3.4	Book I 3.4.7.8, 3.4.7.11 SOW 3.3.4
Provided proof that the proposed Lead BMD SME Key Personnel fulfils all essential qualifications listed in the SOW Section 3.3.8	Book I 3.4.7.9, 3.4.7.11 SOW 3.3.8
Provided proof for at least 50% of the proposed Test Team members that the Test Team members fulfil all essential qualifications listed in the SOW Section 3.3.7	Book I 3.4.7.10 SOW 3.3.7

Completenes of the draft Integrated Support Plan (ISP) describing in detail how the requirements specified in Sections 4.2.2, 4.2.3, 4.2.5, 4.2.7 of the SOW will be met.	Book I 3.4.8.1 SOW 4.2
Completenes of the detailed mentoring activity resource allocations	Book I 3.4.8.1.1 SOW 4.2
Completenes of the draft mentoring plan for the initial mentoring session as specified in Section 4.2.6 of the SOW.	Book I 3.4.8.1.2 SOW 4.2.6
Provided proof that the proposed Lead BMD SME Key Personnel for the mentoring activities fulfils all essential qualifications listed in the SOW Section 3.3.8	Book I 3.4.8.1.1 SOW 3.3.8, 4.2.4
Provided proof that one of the proposed trainers for the mentoring activities fulfils all essential qualifications listed in the SOW Section 4.2.4	Book I 3.4.8.2 SOW 4.2.4

Table 1 – Criteria for Technical Evaluation

ANNEX A – BIDDING SHEETS

[Provided under separate MS Excel File:
"02_RFQ-CO-115625-ETEE WP4 OP ASSUR Book I Annex A Bidding Sheets FINAL".

ANNEX B - INSTRUCTIONS FOR THE PREPARATION OF BIDDING SHEETS

1. Bidders are required, in preparing their Price Quotation to utilise the Bidding Sheets following the instructions detailed in Section 3 – Bid Preparation Instructions and CLIN Bidding sheet instructions within the Bidding sheets itself.

2. Detailed instructions for preparation of the Bidding Sheets may be found in the MS Excel spreadsheet tab entitled “Instructions” of the RFQ file “*02_RFQ-CO-115625-ETEE WP4 OP ASSUR Book I Annex A Bidding Sheets FINAL*”.

ANNEX C – CERTIFICATES

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ANNEX C-1

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 C-2

CERTIFICATE OF INDEPENDENT DETERMINATION

1. Each Bidder shall certify that in connection with this procurement:
   a. This 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 this bid have not been knowingly disclosed by the Bidder and shall 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 or firm to submit, or not to submit, a Bid for the purpose of restricting competition.

2. Each person signing this Bid shall also certify that:
   a. He/she is the person in the Bidder's organisation responsible within that organisation for the decision as to the bid and that he/she has not participated and shall not participate in any action contrary to 1(a) through 1(c) above, or
   b. (i) He/she is not the person in the Bidder's organisation responsible within that organisation for the bid but that he/she has been authorised in writing to act as agent for the persons responsible for such a decision in certifying that such persons have not participated, and shall not participate in any action contrary to 1(a) through 1(c) above, and as their agent does hereby so certify, and
      (ii) He/she has not participated and shall not participate in any action contrary to 1(a) through 1(c) above.

…..
Date

…..
Signature of Authorised Representative

…..
Printed Name and Title

…..
Company

ANNEX C-3

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 shall remain valid for a period of nine (9) months from the Bid Closing Date of this Request for Quote.

…….....
Signature of Authorised Representative

…….....
Date

…….....
Printed Name and Title

…….....
Company

ANNEX C-4

CERTIFICATE OF UNDERSTANDING

I certify that

.....
.....*(insert Company Name)*

has read and fully understands the requirements of this Request for Quote (RFQ) and that the Bid recognises these requirements in total.

I also certify to the best of my expert knowledge that this Bid is within the "state of art" boundaries as they exist at the time of bidding for this project.

…..
Date

…….
Signature of Authorised Representative

…….
Printed Name and Title

…….
Company

ANNEX C-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

…..
Printed Name and Title

…..
Company

ANNEX C-6

ACKNOWLEDGEMENT OF RECEIPT OF RFQ AMENDMENTS

I confirm that the following Amendments to Request for Quote No RFQ-CO-115625-ETEE have been received and the Bid as submitted reflects the content of such Amendments:

Amendment Number	Date Issued	Date of Receipt
[Bidder list all amendments here]		

…….
Date

…….
Signature of Authorised Representative

…….
Printed Name and Title

…….
Company

ANNEX C-7

DISCLOSURE OF REQUIREMENTS FOR NCI AGENCY EXECUTION OF SUPPLEMENTAL AGREEMENTS

I, the undersigned, as an authorised representative of ……. ……*(insert Company Name)*, certify the following statement:

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

2. These supplemental agreements are listed as follows: [*Bidder Insert here any supplemental agreements or "N/A" if none*]

3. Examples of the terms and conditions of these agreements are attached hereto. 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, see …….. *(complete, if any or indicate "N/A")*. 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.

4. 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), see ……. *(Bidder complete, if any)*.

5. 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 NCIA to determine the submitted bid to be non-compliant with the requirements of the RFQ.

6 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

…..
Printed Name and Title

…..

Company

ANNEX C-8

CERTIFICATION OF NATO MEMBER COUNTRY ORIGIN OF DELIVERED EQUIPMENT, SERVICES, MATERIALS AND INTELLECTUAL PROPERTY RIGHTS

The Bidder hereby certifies that, if awarded the Contract pursuant to this solicitation, it 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 provided and replaced as an entity)*; and

(c) 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 countries.

…..
Date

…..
Signature of Authorised Representative

…..
Printed Name and Title

…..
Company

*This definition purposely excludes components and/or parts (as defined in AcodP-1), which are not subject to this certification.

ANNEX C-9

COMPREHENSION AND ACCEPTANCE OF CONTRACT SPECIAL PROVISIONS AND BOA PROVISIONS

The Bidder hereby certifies that it has reviewed the Contract Special Provisions set forth in the Prospective Contract, Book II of this Request for Quote. The Bidder hereby provides its confirmation that it fully comprehends the rights, obligations and responsibilities of the Contractor as set forth in the Articles and Clauses 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 Terms and Conditions and it shall accept and abide by the stated Special Contract Provisions and the BOA agreement provisions if awarded the contract as a result of this Request for Quote.

…..
Date

…..
Signature of Authorised Representative

…..
Printed Name and Title

…..
Company

ANNEX C-10

LIST OF PROSPECTIVE SUB-CONTRACTORS/CONSORTIUM MEMBERS

Name and Address of Sub-Contractor, incl. country of origin/registration	Primary Location of Work	Items/Services to be Provided	Estimated Value of Sub-Contract

If no sub-Contractors/consortium members are involved, [state this here below]:
……..
……
……
……

…….....
Date

…….....
Signature of Authorised Representative

…….....
Printed Name and Title

…….....
Company

ANNEX C-11

CERTIFICATE OF AQAP 2110 OR ISO 9001:2015 COMPLIANCE

I hereby certify that _____(*insert Company name*) 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].

A copy of the certification is attached herewith.

…….. Date

…….. Signature of Authorised Representative

…….. Printed Name and Title

…….. Company

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

ANNEX C-12

LIST OF KEY PERSONNEL SECURITY CLEARANCE INFORMATION

Key Personnel Name	Level of NATO Clearance	Dates of Clearance Validity	National Certifying Authority	Expected date of obtaining the required Security Clearance

ANNEX C-13
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 company'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 NCIA Position	Current Company 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 : .....

Name & Title : .....

Company : .....

Bid Reference : .....

Excerpt of NCI Agency AD. 05.00, NCIA Code of Conduct dated May 2017.

Article 14 PROCUREMENT AND CONTRACTORS

14.1 NCI Agency Personnel are required to maintain unquestionable integrity and impartiality in relation to procurements initiated by the NCI Agency.

14.2 NCI Agency Personnel shall not disclose any proprietary or contract related information regarding procurement directly or indirectly to any person other than a person authorized by the NCI Agency to receive such information. NCI Agency Personnel shall not disclose any documentation related to a procurement action to any third party without a need to know1 (e.g., draft statement of work, statement of requirements) unless this is expressly provided under NATO Procurement Regulations or authorized in writing by the Director of Acquisition. During an on-going selection, NCI Agency Personnel shall not disclose any information on the selection procedure unless authorized by the Chairman of the award committee/board. The NCI Agency Personnel concerned will ensure that proper access controls are put in place to prevent disclosure of procurement information that has not yet been authorized for release for outside distribution, including draft statements of work and requirement documentations.

14.3 NCI Agency Personnel will not participate in a source selection if an offer has been provided by a friend, family member, a relative, or by a business concern owned, substantially owned, or controlled by him/her or by a friend, family member or a relative. NCI Agency Personnel appointed as part of an evaluation shall report such links to the Director of Acquisition immediately upon becoming aware of it.

14.4 Contractors and consultants shall not be allowed to participate in the drafting of the statement of work or in the source selection process unless they and their company/employer will be excluded from competition of the related contract. The same will apply to contractors and consultants involved in the definition and development of requirements.

14.5 Contractors will be given specific and coherent statements of work, providing precise explanation of how she/he is going to be employed. Tasks to be performed and minimum qualifications are to be well defined from the start. In addition, supervisors will ensure that contractors do not occupy managerial positions within the Agency.

14.6 NCI Agency Personnel shall not enter into authorized commitments in the name of NCI Agency or NATO unless specifically authorized. NCI Agency Personnel must abstain from making promises or commitment to award or amend a contract or otherwise create the appearance of a commitment from the NCI Agency unless properly authorized by the NCI Agency.

14.7 NCI Agency Personnel shall not endorse directly or indirectly products from industry. Therefore, NCI Agency Personnel shall not name or make statements endorsing or appearing to endorse products of specific companies.

14.8 Industry partners will need to abide with the post-employment measures under this Directive upon submission of their bids / proposals to the NCI

Agency. As part of the selection process, industry will be requested to agree with an ethical statement.

15 INDUSTRY INITIATIVES

15.1 Industry initiatives may include loans, displays, tests or evaluation of equipment and software, requesting NCI Agency speakers at industry gatherings and conferences, inviting speakers from industry to NCI Agency events, consultancy or studies of technical or organizational issues, etc. These initiatives are usually at no cost to the NCI Agency and take place at a pre-contractual phase or before the development of requirements and specifications. While there are benefits associated with the early involvement of industry in the definition of requirements and specifications, this also raises the potential for unfair treatment of potential competitors.

15.2 Industry initiatives which go beyond routine interaction in connection with on-going contracts must be reported to and coordinated by the NCI Agency Acquisition Directorate for approval. Industry initiatives shall be properly documented and governed by written agreements between the NCI Agency and the company concerned where relevant. Such agreements may contain provisions describing the nature of the initiative, the non-disclosure of NCI Agency/NATO information, NCI Agency ownership of any resulting work, the NCI Agency's right to release such work product to future competitors for any follow-on competition or contract, the requirement that any studies must provide non-proprietary solutions and/or an acknowledgement that the participating companies will not receive any preferential treatment in the contracting process.

15.3 Any authorized industry initiatives must be conducted in such a way that it does not confer an unfair advantage to the industry concerned or create competitive hurdles for potential competitors.

16 POST EMPLOYMENT MEASURES

17.1 The NCI Agency will not offer employment contracts to former NCI Agency Personnel who departed less than 2 years earlier, unless prior approval by the General Manager has been received.

17.2 Former NCI Agency Personnel will not be accepted as consultants or commercial counterpart for two (2) years after finalization of their employment at NCI Agency, unless the General Manager decides otherwise in the interest of the Agency and as long as NATO rules on double remuneration are observed. Such decision shall be recorded in writing. Commercial counterparts include owners or majority shareholders, key account managers, or staff member, agent or consultant of a company and/or subcontractors seeking business at any tier with the NCI Agency in relation to a procurement action in which the departing NCI Agency staff member was involved when he/she was under the employment of the NCI Agency. As per the Prince 2 Project methodology, a Project is defined as a "temporary organization that is created for the purpose of delivering one or more business products according to an agreed business case". For the purpose of this provision, involvement requires (i) drafting, review or coordination of internal procurement activities and documentation, such as statement of work and statement of requirement; and/or (ii) access to procurement information that

has not yet been authorized for release for outside distribution, including draft statements of work and requirement documentations; and/or (iii) being appointed as a representative to the Project governance (e.g., Project Board) with access to procurement information as per (ii) above; and/or (iv) having provided strategic guidance to the project, with access to procurement information as per (ii) above.

17.3 In addition to Section 17.2 above, former NCI Agency Personnel at grades A5 and above or ranks OF-5 and above are prohibited during twelve months following the end of their employment with the NCI Agency to engaging in negotiations, representational communications and/or advisory activities with the NCI Agency on behalf of a private entity, unless this has been agreed in advance by the NCI Agency General Manager and notified to the ASB.

17.4 NCI Agency Personnel leaving the Agency shall not contact their former colleagues in view of obtaining any information or documentation about procurement activities not yet authorized' release. NCI Agency Personnel shall immediately report such contacts to the Director of Acquisition.

17.5 The ASB Chairman will be the approving authority upon recommendation by the Legal Adviser when the NCI Agency Personnel concerned by the above is the NCI Agency General Manager and will notify the ASB.

17.6 NCI Agency Personnel leaving the Agency shall sign a statement that they are aware of the post-employment measures set out in this Directive.

17.7 The post-employment measures set out in this Directive shall be reflected in the NCI Agency procurement documents, such as IFBs, and contract provisions.

ANNEX C-14

CONTRACTOR AND SUB-CONTRACTOR NON-COTS BACKGROUND IPR

The Contractor and Sub-Contractor Non-COTS Background IPR specified in the table below will be used for the purpose of carrying out work pursuant to the Contract.

ITEM	DESCRIPTION
[*Bidder list IPR or indicate "None"*]	

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

The Background IPR stated above complies with the terms specified in the Prospective Contract (Book II) Special Provisions.

ANNEX C-15

LIST OF NON-COTS 3rd PARTY IPR

The Non-COTS 3rd Party IPR specified in the table below will be used for the purpose of carrying out work pursuant to the Contract.

ITEM	DESCRIPTION
[Bidder list IPR or indicate "None"]	

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

The 3rd Party IPR stated above complies with the IPR terms as specified in the Prospective Contract (Book II) Special Provisions.

ANNEX D – Bid-Requirements Cross Reference Matrix (BRCM)

Bidders shall provide the BRCM in Excel format according to the template "02B_RFQ-CO-115625-ETEE WP4 OP ASSUR Book I Annex D BRCM FINAL".

Purpose: The BRCM is an instrument for the Bidder to cross-link the relevant sections of their technical proposal with the RFQ requirements, instructions and evaluation criteria. Bidders taking care to carefully and thoroughly complete the BRCM will ensure that all relevant sections of their proposal are taken into account during Purchaser evaluation and to ensure the best possible evaluation result.

The Sections 3.4.6 through 3.4.8 of the Bidding Instructions provide guidance on the build-up and content of the bid. The section 4.4.1 of the Bidding Instructions provide the criteria that will be applied for the evaluation of the bid. Both areas are relevant for the BRCM. The items already filled-in in the provided BRCM sheet is to ensure that Bidders have considered, at an absolute minimum, the traceability from the content requirements to the bid sections. Adding extra elaboration in the BRCM to reference the Section 4.4.1 of the Bidding Instructions and the specific requirements in the Statement of Work (SoW) provides extra granularity to the Purchaser for the traceability of RFQ requirements to your technical proposal.

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 3.4.6 through 3.4.8 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 "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.
    - "Partial": The Bidder states fulfilling the requirement but only describes part of it. Such a classification is expected only for a small number of SOW and SOW Annexes requirements.

One copy of the duly completed BRCM shall be included in the Technical Proposal Package.

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

ANNEX E – Clarification Request Forms

INSERT COMPANY NAME

HERE INSERT SUBMISSION

DATE HERE

ADMINISTRATION or CONTRACTING			
Serial Nr	**RFQ Book**	**RFQ Section Ref.**	**QUESTION**
A.1			
A.2			
A.3			

INSERT COMPANY NAME HERE

INSERT SUBMISSION DATE HERE

PRICE			
Serial Nr	**RFQ Book**	**RFQ Section Ref.**	**QUESTION**
P.1			
P.2			
P.3			

INSERT COMPANY NAME

HERE INSERT SUBMISSION

DATE HERE

TECHNICAL			
Serial Nr	**RFQ Book**	**RFQ Section Ref.**	**QUESTION**
T.1			
T.2			
T.3			

ANNEX F – RESERVED

RFQ-CO-115625-ETEE

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

PROSPECTIVE CONTRACT

RFQ-CO-115625-ETEE

OPERATIONAL ASSURANCE, HAND OVER, TRAINING AND MENTORING CAPABILITY WITHIN EDUCATION, TRAINING, EXERCISE AND EVALUATION (ETEE) FUNCTIONAL SERVICES (FS)

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SIGNATURE SHEET

NCI Agency PURCHASE ORDER	
1. Original Number __ of	**2. PO Number : [TBD]**
3. Contract Number: CO-115625-ETEE	**4. Effective date (EDC): SEE BLOCK 17**
5. Contractor: **[TBD]**	**6. Purchaser:** The General Manager NATO Communications and Information Agency Boulevard Leopold III B-1110 Bruxelles Tel: +32(0)2 707 8282
7. CONTRACT SCOPE: This is a Contract for the provision of Operational Assurance, Hand Over, Training and Mentoring within ETEE Functional Services, to be delivered in accordance with the terms and conditions specified herein.	
8. TOTAL AMOUNT OF CONTRACT : _____ Currency – Excluding VAT Firm Fixed Price	
9. PERIOD OF PERFORMANCE As stated in Schedule of Supplies and Services and Special Provisions	**10. DELIVERY SITE** As stated in Schedule of Supplies and Services and Special Provisions
11. CONTRACT This Contract consists of the following parts and named documents: a) Part I. Schedule of Supplies and Services b) Part II. Special Contract Provisions and Annexes c) Part III. Statement of Work and Annexes d) NCI Agency Basic Ordering Agreement General Provisions and Appendix 1, of the Basic Ordering Agreement NCIA/BOA/XXXXX XX Month 20xx, incorporated herein by reference. e) In the event of any conflict or inconsistencies between or among any of the documents comprising this Contract, the order of priority specified in Clause 2 of Part II shall apply.	
12. Signature of Contractor	**13. Signature of Purchaser**
14. Name and Title of Signer	**15. Name and Title of Signer**
16. Date signed by the Contractor	**17. Date signed by the Purchaser**

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TABLE OF CONTENTS

1. Part I, Schedule of Supplies and Services
2. Part II, Contract Special Provisions
3. Part III, Statement of Work & Annexes

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CO-115625-ETEE

OPERATIONAL ASSURANCE, HAND OVER, TRAINING AND MENTORING CAPABILITY WITHIN EDUCATION, TRAINING, EXERCISE AND EVALUATION (ETEE) FUNCTIONAL SERVICES (FS)

PART I - CONTRACT SCHEDULES OF SUPPLIES AND SERVICES

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

OPERATIONAL ASSURANCE, HAND OVER, TRAINING AND MENTORING CAPABILITY WITHIN BALLISTIC MISSILE DEFENCE (BMD) FUNCTIONS IN EDUCATION, TRAINING, EXERCISE AND EVALUATION (ETEE) FUNCTIONAL SERVICES (FS)

RFQ-CO-115625-ETEE WP4

BOOK II - PART II

CONTRACT SPECIAL PROVISIONS

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TABLE OF CONTENTS

1. DEFINITIONS....2
2. SCOPE....2
3. PARTICIPATING COUNTRIES....2
4. CONTRACT ADMINISTRATION....3
5. SECURITY....4
6. INTELLECTUAL PROPERTY....5
7. INTELLECTUAL PROPERTY RIGHT INDEMNITY AND ROYALTIES....5
8. ROLES AND RESPONSIBILITIES IN AGILE/SCRUM PROCUREMENT....6
9. INDEMNITY....7
10. KEY PERSONNEL AND CONTRACTOR TEAM ADEQUACY....7
11. OWNERSHIP AND TITLE....9
12. ORDER OF PRECEDENCE....9
13. ACCEPTANCE PROCEDURES – AGILE DEVELOPMENT....9
14. INVOICES AND PAYMENT....10
15. FORCE MAJEURE....11
16. INDEPENDENT CONTRACTOR....11
17. PRICING OF CHANGES, AMENDMENTS AND CLAIMS....12
18. LIQUIDATED DAMAGES....12
19. WARRANTY....13
20. SUPPLEMENTAL AGREEMENT(S), DOCUMENTS AND PERMISSIONS....13
21. CONFLICT OF INTEREST....14
22. THIRD PARTIES....15
23. TECHNICAL DIRECTION....16
24. NOTICE OF AUTHORIZED DISCLOSURE OF INFORMATION FOR MANDATED NATO THIRD PARTY AUDITS....17
ANNEX A. CONTRACTOR AND SUBCONTRACTOR NON-COTS BACKGROUND IPR....20
ANNEX B. THIRD PARTY NON-COTS IPR....21

1. DEFINITIONS

1.1 For the purpose of this contract and unless otherwise explicitly indicated, the following definitions shall apply:

1.2 Acceptance: The act of an authorized representative of the Purchaser by which the Purchaser assumes title and ownership of delivered Works rendered as partial or complete performance of the Contract. “Acceptance” in this regard, unless specifically provided otherwise in the Contract Special Provisions, means final Acceptance where the Contract provides for Provisional or Partial Acceptance.

1.3 Basic Ordering Agreement (BOA): Means the separate agreement the Contractor holds with the NCI Agency under the auspices of the NCI Agency BOA Program.

1.4 Contracting Authority: The General Manager of the NCI Agency, the Director of Acquisition of the NCI Agency, the Chief of Contracts of the NCI Agency or the authorised representatives of the Chief of Contracts of the NCI Agency.

1.5 Contractor: The person or legal entity from a Participating Country which has signed this Contract and is a Party thereto.

1.6 General Provisions: Means the General Provisions contained in the Contractor’s BOA.

1.7 Purchaser: NCI Agency, as represented by the General Manager, NCI Agency. The Purchaser is the legal entity who awards and administers the Contract and stands as one of the Contracting Parties.

2. SCOPE

2.1 The Contractor shall implement the setup and management of a continuous operational assurance and integration test program including schedule, test plan, test data and result. This will be synchronised with the timelines of ETEE BMD FS Work Package (WP) 1 (BMD Enhanced JEMM System), WP2 (AMD Simulation System), and WP3 (BMD Exercise IM Portal) for sprints and releases. The contract will also support the handover to and the training and mentoring of the operational users of the ETEE BMD FS to enable the BMD Community of Interest (COI) to meet their ETEE requirements.

3. PARTICIPATING COUNTRIES

3.1 The following NATO member nations have agreed to fund this acquisition effort: (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.

3.2 The Contractor may issue sub-contracts to firms and purchase from qualified vendors in any participating NATO Nation. None of the work, including project design, labour and services, shall be performed other than by firms from and within participating countries, as per NATO policy.

3.3 The Contractor shall notify in writing to the Purchaser immediately upon being informed of any change in the nationality of its Subcontractor(s) which would prevent the Contractor from further complying with Clause 3.3 above. Upon receipt of this information from the Contractor, the Purchaser may, within three months from this notification, require the Contractor to find an alternate subcontractor, complying with the requirements set out in Clause 3.2 above.

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

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

4. CONTRACT ADMINISTRATION

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

4.2 All notices and communications between the Contractor and the Purchaser shall be written and conducted in English.

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

4.4 Informal notices and informal communication for normal project management may be exchanged by any other means, including telephone.

4.5 All notices and communication shall be effective upon receipt.

4.6 Official Points of Contact are:

Purchaser	Contractor
NCI Agency	
For contractual matters: Attn: Mr Peter Kowalski Senior Contracting Officer E-mail: Peter.Kowalski@ncia.nato.int	For contractual matters: Attn: Tel: E-mail:
For technical/project management matters: Attn. Senior Project Manager Tel: E-mail:	For technical/project management matters: Attn: Project Manager Tel: E-mail:

5. SECURITY

5.1 The Contractor is responsible, in accordance with NATO and National Security regulations, for the proper handling, storage and control of any classified documents and information as may be furnished to the Contractor in relation to the performance of the present contract.

5.2 The security classification of this contract is “NATO UNCLASSIFIED”.

5.3 Contractor's personnel working in the execution of this contract shall hold and maintain a NATO SECRET security clearance valid for the duration of the Contract. This requirement applies to all sub-contracts issued by the Contractor for the effort under this prime Contract.

5.4 The Contractor's facilities shall hold and maintain a facility clearance to permit handling and storage of information classified up to and including NATO RESTRICTED.

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

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

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

5.8 In the absence of valid security clearances for the Contractor's personnel and facility, the Purchaser reserves the right to terminate the Contract for “Default”.

5.9 The Contractor shall note that there are restrictions regarding the carriage and use of electronic devices (e.g. laptops, cellular phones, smart-phones and the like) in NATO designated Security Areas. The Contractor shall be responsible for satisfying and obtaining from the appropriate NATO Authorities the necessary clearance to introduce and utilize any such equipment into the facility.

6. INTELLECTUAL PROPERTY

6.1 All rights arising out of the results of work undertaken by or on behalf of the Purchaser for the purposes of this Contract, including any and all technical data specifications, reports, drawings, computer software data, computer programmes, computer databases, computer software, computer source code, documentation including software documentation, design data, specifications, instructions, test procedures, training material, produced or acquired in the course of such work and, in particular, all rights, including copyright therein, shall from its creation vest in and be the sole and exclusive property of the Purchaser in both object and source code.

6.2 The Purchaser will accept no constraints or limitations on the use of Contract deliverables. Accordingly, the Contractor shall not include Background Intellectual Property in any of the deliverables provided to the Purchaser.

6.3 The Contractor confirms that the products listed in Annex A and B of these Special Provisions is a correct, exhaustive, and complete listing as of the time of Contract signature. The Contractor shall promptly notify the Purchaser in writing should the list of products need updating or correction, and the Contract shall be amended.

7. INTELLECTUAL PROPERTY RIGHT INDEMNITY AND ROYALTIES

7.1 The Contractor shall assume all liability and indemnify the Purchaser, its officers, agents and employees against liability, including costs for the infringement of any patents or copyright in force in any countries arising out of the manufacture,

services performed or delivery of supplies, or out of the use or disposal by or for the account of the Purchaser of such supplies. The Contractor shall be responsible for obtaining any patent or copyright licences necessary for the performance of this Contract and for making all other arrangements required to indemnify the Purchaser from any liability for patent or copyright infringement in said countries.

7.2 The Contractor shall exclude from his prices any royalty pertaining to patents which in accordance with agreements reached between NATO countries may be utilised free of charge by member nations of NATO and by NATO organisations.

7.3 The Contractor shall report in writing to the Purchaser during the performance of this Contract:

7.3.1 The royalties excluded from his price for patent utilised under the agreements mentioned in the Para 7.3 above;

7.3.2 The amount of royalties paid or to be paid by the Contractor directly to others in performance of this Contract.

8. ROLES AND RESPONSIBILITIES IN AGILE/SCRUM PROCUREMENT

8.1 The Purchaser and Contractor will work collaboratively using roles and elements of agile/Scrum development to execute the project and achieve all stated requirements using the methodology described in the Contract Statement of Work.

8.2 Agile development is a software development approach based on iterative development, early and frequent inspection, and incremental deliveries in which user stories and solutions evolve through collaboration in cross-functional teams and through continuous stakeholder feedback. All user epic software requirements listed in this Contract are mandatory, and the Contractor must validate all requirements as stated.

8.3 Neither the Purchaser's Project Manager, nor the Integrated Project Management Team or any other NATO personnel, other than the Purchaser's Contracting Authority, is authorized to make changes to any part of the Contract.

8.4 The Purchaser's Project Manager may provide guidance and direction to the Contractor related to the methodology, planning, review, integration and prioritization of requirements as detailed in the Contract Statement of Work, Part II, "Task 1: Project Management" and "Task 2: Software Testing and Training".

9. INDEMNITY

9.1 The Contractor will indemnify and hold harmless NATO, its servants or agents, against any liability, loss or damage arising out of or in connection of the Supplies and Services under this Contract, including the provisions set out in Clause 22, "Patent and Copyright Indemnification" of the BOA General Provisions.

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

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

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

9.5 This indemnification applies only to the extent that the claim is not compensated for by insurance or otherwise.

10. KEY PERSONNEL AND CONTRACTOR TEAM ADEQUACY

10.1 The individuals listed below are considered to be key to the performance of this contract and shall not be replaced by the Contractor with substitute personnel without the prior written approval of the Purchaser. The Key Personnel are as follows:

POSITION	NAME
Contractor Project Manager (CPM)	[TBD]
Contractor Lead Test Engineer Work Package 1	[TBD]

POSITION	NAME
Contractor Lead Test Engineer Work Package 2	[TBD]
Contractor Lead Test Engineer Work Package 3	[TBD]
Lead BMD Subject Matter Expert (SME)	[TBD]

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

10.3 If the Contractor is unable to nominate and/or replace the lost personnel within the timeframe mentioned in 10.2 above, the Purchaser may conclude that the loss of the Key Personnel endangers progress under the Contract to the extent that the Purchaser may resort to the Clause 19 – "Termination for Default" of the Contract BOA General Provisions for redress of the situation.

10.4 The Purchaser has the right to refuse any proposed substitution if not meeting the qualifications and request the Contractor to offer another qualified individual in lieu thereof. The Purchaser will confirm any consent given to a substitution in writing and only such written consent shall be deemed as valid evidence of Purchaser consent.

10.5 The Purchaser reserves the right, even after acceptance of Contractor personnel on the basis of his/her CV and/or interview, to require the Contractor immediately to cease to employ any Key Personnel under the present contract if, in the sole opinion of the Purchaser, the individual is not meeting the required level of competence and/or his/her employment as Key Personnel is considered undesirable. The Purchaser will inform the Contractor, in writing, in cases where such a decision is taken and the Contractor shall propose and make qualified substitute Key Personnel available within 15 working days after the written notification. The Purchaser's removal of Contractor Key Personnel shall in no way relieve the Contractor of his responsibility to achieve the contractual and technical requirements of this Contract nor imply any responsibility of the Purchaser.

10.6 The Contractor shall guarantee that suitable backup personnel will be available to promptly remedy situations of key personnel non-availability that may endanger the performance of services or Deliverables set in the Contract.

10.7 The Contractor shall provide and maintain an adequately sized and appropriately skilled agile development team, to include, but not limited to, the personal listed in Para 10.1, to meet the requirements of the Contract. If The Contractor fails to do so, the Purchaser may terminate this Contract in whole or in part as provided in Clause 19 ("Termination for Default") of the BOA General Contract Provisions, and in that event the Contractor shall be liable, in addition to the excess costs provided in Clause 18, "Liquidated Damages" of these Special Provisions, for such liquidated damages accruing until such time as the Purchaser may reasonably obtain delivery or performance of similar services.

11. OWNERSHIP AND TITLE

11.1 Ownership and title for all works conducted under this contract, including any and all test plans, test cases, test data, technical data specifications, reports, drawings, computer software data, computer programmes, computer databases, computer software, computer source code, documentation including software documentation, design data, specifications, instructions, test procedures, training material produced or acquired in the course of such work, shall from its creation, pass to the Purchaser.

11.2 Ownership and title to all deliverables not covered under Para 11.1 above shall pass to the Purchaser upon written notification of acceptance by the Purchaser but at the latest on Final Contract Acceptance.

12. ORDER OF PRECEDENCE

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

a. The Signature Page

b. The Contract Schedules

c. These Contract Special Provisions

d. Basic Ordering Agreement NCIA/BOA/XXXXX dated XX Month 20XX, incorporated by reference

e. The Statement of Work

f. The Annexes to the Statement of Work

13. ACCEPTANCE PROCEDURES – AGILE DEVELOPMENT

13.1 "Acceptance" is the action by which the Purchaser formally acknowledges that the Contractor has fully demonstrated that the sprints test plan, cases and data

and subsequent sprint test execution, or individual CLINs, are “complete” in accordance with the criteria and definitions in Section 2, Section 3 and Section 4 of the Statement of Work, and that Contract Deliverables are complete or have been performed according to the requirements set forth

13.2 Contract payment milestones, as designated in the Schedule of Supplies and Services, shall only be considered as complete and eligible for payment when all milestone entry and exit criteria, and any works or events as defined in this contract as associated and underlying the payment milestone has been formally delivered in both test plans, test cases, test data and test execution reports and acknowledged as completed by the Purchaser. Payment milestones shall only be considered as confirmed and fully achieved when the Purchaser has advised the Contractor formally in writing that all conditions necessary for milestone completion have been successfully met.

13.3 Purchaser review and acceptance procedures specific to contract documentation to be submitted by the Contractor are as described in Section 5 of the Statement of Work, “*Contract Documentation Requirements*”.

14. INVOICES AND PAYMENT

14.1 No payment shall be made with respect to undelivered supplies; works not performed, services not rendered and/or incorrectly submitted invoices.

14.2 The Contractor shall be entitled to submit invoices as shown in the “*Milestones and Payment*” Tab in the Schedule of Supplies and Services.

14.3 Evidence of the acceptance by the Purchaser shall be attached to all invoices.

14.4 The Purchaser is released from paying any interest to the Contractor resulting from any reason whatsoever.

14.5 The Contractor shall render all invoices in a manner, which shall provide a clear reference to the Contract. Invoices in respect of any service and/or deliverable shall be prepared and submitted as specified hereafter and shall contain:

14.5.1 Contract number CO-115625-ETEE

14.5.2 Purchase Order numbers: [TBD];

14.5.3 Contract Amendment number (if any);

14.5.4 Contract Line Item(s) (CLIN) as they are defined in the priced Schedule of Supplies and Services

14.5.5 Bank Account details for international wire transfers.

14.6 The invoice shall contain the following certificate: "*I certify that the above invoice is true and correct, that the delivery of the above described items has been duly effected and/or that the above mentioned services have been rendered and the payment therefore has not been received.*" The certificate shall be signed by a duly authorised company official on the designated original

14.7 Invoices referencing "CO-115625-ETEE/ PO [TBD] shall be submitted in electronic format to: accountspayable@ncia.nato.int, with an electronic copy to the Purchaser's Contracting Officer at the email address specified at the Para 4.6 of these Special Contract Provisions.

14.8 The Purchaser shall make payment within 45 days of receipt by NCI Agency of a properly prepared and documented invoice.

15. FORCE MAJEURE

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

16. INDEPENDENT CONTRACTOR

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

16.2 It is the sole responsibility of the Contractor to ensure their employees, subcontractors, and any other person assigned for the implementation of this contract are acting in full accordance with applicable national law, to include without limitation work permits, residence permits, tax and social legislation obligations, driving permits, etc. Contractor staff performing under this Contract are not eligible for any privileges & immunities or NATO employee benefits.

17. PRICING OF CHANGES, AMENDMENTS AND CLAIMS

17.1 Contractor's pricing proposals for Changes, Amendments and Claims shall be priced in accordance with the schedules of forward labour rates which were submitted in the Contractor's bid incorporated in the Contract by reference;

17.2 The Contractor shall be bound by the stated labour rates for the entire duration of this Contract.

18. LIQUIDATED DAMAGES

18.1 If the Contractor fails to deliver and obtain Purchaser acceptance of the payment milestones, or to acceptably perform the services or to execute the work and meet all the performance requirements detailed in the Schedule of Supplies and Services and Statement of Work, in a timely manner in accordance with the contract and at the time deadlines specified in the Schedule of Supplies and Services and Statement of Work of this Contract, or any extension thereof, the actual damage to the Purchaser for the delay will be difficult or impossible to determine. Therefore, in lieu of actual damages the Contractor shall pay to the Purchaser fixed and agreed liquidated damages of 0.5% (one-half per cent) per day of the total value of the unaccepted/delayed Contract payment milestone as set forth in the Schedule, but never less than an accumulated total of 100 EUR (One Hundred Euro) per day until full delivery and/or acceptable performance of the milestone and associated services.

18.2 In addition, the Purchaser may terminate this Contract in whole or in part, as provided in Clause 19 – "Termination for Default" of the BOA General Provisions and in that event the Contractor shall be liable to pay the excess costs as provided in Para 19.2 of that Clause.

18.3 The Contractor shall not be charged with liquidated damages when the delay arises out of causes beyond the control and without the fault or negligence of the Contractor as defined in Para 19.3 of Clause 19 ("Termination for Default") of the BOA General Provisions. In such event, subject to the Disputes and Arbitration Clause, the Purchaser shall ascertain the facts and extent of the delay and shall extend the time for performance of the Contract when in his judgement the findings of fact justify an extension.

18.4 Liquidated damages under 18.1 shall be payable to the Purchaser from first day of delinquency and shall accrue at the rate specified in Para 18.2 to 15% of the value of each delinquent payment milestone individually with a minimum aggregated sum of all delinquent items of 3,000 EUR (Three Thousand Euro). The combined value of liquidated damages under 18.2 shall not exceed a maximum aggregated sum of 10% of the total value of the Contract. These liquidated damages shall accrue automatically and without any further notice to the Contractor being required.

18.5 The amount of Liquidated Damages due by the Contractor shall be recovered by the Purchaser in the following order of priority:

18.5.1 By deducting such damages from the amounts due to the Contractor against the Contractor's invoices;

18.5.2 By proceeding against any surety;

18.5.3 By reclaiming such damages through appropriate legal remedies.

18.6 The Contractor acknowledges that any sums payable under this Clause are in the nature of liquidated damages and not penalties, and represent a reasonable estimate of fair compensation for the losses that may be reasonably anticipated from such failure to perform obligations.

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

19. WARRANTY

19.1 The Contractor warrants to the Purchaser that all deliverables furnished hereunder will be merchantable, free from defects in design, material and workmanship, fit and sufficient for the purposes intended by the Purchaser, free from all liens and encumbrances and will strictly conform to and perform in accordance with applicable specifications, drawings and samples.

19.2 The Contractor also warrants to the Purchaser that any Services provided hereunder will be performed to the best practices of the Contractor’s profession or industry, in a professional and well organized manner, in strict compliance with the specifications, and with care, skill, and diligence. If the Contractor fails to meet applicable professional standards, the Contractor will, without additional compensation, promptly correct or revise any errors or deficiencies in the services furnished hereunder.

20. SUPPLEMENTAL AGREEMENT(S), DOCUMENTS AND PERMISSIONS

20.1 If any supplemental agreements, documents and permissions are introduced after Contract award, the execution of which by the Purchaser is/ are required by national law or regulation, and it is determined that the Contractor failed to disclose the requirement for the execution of such agreement from the Purchaser prior to Contract signature, the Purchaser may terminate this Contract for Default, in accordance with Clause 19 (Termination for Default) of the Contract BOA General Provisions.

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

21. CONFLICT OF INTEREST

21.1 A conflict of interest means that because of other activities or relationships with other persons or entities, a Contractor is unable, or potentially unable to render impartial assistance or advice to the Purchaser, or the Contractor's objectivity in performing the Contract work is, or might be otherwise impaired, or the Contractor has an unfair competitive advantage. Conflict of interest includes situations where the capacity of a Contractor (including the Contractor's executives, directors, consultants, subsidiaries, parent companies or subcontractors) to give impartial, technically sound advice or objective performance is or may be impaired or may otherwise result in a biased work product or performance because of any past, present or planned interest, financial or otherwise in organizations whose interest may substantially affected or be substantially affected by the Contractor's performance under the Contract.

21.2 The Contractor is responsible for maintaining and providing up-to-date conflict of interest information to the Purchaser. If, after award of this Contract or task order herein, the Contractor discovers a conflict of interest with respect to this Contract which could not reasonably have been known prior to award, or if any additional conflicts or potential conflicts arise after award, the Contractor shall give written notice to the Purchaser as set forth below.

21.3 If, after award of this Contract herein, the Purchaser discovers a conflict of interest with respect to this Contract or task order, which has not been disclosed by the Contractor, the Purchaser may at its sole discretion request additional information to the Contractor, impose mitigation measures or terminate the Contract for default in accordance with Clause 19 (Termination for Default) of the Contract BOA General Provisions.

21.4 The Contractor's notice called for in Para 22.2 above shall describe the actual, apparent, or potential conflict of interest, the action(s) the Contractor has taken

or proposes to take to avoid or mitigate any conflict, and shall set forth any other information which the Contractor believes would be helpful to the Purchaser in analysing the situation. Any changes to the Contractor's Conflict of Interest Mitigation Plan, if any is incorporated in the contract, should be also detailed.

21.5 The Contractor has the responsibility of formulating and forwarding a proposed mitigation plan to the Purchaser, for review and consideration. This responsibility arises when the Contractor first learns of an actual, apparent, or potential conflict of interest.

21.6 If the Purchaser in his/her discretion determines that the Contractor's actual, apparent, or potential conflict of interest remains, or the measures proposed are insufficient to avoid or mitigate the conflict, the Purchaser will direct a course of action to the Contractor designed to avoid, neutralize, or mitigate the conflict of interest. If the parties fail to reach agreement on a course of action, or if having reached such agreement the Contractor fails to strictly adhere to such agreement during the remaining period of Contract performance, the Purchaser has the discretion to terminate the Contract for default or alternatively refrain from exercising any further Option or Work Package under the contract.

21.7 The Contractor's misrepresentation of facts in connection with a conflict of interest reported or a Contractor's failure to disclose a conflict of interest as required shall be a basis for default termination of this contract

21.8 With the aim to prevent an organizational conflict of interest in industrial roles under the BMD Functions in ETEE Functional Services project, the Contractor and their prospective Sub-Contractors shall be excluded from participation of any kind in the companion NCI Agency projects under solicitation(s)/contract(s) IFB-CO-115112-ETEE (BMD Enhanced JEMM System), IFB-CO-115113-ETEE (AMD Simulation System), and RFQ-CO-115114-ETEE (BMD Exercise IM Portal).

22. THIRD PARTIES

22.1 The Contractor shall be aware of and support the need to work closely with and participate in meetings and reviews to be held jointly with third parties who perform work which contributes to, or is strongly related to, work conducted under this Project. This will include, but not be limited to, working with and exchanging data under a data processing arrangement with the Contractor(s) chosen to perform ETEE BMD FS Work Package (WP) 1 (BMD Enhanced JEMM System), WP2 (AMD Simulation System), and WP3 (BMD Exercise IM Portal). Such Contractor work with third parties is inherent in the existing contract scope and the industrial structure of the overall ETEE FS project implementation.

22.2 The Contractor shall have no rights to raise claims, ask for excusable delays or interrupt the performance of the Contract on the basis of, or in connection with, his responsibilities to work/co-ordinate with third parties running work on or related to this Project.

22.3 The above described effort is already included in the Total Firm Fixed price of this Contract and the Contractor shall have no recourse for additional costs, claims, or delays in the performance of this Contract on the basis of the above described effort.

22.4 The Purchaser reserves the right to make technical documentation produced under this Contract, even in draft version, available to any third parties.

23. TECHNICAL DIRECTION

23.1 The Contract will be administered by the Purchaser in accordance with the Clause 4 of these Contract Special Provisions entitled “Contract Administration”.

23.2 The individuals working on this Contract shall perform the effort within the general scope of work identified in the Contract Part III - Statement of Work (SOW). This effort will be directed on a more detailed level by the Purchaser’s Project Manager who will provide detailed tasking and instruction on how to proceed.

23.3 The Purchaser reserves his right to assign a Technical Representative who will provide the Contractor personnel with instruction and guidance, within the general scope of work, in performance of their duties and working schedule.

23.4 Neither the Purchaser’s Project Manager as identified in Clause 4 of these Contract Special Provisions, nor any Technical Representative, nor any Third Party as mentioned in Clause 22 above, has the authority to change the terms and conditions of the Contract. If the Contractor has reason to believe that the Project Manager/Technical Representative is requesting products and services on terms inconsistent with that in the scope of the Contract, the Contractor shall immediately inform the Purchaser’s Contracting Authority for confirmation of the actions. Failure to obtain confirmation that the action of the Project Manager is under the authority of the Contract shall render any subsequent claim null and void.

23.5 Upon receipt of such notification above, the Purchaser’s Contracting Authority will:

a) confirm the effort requested is within scope, or;

b) confirm that the instructions received constitute a change and request a quotation for a modification of scope and/or price, or;

c) rescind the instructions.

24. NOTICE OF AUTHORIZED DISCLOSURE OF INFORMATION FOR MANDATED NATO THIRD PARTY AUDITS

24.1 Definitions. As used in this clause:

24.1.1 "*Resource Committees*" means committees under the North Atlantic Council (NAC) that are responsible, within the broad policy guidance provided by the Resource Policy and Planning Board (RPPB) on matters of resource allocation, for the implementation of the NATO Security Investment Programme (NSIP) or Budget/Civil budgets.

24.1.2 "*Mandated Third Party Audits*" means audits mandated by a resource committee.

24.1.3 "*Third Party Auditor*" means an independent, external audit body for NATO such as the International Board of Auditors for NATO (IBAN) or an appointed private contractor (including its experts, technical consultants, subcontractors, and suppliers) providing audit support under a Resource Committee Appointment based on an agreed mandate.

24.1.4 "Sensitive information" means information of a commercial, financial, technical, proprietary, or privileged nature. The term does not include information that is lawfully, publicly available without restriction.

24.2 The Purchaser may disclose to a mandated third party auditor, for the sole purpose of audit support activities, any information, including sensitive information, received - (1) within or in connection with a bid, quotation or offer; or, (2) in the performance of or in connection with a contract.

24.3 Flowdown. Include the substance of this clause, including this paragraph, in all subcontracts, including subcontracts for commercial items.

ANNEX A. CONTRACTOR AND SUBCONTRACTOR NON-COTS BACKGROUND IPR

a. The Contractor and Subcontractor Background IPR specified in Table 1 will be used for the purpose of carrying out work pursuant to the prospective Contract.

IPR DESCRIPTION	IPR OWNER	REMARKS/RESTRICTIONS
[TBD]	[TBD]	[TBD]

Table 1 – Contractor and Subcontractor Non-COTS Background IPR

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

c. The Background IPR stated above complies with the terms specified in these Special Contract Provisions and shall be licensed to the Purchaser according to the terms and conditions specified in the Contract.

ANNEX B. THIRD PARTY NON-COTS IPR

a. The Third Party Background IPR specified in Table 2 will be used for the purpose of carrying out work pursuant to the prospective Contract.

IPR DESCRIPTION	IPR OWNER	REMARKS/RESTRICTIONS
[TBD]	[TBD]	[TBD]

Table 2 –Third Party Non-COTS IPR

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

c. The Third Party IPR stated above complies with the terms specified in these Special Contract Provisions and shall be licensed to the Purchaser according to the terms and conditions specified in the Contract.

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

OPERATIONAL ASSURANCE, HAND OVER, TRAINING AND MENTORING CAPABILITY WITHIN BALLISTIC MISSILE DEFENCE (BMD) FUNCTIONS IN EDUCATION, TRAINING, EXERCISE AND EVALUATION (ETEE) FUNCTIONAL SERVICES (FS)

RFQ-CO-115625-ETEE

BOOK II – PART III

STATEMENT OF WORK

Table of Contents

1. Introduction....4
1.1. Introduction to the ETEE FS BMD Project:....4
1.2. Purpose and Scope of this Contract....6
1.3. Statement of Work Organization....6
1.4. High-level Contract Objectives....7
1.5. Contract Requirements....11
2. Task 1: Project Management....12
2.1. Scope....12
2.2. Project Management Start Date and Schedule....13
2.3. Project Management Key Personnel....13
2.5. Project Management Location of Work....14
2.6. Purchaser Responsibilities....15
2.7. Project Management Control (Meeting & Project Highlight Report)....15
2.7.1. Project Management Milestones and Approval....15
3. Task 2: Software Testing and Training....16
3.1. Scope....16
3.2. Software Testing Start Date and Schedule....16
3.3. Software Testing Key Personnel....16
3.4. Testing System Requirements....18
3.5. Purchaser Responsibilities....19
3.6. Testing methodology....19
3.7. Software architecture....20
3.8. Test implementation location of work, environment and tools....20
3.9. Testing configuration management....22
3.10. Test Acceptance plan....23
3.11. Quality assurance....27
3.12. Contribution to the training for operational Users....27
3.13. Contribution to training for system administrators....28
3.14. Software licenses....28
4. Task 3: Integrated Support....28
4.1. Baseline deployment....28
4.2. Initial Operation Support....28
4.3. Configuration Management....29

5. Contract Documentation Requirements 31
5.1. General 31
6. Definitions 33
ANNEX A: Concept of utilisation and Software Requirement Specifications 34
ANNEX B: System Architecture 34
ANNEX C: BMD IM Portal Software Requirements Specifications 34
ANNEX D: Purchaser Furnished Property 34

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. 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. This Contract is for 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

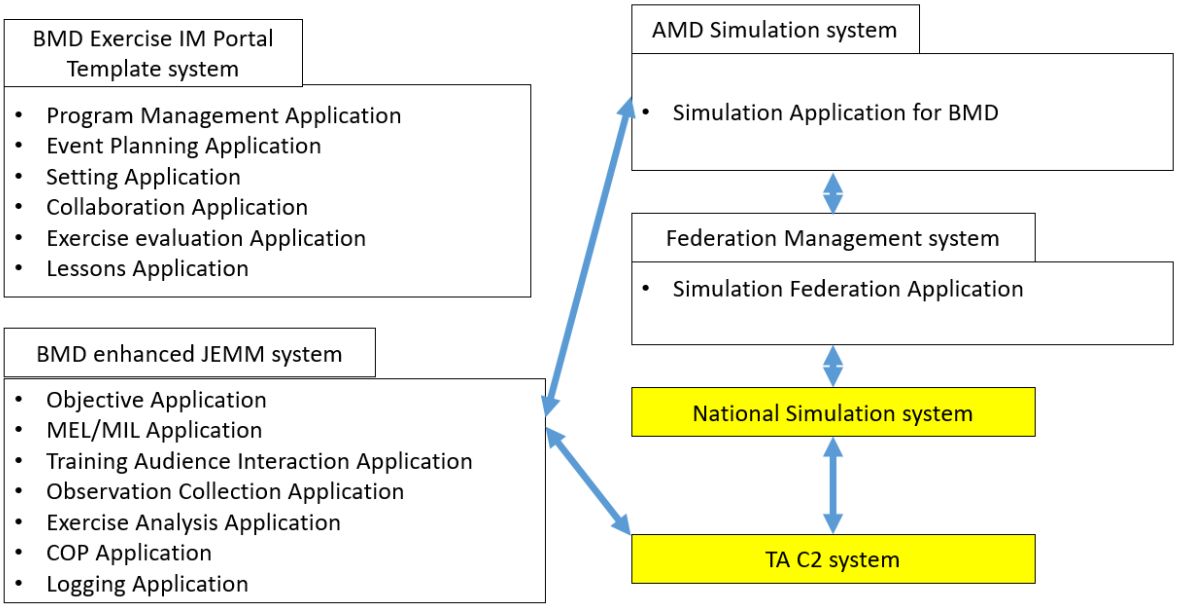


Figure 1.1 System Interaction Diagram

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 sixteen (16) 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).

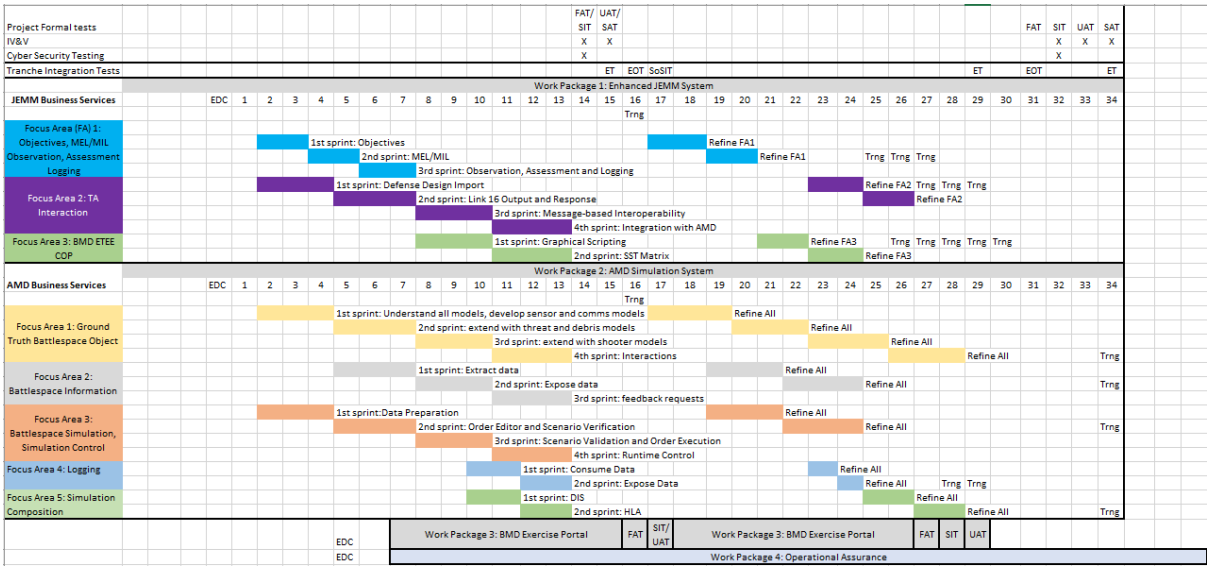


Figure 1.2: Project Schedule

1.1.8. The detailed schedule for Work Package 4, the subject of this Contract, is described in Section 1.4.

1.1.9. 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 4 is to provide support for the testing, documentation, training and initial mentoring of operational users for Work Packages 1 and 2. For Work Package 3 the support is limited to testing support.

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. This SOW will support the testing, verification and validation of all software requirements for Work Packages 1, 2 and 3.

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 Testing and Training support tasks that the Contractor shall undertake.

1.3.1.4. Section 4 specifies the contribution by the Contractor to Initial Operations Support (IOS) for the JEMM system and for the AMD system by providing mentoring to the operational users and the Configuration Management requirements.

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. Develop test plans, including test cases and test data, execute tests and report on test results, for the required software enhancements for the BMD enhanced JEMM system, for the AMD simulation system and for the BMD Exercise Information Management Portal Template system according to an agile development methodology in a distributed working environment. The planned test schedules and their subject are defined in Tables 1-1 through 1-7 for the intermediate and the final delivery phases. For JEMM and for the AMD simulation the software enhancements have been grouped into a number of Focus Areas that are addressed in specific sprints. The indicative schedules below are expressed in months (M) relative to the Effective Date of Contract (EDC). The start dates specify a contractual not-later-than constraint. The actual schedules may be updated at EDC as specified in Section 3.2. Final Contract Acceptance (FCA) is deemed to occur at successful completion of the mentoring activities of the Final Delivery.

JEMM Focus Area	Activity	Business Services	Start Date	Activity Duration
FA1	Test Sprint 1+2+3	Objectives + MEL/MIL + Observation, Assessment, Logging	EDC+2M	3M
FA2	Test Sprint 1+2	Defence Design + Link 16	EDC+2M	3M
FA2	Test Sprint 3	Messages	EDC+4M	3M
FA2	Test Sprint 4	Integration with AMD	EDC+7M	3M
FA3	Test Sprint 1	Graphical Scripting	EDC+4M	3M
FA3	Test Sprint 2	SST Matrix	EDC+7M	3M
All FAs	FAT+SIT	All	EDC+7M	4M

Table 1-1 JEMM Schedule of Intermediate Delivery Phase

JEMM Focus Area	Activity	Business Services	Start Date	Duration
FA1	Test Refine 1	Modified FA1 Services	EDC+13M	2M
FA1	Test Refine 2	Modified FA1 Services	EDC+15M	2M
FA2	Test Refine 1	Modified FA2 Services	EDC+19M	2M
FA2	Test Refine 2	Modified FA2 Services	EDC+21M	2M
FA3	Test Refine 1	Modified FA3 Services	EDC+17M	2M
FA3	Test Refine 2	Modified FA3 Services	EDC+19M	2M
All FAs	FAT	All FAs Services	EDC+25M	2M
All FAs	SIT	All FAs Services	EDC+26M	2M

Table 1-2 JEMM Schedule of Final Delivery Phase

AMD Focus Area	Activity	Business Services	Start Date	Duration
FA1	Test Sprint 1 + 2	Ground truth sensor and communications models + Ground truth threat and debris models	EDC+2M	3M
FA1	Test Sprint 3	Ground truth shooter models	EDC+4M	3M
FA1	Test Sprint 4	Ground truth object interactions	EDC+7M	3M
FA2	Test Sprint 1	Battlespace Information Extract Data	EDC+2M	3M
FA2	Test Sprint 2	Battlespace Information Expose Data	EDC+4M	3M
FA2	Test Sprint 3	Battlespace Information Feedback requests	EDC+7M	3M
FA3	Test Sprint 1 + 2	Data Preparation + Simulation Control Order Editor and Scenario Verification	EDC+2M	3M
FA3	Test Sprint 3	Simulation Control Scenario Validation and Order Execution	EDC+4M	3M
FA3	Test Sprint 4	Simulation Control Runtime Control	EDC+7M	3M
FA4	Test Sprint 1	Logging Consume Data	EDC+6M	2M
FA4	Test Sprint 2	Logging Expose Data	EDC+8M	2M
FA5	Test Sprint 1	Simulation Composition DIS	EDC+6M	2M
FA5	Test Sprint 2	Simulation Composition HLA	EDC+8M	2M
All FAs	FAT+SIT	All	EDC+7M	4M

Table 1-3 AMD Simulation Schedule of Intermediate Delivery Phase

AMD Focus Area	Activity	Business Services	Start Date	Duration
FA1	Test Refine 1	Refined FA1 Services	EDC+13M	3M
FA1	Test Refine 2	Refined FA1 Services	EDC+16M	3M
FA1	Test Refine 3	Refined FA1 Services	EDC+19M	3M
FA1	Test Refine 4	Refined FA1 Services	EDC+22M	3M
FA2	Test Refine 1	Refined FA2 Services	EDC+15M	3M
FA2	Test Refine 2	Refined FA2 Services	EDC+18M	3M
FA3	Test Refine 1	Refined FA3 Services	EDC+15M	3M
FA3	Test Refine 2	Refined FA3 Services	EDC+18M	3M
FA4	Test Refine 1+2	All FA4 Services	EDC+19M	2M
FA5	Test Refine 1	All FA5 Services	EDC+21M	2M
FA5	Test Refine 2	All FA5 Services	EDC+23M	2M
All FAs	FAT	All Services	EDC+25M	2M
All FAs	SIT	All Services	EDC+26M	2M

Table 1-4 AMD Simulation Schedule of Final Delivery Phase

Portal Service	Activity	Start Date	Duration
All Services	FAT	EDC+9M	3M
All Services	SIT	EDC+10M	3M

Table 1-5 BMD ETEE Portal Schedule of Intermediate Delivery Phase

Portal Service	Activity	Start Date	Duration
All Services	FAT	EDC+20M	3M
All Services	SIT	EDC+21M	3M

Table 1-6 BMD ETEE Portal Schedule of Final Delivery Phase

System	Activity	Start Date	Duration
Portal	UAT Intermediate Delivery	EDC+10M	3M
JEMM & AMD Simulation	UAT+SAT Intermediate Delivery	EDC+7M	4M
All Systems	Mentoring weekly exercise 1	EDC+12M	1W
All Systems	Mentoring weekly exercise 2	EDC+13M	1W
All Systems	Mentoring weekly exercise 3	EDC+14M	1W
Portal	UAT Final Delivery	EDC+23M	2M
JEMM & AMD Simulation	UAT Final Delivery	EDC+24M	5M
JEMM & AMD Simulation	SAT Final Delivery	EDC+24M	6M
All Systems	Mentoring weekly exercise 1	EDC+30M	1W
All Systems	Mentoring weekly exercise 2	EDC+31M	1W
All Systems	Mentoring weekly exercise 3	EDC+32M	1W

Table 1-7 BMD ETEE Test, Handover and Mentoring events

1.4.3. Contribute to the production of the Approved Fielded Product List (AFPL) baseline documentation for the BMD enhanced JEMM system and for the AMD simulation system as further specified in Section 3.10.13.

1.4.4. Produce BMD JEMM enhanced operational user training materials for the JEMM BMD mode of operation.

1.4.5. Produce BMD-related training materials for the operational users of the AMD simulation system.

1.4.6. Support the hand-over of the BMD enhanced JEMM system and of the AMD simulation system to the operational community by providing mentoring to the operational users on site. Mentoring shall be provided during the full exercise cycle of preparation, conduct and analysis for 3 weekly exercises. For a weekly exercise the full exercise cycle is completed within one (1) week and the conduct is limited to one or half a day.

1.4.7. Provide support for the UATs and SATs by developing test plans, test cases, test data and documenting test results, training operational users and assisting in the conduct of the tests.

1.5. Contract Requirements

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

1.5.2. The requirements for Software Testing are described in Section 3.

1.5.3. The software requirements that will need to be tested for the BMD enhanced JEMM and AMD simulation system are included in ANNEX A and are identified as "*JEMM – NNN - XXX*" for the BMD enhanced JEMM system and "*AMD – NNN – XXX*" for the AMD simulation system.

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 included in ANNEX B.

1.5.5. The requirements for the BMD Exercise Information Management Portal Template system are described in ANNEX C.

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

1.5.7. The requirements for initial operations support and configuration management are described in Section 4.

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

2. Task 1: Project Management

2.1. Scope

2.1.1. This Section outlines the Project Management activities for the Work Package 4 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 and Work Breakdown Structure (WBS), that specifies for each of the activities listed in the schedule defined in Tables 1-1 through 1-7:

2.1.3.1. The resource profiles and allocated number of man-days. The actual resources shall be identified at the latest forty (40) working days before the planned start of an activity as specified in Tables 1-1 through 1-7. For each identified 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 Testing and Training activities of this project are those specified in this SoW.

2.1.5. The Project Manager shall ensure and provide proof to the Purchaser 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 successful completion of the last mentoring activity of the final delivery phase.

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 actively 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, or Purchaser's Technical Lead.

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

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

2.3.4.2. At least five (5) years of proven working experience in the last 8 years in managing software development or software validation projects including the delivery, training and hand-over to customers.

2.3.4.3. At least three (3) years of proven working experience in the last 8 years in the management of software projects of medium to small size using formal project methodologies like PRINCE 2 applied for agile development methodologies.

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

2.3.4.5. A valid NATO SECRΞT (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.

2.3.5. 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 territory.

2.5.2. The Contractor shall establish the collaboration environment and distributed software testing 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 and the applicable test teams shall plan to work at the

Purchasers site for the FAT, SIT, UAT and SAT. Hand-over and mentoring to the operational community shall be executed on site at a single user location in Germany. 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 any additional 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 Microsoft Teams, 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 programmatic 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 this 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 activity described in Tables 1-1 through 1-7, the Contractor 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 Contractor PM to verify that the team assigned to an activity 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 of the initial submission of the plan.

2.7.2. Within five (5) working days following the acceptance of an activity that the Contractor contributed to, the Contractor PM shall present a Project Highlight Report (PHR) focussing on the items specified in Section 2.1.3.

3. Task 2: Software Testing and Training

3.1. Scope

3.1.1. The scope of the software testing and training support work consists of the support by specified Software Testing Team for the test preparation, conduct and documentation of the requirements described and scope defined in Section 1.4 and detailed in ANNEX A, B and C in accordance with the schedule defined in Section 1.4 and in compliance with the test and training methodology described in Sections 3.6 through 3.13.

3.2. Software Testing Start Date and Schedule

3.2.1. The Software Test and Training (STT) PSD under this Work Package shall commence no later than 4 (four) weeks after the Effective Date of Contract (EDC).

3.2.2. The schedule defined in Section 1.4 is an indicative schedule as execution of the testing is dependent on the completion of the deliverables by the Work Package 1 to 3 Contractors. The actual delivery start or end time could be later or earlier than expected according to the schedule.

3.3. Software Testing Key Personnel

3.3.1. The Contractor shall provide three test teams composed of a Lead Test Engineer and a testing team, one for the enhanced JEMM system, one for the Air and Missile Defence (AMD) simulation system including simulation federation management and one for the BMD Exercise Information Management Portal

Template system. The performance period of the teams shall be in accordance with the project schedule defined in Tables 1-1 through 1-7 and may be refined based on the actual delivery dates of the Sprint output. The Contractor shall provide a composite test team for each Portal and for each JEMM & AMD simulation UAT and SAT defined in Table 1-7. The test teams shall be composed of a Lead Test Engineer and of a testing team.

3.3.2. The Lead Test Engineers are identified as Key Personnel. The Contractor shall designate a Lead Test Engineer for each team to ensure that the testing process is applied as intended by the Scrum framework as defined by www.scrumguides.org.

3.3.3. The Lead Test Engineer shall ensure that testing supports the Scrum process and is accountable for the preparation, conduct and documentation of the tests that are required to be conducted in a scheduled activity.

3.3.4. The Lead Test Engineer 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 Lead Test Engineer 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 Lead Test Engineer for the validation 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 test case management software as included in Azure DevOps.

3.3.4.5. For the Lead Test Engineer proposed for WP1 and for WP2, a minimum of two (2) years of experience with the development of automated Application Programming Interface (API) and User Interface (UI) tests using SpecFlow, Gherkin and Selenium or equivalent automated behaviour driven testing tools.

3.3.5. For each activity listed in Tables 1-1 through 1-6, for the UATs and SATs, the Contractor shall assemble a suitably sized and qualified testing team, to the Purchaser's full and complete satisfaction, to prepare, conduct and document the testing of the software requirements specified in ANNEX A, B and C.

3.3.5.1. The first phase of the project, the testing shall address all the software requirements defined in the ANNEXs A, B and C to this SoW.

3.3.5.2. For the second phase of the project, all software requirements for WP1 and WP2 defined in ANNEX A and B shall be revalidated. Where applicable, test plans, test cases and test data developed for the first phase shall be reused. It should be assumed that in total up to 30% of the test plans, test cases and test

data developed for Phase 1 will need to be adapted to reflect the refinements developed during phase 2.

3.3.6. The role of the testing team will be to design, develop, prepare, execute and document the tests that are necessary to verify and validate the User stories associated with the activities listed in Tables 1-1 through 1-6, for the UATs and SATs according to the process described in section 3.6. Where existing functionality is enhanced, the existing automated API and UI tests shall be re-used and shall be adapted and/or extended by the contractor to cover the enhanced functionality.

3.3.7. The members of the testing teams are not identified as Key Personnel and shall all meet the following essential qualifications:

3.3.7.1. A minimum of two (2) years of proven experience within the last 5 years of fulfilling the role of tester in an agile development environment.

3.3.7.2. A minimum of two (2) years of proven experience within the last 5 years of developing test plans, test cases, test data, executing tests and documenting the results in a traceable manner including automated API and UI tests using SpecFlow, Gherkin and Selenium or equivalent automated behaviour driven testing tools..

3.3.7.3. A minimum of two (2) years of proven experience within the last 5 years of implementing test case management in support of agile development projects preferably in the Azure DevOps environment.

3.3.7.4. 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.

3.3.8. The Testing Teams shall be able to consult with at least one Lead BMD Subject Matter Expert (SME), made available by the Contractor, for any BMD knowledge required for the Test Teams to complete their work according to the schedule listed in Tables 1-1 through 1-7.

3.3.8.1. The Lead BMD SME is identified as Key Personnel and shall have at least two (2) years of proven working experience within the last (seven) 7 years with BMD operations and information products including tactical data links. There is no requirement for a full time Lead BMD SME.

3.3.8.2. The lead BMD SME shall have 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.

3.4. Testing System Requirements

3.4.1. The software requirements that need to be tested within the scope of this Contract for Work Packages 1 and 2 are described in ANNEX A and those for Work Package 3 are described in ANNEX C. The software requirements in ANNEX A 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 testing of the software requirements identified in ANNEX A that start with “JEMM” or “AMD” shall all be included within the scope of this Contract.

3.4.3. The testing of the software requirements identified in ANNEX C that start with “PORTAL” shall all be included within the scope of this Contract.

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

3.4.5. The Contractor shall perform the role of Tester in the agile development process for the testing events identified in tables 1-1 through 1-7. The specific tasks are described in the Sections 3.6 to 3.9

3.5. Purchaser Responsibilities

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

3.5.2. The Purchaser shall produce regular releases based on WP1, WP2 and WP 3 deliveries for release testing, for integration testing and for end-user testing as described in Section 3.10.

3.6. Testing methodology

3.6.1. For Work Package 1, 2 and 3, a series of Sprints will address groupings of business services. Each Sprint will address specific groupings of functionality identified in ANNEX A and specified in ANNEX B for the business services of WP1 and WP2 and in ANNEX C for WP3.

3.6.2. Each Sprint will be organised in a number of iterations that will be specified by the Purchaser at the start of the Sprint. For WP1 and WP2, each iteration will result in a working software solution that fulfils a set of application functions defined in ANNEX B and specified for the iteration. For WP3 each iteration will address a part of the functionality specified by the Purchaser at the start of the Sprint and will result in working software. The duration of an iteration will depend on the complexity of the Sprint and is anticipated to span one (1) to three (3) weeks.

3.6.3. At the end of each Sprint or grouping of Sprints, building of the releases will be performed by the Purchaser. The releases will have been tested already at unit level. As part of the release build for WP1 and WP2, API test clients will be generated by the Purchaser. The Contractor’s test teams for WP1 and WP2 shall develop and apply automated integration tests and automated UI tests as well as

manual User Story tests that test the application functions specified for the sprint(s) included in a test period identified in tables 1-1 through 1-4. For WP3 manual User Story tests shall be sufficient. The test cases, tests and test results shall be documented and maintained in a Purchaser's provided tool suite in an Azure DevOps environment.

3.6.4. At EDC, a refined design of the various business services, application services, application functions, User stories and components included in the initial sprints and described in ANNEX B will already be developed by the Purchaser to start the development effort in the most efficient manner. Automated API and UI tests shall be made available by the Purchaser to the WP4 Contractor for the existing WP1 and WP2 functionality, that needs to be enhanced by the WP1 and WP2 contractors. Also test data for JEMM and for ITC/AMD covering existing functionality relevant for the planned enhancements will be made available to the Contractor.

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

3.6.6. For the FAT, SIT, UAT and SAT, the complete set of User stories shall be tested. The Contractor shall not we held responsible for User stories that can not be tested due to UI and Integration tests that have not been passed successfully prior to the commencement of FAT, SIT, UAT and SAT.

3.7. Software architecture

3.7.1. The complete architecture for WP 1 and WP 2 is shown in ANNEX B.

3.7.2. The architecture description for Work Packages 1 and 2 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 3.6.4 above, the refined architecture design will be available at EDC to support the agile software development process.

3.7.4. The architecture applied for WP 3 will be based on a MS SharePoint platform.

3.8. Test 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 and at all times physically located in a NATO member nation territory. The Contractor shall plan for the applicable test teams to work at the Purchasers site during the FAT, SIT, UAT and SAT events. In addition the Contractor PM may request to temporarily locate Contractor test personnel at the Purchaser's facilities, for example during the start or the end 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 this temporary re-location shall not be considered as a valid basis for additional compensation or contract change requests 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 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 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. The technologies that are intended to be used for the implementation of WPs 1-3 including third party components are described in the architecture at ANNEX B.

3.8.7. The Purchaser will provide the Contractor with a maximum of 12 virtual test machines that are fully configured to support the required testing for the duration of the Contract. The virtual test machines will be made available inside the NATO Software Factory (NSF), an internet facing Azure DevOps environment, in accordance with the performance period identified in tables 1-1 through 1-7. The Contractor shall specify the number of virtual test machines that are required concurrently for each period over the duration of the Contract. The total number of virtual test machines required concurrently by the Contractor shall not exceed 12.

3.8.8. The Contractor shall provide a dedicated physical 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 execution of the tasks described in this SOW. The physical 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 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, necessary to comply with the requirements of Section 3.8.8, to connect into the Purchaser's collaborative development and test 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 virtual test machines will be configured by the Purchaser with the Edge or Firefox browser for Work Packages 1 and 3. For Work Package 2, the FLAMES runtime control tools FORGE and Master Simulation Control shall be available for testing.

3.9. Testing configuration management

3.9.1. The application function requirements for a Sprint shall be managed by the Contractor in the Purchaser's provided Test management tool suite with the same identification as specified in the architecture ANNEX B.

3.9.2. The application function test cases and test data shall be traceable to the application function requirements and shall be managed by the Contractor in the Purchaser's provided Test management tool suite.

3.9.3. The application function test results shall be traceable to the test case and the application function and shall be managed by the Contractor in the Purchaser's provided Test management tool suite.

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

3.9.5. The Contractor shall maintain a list of physical 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 certification of performance and conformity for the wiping signed by the Contractor's Corporate Security Officer. After wiping, the Contractor is free to use the physical development workstations for any other purpose.

3.10. Test Acceptance plan

3.10.1. The Scope of the tests is defined in ANNEX A, B and C. The schedule shall be as specified in Tables 1-1 through 1-7.

3.10.2. As described in Section 1.1.7 Work Packages 1, 2 and 3 include an intermediate delivery.

3.10.3. Any bugs reported after the intermediate delivery shall be addressed by the Contractors for Work Package 1 and 2 as part of their 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 or grouping of Sprints as specified in tables 1-1 through 1-4 and as described in section 3.6.3 and be documented as described in section 3.9.

3.10.4.1. Iteration tests shall be performed by the Purchaser.

3.10.4.2. For Sprint(s) tests as specified in tables 1-1 through 1-4, test plans, test cases, automated test code and test data shall be provided by the Contractor twenty (20) working days before the scheduled completion of the Sprint(s) test.

3.10.4.3. The Purchaser shall make a release build available to the Contractor no later than fifteen (15) days before the scheduled completion of the Sprint test.

3.10.4.4. For Sprint tests as specified in tables 1-1 through 1-4, test results shall be provided by the Contractor to the Purchaser within ten (10) working days after the release build has been made available by Purchaser.

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 Contractor and will verify that all the software requirements associated with the business processes described at ANNEX A and C can be executed successfully. The test results will be logged by the Contractor including the test data, outcome and comments. Each test case shall be classed as successful, partially successful or failed. Partially successful or failed test cases will be repeated a maximum of three (3) times with new

software releases. In the event that a test case fails three (3) times, the requirement shall be marked and definitively considered as unfulfilled, and the Contractor's responsibility for the testing effort shall be considered as fulfilled. Further re-testing beyond the maximum of three (3) times shall be under the responsibility and performance by the Purchaser, or the Purchaser may choose to equitably adjust the contract to authorize additional re-testing effort by the Contractor.

3.10.7. The SIT will be performed by the Contractor and will verify that all the requirements associated with the business processes described at ANNEX A and C can be executed successfully and that the interaction with external systems depicted in Figure 1.1 function correctly. The test results will be logged. The partially successful and failed test cases will be repeated the same manner as for the FAT.

3.10.8. Independent Validation and Verification (IV&V) testing organized by the Purchaser will be conducted in parallel to the SIT.

3.10.9. Cyber security testing will be performed by the Purchaser in parallel to the SIT.

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

3.10.10.1. For the FAT, SIT UAT and SAT, test plan, test cases and test data shall be provided by the Contractor to the Purchaser ten (10) working days prior to the start of the test execution.

3.10.10.2. For the FAT, SIT, UAT and SAT, test results shall be provided by the Contractor to the Purchaser within ten (10) working days after the completion of the initial execution of the entire set of tests for the respective work packages.

3.10.10.3. Test results of re-tests as specified in Section 3.10.6 shall be provided by the Contractor to the Purchaser within five (5) working days after the completion of the re-test.

3.10.11. The Contractor shall support the operational users during the UAT and during the SAT by providing them with the set of test cases related to requirements and User Stories, supplying them with representative test data, providing them with system training related to User Stories and by capturing test results in the Purchaser's provided Test management tool suite. The Lead BMD SME specified in section 3.3.8 shall participate in the UATs and SATs full time and on site.

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

3.10.13. The Contractor shall support the Purchaser in the AFPL process by delivering an integrated JEMM-AMD Concept of Operation document, a functional test report and user acceptance test report for each system including its integrated usage.

3.10.14. The following method will be applied by the Purchaser to assess the completeness and effectiveness of the test process performed by the Contractor:

3.10.14.1. At the beginning of a test identified in tables 1-1 through 1-4, review that the test-related information specified in sections 3.9.1 and 3.9.2 is complete.

3.10.14.2. At the beginning of a test identified in tables 1-1 through 1-4, review the test data and verify that the data is representative and meets the non-functional requirements specified in ANNEX B.

3.10.14.3. At the end of each test period identified in tables 1-1 through 1-4, review the automated API and UI test coverage, test results and repeat a Purchaser-selected sample of up to 10% of tests.

3.10.15. Acceptance of test plans, test cases and test data for the tests specified in tables 1-1 through 1-4 shall not be dependent upon the acceptance of test results.

3.10.16. Acceptance of test plans, test cases and test data for the Sprint and Refinement tests shall be conditional on the timely provision as specified in section 3.10.4 as well as on missing no more than 5% of the test-related information specified in Sections 3.10.14.1 and 3.10.14.2 and on adding missing elements within 1 working week.

3.10.17. Acceptance of test results for the Sprint and Refinement tests shall be conditional upon:

3.10.17.1. The timely provision of test results as specified in section 3.10.4.

3.10.17.2. Automated API and UI tests having a coverage of 99%.

3.10.17.3. At the end of the test at least 90% of the Purchaser repeated tests, described in section 3.10.14.3, having the same outcome as the Contractor’s.

3.10.18. Sprint acceptance failure shall not delay the start any test activity related to follow-on Sprints.

3.10.19. In addition, the following steps will be performed by the Purchaser as part of the FAT and SIT:

3.10.19.1. At the start of the Test, verify and validate that the necessary tests have been defined to validate all the software requirements associated with the business processes as specified in Section 3.10.6.

3.10.19.2. At the start of the Test, verify and validate that the necessary tests have been defined to validate the performance and usability as specified for the system.

3.10.19.3. At the start of the Test, verify and validate that all the necessary tests have been defined to validate that the specified on-line help for the system is available.

3.10.19.4. At the start of the Test, verify and validate that all the necessary tests have been defined to validate that the specified system administration documentation for the system is available.

3.10.19.5. At the end of the Test, verify and validate that the necessary tests have been executed and documented to validate all the software requirements associated with the business processes as specified in Section 3.10.6.

3.10.19.6. At the end of the Test, verify and validate that the necessary tests have been executed and documented to validate the performance and usability as specified for the system.

3.10.19.7. At the end of the Test, verify and validate that all the necessary tests have been executed and documented to validate that the specified on-line help for the system is available.

3.10.19.8. At the end of the Test, verify and validate that all the necessary tests have been executed and documented to validate that the specified system administration documentation for the system is available.

3.10.19.9. Repeat a Purchaser-selected sample of up to 10% of tests.

3.10.20. Acceptance of test plans, test cases and test data for the FAT and SIT shall not be dependent upon the acceptance of test results.

3.10.21. Purchaser acceptance of FAT and SIT test plans, test cases and test data shall be conditional upon on the timely provision of these products as specified in section 3.10.10 as well as upon missing no more than 5% of the test-related information specified in sections 3.9.1 and 3.9.2, 3.10.19.1, 3.10.19.2, 3.10.19.3 and 3.10.19.4 and on adding missing elements within 1 working week.:

3.10.22. Purchaswer acceptance of FAT and SIT test results shall be conditional upon:

3.10.22.1. The timely provision of test results as specified in section 3.10.10.2 and the sections 3.10.19.5 through 3.10.19.8

3.10.22.2. At the end of the test at least 90% of the Purchaser repeated tests, described in 3.10.19.9, having the same outcome as the Contractor's.

3.10.23. In addition to the previous steps, the following steps will be performed by the Purchaser as part of the UAT and SAT prior to their execution:

3.10.23.1. Verify that the User Story oriented training materials reflect all the User Stories from ANNEX A.

3.10.23.2. Verify that the training materials describe the application functionality that needs to be applied to fulfil a User Story and that they include at least one (1) User Story complete test case to validate that the training has achieved the intended outcome.

3.10.24. UAT and SAT test acceptance by the Purchaser shall be conditional upon:

3.10.24.1. The same acceptance criteria as for FAT and SIT.

3.10.24.2. Prior to the execution a maximum of one (1) of User Stories missing from the training materials.

3.10.24.3. Prior to the execution a maximum of one (1) training validation test case as described in Section 3.10.23.2. is missing and is added within one (1) working week.

3.10.24.4. At UAT and SAT completion an evaluation report shall be produced for each event and provided by the Contractor to the Purchaser. The evaluation report shall list all training subjects and validation cases covered during the event. At least 90% of all the training subjects as approved by the Sections 3.10.24.2 and 3.10.24.3 shall are covered at the full scope during the event.

3.11. Quality assurance

3.11.1. The quality of Contractor testing will be verified by the Purchaser using the following criteria:

3.11.1.1. Completeness: verify that all requirements are sufficiently covered by the tests and verify that all the tests, to verify and validate a particular requirement have been defined, executed and documented.

3.11.1.2. Test Reliability: At least 90% of the Purchaser repeated tests have the same outcome as the Contractor's.

3.11.1.3. Usability: at least 90% of issue descriptions are considered actionable by the WP1, WP2 and WP3 contractors working on the respective system and by the Purchaser.

3.12. Contribution to the training for operational Users

3.12.1. The Contractor shall contribute to the training of operational Users by producing BMD JEMM enhanced operational user training materials for the JEMM BMD mode of operation in accordance with the documentation requirements in section 5.

3.12.2. The Contractor shall contribute to the training of operational Users by producing BMD-related training materials for the operational users of the AMD simulation system in accordance with the documentation requirements in section 5.

3.12.3. The training materials shall be organized according to the Concept of Utilization described in Annex A and shall aim to train the specified roles in performing their tasks using the functionality provided by the systems.

3.12.4. The Contractor shall produce the training materials for the intermediate delivery phase and shall update the training materials for the final delivery phase to reflect the refinements implemented in the JEMM and AMD Simulation systems.

3.12.5. The Contractor shall produce the requested training materials as PowerPoint presentations with step by step descriptions of the tasks to be performed including system screenshots. The presentations will be consistent with the style already applied for existing JEMM training materials.

3.13. Contribution to training for system administrators

3.13.1. The Contractor shall not contribute to the training for system administrators

3.14. Software licenses

3.14.1. The Contractor shall not employ without prior written approval of the Purchaser any software requiring a specific license agreement or any software to which background Intellectual Property Rights apply for the development, storage or maintenance of test cases and test data other than referred in this SOW.

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. Initial Operation Support will be conducted at the Purchaser site. The Purchaser will ensure the availability of system baselines

4.2.2. The Contractor shall support initial operations by providing one (1) composite hand-over and mentoring team on site to support the mentoring of the weekly exercises defined in Table 1-7. The team shall assist in the hand-over of the BMD

enhanced JEMM system and of the AMD simulation system to the operational community by providing mentoring for three (3) weekly exercises preparation, conduct and analysis within 3 months of the SAT for the Intermediate Delivery of the JEMM and AMD Simulation systems.

4.2.3. The Contractor shall support initial operations by providing one (1) composite hand-over and mentoring team on site to support the mentoring of the weekly exercises defined in Table 1-7. The team shall assist in the hand-over of the BMD enhanced JEMM system and of the AMD simulation system to the operational community by providing mentoring for 3 weekly exercises in preparation, conduct and analysis within 3 months of the SAT for the Final Delivery of the JEMM and AMD Simulation systems.

4.2.4. The composite hand-over and mentoring team shall combine training skills and BMD knowledge. The Lead BMD SME defined in section 3.3.8 as Key Personnel shall be part of the hand-over and mentoring team.

4.2.4.1. At least one of the members of the mentoring team shall meet the following essential qualifications:

4.2.4.1.1. A minimum of 6 months of proven experience producing user training materials for interactive systems.

4.2.4.1.2. A minimum of a proven delivery of at least 25 days of training classes for these types of applications within the past three (3) years in the English language.

4.2.4.1.3. 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

4.2.5. The objective of the mentoring activities after the intermediate and final delivery is to enable the users to utilize the BMD JEMM system and AMD Simulation system autonomously in accordance with the Concept of Utilization in Annex A.

4.2.6. For each mentoring session, the Contractor shall develop a mentoring plan specifying the specific mentoring objectives and how they will be achieved (e.g. by demonstration or by observation).

4.2.7. Following the conclusion of the mentoring session, the Contractor shall produce an assessment report describing the outcome of the specific mentoring session objectives and include a list of necessary remedial actions.

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 project deliverables with the exception of Test Cases, Test Data and Test

Results already captured in the Purchaser's provided Test management tool suite. These project deliverables are (but not limited to):

4.3.2.1. Project Management documents

4.3.2.2. Test support documents

4.3.2.3. Training documents

4.3.2.4. Mentoring Support documents

4.3.3. All project deliverables with the exception of Test Cases, Test Data and Test Results already captured in the Purchaser's provided Test management tool suite, 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 Purchaser’s own 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 deliverable. 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. Iteration Release: All the software that fulfils the requirements of the iteration.

6.1.2. 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.

6.1.3. System 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: BMD IM Portal Software Requirements Specifications

ANNEX D: Purchaser Furnished Property

OPERATIONAL ASSURANCE, HAND OVER, TRAINING AND MENTORING CAPABILITY WITHIN BALLISTIC MISSILE DEFENCE (BMD) FUNCTIONS IN EDUCATION, TRAINING, EXERCISE AND EVALUATION (ETEE) FUNCTIONAL SERVICES (FS)

RFQ-CO-115625-ETEE OP ASSUR

BOOK II – PART III

STATEMENT OF WORK

Annex A: Concept of Utilisation and Software Requirement Specifications

Annex A: Concept of Utilisation and Software Requirement Specifications

Contents

1 Introduction 3
2 Concept of Utilization for exercise preparation and conduct of all exercises. 3
3 Concept of Utilization for the training plan management of BMD weekly exercises. 6
4 Concept of Utilization for exercise preparation of BMD exercises. 11
5 Concept of Utilization for exercise conduct of BMD exercises. 35
6 Concept of Utilization for exercise After Action Analysis of BMD exercises 45
7 JEMM Logical Data Structure changes 46
8 AMD simulation Orders 49
9 AMD simulation Models 53

1 Introduction

1.1 This document describes the concept of utilization of the future ETEE services to support the BMD Community Of Interest (COI) in preparing and executing BMD weekly exercises.

1.2 In line with the BMD Architecture Definition Document (ADD), this document describes the organizational elements that will use the exercise application services and the expected workflow.

1.3 This document refers to the same ETEE systems that will be employed to exercise with ACCS LOC 1 and that are currently employed by the ETEE COI.

1.4 The concept of utilization for the recurring exercises can be applied for yearly exercises with the difference that a separate JEMM scenario will be used of each exercise.

1.5 The tables in the concept of utilization describe the refined user stories based on the use cases described for the ETEE operational functions of the BMD ADD and the resulting Software Requirements for modifications of the existing services (JEMM and the AMD simulation) or for the new required services. The code in green in the user stories refers to the corresponding function in the ADD.

1.6 The Main JEMM logical data changes are described in Section 7.

2 Concept of Utilization for exercise preparation and conduct of all exercises.

2.1 The concept of operation for non-BMD exercises preparation and execution will remain unchanged:

2.1.1 The training officer will use JEMM to prepare and execute an exercise

2.1.2 The training officer will use AMD/ITC to prepare and execute Air Computer Aided eXercises

Concept of utilization: Refined User Stories	Solution Implication: Software Requirement Specifications
1. The NATO Command Structure (NCS) Training officer will use JEMM to create a new JEMM scenario and specify its Exercise Mode (initial, Development, Rehearsal, Execution, AAR or Archive) and exercise profile (BMD Profile, CI-Profile) to limit the accessibility to JEMM and AMD functionalities depending on the type and development stage of the exercise scenario.	• JEMM-ADM-01 (ID: ETEE-FS-173): JEMM [JEMM-O-21] JEMM shall provide the ability to specify • Exercise Mode of scenario (Development, Rehearsal, Execution, Archive) extended to include Initial and AAR • The exercise profile of scenario (BMD Profile, CI-Profile) • The scenario state (Active, Hidden, Locked)

	• JEMM-ADM-02 (ID: ETEE-FS-174): JEMM [JEMM-O-21]
	JEMM shall limit the access to functionalities depending on the exercise mode specified for the scenario:
	  • Initial: (created, not configured) access limited to scenario administrator
	  • Development: No automatic send of any injection mean
	  • Rehearsal: simulation ready for execution, scheduled scenario elements might be sent automatically, No message sent to Training Audience (sent to specific address), No other restriction
	  • Execution: script red line appears, reference element ID are fixed and cannot be changed, simulation is ready for execution, scheduled scenario elements might be sent automatically, No other restriction
	  • AAR mode: View only on all data except for the scenario administrator.
	analysis and observations, recordings replay remain accessible
	  • Archive: View only on all data except for the scenario administrator
	• JEMM-ADM-03 (ID: ETEE-FS-175): JEMM [JEMM-O-21]
	JEMM shall limit the access the accessibility to functionalities depending on the scenario profile:
	  • BMD Profile: Give access to BMD Functionalities (SST Matrix, Virtual activities, Verify, Validation menu items for event or scenario) and requires AMD simulation service to be configured and operational when the scenario is in rehearsal, Execution or AAR mode.
	In development mode, the virtual activities functionality is only available when the AMD simulation service is operational
	  • CI Profile: Give access to Intel Functionalities

2. The JEMM Technical administrator will use JEMM to hide and lock scenarios under construction or maintenance to temporarily limit the accessibility to JEMM and AMD functionalities.	• JEMM-ADM-04 (ID: ETEE-FS-176): JEMM [JEMM-O-21] JEMM shall limit the access the accessibility to functionalities depending on the scenario state:
	  • Hidden: same as Archive but not showing in any list (except the 'unhide' list)
	  • Locked: access is (temporarily) disabled to all users except administrators (e.g. for maintenance) – users who try to open it get a specific warning

3. The NCS training officer will use JEMM to prepare and execute exercises.	• ~~JEMM-ADM-05 (ID: ETEE-FS-177)~~: JEMM shall continue to provide all the existing functionality available in the baseline version at the start of the project unless otherwise specified. This requirement is not included in the architecture and is outside the scope of the project. • ~~JEMM-ADM-06 (ID: ETEE-FS-178)~~: During the execution of the project, maintenance updates as well as functional modifications funded through other projects shall be incorporated in the baseline deliveries of this project. The integration of these elements are outside the scope of this project and this requirement is therefore not included in the architecture. • ~~JEMM-ADM-07 (ID: ETEE-FS-179)~~: JEMM Scenario administration ADMIN - DATABASE - Create function shall be updated to reflect latest Data structure changes. This requirement is outside the scope of the project and is not included in the architecture.
4. The NCS training officer will use AMD/ITC to prepare and execute Air Computer Aided eXercises.	• ~~AMD-ADM-01 (ID: ETEE-FS-106)~~: AMD Simulation shall continue to provide all the existing functionality available in the ITC baseline version at the start of the project unless otherwise specified. This requirement is not included in the architecture and is outside the scope of the project. • ~~AMD-ADM-02 (ID: ETEE-FS-107)~~: During the execution of the project, maintenance updates as well as functional modifications funded through other projects shall be incorporated in the

	baseline deliveries of this project. The integration of these elements are outside the scope of this project and this requirement is therefore not included in the architecture.

3 Concept of Utilization for the training plan management of BMD weekly exercises.

3.1 The concept for the management of a training plan for the regular BMD exercises is described in the table below.

CONOPS: Refined User Stories	Solution Implication: Software Requirement Specifications
1. The BMD Operations Centre (BMDOC) training officer will use JEMM to prepare the reference set of Training Objectives (TO) for recurring exercises. A reference Training Objective specifies the task that a generic Training Audience (TA) needs to be able to perform to a given standard under specific operational conditions. The BMDOC training officer will be able to associate a reference story line description to a TO. ETE.10.090 Note: Reference set of TOs is already supported in JEMM 4.0	• JEMM-TO-01 (ID: ETEE-FS-267): JEMM TO [JEMM-O-01] The user shall be able to manage Storylines in the reference TO database. Reference Storylines will be limited to an ID and a description. Multiple reference story lines shall be able to be associated with a reference TO.
2. The BMDOC training officer will create a JEMM event for each exercise that is a part of a series of exercises for given training audience e.g. there will be a BMDOC internal training JEMM scenario which will contain events for each BMDOC internal training event. A single JEMM scenario will be used for recurring training events to be able to measure progress in training objective achievement. The training audiences will be BMDOC officers and units. ETE.10.090	• JEMM-MM-01 (ID: ETEE-FS-196): JEMM MEL/MIL [JEMM-O-03] The date/time selection within elements that belong to the event shall be defaulted to the start time of the event. • JEMM-MM-02 (ID: ETEE-FS-197): JEMM MEL/MIL [JEMM-O-03] The user with scenario admin Role shall be able to create an Event for each recurrent exercise. • The user shall have the ability to manage (CRUD) Event

	• The user shall be able to specify for each Event the start and end date. The default Start and end time should be set to the exercise time window if that time window is in the future; otherwise the start and end time should be set to the current date and current date + 7 days. • The user shall have the ability to duplicate an Event. Duplicating an event shall make a copy of all event elements including implied elements like story line observation tasks. Observations and analysis will not be copied. All the states shall be set to 'to be modified'. • The user shall have the ability to time shift an event. • The user shall have the ability to reset an event. Resetting an event will cause all states of elements to be set to draft, battle log and Observations linked to storyline observation tasks to be deleted.
3. The BMD Training officer will use JEMM to specify the Exercise Mode of scenario (initial, Development, Rehearsal, Execution, AAR or Archive) for each event to limit the accessibility to JEMM and AMD functionalities depending on the development stage of the weekly exercise scenario.	• JEMM-ADM-08 (ID: ETEE-FS-180): JEMM [JEMM-O-03] JEMM shall provide the ability to specify the Exercise Mode (initial, Development,

	Rehearsal, Execution, AAR or Archive) for each event • JEMM-ADM-09 (ID: ETEE-FS-181): JEMM [JEMM-O-21] JEMM shall limit the access to functionalities and data depending on the exercise mode specified for the event • Development: No automatic send by any injection means • Rehearsal: simulation ready for execution, scheduled scenario elements might be sent automatically, No message sent to Training Audience (sent to specific address), No other restriction • Execution: script red line appears, reference element ID are fixed and cannot be changed, simulation is ready for execution, scheduled scenario elements might be sent automatically, No other restriction • AAR mode: View only on all data except for the scenario administrator. analysis and observations, recordings replay remain accessible • Archive: View only on all data except for the scenario administrator

4. The BMDOC Training officer will use JEMM to assign Training objectives to TAs across Multiple exercises ETE.10.090
   4.1. Create a TO for a specific TA from the reference set
   4.2. Assign TO a specific event

	Event 1	Event 2	Event 3	
TO1/TA1	X	X		
TO2/TA2		X		
TO3/TA1		X	X	

- JEMM-TO-02 (ID: ETEE-FS-268): JEMM TO [JEMM-O-02]
  The user with scenario admin Role shall be able to manage TO assignment over multiple Event using a matrix:
  - Using matrix TO/Event with filter on TA
  - Using matrix TA/Event with cell containing assigned TO

  Note: In the context of BMD exercises, the TO will be associated to a single TA and might be executed over multiple events.
- JEMM-TO-03 (ID: ETEE-FS-269): JEMM TO
  The user shall be able to create all TOs for a TA from the reference TO database based on a selection of one or more TA types.
  Note: The current JEMM HQ Type shall be renamed to TA Type (in the MCA in the reference TO database)
- JEMM-MM-03 (ID: ETEE-FS-198): JEMM MEL/MIL [JEMM-O-02]
  Manage Event Function shall provide the ability to update Associated TO and visualize associated TO/TA as a matrix with identified story Line.
- JEMM-MM-04 (ID: ETEE-FS-199): EBT Reporting Module [JEMM-O-02]
  EBT – SL by TA versus Event function shall display the TO/TA association

<table>
<tr><td></td><td>• JEMM-TO-04 (ID: ETEE-FS-270): JEMM TO [JEMM-O-02]
TO Display Function shall be updated to visualize TA and related Events</td></tr>
<tr><td>5. The BMDOC Training officer will use JEMM to assess the achievement of Training objectives by TAs across Multiple exercises/events ETE.10.090
<table><tr><th></th><th>Event 1</th><th>Event 2</th><th>Event 3</th><th></th></tr><tr><td>TA1</td><td>TO1</td><td>TO1, TO3</td><td>TO3</td><td></td></tr><tr><td>TA2</td><td></td><td>TO2</td><td></td><td></td></tr></table>Note: TOs Analysis is already supported in JEMM 4.0</td><td></td></tr>
</table>

4 Concept of Utilization for exercise preparation of BMD exercises.

4.1 The concept of operation or the recurring BMD exercise preparation is as follows and the table details the implied modifications or enhancements:

Concept of utilization: Refined User Stories	Solution Implication: Software Requirement Specifications
1. The BMDOC training officer will instantiate story lines from the relevant set of Reference story lines into the particular JEMM event based on selected Training. ETE.10.100	• JEMM-MM-05 (ID: ETEE-FS-200): JEMM MEL/MIL [JEMM-O-01] The user shall be able to create a specific Story line in an event based on a Reference story line that is associated with a reference TO. The reference Story line description shall be copied into the specific Story Line description. • JEMM-MM-27 (ID: ETEE-FS-221): JEMM MEL/MIL The user shall be able to create a specific ISO in a Story line based on a primary TO.
2. The BMDOC training officer will use JEMM to develop the details of story lines that support specific training objectives. Each story line will consist of lead-in injections and actions. Intended Story line Outcomes (ISO) will have a time constraint associated with an action or injection to specify the expected time that is allowed to elapse before the outcome is achieved by the Training Audience. An action will be able to be associated with a regular virtual BMD activity. (e.g. BM Fire, a unit losing communication). Rewarding and encouraging injections and actions will be able to be associated in time with a specific ISO and will be triggered during the execution by an ISO state change.	• JEMM-MM-06 (ID: ETEE-FS-201): JEMM MEL/MIL [JEMM-O-04] The user shall have the ability to manage ISO time dependency as a start time and a duration. Story line element time dependency on ISO shall depend on the ISO calculated end time. • JEMM-ADM-10 (ID: ETEE-FS-182): JEMM administration [JEMM-O-05]

ETE.10.100 Note: A virtual activity can cover a period of time or may happen at a specific time such as system not operational, communication loss, ammunition low. The effect needs to be reflected in the simulation.	The user with administrative rights shall be able to specify ISO state that triggers Encouraging and Rewarding injection and Action activation • JEMM-MM-07 (ID: ETEE-FS-202): JEMM MEL/MIL [JEMM-O-06] o JEMM Actions shall have a type similar to injections i.e. lead-in, rewarding, encouraging. o The current action type shall be renamed to action category. • JEMM-MM-08 (ID: ETEE-FS-203): JEMM MEL/MIL [JEMM-O-06, 07, 08] JEMM user shall have the ability to create time dependencies between Injection, action, return and ISO. • JEMM-ADM-11 (ID: ETEE-FS-183): JEMM administration The user shall be able to specify the scenario profile. If the profile is the BMD Profile, the user will have access to all the simulation functionalities and will be able to create virtual activities • JEMM-MM-09 (ID: ETEE-FS-204): JEMM MEL/MIL [JEMM-O-09] The user shall have the ability to manage Virtual Activities associated to Actions. When creating a virtual activity, the user shall be able to

	select a Virtual activity from a categorized list of Virtual Activities, and a number of action attributes will be passed with the creation request to the AMD Order Editor to avoid having to repeat the entry of data e.g. time, location, actor (ORBAT entity), etc. The AMD order editor will map the attributes to virtual activity attributes based on the order type. Note: An Action will have a maximum of one virtual Activity. • AMD-SCL-01 (ID: ETEE-FS-124): AMD Order Editor o AMD shall be able to return a categorized list of supported virtual activities. o AMD shall expose the virtual activities that it supports, and their user interface as an embeddable form. • AMD-SCL-02 (ID: ETEE-FS-125): AMD Order Editor The AMD Order Editor shall return to JEMM the virtual activities in generic JEMMIS format, including their geospatial, ORBAT and time representation, and as an AMD order script. • JEMM-MM-10 (ID: ETEE-FS-205): MEL/MIL [JEMM-O-09]

	JEMM shall store the AMD order script with the virtual activity. • AMD-SCL-03 (ID: ETEE-FS-126): AMD Order Editor AMD shall provide the ability to manage (RU) an existing virtual activity through an embeddable form. The user shall have the ability to manage as virtual activities the AMD simulation orders described in Section 8 of this document. • JEMM-MM-11 (ID: ETEE-FS-206): JEMM MEL/MIL [JEMM-O-04] Story Line – Chart View Function shall display the ISO start and end time. • JEMM-MM-12 (ID: ETEE-FS-207): JEMM MEL/MIL [JEMM-O-04] Story Line – Timeline View Function shall visualize ISO start and end time. • JEMM-MM-13 (ID: ETEE-FS-208): JEMM MEL/MIL [JEMM-O-04] Story Line – Dependency View Function shall visualize ISO dependency • JEMM-MM-14 (ID: ETEE-FS-209): JEMM MEL/MIL [JEMM-O-04], [JEMM-O-06], [JEMM-O-07], [JEMM-O-08] Story Line - Shift Time Function shall shift the ISO start time and take into

	consideration the time dependencies between ISO and other Storyline elements.
	• JEMM-MM-15 (ID: ETEE-FS-210): JEMM MEL/MIL [JEMM-O-04], [JEMM-O-06], [JEMM-O-07], [JEMM-O-08]
	Import/Export Story Line Function shall take into consideration all data Object changes:
	  • The ISO start time, duration and the new time dependency between Storyline elements.
	  • The actions changes
	  • The attached virtual activities
	• JEMM-MM-16 (ID: ETEE-FS-211): JEMM MEL/MIL [JEMM-O-06], [JEMM-O-09]
	Manage Action Function shall provide the ability to manage:
	  • Renamed current Action Type to Action Category
	  • New Action Type (Lead in, Encouraging and Rewarding)
	  • Time dependency on an ISO end time
	  • Linked Virtual Activity
	• JEMM-MM-17 (ID: ETEE-FS-212): JEMM MEL/MIL [JEMM-O-06], [JEMM-O-09]
	Export Action Function shall transform the Action's Time

	dependency on an ISO end time to an absolute time. Import/Export Action Function shall import/export also: • Action Type and Action Category • Virtual activity • JEMM-MM-18 (ID: ETEE-FS-213): JEMM MEL/MIL [JEMM-O-07] Manage Injection Function shall provide the ability to manage the time dependency on an ISO end time • JEMM-MM-19 (ID: ETEE-FS-214): JEMM MEL/MIL [JEMM-O-07] Export Injection Function shall transform the Injection's Time dependency on an ISO end time to an absolute time. • JEMM-MM-20 (ID: ETEE-FS-215): JEMM MEL/MIL [JEMM-O-04] Manage Return Function shall provide the ability to manage the time dependency on an ISO end time • JEMM-MM-21 (ID: ETEE-FS-216): JEMM MEL/MIL [JEMM-O-04] Export Return Function shall take into account the time dependency on an ISO end time • JEMM-MM-22 (ID: ETEE-FS-217): JEMM MEL/MIL [JEMM-O-04], [JEMM-O-06], [JEMM-O-07], [JEMM-O-08] • Exercise Script Function shall:

	• Visualize the SL observation task at its start time • Visualize the ISO attributes at its end time • Show ISO link for time dependent Elements • Indicate time dependency on ISO • Show time dependent elements as links on ISO • Show a special symbol (with hyperlink) if an action is linked to a virtual activity • Exercise Script Function: the Type filter shall also include ISO and the State filter shall include ISO States • JEMM-MM-23 (ID: ETEE-FS-218): JEMM MEL/MIL [JEMM-O-04], [JEMM-O-06], [JEMM-O-07], [JEMM-O-08] Report-Exercise Script Function shall take into account data structure changes
3. The BMDOC training officer will import the Defense Design from AIRC2IS into the ACCS BMD exercise string	No changes to ETEE FS
4. The BMDOC training officer will update the status of the participating units in the exercise using the ACCS BMD exercise string. ETE.xx.xx	No changes to ETEE FS

5. The BMDOC training officer will use the JEMM Graphical Scripting Module for importing from AIRC2IS, building or updating the Blue and the red ORBAT. For the blue units, the training officer will be able to indicate whether the unit will be simulated or live in the exercise (important for coordination and technical control during the execution phase) ETE.10.020, ETE.15.060 Note: The ORBAT will be built for the whole JEMM scenario however a particular unit might be active or not for one event. Note: if the unit is live in the exercise, it is assumed that its combat system will not be simulated by the NATO simulation. However, its combat system simulation might be connected to the NATO simulation via DIS protocol.	• JEMM-RP-12 (ID: ETEE-FS-232): JEMM Graphical Scripting Module [JEMM-O-10] For a specific scenario, JEMM shall have a single ORBAT. • JEMM-RP-13 (ID: ETEE-FS-233): JEMM Graphical Scripting Module [JEMM-O-11] The user shall have the ability to import the alliance and threat units as well as sensor units contained in the Defense Design provided by AIRC2IS which will augment the existing ORBAT and set a unit as active in the STARTEX situation. The user shall also be able to import weapon system characteristics contained in the Defense Design. • JEMM-RP-14 (ID: ETEE-FS-234): JEMM Graphical Scripting Module [JEMM-O-12] The user shall be able to save the Defense Design APP-11 and NVG as attachments to the JEMM Scenario or Event. • JEMM-TI-20 (ID: ETEE-FS-263): Automated Reporting and TDL Module The Module shall be able to interpret the Defense Design APP-11 and NVG files and offer the result in a standardized format to the JEMM

	Graphical Scripting Module and other consumers.
	The Module shall be able to offer the source file from which the data was derived to the JEMM Graphical Scripting Module and other consumers.
	• JEMM-RP-15 (ID: ETEE-FS-235): JEMM Graphical Scripting Module [JEMM-O-10]
	The user shall have the ability to create/Update the Blue and Red sides of the ORBAT.
	  • The blue ORBAT shall include:
	  • Land units with Weapon System: Sensor, AD system, Communication Links, Missile stocks
	  • Ship units with Weapon System: Sensor, AD system, Communication Links, Missile stocks
	  • If a unit is live or not
	  • If a unit is active or not
	  • The red ORBAT shall include: BM Launchers, Missiles type, Missile stock

	• For weapon systems, the user shall be able to CRUD them. Weapon systems will be of a certain type which will determine its attributes
6. The BDMOC training officer will use the JEMM Graphical Scripting Module to position ORBAT entities and to edit their attributes including holdings, supplies of missiles and communication status. The JEMM Graphical Scripting Module will be able to display the BMD defense design from AIRC2IS. ETE.10.020, ETE.15.060	• JEMM-RP-16 (ID: ETEE-FS-236): JEMM Graphical Scripting Module [JEMM-O-11] The user shall be able to develop the STARTEX situation (Unit Active, Simulated/live, location, initial status, stock level, ROEs, sector allocation) on the map. Note: Live units may be given a position that does not correspond to their actual position. • JEMM-RP-17 (ID: ETEE-FS-237): JEMM Graphical Scripting Module The user shall be able to save the STARTEX situation as an attachment to a scenario or to a specific event. • JEMM-RP-18 (ID: ETEE-FS-238): JEMM Graphical Scripting Module The user shall have the ability to visualize on a **Map View** the selected NVG defense design from the JEMM Scenario or MEL/MIL event. • JEMM-RP-19 (ID: ETEE-FS-239): JEMM Graphical Scripting Module The user shall have the ability to visualize on a **Map View** the NVG

	defense design selected from a list of available defense design plan files Note: This JEMM Graphical Scripting Module will be implemented based on EXCON COP and lessons learned from JOB/JOMM fat client application.
7. The BMDOC training officer will use the JEMM MEL/MIL editor or the JEMM Graphical Scripting Module to: • Create Story Line elements • Create injections and associate operational messages to them. The message (ETE.10.60) may have been created with Office automation tools or pre-recorded in C2 systems (ETE.15.070) • Associate story line actions virtual activities with specific ORBAT entities. Virtual activities may contain options on the outcome of activities (Fire Missile - with missile destruction – with no detection,…). The JEMM Graphical Scripting module will display the selected story line injections and actions on a map and on a time line as well as the ORBAT entities and the NVG defense design. The BMDOC training officer will be able to select actions and injections from the map or the time line and edit the associated virtual activities. Selecting an ORBAT entity will highlight the associated story line elements in the time line and its location on the map. ETE.15.060	• Refer to JEMM-MM-09 (ID: ETEE-FS-204) • JEMM-RP-20 (ID: ETEE-FS-240): JEMM Graphical Scripting Module The user shall have the ability to visualize and manage (CRUD) story line actions and injections on a **Map View and on a timeline**. • JEMM-RP-21 (ID: ETEE-FS-241): JEMM Graphical Scripting Module The user shall be able to display the actions and injections belonging to selected story lines from the MEL/MIL tree on a map and on a time line. • JEMM-RP-22 (ID: ETEE-FS-242): JEMM Graphical Scripting Module The user shall be able to display the ORBAT in a tree. Selecting an ORBAT entity will display and highlight the associated story line elements in the time line and their location on the map. Note: The existing ORBAT tree component shall be re-used for

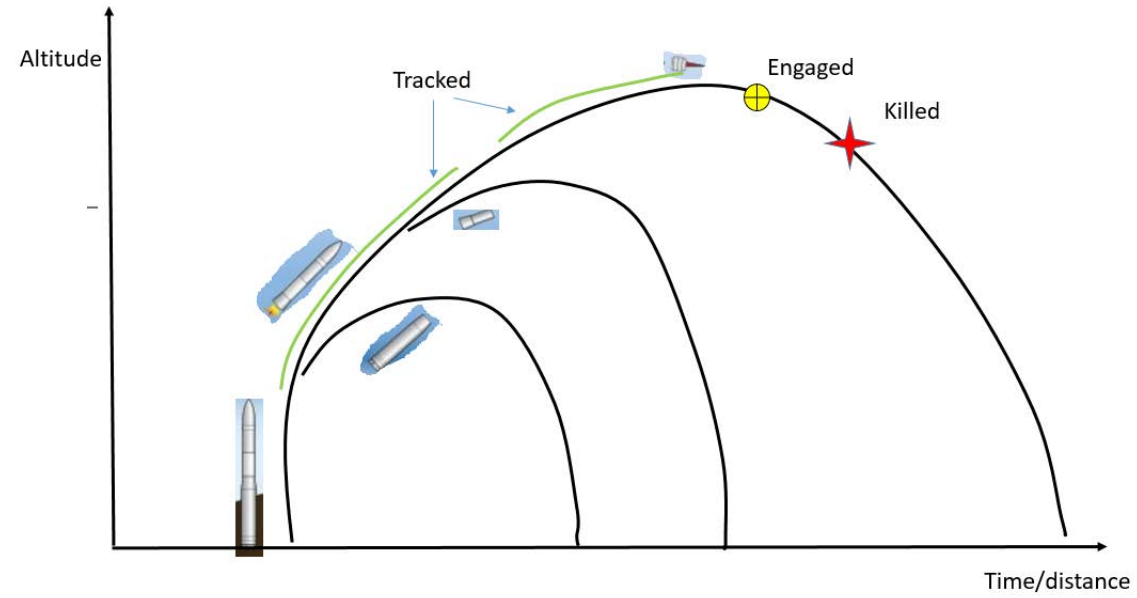
	displaying the ORBAT in a tree in the Graphical Scripting Module. • JEMM-RP-23 (ID: ETEE-FS-243): JEMM Graphical Scripting Module The user shall be able to select actions from the map or the time line and add/modify/delete the associated virtual activities. • JEMM-RP-24 (ID: ETEE-FS-244): JEMM Graphical Scripting Module The user shall be able to display the geospatial representation of virtual activities e.g. trajectory of a Virtual activity on the map • JEMM-RP-25 (ID: ETEE-FS-245): JEMM Graphical Scripting Module The user shall be able to display time representation of Virtual Activities on the timeline. • JEMM-RP-26 (ID: ETEE-FS-246): JEMM Graphical Scripting Module The user shall be able to display the ORBAT representation involved in a Virtual activity. • AMD-SCL-04 (ID: ETEE-FS-127): AMD Order Editor AMD shall be able to return the geospatial representation, the time representation and ORBAT representation of each virtual activity.

<table>
<tr>
<td></td>
<td>Note: The JEMM Graphical Scripting Module will be implemented based on EXCON COP</td>
</tr>
<tr>
<td>8. The BMDOC training officer will use the SST Matrix (Sensor/Shooter/Threat matrix) module to define the intended relationship between threat, sensors and shooters.
ETE.xx.xx
Spreadsheet View
<table>
<tr><th></th><th colspan="2">Story Line 1</th></tr>
<tr><td></td><td>Action1 (BM Type) Expectation</td><td>Action1 –Actual</td></tr>
<tr><td>WS1</td><td>TUL (Tracking Upper Level) or TLL (Tracking Lower Level)</td><td>Bo1-TUL (Ballistic Stage 1-TUL), Wh-TUL (Warhead – TUL)</td></tr>
<tr><td>WS2</td><td>EE (Engaging, Engaging) implies no kill</td><td></td></tr>
<tr><td>WS3</td><td></td><td>E, K (Engaging, Kill)</td></tr>
</table>
Trajectory View per WS</td>
<td>

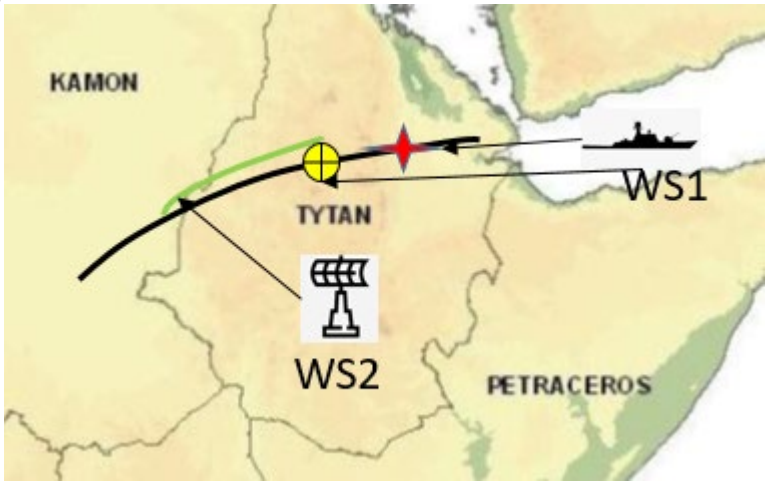
JEMM-ADM-15 (ID: ETEE-FS-187): JEMM Administration
The user shall be able to specify for the scenario the types of virtual activities shown in the SST Matrix.
JEMM-RP-01 (ID: ETEE-FS-227): JEMM <u>SST Matrix</u> (Sensor/Shooter/Threat matrix) [JEMM-O-13]

The user shall be able to manage (CRUD) the SST Matrix from the Event or from the Scenario.
The SST matrix will contain columns for specified types of virtual activities sorted by time and rows for all active ORBAT entities.
The user shall be able to filter the SST matrix by story line(s).
The user shall be able to toggle in each cell whether the ORBAT entity is associated with the virtual activity. A note/battle log entry can be added for each

</td>
</tr>
</table>



Map View



cell to describe what the actual association entails.

- The user shall be able to visualize the SST Matrix content as a table.
- The user shall be able to visualize the SST Matrix content on a map using the geospatial representation of the virtual activity, and, depending on the ORBAT entity type, an annotated line shall be drawn between the ORBAT entity location and either the middle point or the start point or end point of the virtual activity geographical representation.
- The user shall be able to visualize the SST Matrix content as a trajectory view (altitude over time and distance) using the geospatial representation of the virtual activity, and associated ORBAT entities with the associated note, to the left, centered above or to the right of the trajectory, depending on the ORBAT entity type. A line shall be drawn between the ORBAT

	entity and either the middle point or the start point or end point of the virtual activity, depending on the ORBAT entity type.
9. The BMDOC training officer will use the JEMM Graphical Scripting module using the Link-16 source and track block service to assign source JU numbers and detected track blocks to unit sensors based on an imported OPTASK message.	• JEMM-RP-27 (ID: ETEE-FS-247): JEMM Graphical Scripting Module The user shall be able to receive an OPTASK message content and to assign unit and sensors to JU numbers and track blocks in the ORBAT STARTEX situation. The user shall be able to manage (CRUD) this assignment. • JEMM-TI-21 (ID: ETEE-FS-264): Automated Reporting and TDL Module The Module shall be able to interpret a selected OPTASK message and offer the result in a standardized format to the JEMM Graphical Scripting Module and other consumers. Existing functionality. • JEMM-RP-39 (ID: ETEE-FS-255): JEMM Graphical Scripting Module At event or scenario verification, all sensors of the blue side shall be checked if they have unique JU numbers and that track blocks are assigned and do not overlap.
10. The BMDOC training officer will be able to verify and validate the virtual activities associated with the story lines included in an event or a scenario.	• JEMM-MM-25 (ID: ETEE-FS-219): JEMM MEL/MIL

ETE.10.140 The validation activities will be executed by the AMD simulation that portrays Ballistic Missile Threat trajectories, Detections, Weapon system engagement and interceptions. ETE.10.020	The user shall be able to select a particular event or scenario and verify all the associated virtual activities: • The module shall submit to the AMD Scenario verification module a list of virtual activities for verification. • The module shall display the list of activity errors returned by the AMD Scenario verification module. • The user shall be able to edit activities from the list to fix errors. • AMD-BS-01 (ID: ETEE-FS-111): AMD Scenario Verification module The module shall: • Verify virtual activities submitted by JEMM. • Return a list of errors for virtual activities. • JEMM-RP-02 (ID: ETEE-FS-228): JEMM SST matrix The user shall be able to select a particular event or story line and call the AMD Scenario Validation service from the SST matrix: • The user shall be able to submit the content of the SST matrix for preview.

	• The user shall be notified when the preview run has been completed. • The user shall be able to view the results in the 3 views of the SST Matrix. • In each row of the SST spreadsheet view, a time line state of the ORBAT entity will be shown. The cells will be colour-coded according to the simulated association of the ORBAT entity with the virtual activity. • In the SST map view, the geospatial, ORBAT and time representations of the virtual activities will be displayed as they were executed. The user shall be able to filter the map view by virtual activity (multiple selection) or by ORBAT entity (multiple selection). The user shall be able to use a time slider to review the execution of simulation over time (play at speed, start, stop). The association of ORBAT entities with virtual activities will be displayed

	• In the SST trajectory view, the altitude and time representations of the virtual activities will be displayed in a graph as they were executed. The user shall be able to filter the Trajectory view by virtual activity (multiple selection). The user shall be able to visualize on the trajectory detection period, engagement and destruction. The association of ORBAT entities with detection, engagement and destruction will be displayed. • AMD-SCL-05 (ID: ETEE-FS-128): AMD Scenario Validation The module shall be able to execute the scenario validation for a particular event or scenario: • The AMD module shall notify when the preview run has been completed. • The AMD module shall initialize from the selected event or scenario STARTEX, shall execute all the selected story line virtual activities

	and log the execution of the simulation.
	• AMD-GT-01 (ID: ETEE-FS-115): AMD Sensor Modeling
	  • The AMD FLAMES sensor models owned by NATO shall be extended to:
	  • simulate realistic behaviours for the selected sensors specified in Section 9
	  • Have operator configurable attributes to create and simulate specific sensor types
	  • Accept and interpret the relevant orders specified in section 8.
	• AMD-GT-02 (ID: ETEE-FS-116): AMD Modeling
	  • The AMD FLAMES models shall be extended to accept all the unit-related simulation orders specified in Paragraph 8 and behave and interact accordingly.
	• AMD-GT-04 (ID: ETEE-FS-118): AMD Network Modeling

	• The AMD FLAMES network models owned by NATO shall be extended to:
	  • simulate realistic network capabilities and behaviours as specified in section 9.
	  • Have operator configurable attributes to create and simulate specific network types
	  • Accept and interpret the relevant orders specified in section 8.
	• AMD-GT-05 (ID: ETEE-FS-119): AMD Threat and Debris Modeling
	  • The AMD FLAMES threat and debris models owned by NATO shall be extended to:
	  • simulate realistic behaviours for the Ballistic Missiles specified in Section 9
	  • Have operator configurable attributes to create and simulate specific weapon system types

	• Accept and interpret the relevant orders specified in section 8.
	• AMD-GT-06 (ID: ETEE-FS-120): AMD Shooter Modeling
	  • The AMD FLAMES shooter models owned by NATO shall be extended to:
	  • simulate realistic behaviours for the air defense systems specified in Section 9
	  • Have operator configurable attributes to create and simulate specific weapon system types
	  • Accept and interpret the relevant orders specified in section 8.
	• AMD-GT-07 (ID: ETEE-FS-121): AMD Interaction Modeling
	  • The AMD FLAMES interaction models owned by NATO shall be extended to:
	  • simulate realistic interactions for the sensors, air defense systems and Missiles

	and Ballistic Missiles specified in section 9 • Have operator configurable attributes to specify interaction outcomes.
11. The NCI Agency exercise simulation specialist will adapt simulation entities parameters to achieve the required behaviour. ETE.10.020	No change (using the FLAMES framework- FORGE)
12. The HQ AMD exercise data administrator will be able to prepare an AMD simulation terrain using the AMD terrain building service. Source elevation, DTED, and vector data, shape files, should be provided by the supporting geographic organization. ETE.10.020	No change (FLAMES Framework - FLAMES Advanced Correlated Terrain Importer).
13. The HQ AMD exercise data administrator will maintain in the administration part of STARTEX & scripting Module a list of potential ORBAT systems and supplies as potential unit holdings. ETE.10.020	• JEMM-RP-28 (ID: ETEE-FS-248): JEMM Graphical Scripting Module [JEMM-O-14] The user shall have the ability to manage (CRUD) the list of available weapon systems and supplies and their required characteristics.
14. If new systems have been created, the HQ AMD exercise data administrator will use the AMD data preparation service to map ORBAT systems and supplies to relevant AMD entity models. ETE.xx.xx	• AMD-BS-02 (ID: ETEE-FS-112): AMD Data Preparation Module The user shall have the ability to map JEMM ORBAT systems and supplies to AMD entity Models.
15. The HQ AMD exercise data administrator or Training officer will use the AMD data preparation service to generate the AMD STARTEX data sets. ETE.xx.xx	• JEMM-MM-26 (ID: ETEE-FS-220): MEL/MIL Module

	The user shall be able to initiate the AMD simulation initialization for a specific scenario or event. • AMD-BS-03 (ID: ETEE-FS-113): AMD Data Preparation Module The AMD Data Preparation Module shall be able to receive the JEMM STARTEX scenario situation associated with a scenario or event to perform the AMD simulation initialization. • AMD-BS-04 (ID: ETEE-FS-114): AMD Data Preparation Module The user shall be able to initiate the AMD simulation initialization for a specific scenario or event.
16. The HQ AMD exercise data administrator or Training officer will be able to preview the event activities by executing AMD in a non-sending mode. ETE.xx.xx Note: In this execution preview mode, other potential simulations will not be connected and no information will be sent to the Training Audience.	Notes: Same functionalities as for the scenario validation.
17. The training officer will use the JEMM observation service to create and manage the exercise observation plan. ETE.10.120, ETE.10.110	• JEMM-OB-01 (ID: ETEE-FS-225): JEMM Observation The user shall be able to generate Storyline Observation Tasks for all the storylines included in the selected event. The user shall select an observer or an observation team to be assigned to the observation

	tasks. The observation time window shall be set to the story line start and end time. The ISO descriptions, TA and their start and end times will be included in the Direction & guidance of the observation task.
18. NCI Agency Tech Control will describe the CAX configuration (the simulation network configuration and its interfaces to TA systems). NCI Agency Tech Control will test the simulation network configuration and its interfaces to TA systems. NCI Agency Tech Control will diagnose the problems in the configuration NCI Agency Tech Control will resolve potential issues with other Tech Control. NCI Agency Tech Control will execute a test vignette for each connected simulation NCI Agency Tech Control and AIRCOM A7 CAX Specialist will execute test vignettes and validate the behaviour of the simulations in collaboration with other participating simulation specialists. NCI Agency Tech Control and AIRCOM A7 CAX Specialist will execute test vignettes and validate the behaviour of the interfaces to the TA systems. ETE.10.140	• IM Portal-01 (ID: ETEE-FS-171): The user shall be able to describe the CAX configuration (the simulation network configuration and its interfaces to TA systems). • JEMM-ADM-16 (ID: ETEE-FS-188): JEMM Administration The user shall be able to manage the additional elements of the CAX configuration: the connection to the AMD simulation and to the loggers . • IM Portal-02 (ID: ETEE-FS-172): The user shall be able to describe the state of the CAX configuration in a form of a dashboard • JEMM-ADM-17 (ID: ETEE-FS-189): JEMM Administration The user shall be able to visualize the state of the CAX configuration in the form of a dashboard. • JEMM-ADM-18 (ID: ETEE-FS-190): JEMM services Monitor: The user shall be able to monitor the state of all JEMM services for a particular scenario.

	• JEMM-ADM-19 (ID: ETEE-FS-191): AMD services Monitor: The user shall be able to monitor the state of all AMD services for a particular scenario.

5 Concept of Utilization for exercise conduct of BMD exercises.

5.1 During exercise execution:

Concept of utilization: Refined User Stories	Solution Implication: Software Requirement Specifications

1. The BMDOC and other participating unit training officer(s) will use JEMM to execute, monitor and modify the associated JEMM scenario or event.
ETE.10.160
The BMDOC Training officer will use JEMM to send exercise instructions such as STARTEX, ENDEX, pause, checkpoint using specific actions with an associated virtual activity. This STARTEX action will be used as an external reference in other story lines to develop a time relative execution of the selected scenario or event.
An exercise control story line containing the STARTEX, ENDEX pause actions will be available for reuse as required.
ETE.15.050
 	
Note: The assumption is that the simulation is initialized with STARTEX situation and that both JEMM and the simulation refer to the system clock as current time in order to execute in a synchronized manner.
	• JEMM-ADM-12 (ID: ETEE-FS-184): JEMM administration [JEMM-O-15]
	  • The user shall be able to specify the simulation order execution service where the virtual activities shall be sent.
	  • The user shall be able to configure the state of the action based on state returned by the simulation order execution service.
	• JEMM-MM-28 (ID: ETEE-FS-222): JEMM simulation command module
	  • If an action is scheduled, the JEMM simulation command module will check whether there is a virtual activity associated with it and will deliver the command file to the simulation order execution service.
	  • The JEMM simulation command module will receive an order state from the simulation order execution service and will change the state of the action as configured and set actual time of the action as fed back.

	• Note: Check that the propagation of action time to time related storyline element is implemented in the business logic.
	• AMD-SCL-06 (ID: ETEE-FS-129): Order execution
	  • The service shall be able to receive simulation instructions and submit them for execution
	  • The service shall return feedback from simulation execution to the caller of the service
	  • The service shall be able to correlate simulation instruction and simulation feedback

2. The training officers will interact with the training audience through their doctrinal communications means (ACCS, voice, chat).
Training officers will be able to use JEMM to deliver automatically operational messages or pre-recorded messages (stored as injection attachments) through e-mail or specific injection means e.g. XMPP.
ETE.15.070, ETE.10.070, ETE.10.130
	• JEMM-TI-09 (ID: ETEE-FS-256): JEMM administration [JEMM-O-20]
	  • The user shall be able to specify multiple chat servers if configured in a single chat federation for the exercise.
	  • The user shall be able to specify Chat user credential for each EXCON cell.
	  • The user shall be able to specify an injection mean as being XMPP
	  • The user shall be able to specify for a TA which chat server/chat room to deliver XMPP messages to
	  • The user shall be able to specify the mail server, sending mail box and connection mechanism.
	  • The user shall be able to configure the state of the injection based on state returned by the Mail execution service.
	  • The user shall be able to configure the state of the injection based on state returned by the XMPP execution service
	  • The user shall be able to specify an injection mean as being INTEL FS

	• The user shall be able to specify The INTEL FS import area or service. • The user shall be able to configure the state of the injection based on state returned by the file transfer or the INTEL FS service. • The user shall be able to specify the injection means that will be sent automatically. • The user shall specify whether automatic sending is enabled at the scenario level. • The user shall be able to configure the delivery of Link-16 messages to NIRIS over the JREAP-C protocol. • The user shall be able to configure the feedback from NIRIS. • JEMM-TI-10 (ID: ETEE-FS-257): JEMM e-Mail execution module • If an injection is scheduled and the injection mean is e-mail and automatic sending is enabled, the JEMM Mail execution module will deliver the functional area message (with attachment) of the injection to receiver mailbox of the mail server on behalf of the injector or acting as the injector. • The JEMM Mail execution module will monitor the mailbox and update the injection state as configured. • JEMM-TI-11 (ID: ETEE-FS-258): JEMM XMPP execution module • If an injection is scheduled and the injection mean is XMPP and automatic sending is enabled, the JEMM XMPP execution module will deliver the functional area message of the injection to the injection receiver's chat room in the chat server acting as the injector. • The JEMM XMPP execution module will update the injection state as configured based on server acknowledgment. • JEMM-TI-12 (ID: ETEE-FS-259): JEMM INTEL FS execution module

	• If an injection is scheduled and the injection mean is INTEL FS and automatic sending is enabled, the JEMM INTEL FS execution module will deliver the injection attachments to the INTEL FS Import area or service. • The JEMM INTEL FS execution module will update the injection state as configured based on server acknowledgment.
3. The training officers will get operational messages from the Training audience and will store them in the MEL/MIL as JEMM Returns. The Training officer will implement training audience decisions by creating or editing JEMM actions and by associating these actions with virtual BMD activities or orders e.g. ROE change, fire control order. Upon proper reaction of the Training audience, the Training officer will set the state of ISO to 'Achieved' and all its related rewarding Injections and actions will be set to 'scheduled' if they are in a state of 'Conditionally scheduled'. Once the end time of an ISO is passed and it is not in a state of 'Achieved', the state will be set to 'not achieved' and all its related encouraging Injections and actions will be set to 'scheduled' if they are in a state of 'Conditionally scheduled'. ETE.15.060, ETE.15.040, ETE.15.150 When saving the ISO state to either achieved or not achieved, the training officer shall be presented with a pre-filled observation window associated to the story line Observation task. If there are multiple storyline observation tasks, the training officer shall be able to select one. The training officer shall be able to add additional text to the observation.	Note: Returns already exist • JEMM-ADM-13 (ID: ETEE-FS-185): JEMM administration The user shall be able to specify which ISO state automatically triggers an observation. • JEMM-MM-29 (ID: ETEE-FS-223): JEMM MEL/MIL The user shall be able to view ISO in the Exercise script and update their states. • JEMM-MM-30 (ID: ETEE-FS-224): JEMM MEL/MIL • The user shall be able to set the state of ISO to 'Achieved'. All its related rewarding Injections and actions shall then be set to 'scheduled' if they are in a state of 'Conditionally scheduled'. • If the end time of an ISO is passed and it is not in a state of 'Achieved', the ISO state is set to 'not achieved' and all its related encouraging Injections and actions will be set to 'scheduled' if they are in a state of 'Conditionally scheduled'. • When the ISO state is changed to a value that triggers an observation and a storyline observation task already exists, a pre-filled observation window associated to the story line Observation task will pop up. The time of the observation will be set to current time and the observation description will contain the ISO and its state.

	If there are multiple storyline observation tasks the user shall be able to select one.
	• JEMM-RP-33 (ID: ETEE-FS-249): JEMM Graphical Scripting Module
	  • Within a selected story line, the user shall have the ability to select a unit and add an action with a virtual activity. This will first create an action and when submitted it will create a virtual activity and retrieve the list of valid virtual activities (Move, switch on, Fire, ROE, direction) that can be created for this type of unit or non-persistent entity (dynamic simulation entity created by the simulation like in flight ballistic missile or booster, Air defense missile,…).
	• AMD-SCL-07 (ID: ETEE-FS-130): AMD Order Editor
	  • The AMD Order Editor module shall have the ability to return the valid list of activities for a specific unit or non-persistent entities.
	• JEMM-RP-34 (ID: ETEE-FS-250): JEMM Graphical Scripting Module
	  • The user shall have the ability to verify virtual activities related to Units and non-persistent entities and schedule the related action
	  • The user shall be able to monitor the current state of the ORBAT entities and of the non-persistent entities

4. In addition to the Training Officer, a specific observation team may follow the execution of the exercise with JEMM (ETE.15.030) and will use the observation service to collect exercise observations. ETE.15.010, ETE.10.110 Note: No Change, already supported by JEMM	• JEMM-OB-02 (ID: ETEE-FS-226): Observation OPCAR Function shall be updated as follows: • The observation task list view shall visualize the TA in a column.
5. The NCI Agency exercise technical controller will use JEMM to: - start, stop, save and re-start the simulation. - Control speed of execution with respect to real time.	• JEMM-ADM-14 (ID: ETEE-FS-186): JEMM Administrator Module [Exist] The user with JEMM administrator access rights shall be able to issue scenario control commands:

ETE.10.150	- start, stop, save checkpoint and re-start from checkpoint. - Control speed of execution with respect to real time. • AMD-SCL-08 (ID: ETEE-FS-131): AMD Scenario execution Module The module shall receive the scenario control commands and execute the corresponding orders described in section 8 under Game control.
6. The BMDOC Training officer shall be able to monitor the combined state of the MEL/MIL and of the simulation on a map based display either from a ground truth or from a side specific perceived situation. The Training officer shall be able to receive feedback from the activities of simulation entities and from their interactions in the form of messages. ETE.10.150	• JEMM-RP-35 (ID: ETEE-FS-251): JEMM Graphical Scripting Module • The user shall be able to select the ground truth or a side-specific perception. • The user shall be able to select to view the AMD, DIS and/or Link16 feedbacks • The user shall be able to view the map in 2D or 3D • The map shall display the selected perception. • The user shall be able to view the feedback about entities states, activities and interactions on the map. • The user shall be able to view the past locations of selected entities or entity types as a polyline on the map. • The event log shall display the selected perception. • The user shall be able to visualize the feedback about entity state changes, activities and interactions in the form of a filter-able event log. • The user shall be able to select an entity and display its related filter-able event log. • AMD-BI-01 (ID: ETEE-FS-108): AMD JEMMIS Feedback • The service shall provide feedback about entity actual and perceived State, Activities and Interactions as specified in the corresponding Data Objects. • Feedback will be provided for AMD simulation entities and for entities controlled by other simulations. • AMD-BI-02 (ID: ETEE-FS-109): AMD JEMMIS Exposure • The service shall transform the AMD JEMMIS extracted information into JEMMIS-compliant Data Objects to

	provide the AMD JEMM Feedback with the necessary information to respond to feedback requests.
	• AMD-BI-03 (ID: ETEE-FS-110): AMD JEMMIS Extraction
	  • The AMD JEMMIS extraction service shall extract the internal AMD entity state, activity and interaction representations that is required by the JEMMIS specification.
	• AMD-LOG-01 (ID: ETEE-FS-122): AMD Logging Module Store
	  • The AMD logging module will store entity actual and perceived state changes, activities and interactions with a timestamp
	• AMD-LOG-02 (ID: ETEE-FS-123): AMD Logging Module Response
	  • The module should be able to respond to a request for entity actual or perceived state changes, activities and interactions for a specific period of time.

7. The training officers will use the JEMM SST Matrix to monitor the actual sensor/shooter/matrix views and compare them with the story line intent and with the reported situation on the TA systems.
ETE.10.150
	• JEMM-LOG-02 (ID: ETEE-FS-195): NIRIS Link16 JEMMIS feedback
	  • The service shall return link 16 state and events related to a specific source (JU number) over a specific time period.
	  • The service relies on the NIRIS track store to provide the actual link 16 information over time.
	• AMD-SCN-01 (ID: ETEE-FS-132): DIS Logging Module
	  • The service shall interpret the DIS PDUs (Entity state update, Fire, Detonation, Entity damage status) and store them as entity state and events with a time stamp
	  • The service shall return DIS state and events related to a specific entity over a specific time period.
	  • Note: in addition to the DIS logging module, the BMD ETEE FS system will rely on COTS software to record and replay DIS traffic.
	  • Note: the DIS logging module would rely on a HLA to DIS bridge to receive and interpret HLA traffic.
	• AMD-SCN-03 (ID: ETEE-FS-134): HLA Logging Module

	• The service shall be able to record and replay HLA traffic. • Note: the service will rely on a commercial off the shelf solution. • JEMM-RP-03 (ID: ETEE-FS-229): JEMM SST Matrix • The module will request input from the AMD JEMMIS feedback and NIRIS Link16 JEMMIS feedback modules to return SST information (ORBAT entity/time/Activity ID/simulation entity & Type/Code/ geospatial representation). It will request the situation over a time period (between current time and a delta or between 2 specific times). • Within each cell of the spreadsheet view of the matrix, 2 values will be displayed: • the entry entered during preparation • Multiple SST feedbacks (entity, type and associated code). • JEMM-RP-04 (ID: ETEE-FS-230): JEMM SST Matrix • The trajectory view of the SST matrix shall display SST feedbacks. • The trajectory view shall display the BM detections, engagements and Kill history • JEMM-RP-05 (ID: ETEE-FS-231): JEMM SST Matrix • The map view of the SST matrix shall display SST feedbacks on the map. • The trajectory view shall display the BM detections, engagements and Kill history
8. The training officer(s) acting as exercise simulation controller will use the simulation Run Time Controller to change unit state, holdings, location, …, non-persistent entity state attributes and other relevant entity attributes. ETE.10.160	• JEMM-RP-36 (ID: ETEE-FS-252): JEMM Graphical scripting module • The user with system controller role shall have the ability to control simulation and simulated entities: • Controller orders for entities: Move, Modify (state and holdings), kill

	• Unit orders: Move, switch on, Fire, ROE (automatic engagement), direction. • The module shall rely on the AMD order editor for the provision of orders and on the AMD order execution module for the sending of orders to the simulation.
9. The training officer will be able to monitor that the joint automated messaging service will generate Tactical Data Link and Adat-P3 messages based on a given frequency for a message type or on an entity event. ETE.15.070	• JEMM-TI-17 (ID: ETEE-FS-260): Automated Reporting and TDL module The module shall be able to generate BM launch detection SEW messages. • JEMM-TI-18 (ID: ETEE-FS-261): Automated Reporting and TDL module The module shall be able to generate the following Link 16 messages: • BM Tracks ▪ J3.6 Space Track – This message shall be used to identify the TBM while in-flight. Note: Already implemented ▪ J3.0 Reference Point – This message shall be used to identify the launch and impact point of the TBM while in-flight. (location, Ellipse) Note: Already implemented ▪ J3.5 Land Point/Track – This message shall be used to identify the enemy launcher if the appropriate detection has been completed. Note: Already implemented ▪ J7.7 Association – This message shall be used to associate the J3.5 and J3.6 message tracks if the launcher can be correlated to the launch point of a TBM. ▪ J10.2 Engagement Status – This message shall be used to identify the engaging weapon system and interceptor while the TBM is in-flight

	(Weapon assigned/ allocated, Missile Tracked, Weapon fired, Missile destroyed) ▪ J7.0 Track Management – This message shall be broadcast when a Space Track has been lost due to impact or destruction • The participants in the Link16 network may report their position using the Precise Participant Location and Identification (PPLI J2.x) series messages ▪ J2.5 Alliance ground platform (link 16 capable SAM and sensor) (own location, activity, platform). Note: J2.2, J2.3 and J2.5 are already implemented • JEMM-TI-19 (ID: ETEE-FS-262): Automated Reporting and TDL module • The module shall be able to send the Link 16 messages over the JREAP-C protocol. • JEMM-TI-30 (ID: ETEE-FS-265): Automated Reporting and TDL module The module shall be able to generate link 16 messages for each simulated sensor taking into consideration: • Reported tracks shall refer to the detection source. • JU numbers and track numbers shall be assigned in accordance with the BMD OPTASK • AMD-GT-03 (ID: ETEE-FS-117): AMD modelling module • The simulation shall report all BM tracks that each sensor detects and specify the sensor as its source (i.e. no track correlation in the model for ballistic missile).
10. The NCIA Agency AMD technical controller will employ the simulation federation interoperability service to monitor the state and activity of other simulations. ETE.15.080	• AMD-SCN-02 (ID: ETEE-FS-133): **AMD Simulation Federation interoperability** o The user shall be able to define DIS properties for simulation entities and interactions in order to maintain interoperability with other simulations through DIS.

Note: COTS solutions will be used for DIS or HLA to DIS bridges.	
11. The NCI Agency AMD technical controller will use the NIRIS Link-16 recording service to capture all Link-16 TDL traffic. ETE.15.040	Note: Exists. As part of the exercise configuration, an exercise control NIRIS server will be configured to receive a copy of all Link-16 messages.
12. The JEMM automated messaging service will be able to respond to Link-16 requests for additional TDL data. ETE.xx.xx	• JEMM-TI-31 (ID: ETEE-FS-266): Automated Reporting and TDL module The module shall be able to process incoming J7.1 Link 16 message (Data Update Request) and provide an extended J 3.6 message as specified in STANAG 5516 Ed. 8 (page 4-14).
13. The training officer acting as exercise simulation controller will be able to switch an ORBAT entity from live to simulated at any time and manage its Link 16 source and track blocks assignments e.g. to take over from a virtual that stops participating and is being simulated in AMD during execution. ETE.xx.xx	• JEMM-RP-37 (ID: ETEE-FS-253): JEMM Graphical scripting module • The user with system controller role shall have the ability to: • Switch an ORBAT entity from 'live' to 'simulated' at any time. • Manage Link 16 source and track blocks assignments • The module shall rely on the AMD order editor for the provision of orders and on the AMD order execution module for the sending of orders to the simulation.

6 Concept of Utilization for exercise After Action Analysis of BMD exercises

Concept of utilization: Refined User Stories	Solution Implication: Software Requirement Specifications
1. The NCI Agency Technical Controller will replay the exercise message traffic (DIS and TDL) as required for AAR. ETE.15.090 Note: Will rely on COTS for DIS and NIRIS for TDL.	JEMM-RP-38 (ID: ETEE-FS-254): JEMM SST matrix The user shall be able to replay exercise execution with the same mechanism as the scenario validation.

2. The Training Officer will use the analysis service to conduct an analysis of the observations. ETE.15.090, ETE.10.110 He will identify lessons learned and remedial actions for specific TA and will generate the Lessons Identified Action List (LIAL) for inclusion in the NATO Lessons Learnt management process. ETE.20.010, ETE.10.110	• JEMM-AS-01 (ID: ETEE-FS-192): Analysis The user shall be able to draft the Analysis. The JEMM Analysis Template for BMD exercises shall include the Lessons Identified heading and the Remedial Actions heading. • JEMM-AS-02 (ID: ETEE-FS-193): Analysis The user shall be able to export the (existing) Training Objective Observation Report as a CSV and XML file. • JEMM-AS-03 (ID: ETEE-FS-194): Analysis The existing OPCAR- ANALYSIS function shall be updated as follows: • Add a filter on Date for the analysis

7 JEMM Logical Data Structure changes

7.1 The following table includes the main changes required to the JEMM data representation.

Logical Data structure changes
JEMM-O-01: JEMM TO (Logical Data Structure) **REFERENCE STORYLINE** The JEMM logical data structure shall be changed to include a new Object REFERENCE STORYLINE that will include at least a CODE, DESCRIPTON and a REFERENCE TO ID
JEMM-O-02: JEMM TO (Logical Data Structure) **TO-EVENT** The JEMM data Logical structure shall be changed to include a new relationship TO to EVENT.
JEMM-O-03: JEMM MEL/MIL (Logical Data Structure) EVENT The JEMM EVENT logical data structure shall be changed to include at least: - a START and END DATE/TIME - the EXERCISE MODE (Development, Rehearsal, Execution, AAR mode or Archive)

Logical Data structure changes
JEMM-O-04: JEMM MEL/MIL (Logical Data Structure) **ISO** The JEMM logical data structure of ISO shall be changed to have: - a START DATE/TIME either independent or dependent on another storyline element - a DURATION.
JEMM-O-05: JEMM Scenario administration (Logical Data Structure) **ISO State** The JEMM logical data structure of **ISO State** shall be changed to include at least the following new fields: - ISO State triggering Encouraging action and Injection - ISO State triggering Rewarding action and Injection - ISO Trigger observation (Y/N)
JEMM-O-06: JEMM MEL/MIL (Logical Data Structure) **ACTION** The JEMM logical data structure of ACTION shall be changed as follows: - Rename existing field ACTION TYPE to ACTION CATEGORY - New field ACTION TYPE (Lead In, Encourage, Reward) - DATE/TIME dependency might depend on ISO
JEMM-O-07: JEMM MEL/MIL (Logical Data Structure) **INJECTION** The JEMM logical data structure of INJECTION shall be changed as follows: - DATE/TIME dependency might depend on ISO
JEMM-O-08: JEMM MEL/MIL (Logical Data Structure) **RETURN** The JEMM logical data structure of RETURN shall be changed as follows: - DATE/TIME dependency might depend on ISO
JEMM-O-09: JEMM MEL/MIL (Logical Data Structure) **ACTION-VIRTUAL_ACTIVITY** The JEMM logical data structure shall be changed to: - include the Virtual Activity file name linked to an action with at least ACTION_ID, SIMULATION_IS, V_ACTIVITY_ID, V_ACTIVITY_TYPE and

Logical Data structure changes
NAME - store the Virtual Activity order file.
JEMM-O-10: JEMM Graphical Scripting Module (Logical Data Structure) **ORBAT** The JEMM logical data structure shall be changed to: - store the scenario ORBAT that will include at least UNIT NAME, UNIT_TYPE, COUNTRY_CODE, SIDE, WEAPON_SYSTEM_HOLDINGS, DEFAULT AMMUNITION_STOCK - to link the ORBAT to the SCENARIO
JEMM-O-11: JEMM Graphical Scripting Module (Logical Data Structure) **ORBAT_STARTEX** The JEMM logical data structure shall be changed to: - store the scenario ORBAT_STARTEX that will include at least UNIT NAME, ACTIVE, SIMULATED/LIVE, LOCATION, ROEs, SECTOR_ALLOCATION, AMMUNITION_STOCK, JU_NUMBER, TRACK_ID_RANGE - to link the ORBAT to the SCENARIO or to specific EVENT
JEMM-O-12: JEMM Graphical Scripting Module (Logical Data Structure) **EVENT** The JEMM logical data structure shall be changed to store a Defence Design Plan as an attachment to an EVENT.
JEMM-O-13: SST Matrix (Spreadsheet, Trajectory, Map) (Logical Data Structure) **SST_MATRIX** The JEMM logical data structure shall be changed to store the SST-MATRIX that will include at least the following information: STORY LINE, ORBAT_ENTITY, V_ACTIVITY_ID, INTENDED_INTERACTION.
JEMM-O-14: JEMM Graphical Scripting Module (Logical Data Structure) **WEAPON SYSTEM and MISSILE** The JEMM logical data structure shall be changed to store a list of valid WEAPON_SYSTEM and MISSILE.
JEMM-O-15: JEMM Scenario administration (Logical Data Structure) **VIRTUAL_ACTIVITY_STATE** The JEMM logical data structure shall be changed to store the list possible VIRTUAL_ACTIVITY_STATE that might be returned by the simulation and their related ACTION_STATE

Logical Data structure changes
JEMM-O-20: JEMM Scenario administration (Logical Data Structure) **INJECTION MEANS** The JEMM logical data structure of INJECTION MEANS shall be changed: • Auto-send capable (Y/N) to specify whether this injection mean can be sent automatically • Sending protocol (e-mail, XMPP or INTEL FS) • Auto-send Enabled (Y/N)
JEMM-O-21: JEMM MEL/MIL (Logical Data Object) **SCENARIO** The JEMM SCENARIO logical data structure shall be changed to include at least: - the EXERCISE MODE (Initial, Development, Rehearsal, Execution, AAR, Archive) - The SCENARIO STATE (Active, Hidden, Locked) - The SCENARIO PROFILE (BMD Profile, CI Profile)

8 AMD simulation Orders

8.1 The following table includes the AMD simulation orders that:

8.1.1 The AMD order Editor module shall provide the ability to manage as Virtual activities,

8.1.2 The AMD modelling module shall accept as simulation orders.

8.1.3 The AMD modelling module shall model as behaviours and interactions.

8.2 The table includes for each order:

8.2.1 What FLAMES model it applies to,

8.2.2 Comments about whether the required capability already exists partly or not in the existing implementation of the NATO owned FLAMES models,

8.2.3 Remarks about how this is currently implemented.

Order / capability	**Currently possible with ITC/FLAMES**	**Remarks**
• Game control		
o Start game	Yes	startup through ITCCO
o Pause game	Yes	API Call: FRCLPause
o Resume Game	Yes	API Call: FRCLResume
o Stop Game	Yes	ALTER SERVICE FExecutive STOP_TIME = TO_DATE("0:0:0");
o Set speed	Yes	ALTER SERVICE FExecutive RATE_MODE = "CLOCK", RATE_FACTOR = 2.0; Speed rate is not unlimited!
o Take checkpoint	Yes	ALTER SERVICE "FCPRManager" CHECKPOINT_TIME = "NOW";
o Resume from checkpoint	Yes	
• Magic Move Unit/system		
o Set location (Apply to Unit cognition model)	Yes	INITIATE MAGIC_MOVE on CAOC/Flight/Ground/Ship Alternatively: API call FRCLSendPosition
o Set system operational status: ▪ Sensor ▪ Weapon system (Apply to unit cognition model to apply it to equipment sensor and weapon system models)	Partially	Possibility to modify sensor status (on/off) exists. Weapon system status (on/off) needs to be added.

o Set weapon system Stock level (Apply to Unit cognition model to apply to equipment weapon system)	No	Magic: currently it is not possible to change the number of available missiles during execution
o Set Comm. Link down/up (Apply to Unit cognition model to apply to equipment communications device model)	No	Although this could be accomplished by changing the network on which to communicate to a network with no listeners, the requirement is to be able to disable a unit's communication devices.
o Set unit as active/inactive in simulation (Apply to Unit cognition model)	No	Unit shall stop acting and only respond to an activate order.
• Entity orders		
o Move (Apply to Unit)	Yes	Reposition Ground or Ship Platform;
o Set weapon ROE (Apply to Unit cognition model or all teams in scenario)	Partially	CHANGE_ROE on CAOC, ALTER SERVICE STCVROE at team level and at unit level to engage a specific track. The ROE shall be a set for a unit or team in relation to other teams. ROE in ITC/FLAMES are "Ignore", "Engage", "Shadow", "Escort". It shall be extended with "Weapons hold", "Weapons tight", "Weapons free".
o Allocate sector (Apply to Unit cognition model)	Partially	Zone cognition model; by default the GBAD (Ground Based Air Defence) SAM unit will only engage within a Missile Engagement Zone (MEZ) if located in that MEZ, a Ship Based Air Defence (SBAD) unit will defend the ship that it is on. It shall be extended to enable SAM systems (GBAD and SBAD) to protect a MEZ that they are not located in.
o Switch on/off sensor (sectors, etc.) (Apply to a Unit or Equipment)	Partially	INITIATE "CONTROL" SENSOR = "OFF" switch on all active sensors; to change the direction of the point azimuth (Primary Target Line in the

		C2 system) CONTROL "SENSOR" COMMAND (POINTING_AZIMUTH = 90); Same as "Magic" commands
o Fire Ballistic Missile (Apply to Unit)	Yes	LAUNCH at unit/feature/coordinate. Depending on the munition model, trajectory might be calculated or pre-planned.
o Fire Ballistic missile with ordered trajectory (Apply to Unit cognition model to apply to equipment munition)	No	The munition shall receive a list of trajectory points to follow and be able to determine a ballistic trajectory between these points.
o Fire BM Leaker (Apply to Unit)	No	A specific set of missile types that cannot be killed will defined in the BMD scenarios and be added to each ballistic missile unit. Munitions will have a 0 probability of kill against these missile types.
o Fire self-detonate BM (Apply to Unit cognition model to apply to equipment munition)	No	The munition shall self-detonate after the specified flight time.
• Additional orders		
o destroy a simulation missile (Apply to simulation Entity)	Yes	KILL
o destroy missile debris (booster) and warhead (Apply to simulation Entity)	No	New functionality
• Also the SSTO order should be able to be supported:	Partially	

o assign Engagement Area (no permission required to engage) (Apply to Unit cognition model)	Yes	Already covered above Combination of assign zone and ROE.
o EMCON: on/off (Apply to Unit cognition model to apply to equipment sensor and equipment weapon system model)	Yes	Already covered above SENSOR ON/OFF
o C/R/U/D engagement area (Apply to Unit cognition model)	Partially	All available areas are loaded or re-loaded during simulation execution. Shall be extended with the ability to manage individual engagement areas.
o Launch on remote (Apply to Unit Unit cognition model to apply to unit equipment weapon system)	No	The unit shall be able to guide its weapon system munitions using track data communicated by another unit.

9 AMD simulation Models

9.1 The following table includes the NATO Owned AMD FLAMES simulation models that shall be extended and the system attributes that shall be configurable by the operator.

9.2 The remark column includes comments about whether the required capability already exists partly or not in the existing implementation of the NATO owned FLAMES models.

FLAMES models and attributes	**Remarks**
• The AMD FLAMES models shall be extended to simulate realistic behaviours and interactions for the following simulation sensors, systems, networks and Missiles:	
• Ballistic Missile Weapon system and munition models: ICBM, IRBM, MRBM and SRBM with calculated trajectories and with specified	

trajectory (in that last case, the trajectory will be provided with the fire order)	
• The models shall have operator configurable attributes to create and simulate specific missile types	Current capability – the current limited capability shall be extended to edit the missile attributes.
• It shall simulate multiple Stage booster debris, multiple warheads, chaffs and decoys	Current: only 2-stage missiles with no debris/decoys are modelled.
• Munition impact accuracy and effect	Currently available
• Flight path (depressed/lofted/optimal)	Currently available: depressed or lofted. Also currently available is a curve-fitting algorithm.
• Radar Cross Section for all phases	Exists for the missile itself; Shall be extended for booster, warhead and decoys.
• Trajectory taking into account at least: drag, gravity, atmospheric density, per stage: empty mass, fuel mass, burn rate, thrust, burn time	Currently available
• Predefined trajectory	Currently available
• Different end phase trajectories: RV (Ballistic Re-entry Vehicle)	New
• SEW network capability model	New, it shall portray detection by the entire network and not by individual sensors.
• Sensor model: at least AN/TPY-2, AN/SPY-1, AN/SPY-6	
• The models shall have operator configurable attributes to create and simulate specific sensor types	Current limited capability shall be extended to edit the attributes and add them to the scenario.
• Jamming (sensor can be jammed or not)	Current capability
• Minimum/ maximum range	Current capability
• Altitude range	Current capability
• Ground detection	Current capability
• Weather influence	Current capability
• Over-the-horizon capable (no need for Line Of Sight)	New
• Radar Cross Section of objects to detect	Current capability
• Velocity gate	Current capability
• Frequency Range, transmission power, noise, Signal to Noise ration threshold, scan period, scan angle	Current capability

• Capability to discriminate between warhead / non-threat	New
• Emission Control	New (current: sensor on/off is instant)
• Track quality (J 7.1)	
• Cueing of other systems	New
• AD weapon system and missile: Upper Level (UL) Interceptors and Lower level (LL) interceptors, active and semi active radar missile guidance SAM	UL: new LL: currently semi active only
• The models shall have operator configurable attributes to simulate specific air defense systems and missiles such as:	
- Land Based: Patriot PAC-3, THAAD, Aegis ashore (SM-3), SAMP/T (Aster 30),	New
- Ship based: ASTER 30 (Ship Based). Aegis ship (SM-3)	New
• Setup / teardown procedure	New
• Receive cueing from other systems	New
• TBMD Air Defense Network model: sensor, AD, unit C2 node network: TPY-2 cueing LL AD	New
• Simulation of communication network failure	New
• Sensors capable of cueing other systems (LL AD)	New
• Platform model	No change
• The AMD FLAMES dictionary entries shall be extended with all the required simulation systems. Simulation systems are updated with the FLAMES Forge application and are composed of a combination of FLAMES models. Simulation systems are mapped to ORBAT equipment in the AMD Data Preparation Module.	Update required Functionality provide by FLAMES Forge tool. Ref. AMD-BS-02 (ID: ETEE-FS-112)
• The AMD Units will be generated by the AMD Data Preparation Module based on the exercise ORBAT.	No change to FLAMES Models Ref. AMD-BS-04 (ID: ETEE-FS-114)

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OPERATIONAL ASSURANCE, HAND OVER, TRAINING AND MENTORING CAPABILITY WITHIN BALLISTIC MISSILE DEFENCE (BMD) FUNCTIONS IN EDUCATION, TRAINING, EXERCISE AND EVALUATION (ETEE) FUNCTIONAL SERVICES (FS)

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BOOK II – PART III

STATEMENT OF WORK

Annex B: System Architecture

Annex B: System Architecture

Contents

1 Introduction 3
1.1 Purpose of the Architecture 3
1.2 Terminology and Notation 4
1.3 Meta-model 5
2 Realization of Business Services by Software Application Components and Their Functions 7
2.1 S4 – Functions Supporting Business Services 7
3 Functionality of Software Application Components 15
3.1 P1 – Resource Types: Application Portfolio Catalogue 15
3.2 P1 – Resource Types: Stub Catalogue 29
3.3 P2 – Resource Structure: Application/ Technology Matrix 30
3.3.1 Application Technology 30
3.3.2 Application Technology in Sprints 34
3.3.3 Applicable Standards 41
3.4 P4 – Resource Functions 46
3.5 P8 – Resource Constraints: Non-functional requirements 76
4 Supporting viewpoints that provide additional details 82
4.1 P1 – Resource Types: Technology Portfolio Catalogue 82
4.2 P1 – Resource Types: Technology Standards Catalogue 84
4.3 P3 – Resource Connectivity: Application Interaction Matrix 87
4.4 P3 – Resource Connectivity: Process/ Application Realization Diagram 92
4.4.1 Build AMD Simulation Scenario 92
4.4.2 Manage Virtual Activity 92
4.4.3 Execute Virtual Activity 93
4.4.4 Feed Systems used by the Training Audience 94
4.4.5 Process incoming J7.1 Link16 Message 94
4.5 P7 – Physical Data Model: Logical Data Diagram 96

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 RFQ.

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.

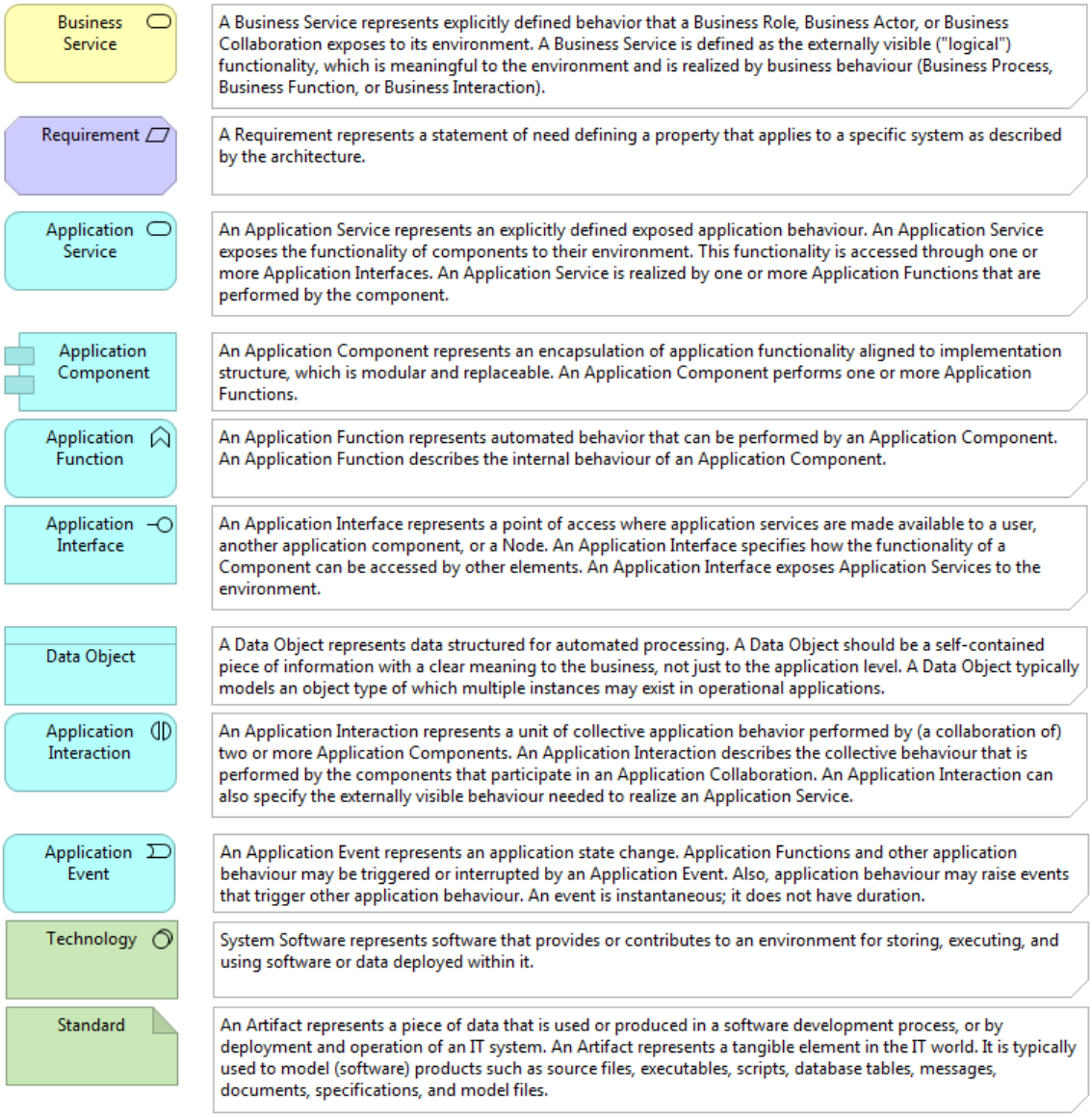

Figure 1: Model building blocks

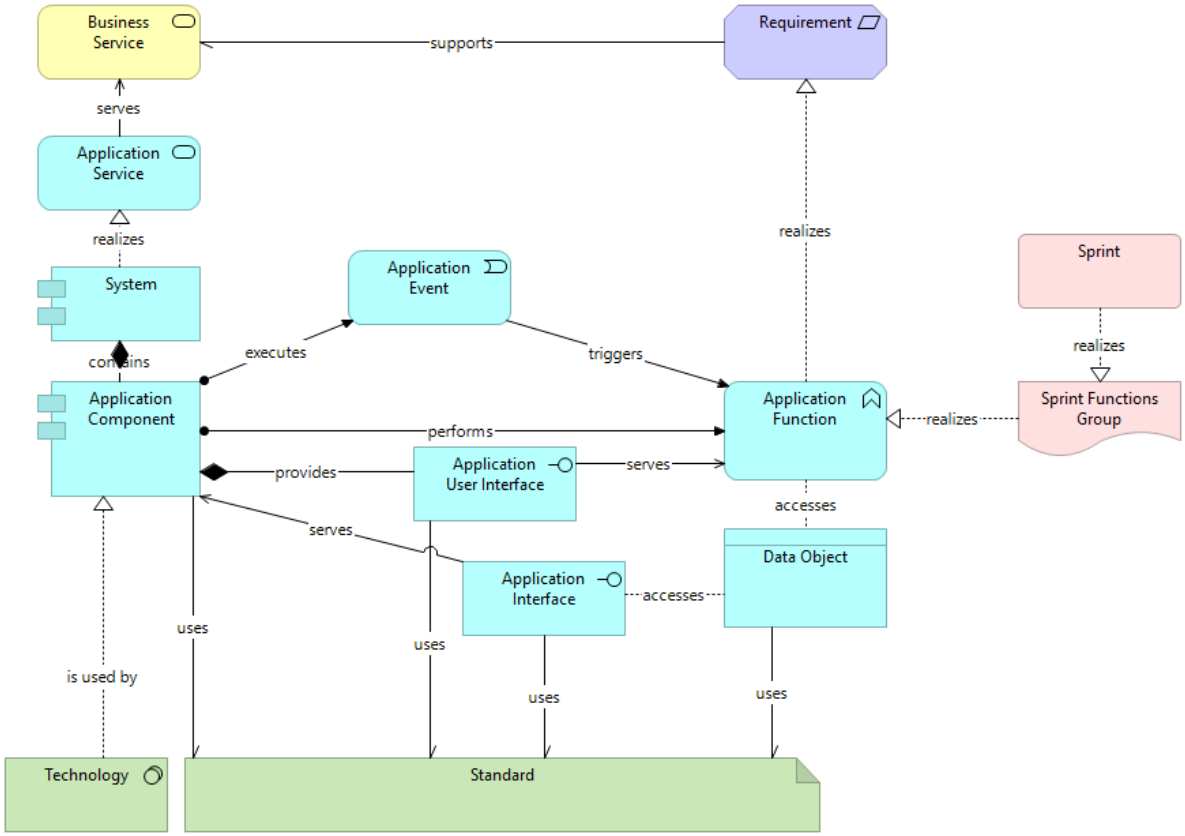

Figure 2: Relations between model building blocks

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	Manages 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 Visual Studio Code 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 Visual Studio Code MS Devops Server 2019 git MS SQL Server 2019 (future) MS LocalDB 2016
AMD-Sprint 4.1	AMD Simulation Logger	FLAMES 18.0 (2019) Visual Studio Code 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) 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
AMD-Sprint 4.2	AMD Simulation Logger	FLAMES 18.0 (2019) Visual Studio Code 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) 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
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 Visual Studio Code 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 Visual Studio Code 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://visualstudio.microsoft.com/vs/
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.

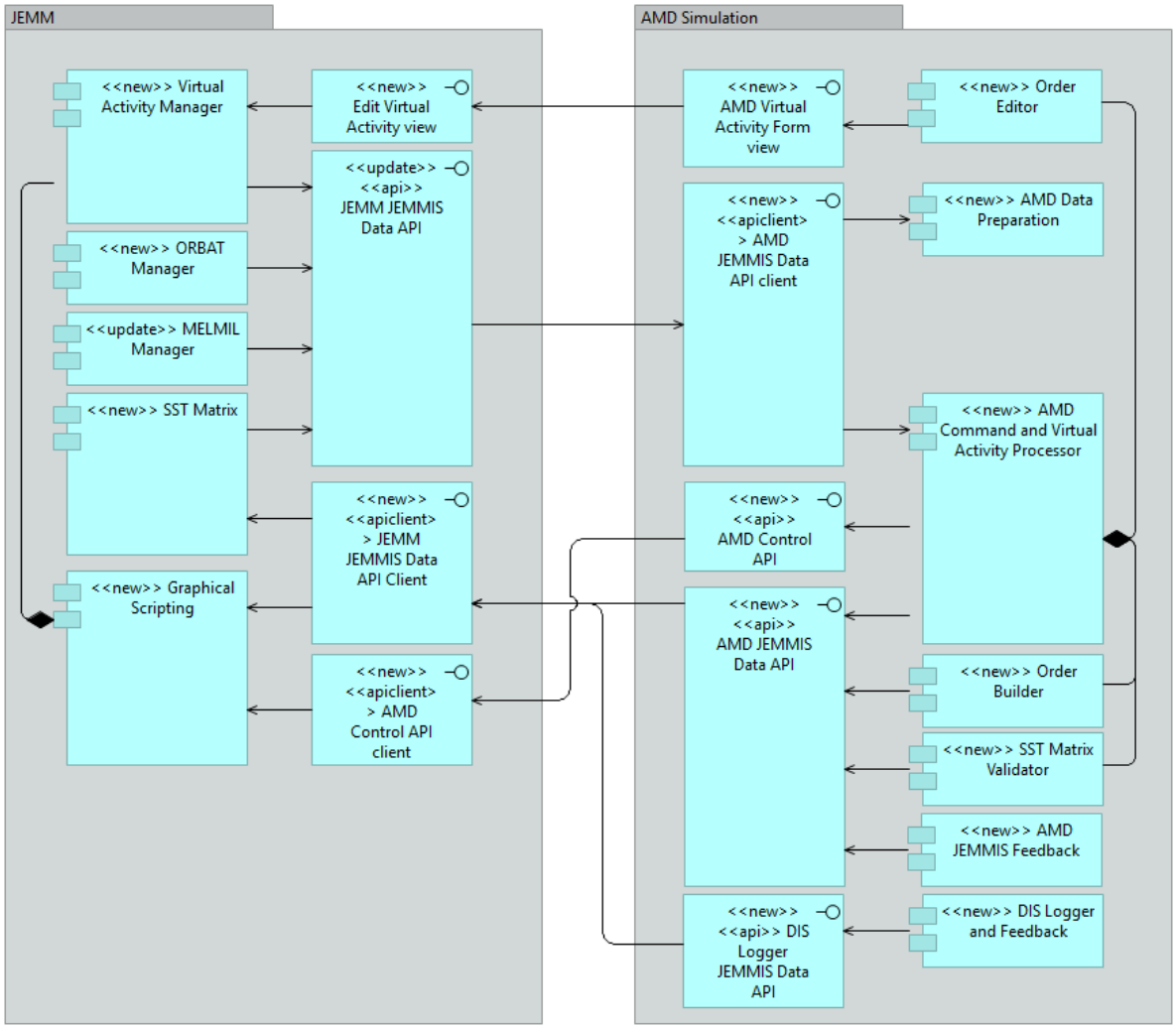

Figure 3: Interactions between JEMM and AMD Simulation, and interfaces used

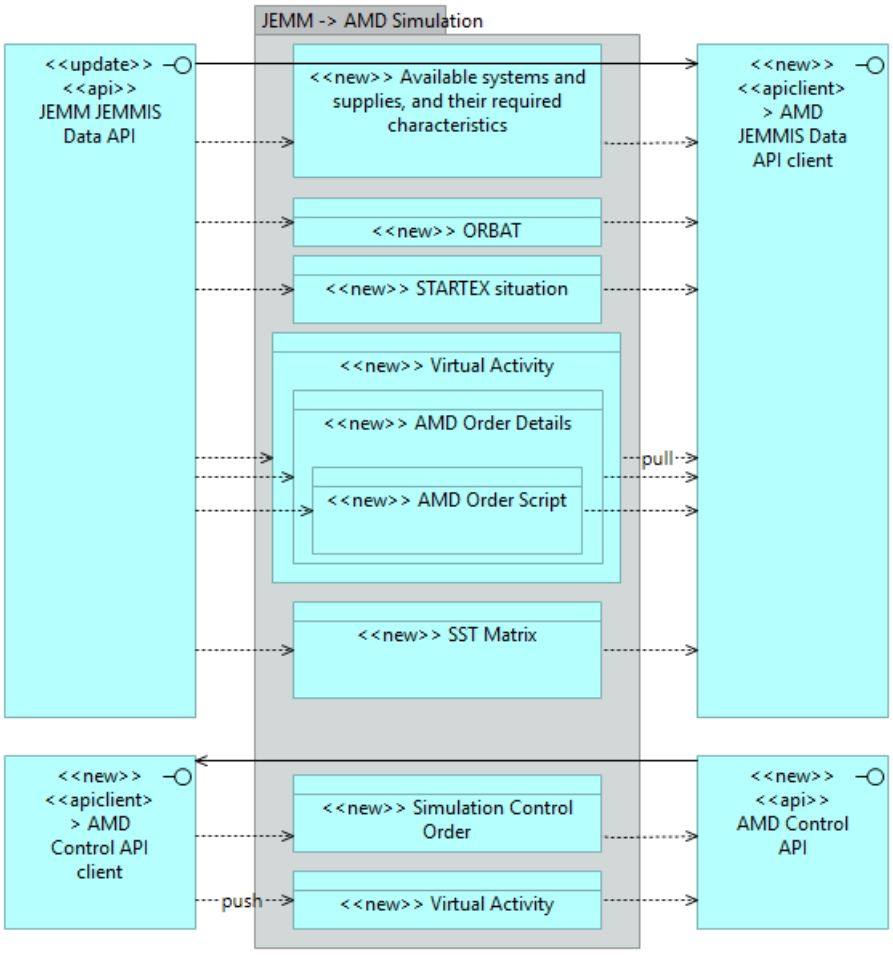

Figure 4: Data exchanged between JEMM and AMD Simulation

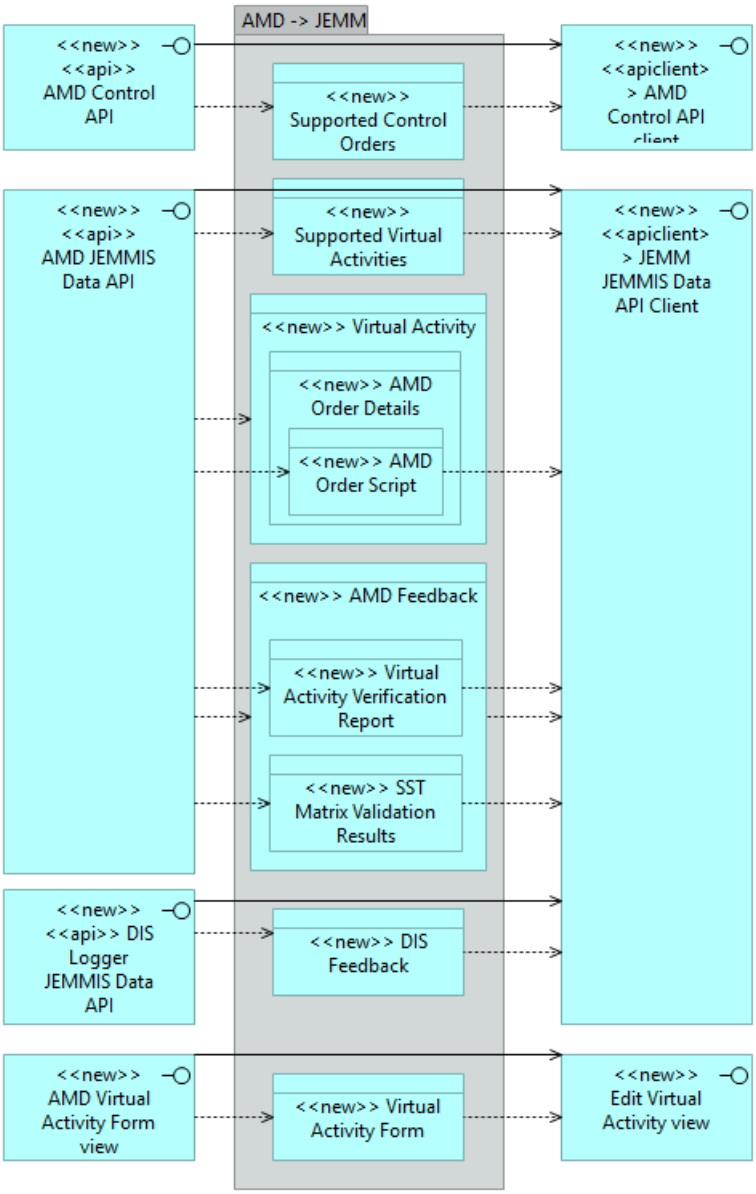

Figure 5: Data exchanged between JEMM and AMD Simulation

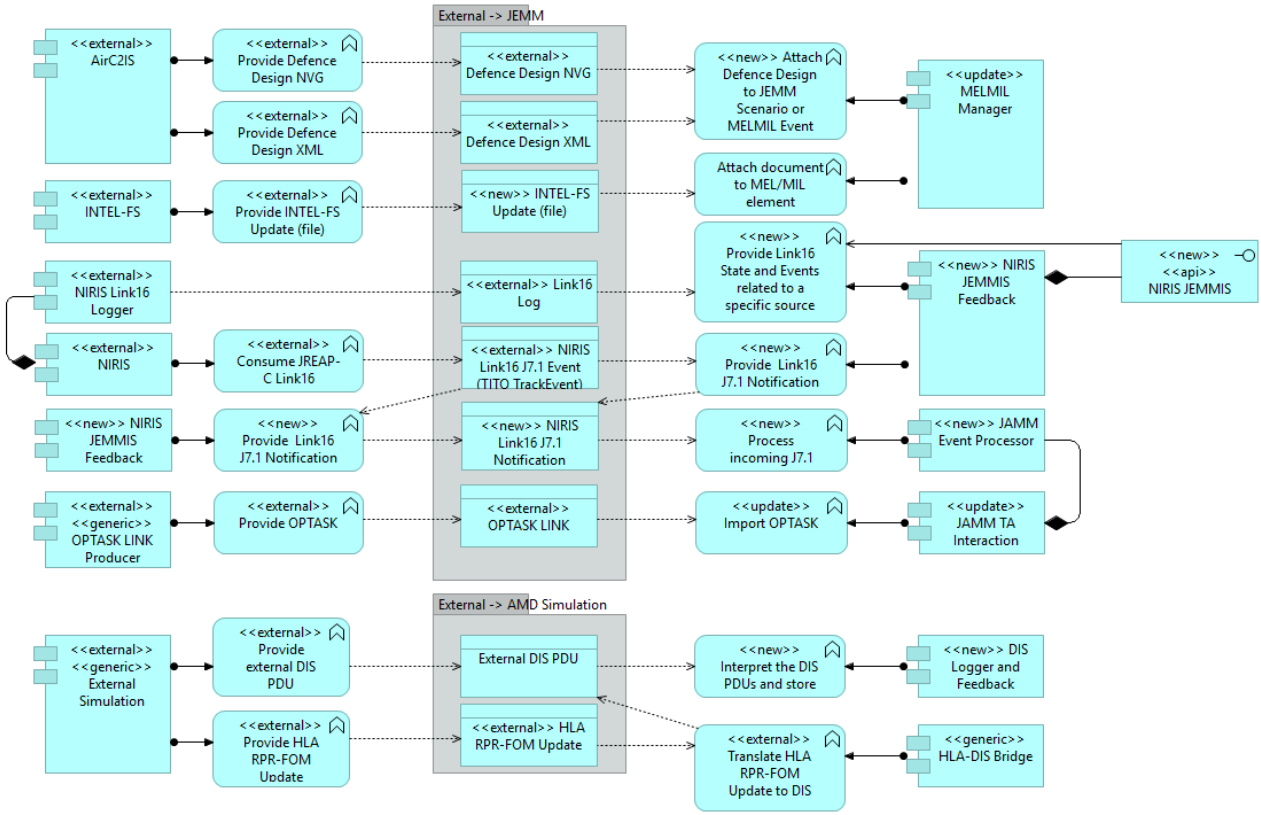

Figure 6: Data received from external systems by JEMM and AMD Simulation

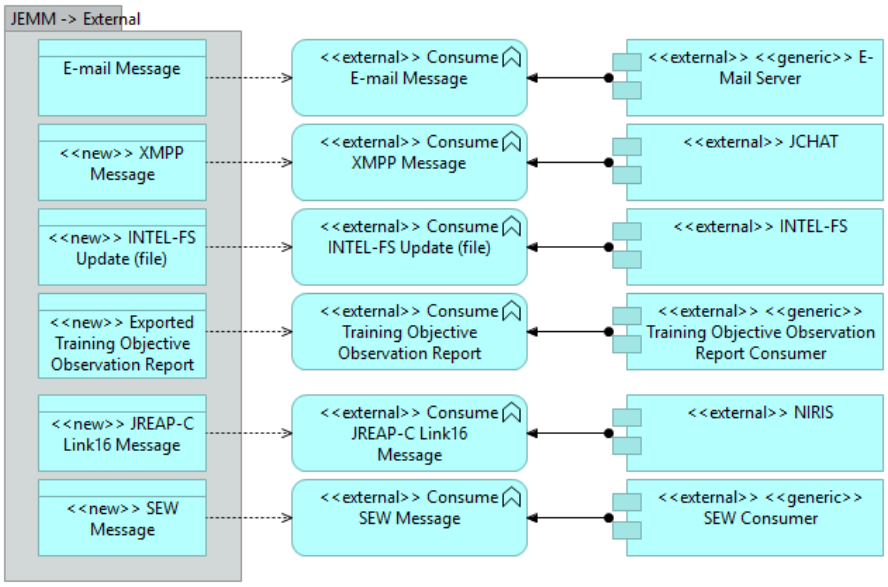

Figure 7: Data sent to external systems by JEMM

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.

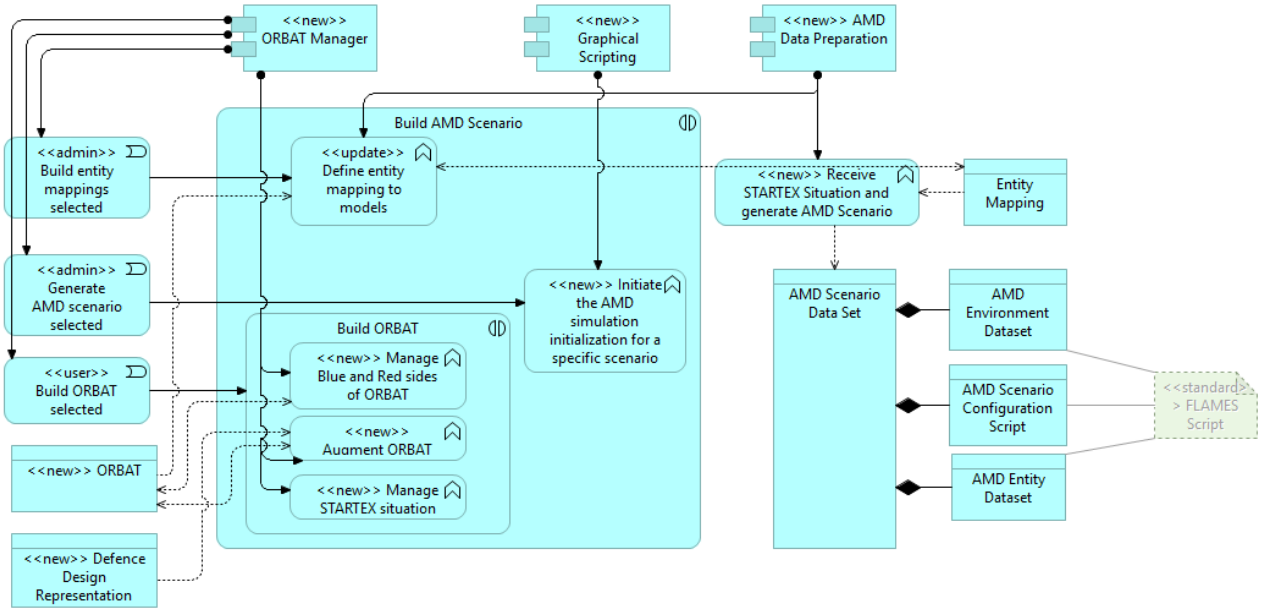

Figure 8: Build AMD Simulation Scenario

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.

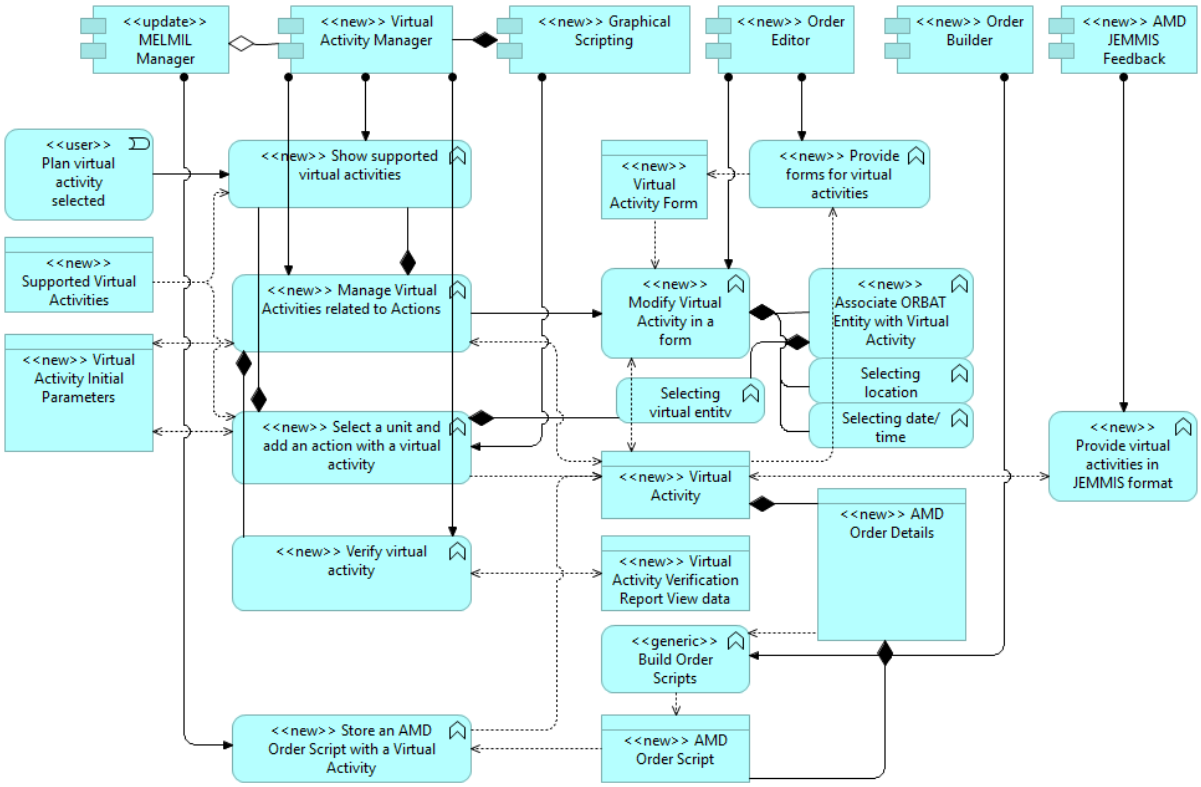

Figure 9: Manage Virtual Activity

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.

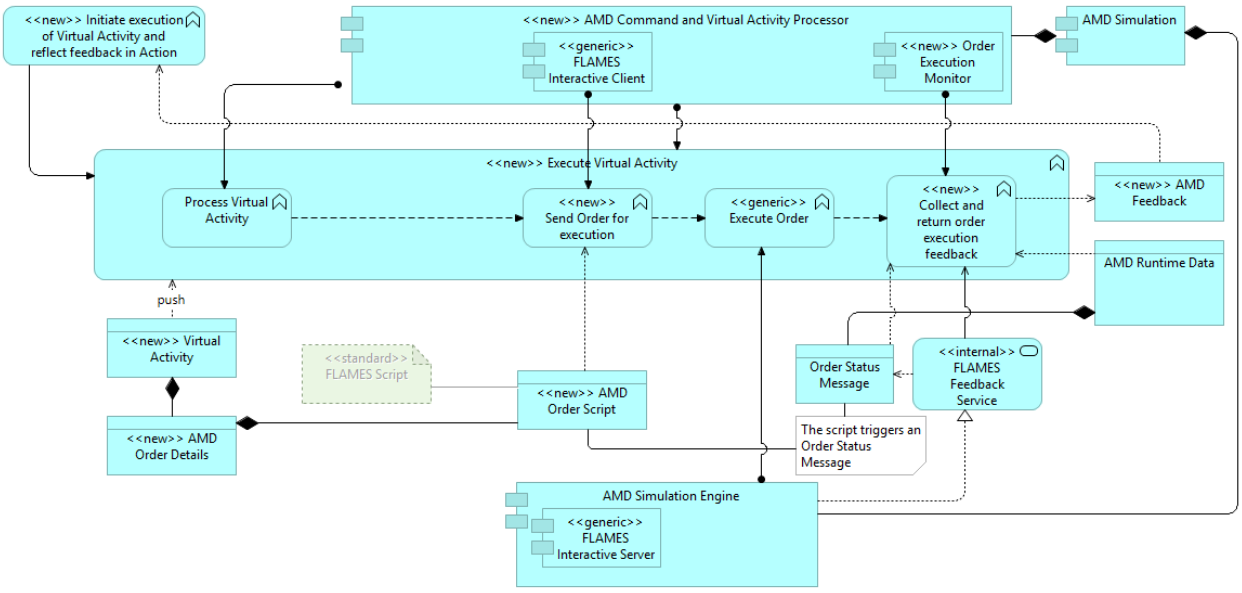

Figure 10: Execute Virtual Activity

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.

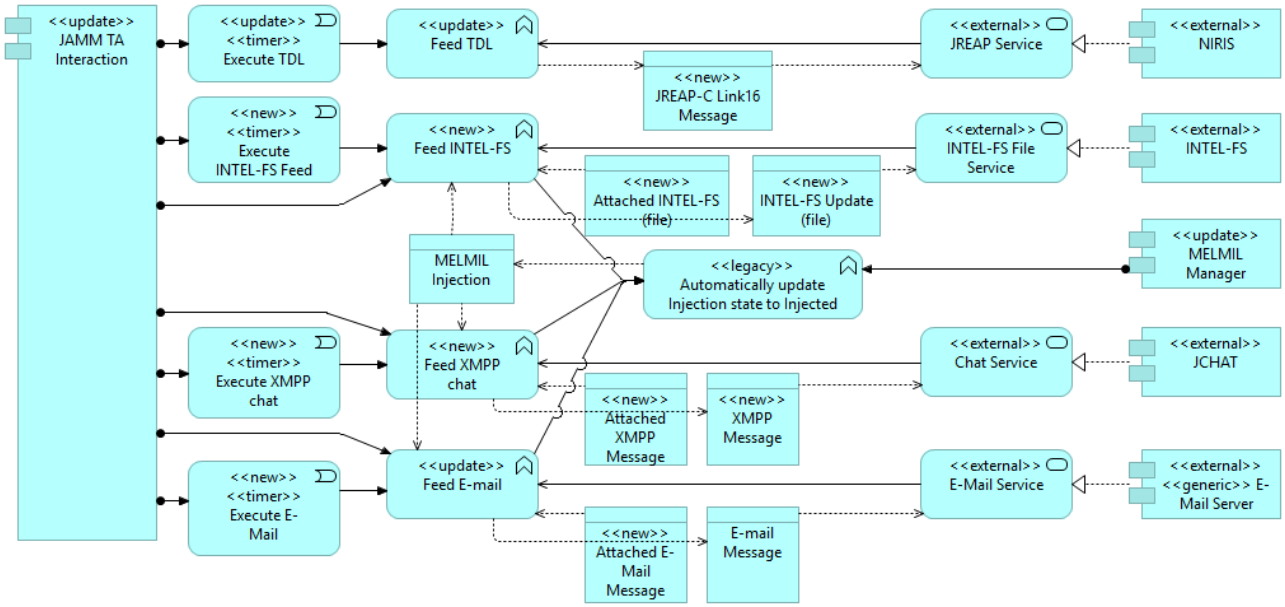

Figure 11: Feed Systems used by the Training Audience

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.

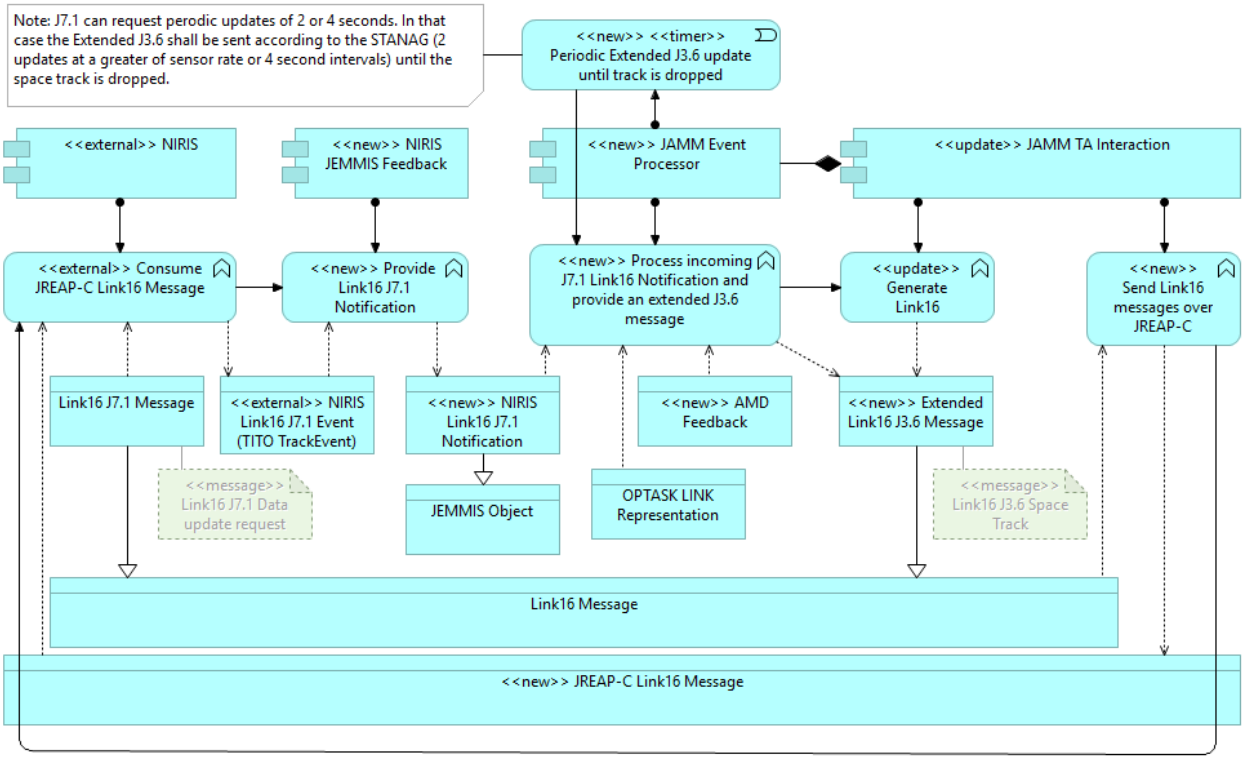

Figure 12: Process incoming J7.1 Link16 Message

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.

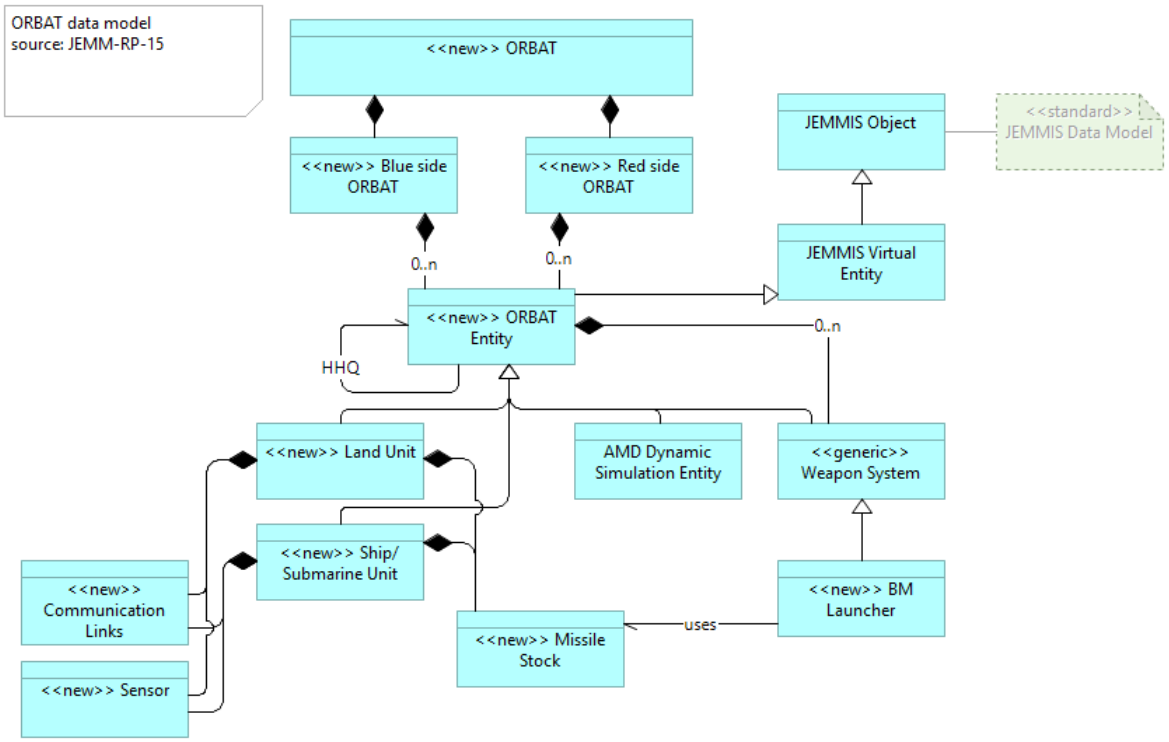

Figure 13: ORBAT data model

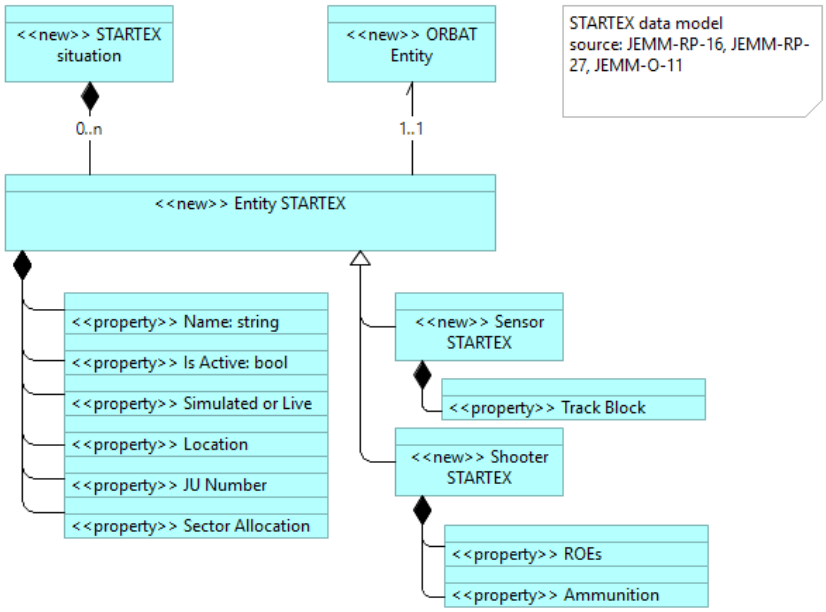

Figure 14: STARTEX data model

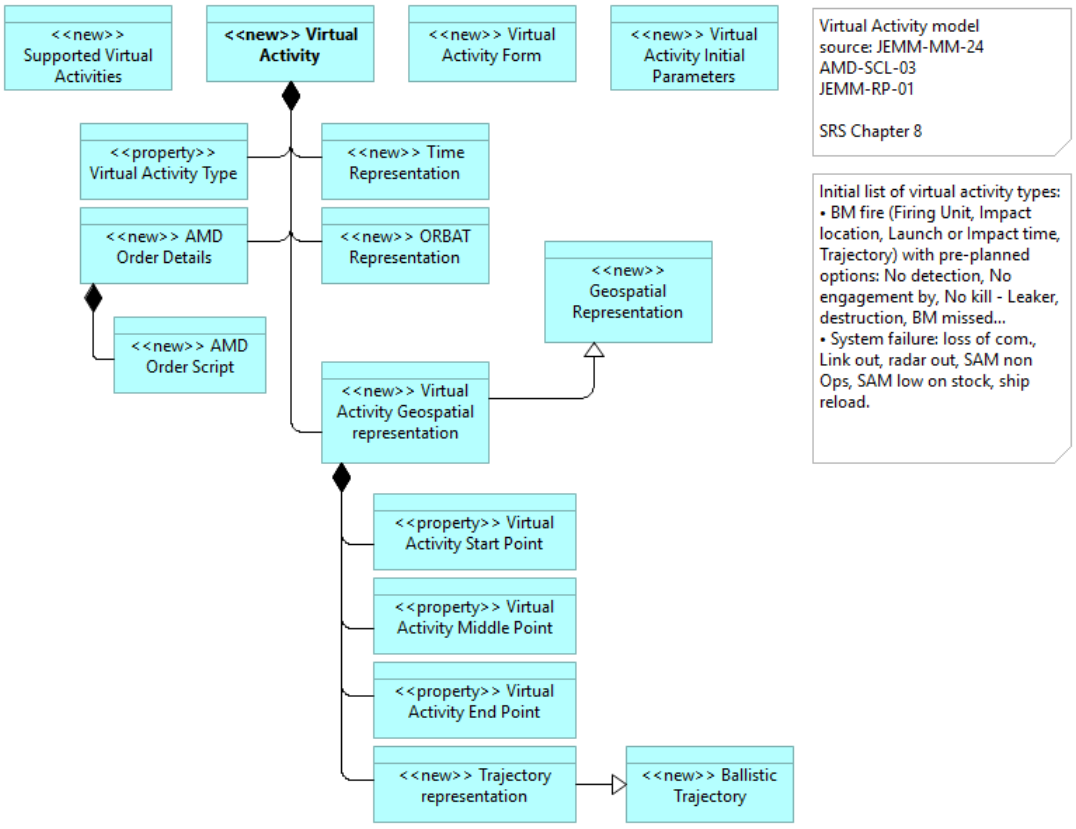

Figure 15: Virtual Activity data model

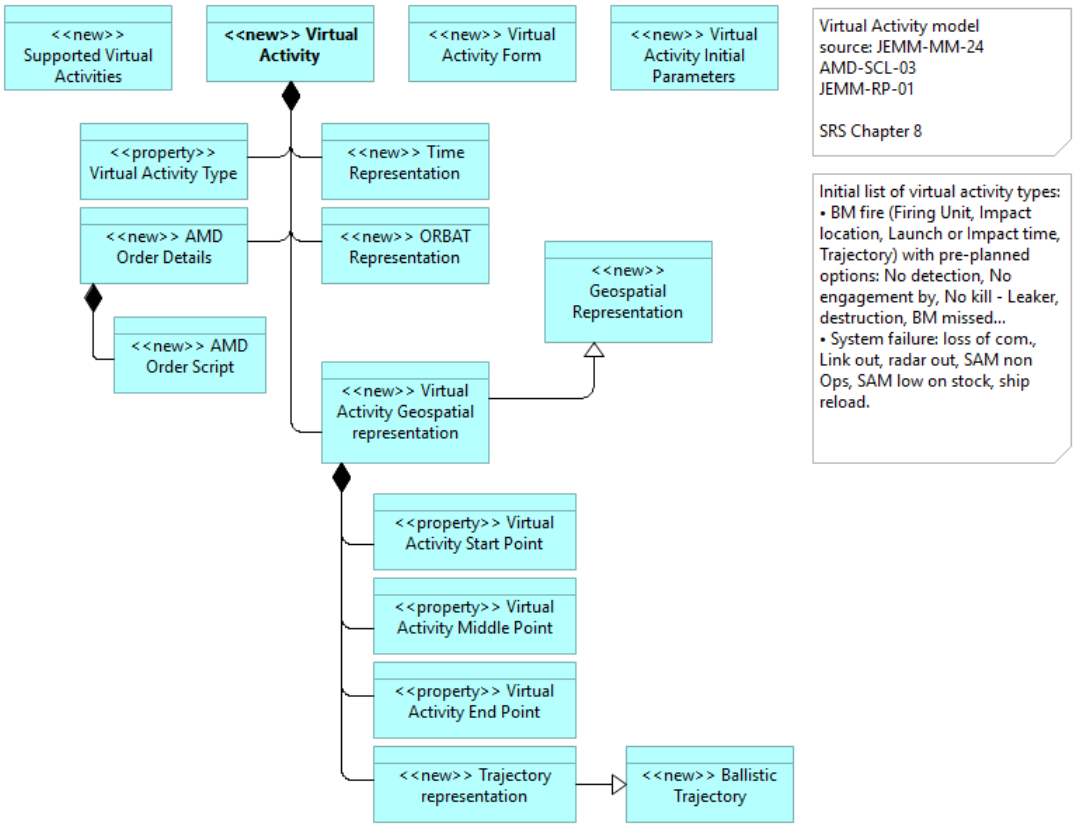

Figure 16: SST Matrix data model

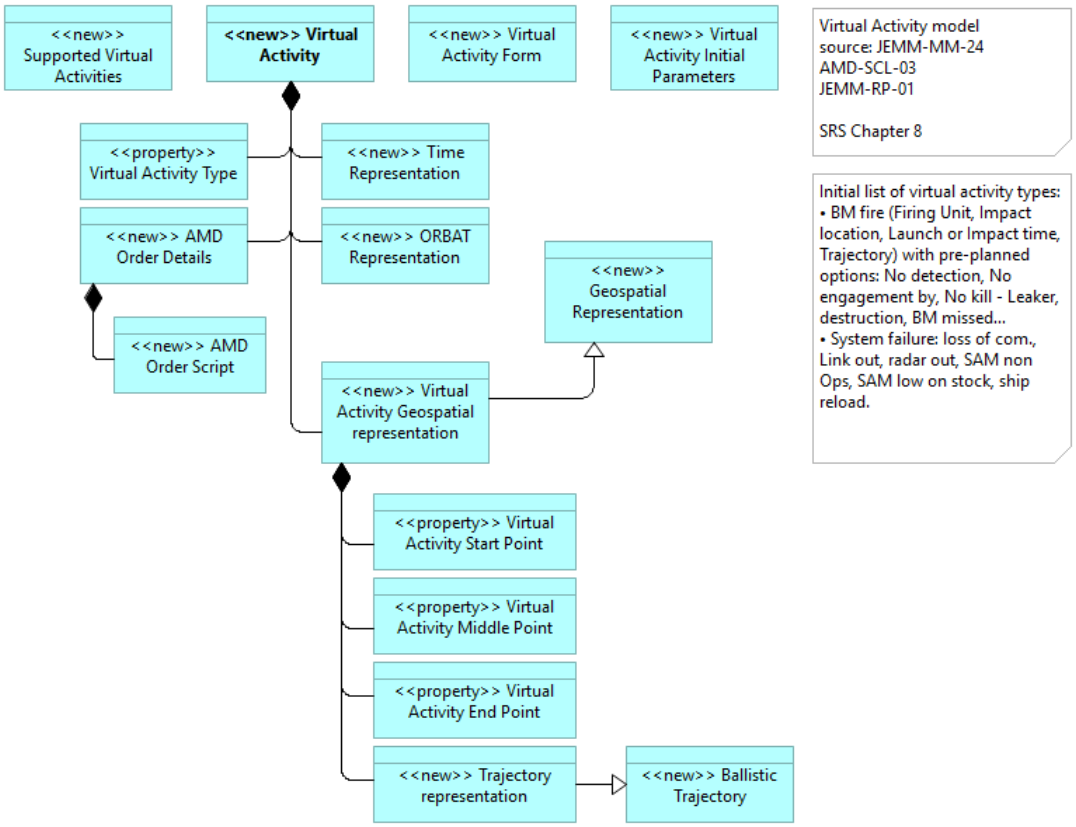

Figure 17: SST Matrix Execution Situation data model

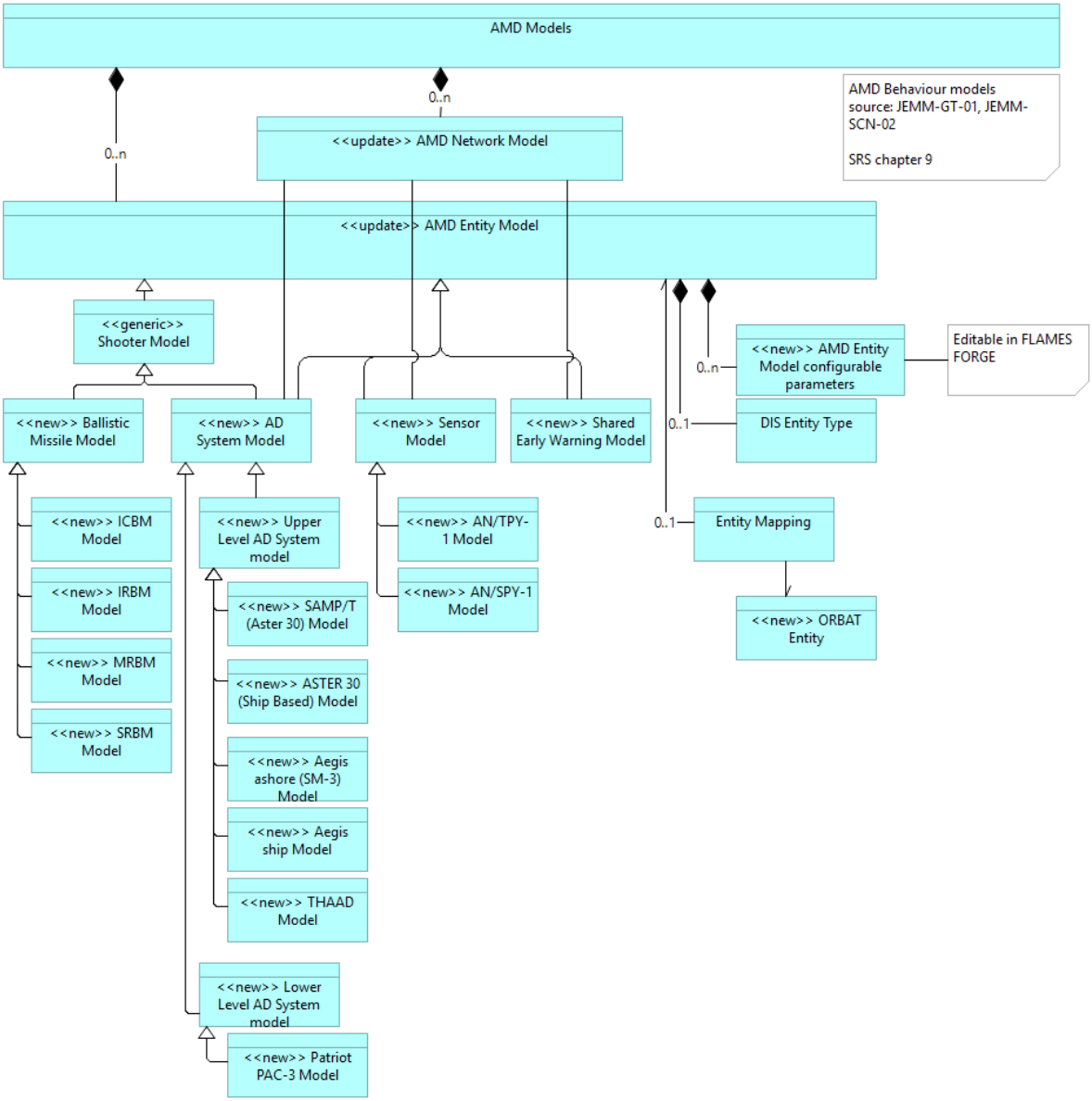

Figure 18: AMD Models

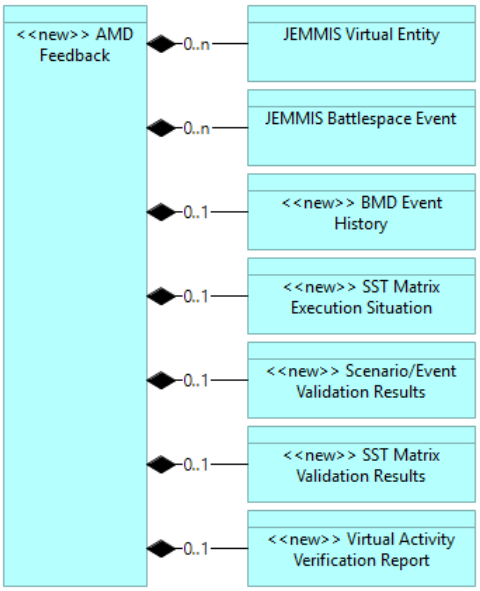

Figure 19: AMD Feedback data model for scenario verification and validation

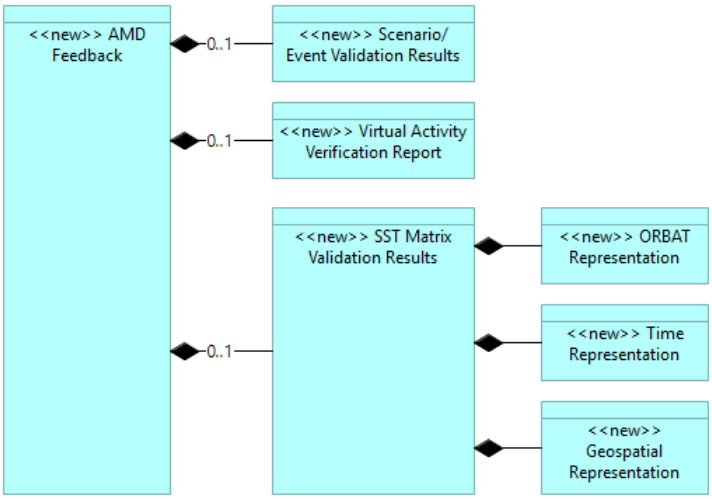

Figure 20: AMD Feedback data model

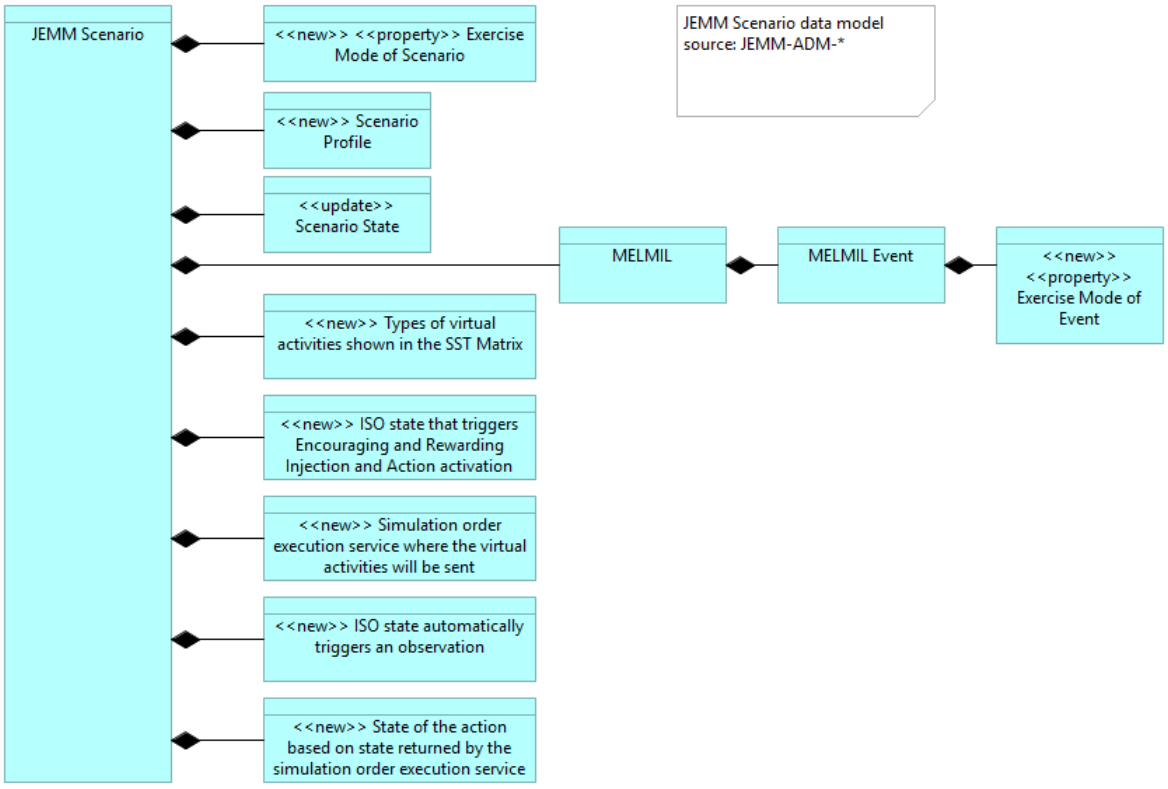

Figure 21: JEMM Scenario Administration data model

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RFQ-CO-115625-ETEE OP ASSUR

BOOK II – PART III

STATEMENT OF WORK

Annex C: BMD IM Portal Software Requirements Specification

Annex C: BMD IM Portal Software Requirements Specification

Contents

1 BMD IM Portal Concept of Utilization 3
2 Program Management Service 3
3 Event Planning Management Service 3
4 Setting Management Service 4
5 Exercise Evaluation Management Service 5
6 Lessons Management Service 6

1 BMD IM Portal Concept of Utilization

1.1 (BMD-IMP-ROLE-01) The BMD exercise portal manager shall be able to specify that domain users can belong to the following groups of users for the exercise program portal:

1.1.1 Exercise program contributor

1.1.2 Exercise program viewer

1.2 (BMD-IMP-ROLE-02) For a particular exercise, the BMD exercise portal manager shall be to instantiate an exercise portal from two template types:

1.2.1 Yearly exercise template

1.2.2 Recurring exercise template

1.3 (BMD-IMP-ROLE-03) For a particular exercise portal, the BMD exercise portal manager shall be able to specify that domain users can belong to the following groups of users:

1.3.1 Exercise Planner

1.3.2 Exercise viewer

1.3.3 Setting Builder

1.3.4 Setting viewer

1.3.5 Exercise Evaluation Manager

1.3.6 Exercise Evaluator

1.3.7 Evaluation Viewer

1.3.8 Exercise Lessons Manager

1.3.9 Lessons Viewer

2 Program Management Service

2.1 (BMD-IMP-PMS-01) The BMD program management service shall be structured according to the same format as the Military Training and Exercise Planning (MTEP) in order to be able to import MTEP data and to export exercise data to the eMTEP.

2.2 (BMD-IMP-PMS-02) The program shall enable the BMD exercise program contributors to add, modify exercise events sponsored by NATO and by nations according to the same organisation in chapters as the MTEP.

2.3 (BMD-IMP-PMS-03) For recurring exercise events, the exercise planner shall be able to specify which units are participating and in what mode, simulated or live in training mode.

3 Event Planning Management Service

3.1 (BMD-IMP-EPMS-01) For a particular exercise, the exercise planner shall be able to instantiate a specific portal that is organised according to the following structure:

3.1.1 Exercise Specification (EXSPEC)

3.1.2 Training Objectives

3.1.3 Setting: as a reference to the base setting that is used for the exercise

3.1.4 Exercise Plan (EXPLAN) with sub-sections corresponding to the structure of the EXPLAN as defined in Bi-SC directive 75-3

3.1.5 For recurring exercises: a specific section shall be added for the Distributed Exercise Simulation and C2 Interoperability plan

3.2 (BMD-IMP-EPMS-02) The exercise viewer shall be able to consult site information.

4 Setting Management Service

4.1 (BMD-IMP-SMS-01) The setting management service will enable the portal manager to instantiate an exercise setting site structured according to the scenario modules specified in the Bi-SC 75-3 directive including but not limited to the following sub-sections:

4.1.1 Theatre of operations information

4.1.2 Strategic initiation with the option to add sub-sections for:

4.1.2.1 Road to Crisis (Narrative summary of the main events leading to planning situation, to be included in MEL/MIL database).

4.1.2.2 UNSC Resolutions and/or other documents providing the legal basis for the operation.

4.1.2.3 NAC Request for Advice.

4.1.2.4 SACEUR’s Strategic Warning Order.

4.1.2.5 SACEUR’s Strategic Assessment.

4.1.2.6 NAC Decision Sheet Requesting Options. SACEUR’s Military Response Options.

4.1.2.7 NAC Initiating Directive.

4.1.3 Crisis Response Planning Information with the option to add sub-sections for:

4.1.3.1 Current Intelligence Summary.

4.1.3.2 Friendly Forces. Provides forces available for planning based on NRF Readiness Reporting System (RRS) and NATO ORBAT as well as current disposition of friendly and neutral forces in the theatre area. Data for generic forces available for planning should be provided in the same formats and level of detail as real forces available for planning would be.

4.1.3.3 Target Integrated Data Base (IDB).

4.1.3.4 Civil military data and information sufficient to support TA development of the production of the Civil Assessment and the CIMIC Estimate as well as the CIMIC input to an Operation Plan.

4.1.3.5 Environmental Assessment.

4.1.3.6 OLRT Recce Reports.

4.1.3.7 NCRS messages.

4.1.3.8 TOPFAS dataset.

4.1.3.9 LogBase dataset.

4.1.3.10 Intelligence dataset, including regional forces' data and scenario-specific Crisis Response Intelligence Package (CRIP).

4.1.3.11 BMD Threat characteristics

4.1.3.12 BMD Threat Situation

4.1.4 Force Activation and Deployment with the option to add sub-sections for:

4.1.4.1 ACTWARN/ACTREQ messages.

4.1.4.2 FORCEPREP messages. Allied Force List (AFL)

4.1.4.3 Force Balancing Results.

4.1.4.4 SOFAs/MOUs/TAs.

4.1.4.5 Multinational Detailed Deployment Plan (MNDDP)/Flow Execution Plan (FEP).

4.1.4.6 ACTORD message(s).

4.1.4.7 ORBATTOA messages.

4.1.4.8 Current Intelligence Summary (INTSUM)/Intelligence Report (INTREP)(as required).

4.1.4.9 Joint Targets List.

4.1.4.10 NCRS messages.

4.1.4.11 Rules of Engagement Authorisation (ROEAUTH)/Implementation (ROEIMPL) messages.

4.1.5 BMD Unit Status specifying the various units available for BMD planning

4.1.6 Reference to the exercise geographic information source

4.2 (BMD-IMP-SMS-02) Setting builders shall be able to create, modify and delete setting information products.

4.3 (BMD-IMP-SMS-03) Setting builders and portal managers shall be able to add sections to the portal.

4.4 (BMD-IMP-SMS-04) The portal manager shall be able to save a specific complete or partial portal as a new template.

4.5 (BMD-IMP-SMS-05) A setting viewer shall be able to consult setting information products.

5 Exercise Evaluation Management Service

5.1 (BMD-IMP-EEM-01) The exercise evaluation management service shall enable the portal manager to manage graded and qualitative evaluation exercise templates.

5.2 (BMD-IMP-EEM-02) For both types of evaluation, the templates will consist of an evaluation criteria section, an evaluation plan section and an evaluation observation and lessons section.

5.3 The differences between both types of portal are:

5.3.1 (BMD-IMP-EEM-03) The portal manager shall be able to extract qualitative evaluation criteria from a specific qualitative evaluation portal and update the reference list of qualitative evaluation criteria.

5.3.2 (BMD-IMP-EEM-04) The qualitative exercise evaluation manager shall be able to extend the list of qualitative evaluation criteria for a particular exercise.

5.3.3 (BMD-IMP-EEM-05) Quantitative evaluation criteria will be associated at their lowest of granularity with quantifiable performance measures that have a weight.

5.3.4 (BMD-IMP-EEM-06) Quantitative evaluation criteria scores are derived from their underlying criteria structure and performance measures.

5.3.5 (BMD-IMP-EEM-07) Qualitative evaluation criteria do not have a fixed scoring mechanism.

5.4 (BMD-IMP-EEM-08) An evaluation criteria section will be created by the exercise evaluation manager using a reference list of evaluation criteria.

5.5 (BMD-IMP-EEM-09) Criteria may have a nested structure of sub-criteria.

5.6 (BMD-IMP-EEM-10) For quantitative evaluation they may be associated a number of performance measures that have a specific weight.

5.7 (BMD-IMP-EEM-11) The evaluation exercise manager shall define evaluation tasks related to evaluation criteria

5.8 (BMD-IMP-EEM-12) The evaluation exercise manager shall be able to assign evaluation tasks to exercise evaluators.

5.9 (BMD-IMP-EEM-13) The evaluation manager shall be able to assess the evaluator workload by reviewing an evaluator's task assignment in time.

5.10 (BMD-IMP-EEM-14) An exercise evaluator shall be able to manage own exercise observations and inputs to the achievement of an exercise criterion by grading or commenting on the criterion.

5.11 (BMD-IMP-EEM-15) The exercise evaluation manager shall be able to aggregate the exercise observations and grades to develop overall lessons identified.

5.12 (BMD-IMP-EEM-16) The portal manager shall be to extract exercise criteria evaluations across multiple exercises.

5.13 (BMD-IMP-EEM-17) Evaluation viewers shall be able to consult all or specifically authorised evaluations.

6 Lessons Management Service

6.1 (BMD-IMP-LMS-01) The portal manager shall be to instantiate a specific lessons portal for an exercise from a template for lessons management.

6.2 (BMD-IMP-LMS-02) The lessons portal template shall consist of a lessons identified section, of a remedial action section, of a best practices section.

6.3 (BMD-IMP-LMS-03) The exercise lessons manager shall be able to associate lessons identified with remedial actions or proposals for best practices.

6.4 (BMD-IMP-LMS-04) The exercise lessons manager shall be able to manage the assignment of remedial actions to specific units.

6.5 (BMD-IMP-LMS-05) The exercise lessons manager shall be able to capture the outcome of remedial actions.

6.6 (BMD-IMP-LMS-06) The exercise lessons viewer shall be able to consult all or specifically authorised lessons portals.

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BOOK II – PART III

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 Test environment inside the NATO Software Factory	3.8.7	At start of the preparation of the first Sprint test	Completion of the final validation event
Release builds	3.5.2	At the end of each Sprint or grouping of Sprints	Completion of the Sprint validation
Temporary office environment for Contractor personnel when working at the Purchaser facility	3.8.3	At start of the agreed period	End of the agreed period
Test environment and software baselines at the Purchaser facility for FAT, SIT, UAT and SAT testing	3.10.10	At start of FAT, SIT, UAT or SAT testing	Completion of FAT, SIT, UAT or SAT validation