



NATO UNCLASSIFIED

ACQUISITION

peter.kowalski@ncia.nato.int

Fax: +32 (0)2 707 8770

NCIA/ACQ/21/6202
19 January 2021

To : All Nominated Prospective Bidders

Subject : **INVITATION FOR BID**

**PROVIDE AIR AND MISSILE DEFENSE (AMD) SIMULATION SYSTEM
WITHIN BALLISTIC MISSILE DEFENCE (BMD) FUNCTIONS IN
EDUCATION, TRAINING, EXERCISE AND EVALUATION (ETEE)
FUNCTIONAL SERVICES (FS)
IFB-CO-115113-ETEE**

Reference(s) : A. AC/4(2008)0002-REV2-ANNEX 1 dated 15 July 2015
B. AC/4-D/2261 (1996 Edition)
C. AC/4-DS(2020)0022
D. C-M(2002)49

Dear Sir / Madam,

1. Your firm is hereby invited to participate in an International Competitive Bid under the Best Value procedures set forth in NATO document AC/4(2008)0002-REV2-ANNEX 1 (Ref. A).
2. The scope of the envisaged project is to provide the Alliance with an Air and Missile Defense (AMD) simulation system within Ballistic Missile Defence (BMD) functions in Education, Training, Exercise and Evaluation (ETEE) Functional Services (FS). The full requirements are described in the prospective Contract (Book II), attached to this letter.
3. NATO intends placing one contract to cover the entire scope of the project. No partial bidding will be allowed.
4. Contract award will be based on the proposal evaluated as the best value in accordance with the selection criteria set forth in the Bidding Instructions (Book I) which follow the procedures for International Competitive Bidding set forth in NATO documents AC/4(2008)0002-REV2-ANNEX 1 (Ref. A) and AC/4-D/2261 (1996 Edition) (Ref. B) or authorized deviations thereto.
5. The reference for the Invitation for Bid is **IFB-CO-115113-ETEE**, and all correspondence concerning the IFB should reference this number.



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

6. THE CLOSING TIME FOR SUBMISSION OF BIDS IN RESPONSE TO THIS INVITATION FOR BID IS 12:00 HOURS (BRUSSELS TIME) ON 14 APRIL 2021.

7. This Invitation for Bid consists of the Bidding Instructions, including Administrative Certificates and Bidding Sheets (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), Contract General Provisions (Part III), and the Statement of Work (Part IV). The Statement of Work and the Annexes thereto set forth detailed specifications and procedures governing the performance requirements of the Contract.

8. The overall security classification of the Invitation for Bid is "NATO UNCLASSIFIED". This Invitation for Bid remains the property of the NCI Agency and shall be protected in accordance with the applicable national security regulations.

9. The successful Bidder will be required to handle and store classified information up to the level of "NATO RESTRICTED". In addition, contractor personnel working on NATO sites will be required to hold individual security clearances of "NATO SECRET". Contractor personnel will be required to work unescorted in Class II and Class I Security areas and therefore, in accordance with paragraph 8(b) of Ref. D, access can only be permitted to cleared individuals. Only companies maintaining such cleared industrial facilities and the appropriate personnel clearances will be able to perform the resulting contract.

10. Bidders have the right to request IFB clarifications as outlined in section 2.6 of the Bidding Instructions (Book I). All requests for clarification will be dealt with strictly in accordance with the procedures at Ref. A.

11. With the aim to prevent an organizational 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 and their prospective Sub-Contractors at any tier shall be excluded from participating in the NCI Agency project under IFB-CO-115115-ETEE entitled "*BMD Functions In ETEE FS - WP4 Operational Assurance & Test*".

12. Recipients are requested to complete and return the enclosed "Acknowledgement of Receipt" at Attachment A within 10 days of the date of this letter, informing the NCI Agency of their intention to bid/not to bid. Firms are not bound by their initial decision, and if a firm decides to reverse its stated intention at a later date, it is requested to advise the NCI Agency by a separate letter.

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

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

FOR THE GENERAL MANAGER:

[Original Signed By]



Gael Craver
Director of Acquisition

Attachments:

- A) Acknowledgement of Receipt of IFB-CO-115113-ETEE
- B) Invitation for Bid IFB-CO-115113-ETEE

Distribution List

All Nominated Prospective Bidders 1

NATO Delegations (Attn: Infrastructure Adviser):

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

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

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



Acting Chief of Contracts	1
Principal Contracting Officer	1
Princial Contracting Assistant	1
Director AMDC2	1
Director NCI Academy	1
NCI Academy – Senior Supplier	1
NCI Academy – Project Manager	1
NCI Academy – Technical Lead	1
Liaison Officer to the Investment Committee	1
Legal Office	1

ATTACHMENT A
ACKNOWLEDGEMENT OF RECEIPT OF INVITATION FOR BID
IFB-CO-115113-ETEE

Please complete and return (as .pdf scan) within 10 days
by e-mail to: Dorina.Cani@ncia.nato.int

We hereby advise that we have received Invitation for Bid IFB-CO-115113-ETEE
on _____, together with all enclosures listed in the Table of Contents.

PLEASE 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 IFB and will notify you of our decision as soon as possible.

Signature: _____

Printed Name: _____

Title: _____

Company: _____

Address: _____



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

**PROVIDE AIR AND MISSILE DEFENSE (AMD) SIMULATION
SYSTEM WITHIN BALLISTIC MISSILE DEFENCE (BMD)
FUNCTIONS IN EDUCATION, TRAINING, EXERCISE AND
EVALUATION (ETEE) FUNCTIONAL SERVICES (FS)**

IFB-CO-115113-ETEE

BOOK I

INSTRUCTIONS TO BIDDERS

TABLE OF CONTENTS

1	INTRODUCTION	4
1.1	Purpose and Scope	4
1.2	Overview of the Prospective Contract	5
1.3	Governing Rules, Eligibility, and Exclusion Provisions	5
1.4	Security	6
1.5	Bidders Conference	6
1.6	Documentation	6
2	GENERAL BIDDING INFORMATION	8
2.1	Definitions	8
2.2	Eligibility and Origin of Equipment and Services	9
2.3	Bid Delivery and Bid Closing	9
2.4	Requests for Extension of Bid Closing Date	10
2.5	Purchaser's Point of Contact	11
2.6	Request for IFB Clarifications	11
2.7	Requests for Waivers and Deviations	13
2.8	Amendment of the Invitation for Bid	13
2.9	Modification and Withdrawal of Bids	13
2.10	Bid Validity	14
2.11	Bid Guarantee	14
2.12	Cancellation of Invitation for Bid	16
2.13	Electronic Transmission of Information and Data	16
2.14	Supplemental Agreements	17
2.15	Notice of Limitations on Use of Intellectual Property Delivered to the Purchaser	17
2.16	Mandatory Quality Assurance and Quality Control Standards	18
3	BID PREPARATION INSTRUCTIONS	19
3.1	General	19
3.2	Bid Package Content	19
3.3	Package Marking	20
3.4	Administrative Documentation Package	20
3.5	Price Quotation	22
3.6	Technical Proposal Package	24
4	BID EVALUATION AND CONTRACT AWARD	31
4.1	General	31
4.2	Best Value Award Approach and Bid Evaluation Factors	32
4.3	Evaluation Procedure	33
4.4	Evaluation Step 1 - Administrative Compliance	34
4.5	Evaluation Step 2 - Technical Evaluation	35
4.6	Evaluation Step 3 - Price Evaluation	37
4.7	Evaluation Step 4 – Calculation of Best Value Scores and Pre-Award Discussions	39
Annex A	Bidding Sheets	1
Annex B	Prescribed Administrative Forms and Certificates	3

Annex C	Bid Guarantee - Standby Letter of Credit	1
Annex D	Clarification Request Form	1
Annex E	Bid-Requirements Cross Reference Matrix (BRCM)	1

1 INTRODUCTION

1.1 Purpose and Scope

1.1.1 The Air and Missile Defence (AMD) simulation system will build upon the existing air Integrated Training Capability (ITC) system and implement new and enhanced components for integration by the Purchaser into the ITC/AMD system baselines enhancements to deliver AMD simulation system baselines that will provide the following business services to enable the BMD Community of Interest to meet their ETEE requirements:

- 1.1.1.1. BMD Battlespace Simulation Service - Moderate enhancement
- 1.1.1.2. Simulation Control Service - Major enhancement
- 1.1.1.3. Simulation Composition Service - Major enhancement
- 1.1.1.4. Battlespace Information Service - Major enhancement
- 1.1.1.5. Ground Truth Battlespace Object Services - Major enhancement
- 1.1.1.6. Logging Service - Major enhancement

1.1.2 This project will deliver working software that implements the full set of application functions associated with the software requirements for the business services mentioned above. The software will be integrated by the Purchaser into AMD simulation system baselines which the Purchaser will deploy for the users. The project will consist of two phases of approximately 18 months each. The first phase will deliver working software that meets the full set of requirements for the AMD simulation system. The second phase aims to refine the first delivery based on actual usage and on insights gained during the development of the first delivery. The project will support the system training periods and the initial operation of the system after final system acceptance by providing corrective maintenance support for the delivered software.

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

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

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

1.1.6 The project scope includes:

- 1.1.6.1 Project Management

1.1.6.2 Software Engineering

1.1.6.3 Initial Operations Support

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

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

1.2 Overview of the Prospective Contract

1.2.1 The Prospective Contract (Book II) requires the selected Contractor to deliver the components for AMD simulation system product baselines. The Contractor shall perform all activities required as per Book II Part IV (Statement of Work – SOW) and shall deliver the associated deliverables as per Book II Part I (Schedule of Supplies and Services – SSS). The Contractor's work encompasses the activities described in Book II Part IV according to the schedule defined in the SOW. The contract is scheduled for 36 month of Contractor performance after Effective Date of Contract (EDC), with follow-on Operation and Maintenance support.

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

1.3 Governing Rules, Eligibility, and Exclusion Provisions

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

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

1.3.3 Best Value Evaluation Method

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

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

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

- 1.3.5 The Bidder shall refer to the Purchaser all queries for resolution of any conflicts found in information contained in this document in accordance with the procedures set forth in Section 2.6 "Request for IFB Clarifications".
- 1.3.6 Prospective Bidders shall note that with the aim to prevent a conflict of interest in industrial roles under the BMD Functions in ETEE Functional Services project, the NATO authorities authorizing this project have directed that Bidders responding to this IFB and their prospective Sub-Contractors shall be excluded from participation in the NCI Agency project under IFB-CO-115115-EETE entitled "*BMD Functions in ETEE FS - WP4 Operational Assurance & Test*".

1.4 Security

- 1.4.1 Contractor will be required to handle and store classified material to the level of "NATO RESTRICTED" and the Contractor shall have the appropriate facility and personnel clearances. Should a Contractor be unable to perform the contract due to the fact that the facility clearance has not been provided by their respective national security agency, this lack of clearance cannot be the basis for a claim of adjustment or an extension of schedule, nor the lack of clearance be considered a mitigating circumstance in the case of an assessment of Liquidated Damages or a determination of Termination For Default by the Purchaser.
- 1.4.2 Contractor personnel working at NATO sites are required to possess a security clearance of "NATO SECRET". Contractor personnel without such a clearance, confirmed by the appropriate national security authority and transmitted to the cognisant NATO security officer at least fourteen (14) days prior to the site visit, will be denied access to the site. Denial of such access by the Purchaser may not be used by the Contractor as the basis for a claim of adjustment or an extension of schedule nor can the denial of access be considered a mitigating circumstance in the case of an assessment of Liquidated Damages or a determination of Termination for Default by the Purchaser.
- 1.4.3 Bidders are advised that contract signature will not be delayed in order to allow the processing of security clearances for personnel or facilities. Should the otherwise successful Bidder not be in a position to accept the offered Contract within a period of time deemed to be reasonable by the Purchaser due to the non-availability of the necessary security clearance(s), the Purchaser may determine the Bidder's Offer to be non-compliant and offer the Contract to the next ranking Bidder. In such a case, the Bidder lacking the necessary security clearance(s) shall be liable for forfeiture of the Bid Guarantee.

1.5 Reserved

1.6 Documentation

- 1.6.1 All documentation, including the IFB itself, all applicable documents and any reference documents provided by the Purchaser are solely to be used for the

purpose of preparing a response to this IFB. They are to be safeguarded at the appropriate level according to their classification and reference documents are provided "as is", without any warranty as to quality or accuracy.

2 GENERAL BIDDING INFORMATION

2.1 Definitions

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

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

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

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

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

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

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

2.1.1.7 "IFB": Invitation for Bid.

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

2.2 Eligibility and Origin of Equipment and Services

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

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

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

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

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

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

2.3 Bid Delivery and Bid Closing

2.3.1 All Bids shall be in the possession of the Purchaser at the address given below in Section 2.3.2 on/or before 12.00 hours (Brussels Time) on **14 April 2021**, at which time and date Bidding shall be closed.

2.3.2 Bids shall be delivered by hand-carried service or express courier to the following address:

NCI Agency
NATO Industrial Infrastructure
Reception Service 1
Rue Arthur Maes
1130 Brussels, BELGIUM
Attention: ACQ/Contracting/Ms. Dorina Cani)

2.3.3 Bids submitted by electronic means are not permitted and will not be considered. Bidders are advised that security or other personnel remaining on

the premises outside of normal business hours may decline to sign or issue receipts for delivered items.

2.3.4 Late Bids

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

2.3.4.2 *Consideration of Late Bid* – The Purchaser considers that it is the responsibility of the Bidder to ensure that the Bid submission arrives by the specified Bid Closing time. Considering the number and quality of express delivery services, courier services and special services provided by the national postal systems, a late Bid shall only be considered for award under the following circumstances:

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

2.3.4.2.2 The Bid was sent to the address specified in the IFB by ordinary, registered or certified mail not later than ten (10) calendar days before the Bid closing date and the delay was due solely to the national or international postal system for which the Bidder bears no responsibility (the official postmark for ordinary and Registered Mail or the date of the receipt for Certified Mail will be used to determine the date of mailing), or,

2.3.4.2.3 The Bid was hand carried, or delivered by a private courier service and the Bidder can produce a receipt which demonstrates that the delivery was made to the correct address and received by a member of the NCI Agency and the failure to be received by the Contracting Authority was due to mishandling within the Purchaser's organisation. Adverse weather, technical issues, traffic conditions, or circumstances of a similar nature will not be considered as grounds for acceptance of late bids.

2.3.4.3 A Late Bid which was hand-carried, or delivered by a private courier, for which a proper receipt cannot be produced, cannot be considered for award under any circumstances nor can late Bids which bear no post marks or for which documentary evidence of mailing date cannot be produced.

2.4 Requests for Extension of Bid Closing Date

2.4.1 Bidders are informed that requests for extension to the closing date for the IFB shall be submitted by the Bidder only through its respective country's NATO Delegation or Embassy to the Purchaser Point of Contact indicated in Section [2.5.1](#) below. Any request for extension shall be submitted by the respective NATO Delegation or Embassy **no later than fourteen (14) calendar days** prior

to the established Bid closing date. Bidders are advised to submit their request in sufficient time as to allow their respective NATO Delegation or Embassy to deliver the formal request to the Purchaser within the above time limit.

2.5 Purchaser's Point of Contact

2.5.1 The Purchaser point of contact for all information concerning this Invitation for Bid is:

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

With a Copy to:

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

2.5.2 All postal mail correspondence related to the IFB will be forwarded to:

NCI Agency
Acquisition Directorate
Boulevard Leopold III
1110 Brussels, Belgium

Attn: Acquisition: Mr Peter Kowalski (contact details stated above)
Attn: Acquisition: Ms Dorina Cani (contact details stated above)

2.6 Request for IFB Clarifications

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

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

- 2.6.3 Additional requests for clarification are limited only to the information provided as answers by the Purchaser to Bidder requests for clarification. Such additional requests shall arrive not later than fourteen (14) calendar days before the established Bid Closing Date.
- 2.6.4 It is the responsibility of the Bidders to ensure that all Clarification Requests submitted bear no mark, logo or any other form or sign that may lead to reveal the Bidders' identity in the language constituting the clarification itself. This prescription is not applicable to the means used for the transmission of the clarification (i.e. email or form by which the clarification is forwarded).
- 2.6.5 The Purchaser declines all responsibilities associated to any and all circumstances regardless of the nature or subject matter arising from the Bidders' failure or inability to abide to the prescription in Section 2.6.4.
- 2.6.6 The Purchaser may provide for the removal of any form of identification in the body of the clarification request in those instances in which such practice is feasible as well as providing for a re-wording of the clarification request in those cases in which the original language submitted is deemed ambiguous, unclear, subject to different interpretation or revelatory of the Bidder's identity.
- 2.6.7 Bidders are advised that subsequent questions and/or requests for clarification included in a Bid shall neither be answered nor considered for evaluation.
- 2.6.8 Except as provided above, all questions will be answered by the Purchaser and the questions and answers (but not the identity of the questioner) will be issued in writing to all prospective Bidders. The Bidders shall immediately inform the Purchaser in the event that questions posed are not reflected in the answers published.
- 2.6.9 Where the extent of the changes implied by the response to a clarification request is of such a magnitude that the Purchaser deems necessary to issue revised documentation, the Purchaser will do so by the mean of the issuance of a formal IFB amendment pursuant to AC/4 D/2261 (1996 Edition) and in accordance with Section [2.8](#) below.
- 2.6.10 The Purchaser reserves the right to reject frivolous clarification requests determined by the Purchaser to be clearly devised or submitted for the purposes of artificially obtaining an extension of the bidding time (i.e. clarifications re-submitted using different wording where such wording does not change the essence of the clarification being requested).
- 2.6.11 The published responses issued by the Purchaser shall be regarded as the authoritative interpretation of the Invitation for Bid. Any amendment to the language of the IFB included in the answers will be issued as an IFB Amendment and shall be incorporated by the Bidder in his offer.

2.7 Requests for Waivers and Deviations

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

2.8 Amendment of the Invitation for Bid

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

2.8.2 The Purchaser will consider the potential impact of amendments on the ability of prospective Bidders to prepare a proper Bid within the allotted time. The Purchaser may extend the "Bid Closing Date" at its discretion and such extension will be set forth in the amendment document.

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

2.9 Modification and Withdrawal of Bids

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

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

favourable to the Purchaser, the modified Bid may be used as the basis of contract award. The Purchaser, however, reserves the right to award a contract to the apparent successful Bidder on the basis of the Bid submitted and disregard the late modification.

- 2.9.3 A Bidder may withdraw its Bid at any time prior to Bid Opening without penalty. In order to do so, an authorised agent or employee of the Bidder must provide an original statement of the firm's decision to withdraw the Bid and remove the Bid from the Purchaser's premises.
- 2.9.4 Except as provided in Section 2.10.4.2 below, a Bidder may withdraw its Bid after Bid Opening only by forfeiture of the Bid Guarantee.

2.10 Bid Validity

- 2.10.1 Bidders shall be bound by the term of their Bids for a period of eighteen (18) months starting from the Bid Closing Date specified in Section 2.3.1 above.
- 2.10.2 In order to comply with this requirement, the Bidder shall complete the Certificate of Bid Validity set forth in Annex B-4. Bids offering less than the period of time referred to above for acceptance by the Purchaser may be determined to be non-compliant.
- 2.10.3 The Purchaser will endeavour to complete the evaluation and make an award within the period referred to above. However, should that period of time prove insufficient to render an award, the Purchaser reserves the right to request an extension of the period of validity of all Bids which remain under consideration for award.
- 2.10.4 Upon notification by the Purchaser of such a request for a time extension, the Bidders shall have the right to:
- 2.10.4.1 accept this extension of time in which case Bidders shall be bound by the terms of their offer for the extended period of time and the Bid Guarantee and Certificate of Bid Validity extended accordingly; or
- 2.10.4.2 refuse this extension of time and withdraw the Bid, in which case the Purchaser will return to the Bidder its Bid Guarantee in the full amount without penalty.
- 2.10.5 Bidders shall not have the right to modify their Bids due to a Purchaser request for extension of the Bid validity unless expressly stated in such request.

2.11 Bid Guarantee

- 2.11.1 The Bidder shall furnish with its Bid a guarantee in an amount equal to **one Hundred Eighty-Eight Thousand Euro (€188,000)**. The Bid Guarantee shall be substantially similar to Annex C as an irrevocable, unqualified and unconditional Standby Letter of Credit (SLC) issued by a Belgian banking

institution fully governed by Belgian legislation or issued by a non-Belgian financial institution and confirmed by a Belgian banking institution fully governed by Belgian legislation. In the latter case signed original letters from both the issuing institution and the confirming institution must be provided. The confirming Belgian bank shall clearly state that it will guarantee the funds, the drawing against can be made by the NCI Agency at its premises in Belgium. Bid Guarantees shall be made payable to the Treasurer, NCI Agency. The validity period of the Bid Guarantee shall be in line with the Bid Validity period as defined in Para 2.10.1.

- 2.11.2 Alternatively, a Bidder may elect to post the required Guarantee in cash (via direct bank deposit) or by certified cheque to be submitted in the Bidders Bid Administrative Package (Para 3.4). If the latter method is selected, Bidders are informed that the Purchaser will cash the cheque on the Bid Closing Date. Instructions regarding direct cash bank deposit shall be obtained from the designated Point of Contact indicated in Para 2.5
- 2.11.3 If the Bid Closing Date is extended after a Bidder's financial institution has issued a Bid Guarantee, it is the obligation of the Bidder to have such Bid Guarantee (and confirmation, as applicable) extended to reflect the revised Bid Validity date occasioned by such extension.
- 2.11.4 Failure to furnish the required Bid Guarantee in the proper amount, and in the proper form and for the appropriate duration by the Bid Closing Date may be cause for the Bid to be determined non-compliant.
- 2.11.5 In the event that a Bid Guarantee is submitted directly by a banking institution, the Bidder shall furnish a copy of said document in the Bid Administration Package.
- 2.11.6 The Purchaser will make withdrawals against the amount stipulated in the Bid Guarantee under the following conditions:
- 2.11.6.1 The Bidder has submitted a bid and, after Bid Closing Date (including extensions thereto) and prior to the selection the compliant bid determined to represent the best value, withdraws its Bid, or states that he does not consider its bid valid or agree to be bound by its bid;
- 2.11.6.2 The Bidder has submitted a compliant bid determined by the Agency to represent the best value, but the Bidder declines to sign the contract offered by the Agency, such contract being consistent with the terms of the Invitation for Bid;
- 2.11.6.3 The Purchaser has offered the Bidder the contract for execution but the Bidder has been unable to demonstrate compliance with the security requirements of the contract within a reasonable time; or

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

2.11.7 Bid Guarantees will be returned to Bidders as follows:

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

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

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

2.11.7.4 pursuant to Section 2.10.4.2 above.

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

2.12 Cancellation of Invitation for Bid

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

2.13 Electronic Transmission of Information and Data

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

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

2.14 Supplemental Agreements

- 2.14.1 Bidders are required, in accordance with the certificate at Annex B-7 of these Instructions to Bidders, to disclose any prospective Supplemental Agreements that are required by national governments to be executed by NATO/NCI Agency or successor organisations as a condition of contract performance.
- 2.14.2 Supplemental Agreements are typically associated with, but not necessarily limited to, national export control regulations, technology transfer restrictions and end user agreements or undertakings.
- 2.14.3 Bidders are cautioned that failure to provide full disclosure of the anticipated requirements and the terms thereof, to the best of the Bidder's knowledge and experience, may result in the Purchaser withholding award of the contract or cancelling an executed contract if it is discovered that the terms of such Supplemental Agreements contradict salient conditions of the Prospective Contract to the extent that either key objectives cannot be accomplished or basic contract principles and Purchaser rights have been abridged.

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

- 2.15.1 Bidders are instructed to review Clauses 6 and 7 of the Contract Special Provisions and Clause 30 of the Contract General Provisions set forth Parts II and III of Book II herein. These Clauses sets forth the definitions, terms and conditions regarding the rights of the Parties concerning Intellectual Property developed and/or delivered under this contract or used as a basis of development under this contract.
- 2.15.2 Bidders are required to disclose, in accordance with the Certificates at Annex B-10 and Annex B-11, the Intellectual Property proposed to be used by the Bidder that will be delivered with either Background Intellectual Property Rights or Third Party Intellectual Property Rights. Bidders are required to identify such Intellectual Property and the basis on which the claim of Background or Third Party Intellectual Property is made. Bidders shall note that Clause 6 of the Special Provisions prohibits the inclusion of any Background Intellectual Property or third party software in the code provided to the Purchaser without the Purchaser's prior agreement.
- 2.15.3 Bidders are further required to identify any restrictions on Purchaser use of the Intellectual Property that is not in accordance with the definitions and rights set forth in the provisions of the Book II prospective Contract concerning use or dissemination of such Intellectual Property.
- 2.15.4 Bidders are reminded that restrictions on use or dissemination of Intellectual Property conflicting with the Book II terms and conditions or with the objectives and purposes of the Purchaser as stated in the Prospective Contract shall result in a determination of non-compliant bid.

2.16 Mandatory Quality Assurance and Quality Control Standards

- 2.16.1 Bidders are requested to note that, in accordance with the Certificate at Annex B-8 hereto, Bidders shall provide documentary evidence that the Bidder possesses a current certification that is compliant with the requirements of Allied Quality Assurance Publication (AQAP) 2110, ISO 9001:2015, or an equivalent QA/QC regime.
- 2.16.2 Bidders shall further demonstrate that such regime is applied within the Bidder's internal organisation, as well as extended to its relationships with Sub-Contractors.
- 2.16.3 If the Bidder is offering a QA/QC regime that is claimed to be equivalent to AQAP 2110 or ISO 9001:2015, the burden of proof of such equivalency shall be on the Bidder and such evidence of equivalency shall be submitted with the Certificate at Annex B-8 in the Bid Administration Package.
- 2.16.4 Failure to execute this Certificate, or failure to provide documentary evidence of compliance with this requirement may result in a determination of non-compliance for the submitted Bid.

3 BID PREPARATION INSTRUCTIONS

3.1 General

- 3.1.1 Bidders shall prepare and submit their Bid in accordance with the requirements and format set forth in this IFB. Compliance with all bid submission requirements is mandatory. Failure to submit a bid in conformance with the stated requirements may result in a determination of non-compliance by the Purchaser and the elimination of the bid from further consideration.
- 3.1.2 Bidders **shall not simply restate the IFB requirements**. A Bid shall demonstrate that the Bidder understands the terms, conditions and requirements of the IFB and shall demonstrate the Bidder's ability to provide all the services and deliverables listed in the Schedules of the prospective Contract. Bidders shall take good note of Para 4.1.4 below in this regard.
- 3.1.3 Bidders are informed that the quality, thoroughness and clarity of the bid will affect the overall scoring of the bid. Although the Purchaser may request clarification of the bid, it is not required to do so and may make its determination on the content of the bid as written. Therefore, Bidders shall assume that inconsistencies, omissions, errors, lack of detail and other qualitative deficiencies in the submitted bid will have a negative impact on the final Best Value score.
- 3.1.4 Partial Bids and/or bids containing conditional statements will be declared non-compliant.
- 3.1.5 Bidders are advised that the Purchaser reserves the right to incorporate the successful Bidder's Offer in whole or in part by reference in the resulting contract.
- 3.1.6 If no specific format has been established for electronic versions, Bidders shall deliver documentation in the native electronic format which is best suited for review and maintenance by the Purchaser (e.g., Project Master Schedule in MS Project format, Project Highlight Reports in MS Word).
- 3.1.7 All documentation submitted as part of the Bid shall be classified no higher than "NATO UNCLASSIFIED".

3.2 Bid Package Content

- 3.2.1 The complete Bid shall consist of three distinct and separated parts described in the following subparagraphs. Detailed requirements for the structure and content of each of these packages are contained in these Bidding Instructions.
- 3.2.2 **The Bid Administration Envelope**, containing one (1) complete hard copy and one (1) soft copy (on CD ROM or DVD unlocked and unencrypted) Adobe .pdf versions of the documents specified in Section 3.4 below.

3.2.3 **The Price Quotation Envelope**, containing two (2) CD ROMs or DVDs soft copies in MS Excel format of the Price Quotation specified in Section 3.5, and one (1) hard copy colour printout of the completed MS Excel file Bidding Sheet tab entitled "Offer Summary". The soft copy shall be native format, unlocked and unencrypted, and files which can be fully manipulated i.e. not an image and be the full and complete price proposal including the CLIN (Contract Line Item Number) Price breakdown sheets.

3.2.4 **The Technical Proposal Envelope** consisting of one (1) CD ROM or DVD, unlocked and unencrypted, containing three (3) Volumes as specified below:

3.2.4.1 Volume 1 – Project Management

3.2.4.2 Volume 2 – Software Engineering

3.2.4.3 Volume 3 – Integrated Support

3.2.4.4 Bidding instructions describing the expected contents of each of the three (3) Volumes constituting the Technical Proposal Package are in Section 3.6 of this document. Advice to Bidders on how the Purchaser plans to conduct the technical evaluation of each of the three (3) Volumes is contained in Section 4.5 of this document.

3.3 Package Marking

3.3.1 The separate parts of the bid shall be placed in outer containers for delivery. All outer containers into which bidding documents are placed shall be opaque or wrapped in opaque paper, sealed and identified with the following markings:

3.3.1.1 "*SEALED BID IFB-CO-115113-ETEE – WP2 AMD SIM*"

3.3.1.2 "*BOX X of Y*" (1 of 3, 2 of 3, etc.)

3.3.1.3 "*NOTIFY Ms. Dorina Cani (Ext. 8421) UPON RECEIPT*"

3.3.2 Each of the bid parts placed in the outer container(s) shall be separately wrapped (multiple copies of the same document may be wrapped together), and marked as follows:

3.3.2.1 Name and address of the Bidder, and

3.3.2.2 The words "*SEALED BID*" followed by the reference "*IFB-CO-115113-ETEE – WP2 AMD SIM*"; and the appropriate package marking (i.e., Bid Administration Documentation, Price Proposal etc.).

3.4 Bid Administrative Documentation Package

3.4.1 The Package must include the original of the Bid Guarantee required by Section 2.11 of the Bidding Instructions. If the Bid Guarantee is sent to the Purchaser

directly from the Bidder's bank, a letter, in lieu of the actual Guarantee, shall be included specifying the details of the transmittal. Bidders are reminded that the Bid Guarantee shall reflect any extensions to the Bid Validity Date due to extensions in the Bid Closing Date.

3.4.2 The Package shall include the Certificates set forth in Annex B to these Bidding Instructions, signed in the original by an authorized representative of the Bidder. The Certificates are as follows:

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

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

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

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

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

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

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

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

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

3.4.2.10 Annex B-10 (Bidder Background IPR);

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

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

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

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

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

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

3.4.2.17 In accordance with Section 3.2.2, the administrative package shall include a hard copy and a CD-ROM/or DVD containing an electronic version (unlocked

and unencrypted) in Adobe .pdf of the hard copy documentation stated in Sections 3.4.2.1 through 3.4.2.16 above.

3.4.3 Documentation Disclosure of Conflict of Interest

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

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

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

3.4.5 No Bidder participating in this competition may participate, either as Bidder or as a prospective Prime or Sub-Contractor at any tier, in the NCI Agency project under IFB-CO-115115-ETEE entitled "*BMD Functions In ETEE FS - WP4 Operational Assurance & Test*". Bidders shall provide acknowledgement and certification of their non-participation in the Annex B prescribed Certificate B-15, "Disclosure of Conflict of Interest".

3.5 Price Quotation

3.5.1 Package Contents

3.5.1.1 This envelope must contain the following documentation and media in the quantities provided in Section 3.2.3:

3.5.1.1.1 CD or DVDs (two (2) copies) each containing an electronic version, unlocked and unencrypted, and ***in MS Excel***, of the Bidder completed electronic file number "2" ("*2_IFB-CO-115113-ETEE WP2 AMD SIM Book I Annex A Bidding Sheets FINAL.xlsx*") issued as part of this IFB, and one (1) hard copy colour printout of the completed MS Excel file Bidding Sheet tab entitled "Offer Summary".

3.5.2 General Rules

3.5.2.1 Bidders are advised that the total bid price for CLINs 1-7 shall not exceed a total of **EUR 4,704,491**. A bid that exceeds this total bid price ceiling shall be determined to be non-compliant and eliminated from further consideration. Bidders shall execute the certificate at B-14 – "Certificate of Price Ceiling" as confirmation of their compliance.

- 3.5.2.2 Bidders shall prepare their Price Quotation by completing the Bidding Sheets referred in Section 3.5.1.1.1 above, in accordance with the instructions specified in the bidding sheets.
- 3.5.2.3 The structure of the Bidding Sheets shall not be changed, other than as indicated elsewhere, nor should any quantity or item description in the Bidding Sheets. The currency(ies) of each Contract Line Item and sub-item shall be shown. The prices provided shall be intended as the comprehensive total price offered for the fulfilment of all requirements as expressed in the IFB documentation including but not limited to those expressed in the SOW.
- 3.5.2.4 When completing the Bidding Sheets the Bidder shall insert information in all yellow cells of the Bidding Sheets and complete the Pricing Summary as instructed. A price for each specified element needs to be supplied on each CLIN. Prices should not be grouped. The prices and quantities entered on the document shall reflect the total items required to meet the contractual requirements. The total price shall be indicated in the appropriate columns and in the currency quoted. If the price of a line item is expressed in different currencies, these shall be identified, and there shall be as many totals on that line item as there are currencies. In preparing the Price Quotation, Bidders shall ensure that the prices of the Sub-items total the price of the major item of which they constitute a part.
- 3.5.2.5 Bidders shall **furnish Firm Fixed Prices for all required items** in accordance with the format set forth in the Instructions for preparation of the Bidding Sheets.
- 3.5.2.6 Bidders shall furnish Firm Fixed Prices for all CLINs as defined in the Bidding Sheets/Schedule of Supplies and Services. Purchaser evaluation of the submitted bids will be on the basis of the complete submission including administrative, price and technical components for all CLINs. The Contract will be awarded for all CLINs.
- 3.5.2.7 Offered prices shall not be "conditional" in nature. Any comments supplied in the Bidding Sheets or in any part of the bid package which are conditional in nature, relative to the offered prices may result in a determination that the bid is non-compliant.
- 3.5.2.8 Bidders are responsible for the accuracy of their Price Quotations. Price Quotations that have apparent computational errors may have such errors resolved in the Purchaser's favour or, in the case of gross omissions, inconsistencies or errors, may be determined to be non-compliant.
- 3.5.2.9 Bidders shall quote in their own national currency or in EURO. Bidders may also submit bids in multiple currencies including other NATO member states' currencies under the following conditions:

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

- 3.5.2.9.2 the Bidder can demonstrate, either through sub-contract arrangements or in its proposed work methodology, that it will have equivalent expenses in that currency. All major subcontracts and their approximate anticipated value should be listed on a separate sheet and included with the Price Quotation.
- 3.5.2.10 The Purchaser, by virtue of his status under the terms of Article IX and X of the Ottawa Agreement, is exempt from all direct and indirect taxes (incl. VAT) and all customs duties on merchandise imported or exported.
- 3.5.2.11 Bidders shall therefore **exclude** from their price Bid all taxes, duties and customs charges from which the Purchaser is exempted by international agreement and are required to certify that they have done so through execution of the Certificate at Annex B-5.
- 3.5.2.12 Unless otherwise specified in the instructions for the preparation of Bidding Sheets in Annex A-1, all prices quoted in the proposal shall be on the basis that all deliverable items shall be delivered "Delivery Duty Paid (DDP)" in accordance with the International Chamber of Commerce INCOTERMS ® 2010.
- 3.5.2.13 The Bidder's attention is directed to the fact that Price Quotation shall contain no document and/or information other than the priced copies of the Bidding Sheets. Any other document will not be considered for evaluation.
- 3.5.2.14 All prices bid shall be clearly traceable in the detailed Bidding Sheets.
- 3.5.2.15 Any adjustment or discount to prices should be clearly traceable to the lowest level of breakdown in the Bidding Sheets and should not be aggregated or summed. Any lack of clarity or traceability may render the bid non-compliant.
- 3.5.2.16 The Bidder understands that there is no obligation under this contract for the Purchaser to exercise optional line items, if any, and that the Purchaser bears no liability should it decide not to exercise the options (totally or partially). Further, the Purchaser reserves the right to order another Contractor (or the same), to perform the tasks described in the optional line items of the current contract through a new contract with other conditions.

3.6 Technical Proposal Package

- 3.6.1 It is of the utmost importance that Bidders respond to all of the technical requirements of the Purchaser Statement of Work (including all Annexes) and all the bidding instructions, not only with an affirmation of compliance but also with an explanation of how each requirement will be met. To facilitate bidding and the subsequent evaluation of the Bidder's response to the various Sections

of the Statement of Work (including all Annexes), bids shall be organised and submitted in three (3) Volumes as follows:

- 3.6.1.1 Volume 1 – Project Management– covering the requirements from Section 2 of the SOW;
 - 3.6.1.2 Volume 2 – Software Engineering – covering the requirements from Section 3 of the SOW; and
 - 3.6.1.3 Volume 3 – Integrated Support – covering the requirements from Section 4 of the SOW.
- 3.6.2 The mapping of SOW Sections to Volumes has been done to facilitate a consistent organisation of the Technical Proposal and its subsequent evaluation.
- 3.6.2.1 The mapping shall be adhered to by Bidders even if individual requirements within Sections of the SOW may seem to more logically belong in a different Volume. Requirements that are answered in Volumes other than as indicated in Section 3.6.1 may not be evaluated, thus affecting the Best Value score or resulting in a determination of non-compliance.
 - 3.6.2.2 The proposed Technical implementation approach shall not be “conditional” in nature. Any comments supplied in the Technical Proposal Package which are conditional in nature, relative to the proposed Technical implementation approach, may result in a determination that the bid is non-compliant.
- 3.6.3 Bidding instructions related to each of the three (3) Volumes are provided in Sections 3.6.4 through 3.6.6.
- 3.6.4 Volume 1 – Project Management
- 3.6.4.1 This Volume will address the following elements:
 - 3.6.4.1.1 Introduction
 - 3.6.4.1.2 Table of Contents for the whole Technical Proposal
 - 3.6.4.1.3 Overall understanding of Purchaser’s Project Management requirements by the Bidder
 - 3.6.4.1.4 Bidder Project Management Qualifications and Key Personnel
 - 3.6.4.1.5 Bid-Requirements Cross-Reference Matrix (BRCM)
 - 3.6.4.2 Introduction
 - 3.6.4.2.1 The introduction shall describe the company structure and activities of the prime Contractor. The country in which the prime Contractor is registered shall be identified and the size and location(s) of the company

headquarters and subsidiary branches described. Within that structure the location and organizational unit of the office which will manage this contract shall be identified. This Section shall also describe the major activities of the company and how they are distributed across the organisation.

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

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

3.6.4.2.4 Bidders shall explicitly state in the introduction that, should their firm be selected and awarded the contract resulting from this solicitation, the delivered product(s) and services shall comply with all the requirements of the Statement of Work (including all annexes).

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

3.6.4.3 Table of Contents

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

3.6.4.4 Overall Understanding of Purchaser's Project Management Requirements

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

3.6.4.5 Bidder Qualifications and Key Personnel

- 3.6.4.5.1 The Bidder shall demonstrate Project Management qualifications by describing the schedule of Project Management tasks, content and associated effort based on the schedule described in the SOW Tables 1-1 and 1-2 and on the Project Management requirements stated in Section 2 of the SOW.
- 3.6.4.5.2 The Bidder shall demonstrate the ability to perform effective project activity resourcing, associated risk assessment and mitigation by describing how the Project Management plan will be maintained to comply with the schedule described in the SOW, how resource-related risks will be assessed and mitigated. The Bidder shall also describe how resources assigned to project activities meet the personnel requirements specified for the activity in a manner that allows the Purchaser to verify that they meet the requirements stated in the SOW for the activity.
- 3.6.4.5.3 The Bidder shall demonstrate the ability to perform a continuous project team performance assessment by describing the approach and criteria that will be used to verify and validate resource performance in fulfilling assigned role(s) and in completing assigned tasks.
- 3.6.4.5.4 The Bidder shall demonstrate in detail the ability to perform agile development by providing a list of such agile software development projects that the Bidder has managed over the past 5 years with a description of the project and of the various roles fulfilled by the Bidder's project members and of their average assignment time to the project.
- 3.6.4.5.5 The Bidder shall provide evidence that the Project Management Key Personnel described Section 2.3 of the SOW meet the required essential qualifications by specifying the Key Personnel university qualification(s) and by describing per agile software development project that they have worked on within the past 8 years: a short, less than 120 words, description of the project, their role, their time assigned to the project, the size of the project expressed in number of team members, the Project Management methodology that was applied, whether the project implemented a service oriented architecture, if applicable which service oriented implementation approach was used, if applicable which service oriented technologies were employed for the implementation. The information shall be presented in a tabular format in descending chronological order.
- 3.6.4.5.6 The Bidder shall provide evidence, for example via TOEFL certificate, that the Project Management Key Personnel meet the English language proficiency requirement described in Section 2.3 of the SOW.
- 3.6.4.5.7 The Bidder may provide additional information to demonstrate that the proposed Project Management Key Personnel meet the qualifications described in Section 2.3.6 of the SOW.

3.6.4.6 Bid-Requirements Cross-Reference Matrix (BRCM)

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

3.6.5 Volume 2 – Software Engineering

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

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

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

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

3.6.5.5 The Bidder shall provide for the final delivery phase Factory Acceptance Test (FAT) and System Integration Test (SIT) activities defined in Table 1-2 of the SOW, a tabular description of the proposed Scrum Master and estimated number of man-days and of the proposed Coding Team Lead Engineer and

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

- 3.6.5.6 The Bidder shall provide evidence that the Scrum Master personnel proposed in the Tables described above meet the required essential qualifications specified in Section 3.3.4 of the SOW by describing per software development project that they have worked on within the past 8 years: a short, less than 240 words, description of the project including the intended outcome of the project, their role, their time assigned to the project, the technologies employed to implement the project and the software development environment. The information shall be presented in a tabular format in descending chronological order.
- 3.6.5.7 The Bidder shall provide evidence that the Coding Team Lead Engineer personnel proposed in the Tables described above meet the required essential qualifications specified in Section 3.3.8 of the SOW by describing per software development project that they have worked on within the past 5 years: a short, less than 240 words, description of the project including the approach applied to deliver the project outcome, their role, their time assigned to the project, the technologies employed to implement the project, the software development environment, their usage of architecture modelling languages and their role in designing, executing and documenting unit testing. The information shall be presented in a tabular format in descending chronological order.
- 3.6.5.8 The Bidder shall provide evidence that the Coding Team member profiles can be fulfilled by Contractor personnel that meet the required essential qualification specified in Section 3.3.8 of the SOW by describing per person the profile that they match, the software development projects that they have worked on within the past 5 years: a short, less than 240 words, description of the project including the approach applied to deliver the project outcome, their role, their time assigned to the project, the technologies employed to implement the project, the software development environment, their usage of architecture modelling languages and their role in designing, executing and documenting unit testing. The information shall be presented in a tabular format in descending chronological order.
- 3.6.5.9 The Bidder shall provide evidence, for example via TOEFL certificate, that the software engineering Key Personnel meet the English language proficiency requirement described in Section 3.3 of the SOW.
- 3.6.5.10 Quality assurance will be measured as described in the SOW Section 3.13 and compliance with the measures will constitute a part of the acceptance of the Contract deliverables. Bidders shall, as part of the bid, provide evidence of their usage of quality assurance measures as described

in SOW Section 3.13 by describing the quality assurance measures that the Bidder has applied in agile software development projects within the last 5 years.

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

3.6.5.12 Failure to provide comprehensive documentary evidence of the application of coding principles and guidelines as specified in Section 3.6.5.10 may result in a determination of non-compliance for the submitted Bid.

3.6.6 Volume 3 - Integrated Support

- 3.6.6.1 This Volume shall contain a draft Integrated Support Plan covering the requirements described in Section 4.2 of the SOW and particularly focus on describing in detail how the requirements specified in Sections 4.2.2 and 4.2.3 will be met.
- 3.6.6.2 The Bidder shall describe the process for submitting of and responding to incidents requiring corrective maintenance. The Bidder shall describe the size and qualifications of the Bidder's team that will be assigned to support initial operations.
- 3.6.6.3 The Bidder shall specify the number of virtual development machines required to perform the initial operations support.
- 3.6.6.4 This Volume shall contain a draft Configuration Management Plan covering the requirements described in the section 4.3 of the SOW and particular focus on describing organisation, CI identification and status accounting.

4 BID EVALUATION AND CONTRACT AWARD

4.1 General

- 4.1.1 The evaluation of Bids will be made by the Purchaser solely on the basis of the requirements specified in this IFB.
- 4.1.2 All bids will be evaluated solely using the formulae, evaluation criteria and factors contained herein. Technical Proposals will be evaluated strictly against the technical criteria and not against other Technical Proposals submitted.
- 4.1.3 The evaluation of bids and the determination as to the Best Value Score will be based only on that information furnished by the Bidder and contained in its Bid. The Purchaser shall not be responsible for locating or securing any information not identified in the Bid and has no obligation to query the Bidder regarding missing information.
- 4.1.4 The Bidder shall furnish with its Bid all information requested by the Purchaser in Book 1, Section 3 Bid Preparation Instructions. Significant omissions and/or cursory submissions will result in a reduced Best Value Score and may result in a determination of non-compliance without recourse to further clarification. The information provided by the Bidder in its proposal shall be to a level of detail necessary for the Purchaser to fully comprehend exactly what the Bidder proposes to furnish as well as its approach, qualifications, and methodologies.

- 4.1.5 During the evaluation, the Purchaser may request clarification of the Bid from the Bidder and the Bidder shall provide sufficient detailed information in connection with such requests as to permit the Purchaser to make a final assessment of the bid based upon the facts. The purpose of such clarifications will be to resolve ambiguities in the bid and to permit the Bidder to state its intentions regarding certain statements contained therein. The purpose of the clarification stage is not to elicit additional information from the Bidder that was not contained in the original submission or to allow the Bidder to supplement cursory answers or omitted aspects of the Bid. The Bidder is not permitted any cardinal alteration of the Bid regarding technical matters and shall not make any change to its price quotation at any time.
- 4.1.6 The Purchaser reserves the right, during the evaluation and selection process, to verify any statements made concerning experience or past performance, facilities, or existing designs or materials by making a physical inspection of the Bidder's facilities and capital assets. This includes the right to validate, by physical inspection, the facilities and assets of proposed sub-Contractors.
- 4.1.7 The evaluation will be conducted in accordance with NATO Infrastructure Bidding Procedures as set forth in the document, and the Best Value evaluation procedures set forth in AC/4(2008)0002-REV2-ANNEX 1 dated 15 July 2015, or any deviation to these procedures as approved by the NATO Investment Committee. The bid evaluation methodology to be followed, including the top-level evaluation criteria, their weighting factors, and the Best Value calculation formulas for determination of the Best Value scores, have been approved by the NATO Investment Committee.

4.2 Best Value Award Approach and Bid Evaluation Factors

- 4.2.1 The Contract resulting from this IFB will be awarded to the Bidder whose conforming and compliant offer provides the Best Value to NATO, as evaluated by the Purchaser in compliance with the requirements of this IFB and according to the evaluation method specified in this Section 4. The top level evaluation criteria are: 40% Price / 60% Technical.
- 4.2.2 Upon approval of the price evaluation report, the NCI Agency Contracts Award Board will open the technical weighting scheme and apply the technical weight to the raw Technical Score (TS) to produce the weighted technical score.
- 4.2.3 A score for the bid's technical quality is composed of sub-scores in three separate areas:
- 4.2.3.1 **Management (M)** – Quality of the Bidder qualifications to meet Statement of Work (SOW) requirements as described in Volume 1. The Management Score is defined to contribute with 30% of the overall Technical Score. The value of the Management Score (M) will be between 0 and 1.
- 4.2.3.2 **Engineering (E)** – Quality of engineering technical implementation approach based on the evaluation of the content of Volume 2 and its convincing ability

to meet the requirements described in the SOW and SOW Annexes requirements. The Engineering Score is defined to contribute with 50% of the overall Technical Score. The value of the Engineering Score (E) will be between 0 and 1.

4.2.3.3 **Supportability (S)** – Quality of the support approach which shall be described in Volume 3. The Supportability Score is defined to contribute with 20% of the overall Technical Score. The value of the Supportability Score (S) will be between 0 and 1.

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

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

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

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

4.2.7 A weighting scheme for sub-criteria values has been developed by Purchaser staff not associated with the Technical Evaluation. This weighting scheme has been sealed and is not known to any of the Purchaser staff beyond the originator and the Chairman of the Contracts Award Board, who are not evaluators within the framework of this IFB or in any manner or form are made privy of evaluation information throughout the course of the evaluation process. The weighting scheme remains sealed until Step 4 of the evaluation process, described in Section 4.7.

4.2.8 The Purchaser will determine the Best-Value final Score (*BBBBBBBB*) for each compliant bid using the calculated values for weighted Technical Score (*TTTT*) and weighted Price Score (*PPPP*) as:

$$BBBBBBBB = TTTT + PPPP$$

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

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

4.3 Evaluation Procedure

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

4.3.1.1 Step 1: Administrative Compliance

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

4.3.1.2 Step 2: Technical Evaluation

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

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

4.3.1.3 Step 3: Price Evaluation

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

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

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

4.4 Evaluation Step 1 - Administrative Compliance

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

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

4.4.1.2 The Bid is packaged and marked properly;

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

- 4.4.1.4 The Bidder has not taken exception to the Terms and Conditions of the Prospective Contract or has not qualified or otherwise conditioned its offer on a modification or alteration of the Terms and Conditions or the language of the Statement of Work (including all its Annexes); and
- 4.4.2 Subject to the stipulation of Section 4.4.1.1 thru 4.4.1.4 Bids failing to conform to the above requirements may be declared non-compliant and may not undergo through further evaluation. Bids that are determined to be administratively compliant will proceed to Step 2, Technical Evaluation.
- 4.4.3 Notwithstanding Section 4.4.2, if it is later discovered in the evaluation of the Technical Proposal or the Price Quotation that the Bidder has taken exception to the Terms and Conditions of the Prospective Contract, or has qualified and/or otherwise conditioned his offer on a modification or alteration of the Terms and Conditions or the language of the Statement of Work (including all its Annexes), the Bidder may be determined to have submitted a non-compliant bid at the point in time of discovery.

4.5 Evaluation Step 2 - Technical Evaluation

- 4.5.1 The Technical Proposal will be evaluated against the criteria set forth in Section 4.2 above. In this Section those criteria will be expanded to identify sub-criteria considered important by the Purchaser during bid evaluation. Sub-criteria appear in descending order of importance within the criterion of which they form a part. For some sub-criteria, there may be additional supporting factors at the next lower level. These lower level factors are not published here but are predetermined and included in the Technical Evaluation Weighting Scheme sealed before Bid Opening. Within each of the three Volumes of the Technical Proposal the criteria and their sub-criteria are identified as follows:
- 4.5.2 Volume 1 – Project Management
- 4.5.2.1 Criteria – Management (30% of the Technical Proposal)
- 4.5.2.1.1 Sub criteria in descending order of importance:
- 4.5.2.1.1.1 Overall understanding of the Purchaser's Project Management requirements through an accurate description of the key success factors of Project Management in the context of this project.
- 4.5.2.1.1.2 Bidder Qualifications and Key Personnel
- 4.5.2.1.1.2.1 Key personnel qualifications, certifications, and experience including language proficiency.
- 4.5.2.1.1.2.2 Accuracy and completeness of the schedule of Project tasks, content and associated effort derived from SOW Tables 1-1 and 1-2 and from the Project Management requirements stated in Section 2 of the SOW.

4.5.2.1.1.2.3 Demonstrated past ability to perform effective project team management and resourcing for agile development projects extending over more than 2 years.

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

4.5.2.1.1.2.5 Accuracy and completeness of the Bidder's approach to perform project team performance assessment.

4.5.3 Volume 2 – Software Engineering

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

4.5.3.1.1 Sub criteria in descending order of importance:

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

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

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

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

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

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

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

4.5.4 Volume 3 – Integrated Support

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

4.5.4.1.1 Sub criteria in descending order of importance:

4.5.4.1.1.1 Quality and completeness of the approach to support initial operations as specified in the SOW.

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

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

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

4.6 Evaluation Step 3 - Price Evaluation

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

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

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

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

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

4.6.3 Basis of Price Comparison

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

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

- The Sum of the Firm - Fixed Prices offered for CLINS 1-7, as detailed below:

CLIN Number	CLIN Name
1.0	PROJECT MANAGEMENT
2.0	SOFTWARE ENGINEERING FOCUS AREA 1
3.0	SOFTWARE ENGINEERING FOCUS AREA 2
4.0	SOFTWARE ENGINEERING FOCUS AREA 3
5.0	SOFTWARE ENGINEERING FOCUS AREA 4
6.0	SOFTWARE ENGINEERING FOCUS AREA 5
7.0	INITIAL OPERATION SUPPORT

4.6.4 Price Balance and Realism

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

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

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

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

4.6.4.1.4 If a Bidder fails to submit a comprehensive and convincing explanation for one of the based above, the Purchaser shall declare the bid non-compliant and the Bidder will so be notified in accordance with the procedures set forth in paragraph 13(iii)(b) of AC/4-D/2261(1996

Edition). Non-compliance for reasons of bid realism is a basis for lodging a complaint under the dispute procedure.

4.6.4.1.5 If the Purchaser accepts the Bidders explanation of a mistake and allows the Bidder to accept the contract at the Bid price or the explanation regarding competitive advantage is convincing, the Bidder shall agree that the supporting pricing data submitted with this bid will be the basis to determine fair and reasonable pricing for all subsequent negotiations for modifications or additions to the contract and that no revisions of proposed prices will be made.

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

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

$$Pw = 100 \times (1 - (\text{Bid Price} / (2 \times \text{Average Bid Price}))) \times 0.4$$
, where 0.4 is the weighted factor for Price, with an expected value of Pw between 0 and 100.

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

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

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

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

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

4.7.5 Upon the successful completion of these pre-award discussions, to the Purchaser's full satisfaction, confirmation of final Bid compliance will be noted,

and the definitive results of the evaluation process will be notified to the relevant NATO authorities.

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

Annex A Bidding Sheets

Provided as Excel Workbook file (“02_IFB-CO-115113-ETEE WP2 AMD SIM Book I Annex A Bidding Sheets FINAL.xlsx”)

Annex A-1. Bidding Sheets

On behalf of the firm stated below I hereby offer the Purchaser the services and deliverables (collectively referred as "ITEMS") set forth in the schedules, at the specified prices, and subject to the terms and conditions stated in IFB-CO-115113-ETEE.

Date :

Signature :

Name & Title :

Company :

Bid Reference :

Annex B Prescribed Administrative Forms and Certificates

Annex B-1. Certificate of Legal Name of Bidder

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

FULL NAME OF CORPORATION: _____

DIVISION (IF APPLICABLE): _____

SUB DIVISION (IF APPLICABLE): _____

OFFICIAL MAILING ADDRESS

E-MAIL ADDRESS: _____

TELEFAX No: _____

POINT OF CONTACT REGARDING THIS BID:

NAME: _____

POSITION: _____

TELEPHONE: _____

ALTERNATIVE POINT OF CONTACT:

NAME: _____

POSITION: _____

TELEPHONE: _____

Date

Signature of Authorised Representative

Printed Name

Title

Company

Annex B-2. Acknowledgement of Receipt of IFB Amendments

I confirm that the following amendments to Invitation for Bid IFB-CO-115113-ETEE have been received and the Bid, as submitted, reflects the content of such amendments.

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

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

Date

Signature of Authorised Representative

Printed Name

Title

Company

Annex B-3. Certificate of Independent Determination

It is hereby stated that:

- a. We have read and understand all documentation issued as part of IFB-IFB-CO-115113-ETEE. Our Bid submitted in response to the referred solicitation is fully compliant with the provisions of the IFB and the prospective contract.
- b. Our Bid has been arrived at independently, without consultation, communication or agreement, for the purpose of restricting competition, with any other Bidder or with any competitor;
- b. The contents of our Bid have not been knowingly disclosed by the Bidder and will not knowingly be disclosed by the Bidder prior to award, directly or indirectly to any other Bidder or to any competitor; and
- c. No attempt has been made, or will be made by the Bidder to induce any other person, firm, or entity to submit, or not to submit, a Bid for the purpose of restricting competition.

Date :

Signature :

Name & Title :

Company :

Bid Reference :

Annex B-4. Certificate of Bid Validity

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

.....
Date

.....
Signature of Authorised Representative

.....
Title

.....
Company

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

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

.....
Date

.....
Signature of Authorised Representative

.....
Title

.....
Company

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

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

.....
Date

.....
Signature of Authorised Representative

.....
Title

.....
Company

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

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

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

These supplemental agreements are listed as follows:

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

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

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

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

.....
Date

.....
Signature of Authorised Representative

.....
Title

.....
Company

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

I hereby certify that _____(name of Company) possesses and applies Quality Assurance Procedures/Plans that are equivalent to the AQAP 2110 or ISO 9001:2015 as evidenced through the attached documentation¹.

Date

Signature of Authorised Representative

Printed Name

Title

Company

¹ Bidders must attach copies of any relevant quality certification.

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

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

Date

Signature of Authorised Representative

Printed Name

Title

Company

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

Annex B-10. Bidder Background IPR

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

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

ITEM	DESCRIPTION

- b. The stated Bidder has and will continue to have, for the duration of the prospective Contract, all necessary rights in and to the Background IPR specified above.
- c. The Background IPR stated above complies with the terms specified in the Book II prospective contract General and Special Provisions.

Date

Signature of Authorised Representative

Printed Name

Title

Company

Annex B-11. List of Sub-Contractor IPR

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

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

ITEM	DESCRIPTION

- b. The stated Bidder has and will continue to have, for the duration of the prospective Contract, all necessary rights in and to the IPR specified above necessary to perform the Contractor's obligations under the Contract.
- c. The Sub-Contractor IPR stated above complies with terms specified in the Book II prospective contract General and Special Provisions.

Date

Signature of Authorised Representative

Printed Name

Title

Company

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

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

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

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

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

Date

Signature of Authorised Representative

Printed Name

Title

Company

Annex B-13. List of Proposed Key Personnel

Position	SOW Reference	Labour Category	Name	Designation Period
Contractor Project Manager (CPM)	2.3.1.1			EDC thru Contract completion
Contractor Scrum Master Focus Area 1 (CSM FA1)	3.3.2			During all Sprints, test and training periods related to FA1
Contractor Coding Team Lead Engineer Focus Area 1 (CCTLE FA1)	3.3.9			During all Sprints, test and training periods related to FA1
Contractor Scrum Master Focus Area 2 (CSM FA2)	3.3.2			During all Sprints, test and training periods related to FA2
Contractor Coding Team Lead Engineer Focus Area 2 (CCTLE FA2)	3.3.9			During all Sprints, test and training periods related to FA2
Contractor Scrum Master Focus Area 3 (CSM FA3)	3.3.2			During all Sprints, test and training periods related to FA3
Contractor Coding Team Lead Engineer Focus Area 3 (CCTLE FA3)	3.3.9			During all Sprints, test and training periods related to FA3

Position	SOW Reference	Labour Category	Name	Designation Period
Contractor Scrum Master Focus Area 4 (CSM FA4)	3.3.2			During all Sprints, test and training periods related to FA4
Contractor Coding Team Lead Engineer Focus Area 4 (CCTLE FA4)	3.3.9			During all Sprints, test and training periods related to FA4
Contractor Scrum Master Focus Area 5 (CSM FA5)	3.3.2			During all Sprints, test and training periods related to FA5
Contractor Coding Team Lead Engineer Focus Area 5 (CCTLE FA5)	3.3.9			During all Sprints, test and training periods related to FA5

Date

Signature of Authorised Representative

Printed Name

Title

Company

Annex B-14. Certificate of Price Ceiling

I hereby certify that the total price offered in the price quotation of this Bid for CLINs 1, 2, 3, 4, 5, 6 and 7 of the Bidding Sheets does not exceed **EUR 4,704,491** (four million seven hundred four thousand four hundred ninety-one Euro) as described in Section 3.5.2.1 of Book I.

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

Date

Signature of Authorised Representative

Printed Name

Title

Company

Annex B-15. Disclosure of Conflict of Interest

I, the undersigned, as an authorised representative of _____,
(*company name*) certify that³:

(check one of the following statements:)

- a real or apparent conflict of interest as defined in Section 3.4.3 of the Bidding Instructions does not exist.
- a real or apparent conflict of interest as defined in Section 3.4.3 of the Bidding Instructions may exist and a plan for the mitigation of the conflict is provided in attachment to this Certificate.

(check one of the following statements:)

- business relationships as defined under Section 3.4.3 of the Bidding Instructions do not exist.
- business relationships as defined under Section 3.4.3 of the Bidding Instructions exist and have been identified in attachment to this Certificate.

(check as acknowledgement and confirmation the following statement:)

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

Date

Signature of Authorised Representative

Printed Name

Title

Company

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

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

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

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

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

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

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

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

Date

Signature of Authorised Representative

Printed Name

Title

Company

Annex C Bid Guarantee - Standby Letter of Credit

Standby Letter of Credit Number:

Issue Date: _____

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

Expiry Date: _____

1. We, (issuing bank) hereby establish in your favour our irrevocable standby letter of credit number {number} by order and for the account of (NAME AND ADDRESS OF BIDDER) in the original amount of € 188,000 (One Hundred Eighty-Eight Thousand Euro). We are advised this Guarantee fulfils a requirement under Invitation for Bid IFB-CO-115113-ETEE dated _____.

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

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

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

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

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

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

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

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

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

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

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

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

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

8. Multiple drawings are allowed.

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

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

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

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

Annex D Clarification Request Form

INSERT COMPANY NAME HERE
INSERT SUBMISSION DATE HERE

INVITATION FOR BID
IFB-CO-115113-ETEE

BMD AMD Simulation System (WP2)

Annex D CLARIFICATION REQUEST FORM

INSERT COMPANY NAME HERE
INSERT SUBMISSION DATE HERE

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

INSERT COMPANY NAME HERE
INSERT SUBMISSION DATE HERE

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

INSERT COMPANY NAME HERE
INSERT SUBMISSION DATE HERE

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

Annex E Bid-Requirements Cross Reference Matrix (BRCM)

Bidders shall provide the BRCM in Excel format according to the template “02B_IFB CO-115113-ETEE WP2 Book I Annex E BRCM”.

The BRCM shall be completed as per the following instructions:

- **“Reference Document”**, the document from which the requirement is defined.
- **“Reference ID”**, the reference of the Section/requirement under consideration. The “Reference ID” column shall cover:
 - “Bidding Instruction” references covering Sections 3.6.4, 3.6.5, and 3.6.6 of this document. “Bidding Instruction” references shall be provided in the format [BI - #] where “#” represents the actual paragraph number.
 - “SOW Requirement” references covering all ‘shall’ statement of the SOW. Requirement References shall be provided in the following format:
 - For the SOW: [SOW - #] where “#” represents the actual requirement (i.e. paragraph) number
- **“Description”**: the actual text of the Section/requirement under consideration.
-
- **“Bid Reference”** indicating where in their Bid the associated Bid Instruction Reference and/or SOW Requirement Reference is/are addressed. Bid Reference shall be provided in the form “Volume # - Doc # - Section #”
- **“Remarks”**, as applicable. The column “Remarks” might be used by the Bidders to provide a brief description of how the Bidder meets the requirement, to facilitate the reading, but any such descriptions will not form part of the formal evaluation.
- **“Compliance statement”**: the way and extent the Bid covers and complies with the Section/requirement under consideration, using the following classifications:
 - “Provided/Detailed”: The Bidder states providing a document or details at the mentioned reference. Such a classification is expected for all BIs and the majority of the SOW and SOW Annexes requirements.

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

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

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

INVITATION FOR BID

IFB-CO-115113-ETEE



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

**PROVIDE AIR AND MISSILE DEFENSE (AMD) SIMULATION
SYSTEM WITHIN BALLISTIC MISSILE DEFENCE (BMD)
FUNCTIONS IN EDUCATION, TRAINING, EXERCISE AND
EVALUATION (ETEE) FUNCTIONAL SERVICES (FS)
BOOK II**

Prospective Contract

PAGE INTENTIONALLY BLANK

Original No. ___ of 2

NCI Agency Contract CO-115113-ETEE

between

NATO Communications and Information Organisation

**- represented by the General Manager, NATO
Communications and Information Agency -**

**Boulevard Leopold III
B-1110 Brussels
Belgium**

and

[TBD]

**Provide AMD Simulation within BMD Functions in
Education, Training, Exercise and Evaluation Functional
Services**

Effective Date: [TBD]

Total Contract Value: [TBD]

PAGE INTENTIONALLY BLANK

SIGNATURE SHEET

IN WITNESS WHEREOF the parties hereto have caused this agreement to be executed by their duly authorised officers on the date shown hereunder:

FOR THE CONTRACTOR:	FOR THE PURCHASER:
..... Signature Signature
..... Printed Name Printed Name
..... Title of Signer Title of Signer
..... Date Date

TABLE OF CONTENTS

PART I – SCHEDULE OF SUPPLIES AND SERVICES.....

PART II - CONTRACT SPECIAL PROVISIONS.....

PART III – CONTRACT GENERAL PROVISIONS.....

PART IV – STATEMENT OF WORK AND ANNEXES.....



CONTRACT CO-115113-ETEE

**PROVIDE AIR AND MISSILE DEFENSE (AMD) SIMULATION
SYSTEM WITHIN BALLISTIC MISSILE DEFENCE (BMD)
FUNCTIONS IN EDUCATION, TRAINING, EXERCISE AND
EVALUATION (ETEE) FUNCTIONAL SERVICES (FS)**

PART I - CONTRACT SCHEDULES



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

**PROVIDE AIR AND MISSILE DEFENSE (AMD) SIMULATION
SYSTEM WITHIN BALLISTIC MISSILE DEFENCE (BMD)
FUNCTIONS IN EDUCATION, TRAINING, EXERCISE AND
EVALUATION (ETEE) FUNCTIONAL SERVICES (FS)**

IFB-CO-115113-ETEE AMD SIM

BOOK II - PART II

CONTRACT SPECIAL PROVISIONS

This Page Intentionally left blank

TABLE OF CONTENTS

1. ALTERATIONS, MODIFICATIONS AND DELETIONS OF THE NCIA
 CONTRACT GENERAL PROVISIONS 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 6

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. TERMINATION FOR DEFAULT – SPECIAL PROVISION..... 10

13. ACCEPTANCE PROCEDURES – AGILE DEVELOPMENT 10

14. INVOICES AND PAYMENT 10

15. FORCE MAJEURE..... 11

16. INDEPENDENT CONTRACTOR 12

17. PRICING OF CHANGES, AMENDMENTS AND CLAIMS 12

18. LIQUIDATED DAMAGES..... 12

19. WARRANTY..... 14

20. SUPPLEMENTAL AGREEMENT(S), DOCUMENTS AND
 PERMISSIONS 14

21. CONFLICT OF INTEREST..... 15

22. THIRD PARTIES 16

23. TECHNICAL DIRECTION 17

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

- 1.1 Clause 3 “*Participating Countries*” supplements Clause 9 “Participating Countries” of the NCI Agency Contract General Provisions.
- 1.2 Clause 5 “*Security*” augments Clause 11 “Security” of the NCI Agency Contract General Provisions.
- 1.3 Clause 6 “*Intellectual Property*” augments Clause 30 “Intellectual Property” of the NCI Agency Contract General Provisions.
- 1.4 Clause 7 “*Intellectual Property Right, Indemnity and Royalties*” augments Clause 29 “Patent and Copyright Indemnity” of the NCI Agency General Provisions.
- 1.5 Clause 12 “Termination for Default – Special Provision” amends Clause 39 “Termination for Default” of the NCI Agency General Provisions.
- 1.6 Clause 17 “*Pricing of Changes, Modifications, Follow-on Contracts and Claims*” augments Clause 19 “Pricing of Changes, Amendments and Claims” of the NCI Agency Contract General Provisions.
- 1.7 Clause 18 “*Liquidated Damages*” replaces Clause 38 “Liquidated Damages” of the NCI Agency Contract General Provisions.
- 1.8 Clause 13 “*Acceptance Procedures – Agile Development*” augments Clause 21 “Inspection and Acceptance of Work” and Clause 22 “Inspection and Acceptance of Documentation” of the NCI Agency Contract General Provisions.
- 1.9 Clause 20 “*Warranty*” augments Clause 27 “Warranty of Work (Exclusive of Software)” and Clause 30 “Software Warranty” of the NCI Agency Contract General Provisions.

2. SCOPE

- 2.1 The Contractor shall participate with the Purchaser, using selected elements of the agile/Scrum software development methodology, to develop and implement an Air and Missile Defence (AMD) simulation system including federation management on the basis of ITC to deliver a simulation system that will enable the BMD Community of Interest (COI) to meet their ETEE requirements.

3. PARTICIPATING COUNTRIES

- 3.1 This Clause supplements Clause 9 of the Contract General Provisions.

- 3.2 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.
- 3.3 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.
- 3.4 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 3.3 above.
- 3.5 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.
- 3.6 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 This Clause augments Clause 11 of the Contract General Provisions.
- 5.2 The Contractor is responsible, in accordance with NATO and National Security regulations, for the proper handling, storage and control of any classified documents and information as may be furnished to the Contractor in relation to the performance of the present contract.
- 5.3 The security classification of this contract is “NATO UNCLASSIFIED”.
- 5.4 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.
- 5.5 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.
- 5.6 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.

- 5.7 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.
- 5.8 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.
- 5.9 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".
- 5.10 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.
- 5.11 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 This Clause augments Clause 30 of the Contract General Provisions.
- 6.2 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.
- 6.3 The Purchaser will accept no constraints or limitations on the use of Contract deliverables. Accordingly, the Contractor shall not include any Background Intellectual Property or third party software in the code provided to the Purchaser. In the event that any such code would have to be included, the Contractor shall seek Purchaser's prior agreement and ensure that unlimited rights are secured for the Purchaser to use the deliverables under the Contract.

7. INTELLECTUAL PROPERTY RIGHT INDEMNITY AND ROYALTIES

- 7.1 This Clause augments Clauses 29 of the Contract General Provisions.
- 7.2 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.
- 7.3 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.
- 7.4 The Contractor shall report in writing to the Purchaser during the performance of this Contract:
- 7.4.1 The royalties excluded from his price for patent utilised under the agreements mentioned in the Para 7.3 above;
- 7.4.2 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 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 software requirements stated in this Contract are mandatory, and the Contractor must achieve 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".

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 9, "Intellectual Property Rights, Indemnity and Royalties".
- 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 Scrum Master Focus Area 1 and 3 (CSM FA13)	[TBD]
Contractor Coding Team Lead Engineer Focus Area 1 and 3 (CCTLE FA13)	[TBD]
Contractor Scrum Master Focus Area 2 (CSM FA2)	[TBD]
Contractor Coding Team Lead Engineer Focus Area 2 (CCTLE FA2)	[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 39 – “Termination for Default” of the Contract 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 the first Para of Clause 39 ("Termination for Default") of the NCIO 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 The provisions of this Clause supersede Clause 24 of the NCIO General Contract Provisions ("Ownership and Title").
- 11.2 Ownership and title for all works conducted under the agile/Scrum software development portion 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, shall from its creation, pass to the Purchaser, in both object and source code.
- 11.3 Ownership and title to all deliverables not covered under Para 11.2 above shall pass to the Purchaser upon written notification of acceptance by the Purchaser but at the latest on Final Contract Acceptance.

12. TERMINATION FOR DEFAULT – SPECIAL PROVISION

- 12.1 The provisions of this Clause amend Clause 39 of the NCIO General Contract Provisions (“Termination for Default”).
- 12.2 Paragraph 39.2 is hereby changed as follows:

FROM: “*In the case of any of the circumstances set forth in Clause 39.1 above, the Purchaser shall issue a letter to the Contractor stating that an actual or potential default exists and requiring a response from the Contractor **within ten (10) Days** that identifies.*”

TO: “*In the case of any of the circumstances set forth in Clause 39.1 above, the Purchaser shall issue a letter to the Contractor stating that an actual or potential default exists and requiring a response from the Contractor **within five (5) contract working days** that identifies.*”

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 and subsequent baseline releases, or individual CLINs, are “complete” in accordance with the criteria and definitions in Section 2 and Section 3 of the Statement of Work, and that Contract Deliverables are complete or have been performed according to the requirements set forth
- 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 object and source code 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 This Clause augments Clauses 25 of the Contract General Provisions.
- 14.2 No payment shall be made with respect to undelivered supplies; works not performed, services not rendered and/or incorrectly submitted invoices.

- 14.3 The Contractor shall be entitled to submit invoices as shown in the “Milestones and Payment” Tab in the Schedule of Supplies and Services.
- 14.4 Evidence of the acceptance by the Purchaser shall be attached to all invoices.
- 14.5 The Purchaser is released from paying any interest to the Contractor resulting from any reason whatsoever.
- 14.6 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:
- 14.6.1 Contract number CO-115113-ETEE
- 14.6.2 Purchase Order numbers: [TBD];
- 14.6.3 Contract Amendment number (if any);
- 14.6.4 Contract Line Item(s) (CLIN) as they are defined in the priced Schedule of Supplies and Services
- 14.6.5 Bank Account details for international wire transfers.
- 14.7 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
- 14.8 Invoices referencing “CO-115113-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.
- 14.9 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 The Purchaser shall not be responsible for securing work permits, lodging, leases nor tax declarations, driving permits, etc., with national or local authorities. 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 Clause 19 of the NCIO General Contract Provisions is hereby supplemented as follows:
- 17.2 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;
- 17.3 The Contractor shall be bound by the stated labour rates for the entire duration of this Contract;

18. LIQUIDATED DAMAGES

- 18.1 This Clause replaces Clause 38 of the Contract General Provisions.
- 18.2 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.

- 18.3 Alternatively, the Purchaser may terminate this Contract in whole or in part, as provided in Para 39.1 of Clause 39 – “Termination for Default” of the Contract General Provisions and in that event the Contractor shall be liable to pay the excess costs provided in Para 39.5.
- 18.4 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 39.6 of Clause 39 – “Termination for Default” of the Contract General Provisions. In such event, subject to the Disputes and Arbitration Clause, the Purchaser shall ascertain the facts and extent of the delay and shall extend the time for performance of the Contract when in his judgement the findings of fact justify an extension.
- 18.5 Liquidated damages under 18.2 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.
- 18.6 The amount of Liquidated Damages due by the Contractor shall be recovered by the Purchaser in the following order of priority:
- 18.6.1 By deducting such damages from the amounts due to the Contractor against the Contractor's invoices;
- 18.6.2 By proceeding against any surety;
- 18.6.3 By reclaiming such damages through appropriate legal remedies.
- 18.7 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.
- 18.8 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 39 (Termination for Default) of the Contract 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 39 (Termination for Default) of the Contract 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 project under contract CO-115115-ETEE entitled "*BMD Functions in ETEE FS - WP4 Operational Assurance & Test*".

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 chosen to perform the Operational Assurance Work Package for the ETEE FS project. 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.

THIS PAGE INTENTIONALLY LEFT BLANK

NATO UNCLASSIFIED

IFB-CO-115113-ETEE
Part III – Contract General Provisions

NATO COMMUNICATIONS AND INFORMATION AGENCY



CONTRACT GENERAL PROVISIONS

V 1.0 dated 16 Oct 2014

Index of Clauses

1.	ORDER OF PRECEDENCE	1
2.	DEFINITIONS OF TERMS AND ACRONYMS.....	1
3.	AUTHORITY	4
4.	APPROVAL AND ACCEPTANCE OF CONTRACT TERMS	5
5.	LANGUAGE.....	5
6.	AUTHORISATION TO PERFORM/CONFORMANCE TO NATIONAL LAWS AND REGULATIONS	5
7.	FIRM FIXED PRICE CONTRACT	5
8.	PERFORMANCE GUARANTEE	5
9.	PARTICIPATING COUNTRIES.....	9
10.	SUB-CONTRACTS.....	10
11.	SECURITY.....	11
12.	RELEASE OF INFORMATION.....	12
13.	PURCHASER FURNISHED PROPERTY.....	13
14.	CONTRACTOR'S PERSONNEL WORKING AT PURCHASER'S FACILITIES	14
15.	HEALTH, SAFETY AND ACCIDENT PREVENTION.....	15
16.	CHANGES	15
17.	STOP WORK ORDER	17
18.	CLAIMS	18
19.	PRICING OF CHANGES, AMENDMENTS AND CLAIMS	20
20.	NOTICE OF SHIPMENT AND DELIVERY	23
21.	INSPECTION AND ACCEPTANCE OF WORK.....	24
22.	INSPECTION AND ACCEPTANCE OF DOCUMENTATION	27
23.	USE AND POSSESSION PRIOR TO ACCEPTANCE.....	28
24.	OWNERSHIP AND TITLE	28
25.	INVOICES AND PAYMENT	28
26.	TAXES AND DUTIES.....	30
27.	WARRANTY OF WORK (Exclusive of Software)	31
28.	RIGHT OF ACCESS, EXAMINATION OF RECORDS	35
29.	PATENT AND COPYRIGHT INDEMNITY	35
30.	INTELLECTUAL PROPERTY	36
31.	SOFTWARE WARRANTY.....	39
32.	NATO CODIFICATION	42
33.	RELEASE FROM CLAIMS.....	44
34.	ASSIGNMENT OF CONTRACT	44
35.	TRANSFER AND SUB-LETTING.....	45
36.	PURCHASER DELAY OF WORK.....	45

37.	CONTRACTOR NOTICE OF DELAY	46
38.	LIQUIDATED DAMAGES	46
39.	TERMINATION FOR DEFAULT	47
40.	TERMINATION FOR THE CONVENIENCE OF THE PURCHASER	50
41.	DISPUTES	55
42.	ARBITRATION	56
43.	SEVERABILITY	57
44.	APPLICABLE LAW	57
	ANNEX 1 TO GENERAL PROVISIONS: PURCHASER'S PRICING PRINCIPLES	A1-1

1. ORDER OF PRECEDENCE

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:

- 1.1. The Signature Page;
- 1.2. The Contract Schedules, Part I;
- 1.3. The Contract Special Provisions, Part II;
- 1.4. The Contract General Provisions, Part III;
- 1.5. The Statement of Work, Part IV of the Contract;
- 1.6. The Annexes to the Statement of Work.

2. DEFINITIONS OF TERMS AND ACRONYMS

- 2.1 **Assembly** - 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.
- 2.2 **Acceptance** - Acceptance is the act by which the Contracting Authority recognises in writing that the delivered Work meets the Contract requirements.
- 2.3 **Claims** - A written demand or written assertion by one of the Parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of Contract terms, or other relief arising under or in relation to this Contract.
- 2.4 **Clause** - A provision of the Special or General Provisions of this Contract.
- 2.5 **Codification Authority** - The National Codification Bureau (NCB) or authorised agency of the country in which the Work is produced.
- 2.6 **Commercial Off-the-Shelf Items (COTS)** - The term “Commercially Off-the-Shelf Item (COTS)” means any item that is a commercial item, customarily used by the general public, that has been sold, leased, or licensed to the general public or has been offered for sale, lease or license to the general public;
 - a) is sold in substantial quantities in the commercial marketplace; and
 - b) is offered to the Purchaser, under a contract or subcontract at any tier, without modification, in the same form in which it is sold in the commercial marketplace.
- 2.7 **Component** - A part or combination of parts, having a specific function, which can be installed or replaced only as an entity.

- 2.8 **Contractor Background IPR** - Any IPR owned by the Contractor and/or any Sub-contractor or licensed by a third party to the Contractor which is not created in relation to or as the result of work undertaken for any purpose contemplated by the Contract and which is needed for the performance of the Contract or for the exploitation of Foreground IPR.
- 2.9 **Correction** - Elimination of a Defect.
- 2.10 **Contract** - The agreement concluded between the Purchaser and Contractor, duly signed by both contracting parties. The Contract includes the documents referred to in Clause 1 (Order of Preference).
- 2.11 **Contracting Authority** - The General Manager of the NCI Agency, the Director of Acquisition, the Chief of Contracts of the NCI Agency or the authorised representatives of the Chief of Contracts of the NCI Agency.
- 2.12 **Contractor** - The person or legal entity from a Participating Country which has signed this Contract and is a Party thereto.
- 2.13 **Day** - A calendar day
- 2.14 **Defect** - Any condition or characteristic in any Work furnished by the Contractor under the Contract that is not in compliance with the requirements of the Contract.
- 2.15 **Deliverable** - Any and all goods (including movable and immovable goods) to be delivered pursuant to the terms of this Contract including, without limitation, building, raw materials, components, intermediate Assemblies, Parts, end products, equipment, documentation, data, software.
- 2.16 **Design Defect** - Defect attributable to incompatibility, unsuitability or erroneous application of theory, drawings or formula.
- 2.17 **Effective Date of Contract (or "EDC")** - The date upon which this Contract is deemed to start. Unless otherwise specified, a Contract enters into force on the date of the last signature of the Contract by the Parties.
- 2.18 **Failed Component** - A part or combination of parts, having a specific function, which can be installed or replaced only as an entity which ceases to perform in a manner consistent with its intended use and specifications of the Contract.
- 2.19 **Foreground IPR** - Any IPR created by the Contractor or any subcontractor of the Contractor in the course of or as the result of work undertaken for any purpose contemplated by the Contract.
- 2.20 **IPR** - Any intellectual property rights of any qualification irrespective of their stage of development or finalisation, including but not limited to patents, trademarks (registered or not), designs and models (registered or not) and applications for the same, copyright (including on computer software), rights in databases, know-how, confidential information and rights in records (whether or not stored on computer) which includes technical and other data and documents.

- 2.21 **Manufacturing Defect** - Defect attributable to improper manufacturing processes, testing or quality control procedures.
- 2.22 **NATO** - The North Atlantic Treaty Organisation. For the purpose of this contract, the term NATO includes NATO bodies, the NATO military command structure, agencies and NATO nations.
- 2.23 **NCI AGENCY** - The NATO Communications and Information Agency. The NCI Agency is part of the NCIO. The General Manager of the Agency is authorised to enter into contracts on behalf of the NATO CI Organisation.
- 2.24 **NATO COMMUNICATIONS AND INFORMATION ORGANISATION (NCIO)**- The NATO Communications and Information Organisation. The NCI Organisation constitutes an integral part of the North Atlantic Treaty Organisation (NATO) The NCI Organisation is the legal personality from whence flows the authority of its agent, the NCI Agency, to enter into contracts.
- 2.25 **NATO Purposes** - Activities conducted by or on behalf of NATO to promote the common defence and common interests of NATO, such as, among others, NATO operations, NATO procurement, NATO training and NATO maintenance.
- 2.26 **Part** - An item of an assembly or sub-assembly, which is not normally further broken down.
- 2.27 **Participating Country** - A NATO member country that participates in financing the effort.
- 2.28 **Parties** - The Contracting Parties to this Contract, i.e., the Purchaser and the Contractor.
- 2.29 **Purchaser** - The NCI Organisation, as represented by the General Manager, NCI Agency. The Purchaser is the legal entity who awards and administers the Contract on behalf of NATO and stands as one of the Contracting Parties.
- 2.30 **Purchaser Background IPR** - Any IPR owned by the Purchaser as of the Effective Date of Contract and which has been developed by, assigned to or licensed to the Purchaser prior to the Effective Date of Contract.
- 2.31 **Purchaser Furnished Property** - Any item of equipment, material, document, technical data, information and Software or any other item of property furnished by the Purchaser to the Contractor required or useful for the performance of the Contract. The Purchaser Furnished Property, if any, shall be detailed in the Contract.
- 2.32 **Software (Computer Software)** - A computer program comprising a series of instructions, rules, routines regardless of the media in which it is recorded, that allows or cause a computer to perform a specific operation or a series of operations.
- 2.33 **Software Defect** - Any condition or characteristic of Software that does not conform with the requirements of the Contract.

- 2.34 **Sub-Assembly** - 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.
- 2.35 **Sub-contract** - Any agreement made by the Contractor with any third party in order to fulfil any part of the obligations under this Contract. Sub-contracts may be in any legal binding form, e.g., contract, purchase order, etc.
- 2.36 **Sub-contractor** - Any person or legal entity directly or indirectly under Sub-contract to the Contractor in performance of this Contract.
- 2.37 **Third Party IPR** - Any IPR owned by a third party not being the Purchaser or the Contractor or its Subcontractor, which is needed for the performance of the Contract or for the exploitation of Foreground IPR. This includes, for example, third party software, including open source software.
- 2.38 **Work** - Any deliverable, project design, labour or any service or any other activity to be performed by the Contractor under the terms of this Contract.

3. **AUTHORITY**

- 3.1. All binding contractual instruments and changes, including amendments, additions or deletions, as well as interpretation of and instructions issued pursuant to this Contract shall be valid only when issued in writing by the Purchaser and signed by the Contracting Authority only.
- 3.2. No direction which may be received from any person employed by the Purchaser or a third party shall be considered as grounds for deviation from any of the terms, conditions, specifications or requirements of this Contract except as such direction may be contained in an authorised amendment to this Contract or instruction duly issued and executed by the Contracting Authority. Constructive change may not be invoked by the Contractor as a basis for Claims under this Contract.
- 3.3. The entire agreement between the Parties is contained in this Contract and is not affected by any oral understanding or representation, whether made previously to or subsequently to this Contract.
- 3.4. Personal notes, signed minutes of meetings, comments to delivered documentation and letters, e-mails and informal messages from project or other Purchaser staff which may indicate the intent and willingness to make changes to the Contract, do not implement the change to the Contract and shall not be used as a basis for claiming change to the Contract by the Contractor.

4. APPROVAL AND ACCEPTANCE OF CONTRACT TERMS

- 4.1. By his signature of the Contract, the Contractor certifies that he has read and unreservedly accepts and approves of all terms and conditions, specifications, plans, drawings and other documents which form part of and/or are relevant to the Contract. The Contractor further agrees that the terms of the Contract take precedence over any proposals or prior commitments made by the Contractor in order to secure the Contract. Contractor also hereby waives any and all rights to invoke any of the Contractor's general and special terms and conditions of sales and/or supply.

5. LANGUAGE

- 5.1. All written correspondence, reports, documentation and text of drawings delivered to the Purchaser by the Contractor shall be in the English language.

6. AUTHORISATION TO PERFORM/CONFORMANCE TO NATIONAL LAWS AND REGULATIONS

- 6.1. The Contractor warrants that he and his Sub-contractors are duly authorised to operate and do business in the country or countries in which this Contract is to be performed and that he and his Sub-contractors have obtained or will obtain all necessary licences and permits required in connection with the Contract. No claim for additional monies with respect to any costs or delay to obtain the authorisations to perform shall be made by the Contractor.
- 6.2. The Contractor acknowledges that he and his Sub-contractors are responsible during the performance of this Contract for ascertaining and complying with all applicable laws and regulations, including without limitation: labour standards, environmental laws, health and safety regulations and export controls laws and regulations in effect at the time of Contract signature or scheduled to go into effect during Contract performance. Failure to fully ascertain and comply with such laws, regulations or standards shall not be the basis for claims for change to the specifications, terms, conditions or monetary value of this Contract.

7. FIRM FIXED PRICE CONTRACT

- 7.1 This is a Firm Fixed Price Contract. The Firm Fixed Price of this Contract is as stated on the signature page of the Contract or any amendments thereto. The Purchaser assumes no liability for costs incurred by the Contractor in excess of the stated Firm Fixed Price except as may be authorised under certain provisions of this Contract.

8. PERFORMANCE GUARANTEE

- 8.1. As a guarantee of performance under the Contract, the Contractor shall deposit with the Purchaser within thirty (30) calendar days from the Effective Date of Contract a bank guarantee (the "Performance Guarantee") denominated in the currency of the Contract, to the value of ten per cent (10%) of the total Contract price.
- 8.2. The Performance Guarantee, the negotiability of which shall not elapse before the expiration of the warranty period, or such other period as may be specified in the Contract, shall be made payable to the Purchaser and shall be in the form of certified cheques or a Standby Letter of Credit subject to the agreement of the Purchaser. In the case of a Standby Letter of Credit, payment shall be made to the Purchaser without question and upon first demand by the Purchaser against a certificate from the Purchaser's Contracting Authority that the Contractor has not fulfilled its obligations under the Contract. The Contractor shall have no right to enjoin or delay such payment.
- 8.3. Certified Cheques issued to fulfil the requirements of the Performance Guarantee will be cashed by the Purchaser upon receipt and held in the Purchaser's account until the term of the Performance Guarantee has expired.
- 8.4. The standby letter of credit shall be subject to Belgian Law and shall be issued by (i) a Belgian bank, (ii) the Belgian subsidiary of a foreign bank licensed to provide financial services in Belgium; or (iii) an insurance company licensed to do business in Belgium and belonging to a Belgian banking institution provided the banking institution guarantees explicitly the demand for payment, unless otherwise specified by the Purchaser.
- 8.5. The Contractor shall request in writing relief from the Performance Guarantee upon expiration of the warranty period or such other period as may be specified in the Contract and such relief may be granted by the Purchaser.
- 8.6. The Contractor shall be responsible, as a result of duly authorised adjustments in the total contract price and/or period of performance by the Purchaser, for obtaining a commensurate extension and increase in the Performance Guarantee, the value of which shall not be less than ten per cent (10%) of the total contract price (including all amendments), and for depositing such guarantee with the Purchaser, within thirty (30) calendar days from the effective date of aforesaid duly authorised adjustment.
- 8.7. The failure of the Contractor to deposit and maintain such Performance Guarantee with the Purchaser within the specified time frame, or any extension thereto granted by the Purchaser's Contracting Authority, is a material breach of the Contract terms and conditions subject to the provisions of the Contract regarding Termination for Default.

- 8.8. The rights and remedies provided to the Purchaser under the present Clause are in addition to any other rights and remedies provided by law or under this Contract. The certificate described in Clause 8.2 above shall not be regarded as a Termination for Default and this Clause is in addition to and separate from the Clause of the Contract detailing termination for default.
- 8.9. If the Contractor elects to post the Performance Guarantee by Standby Letter of Credit, the form of the document shall be substantially as follows:

PERFORMANCE GUARANTEE STANDBY LETTER OF CREDIT

Standby Letter of Credit Number: _____

Issue Date: _____

Initial Expiry Date: _____

Final Expiry Date: _____

Beneficiary: NCI Agency, Finance, Accounting & Operations
Boulevard Leopold III, B-1110, Brussels
Belgium

1. We hereby establish in your favour our irrevocable standby letter of credit number {number} by order and for the account of (NAME AND ADDRESS OF CONTRACTOR) in the amount of _____ of _____ We are advised this undertaking represents fulfilment by (NAME OF CONTRACTOR) of certain performance requirements under Contract No. _____ dated _____ between the NCI Agency (“NCIA and (NAME OF CONTRACTOR)).
2. We hereby engage with you that drafts drawn under and in compliance with the terms of this letter of credit will be duly honoured upon presentation of documents to us on or before the expiration date of this letter of credit.
3. Funds under this letter of credit are available to you without question or delay against presentation of a certificate signed by the NCI Agency Contracting Officer which states:

“(NAME OF CONTRACTOR) has not fulfilled its obligations under Contract No. _____ dated _____ between NCI Agency and (NAME OF CONTRACTOR) (herein called the “Contract”), and the NCI Agency, as beneficiary, hereby draws on the standby letter of credit number _____ in the amount denominated in the currency of the Contract, Amount up to the maximum available under the LOC), such funds to be transferred to the account of the Beneficiary number _____

_____ (to be identified when certificate is presented).”

Such certificate shall be accompanied by the original of this letter of credit.

4. This Letter of Credit is effective the date hereof and shall expire at our office located at _____ (Bank Address) _____ on _____. All demands for payment must be made prior to the expiry date.
5. It is a condition of this letter of credit that the expiry date will be automatically extended without amendment for a period of one (1) year from the current or any successive expiry date unless at least 90 (ninety) calendar days prior to the then current expiry date we notify you by registered mail and notify (NAME OF CONTRACTOR) that we elect not to extend this letter of credit for such additional period. However, under no circumstances will the expiry date extend beyond _____ (“Final Expiry Date”) without amendment.
6. We may terminate this letter of credit at any time upon 90 (ninety) calendar days notice furnished to both (NAME OF CONTRACTOR) and the NCI Agency by registered mail.
7. In the event we (the issuing bank) notify you that we elect not to extend the expiry date in accordance with paragraph 6 above, or, at any time, to terminate the letter of credit, funds under this credit will be available to you without question or delay against presentation of a certificate signed by the NCI Agency Contracting Officer which states:

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

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

8. The Beneficiary may not present the certificate described in paragraph 7 above until 20 (twenty) calendar days prior to a) the date of expiration of the letter of credit should {issuing bank} elect not to automatically extend the expiration date of the letter of credit, b) the date of termination of the letter of credit if {issuing bank} notifies the Beneficiary that the letter of credit is to be terminated in accordance with paragraph 6 above.
9. Multiple partial drawings are allowed to the maximum value of the standby letter of credit.
10. This letter of credit sets forth in full the terms of our undertaking, and this undertaking shall not in any way be modified, amended, or amplified by reference to any document, instrument, or agreement referred to herein (except the International Standby Practices (ISP 98) hereinafter defined) or in which this letter of credit is referred to or to which this letter of credit relates, and any such reference shall not be deemed to incorporate herein by reference any document, instrument, or agreement.
11. This Letter of Credit is subject to The International Standby Practices-ISP98 (1998 Publication) International Chamber of Commerce Publication No.590.

9. PARTICIPATING COUNTRIES

- 9.1 Unless prior written authorisation of the Purchaser has been obtained, none of the Work, shall be performed other than by firms from and within NATO Participating Countries. Unless otherwise specified in the Contract Special Provisions, the Participating Countries are the twenty-eight (28) Member Nations of the North Atlantic Treaty Organisation.
- 9.2 Unless prior written authorisation of the Purchaser has been obtained, 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 NATO Participating Country.
- 9.3 The Contractor shall not place any Sub-contracts outside the NATO Participating Countries without the prior written authorisation of the Purchaser.
- 9.4 Unless prior written authorisation of the Purchaser has been obtained, the intellectual property rights for all software and documentation incorporated by the Contractor and/or its Sub-contractors into the Work shall vest with persons or legal entities from and within NATO participating nations and no royalties or licence fees for such software and documentation shall be paid by the Contractor to any source that does not reside within a NATO participating nation.
- 9.5 Any modification in the nationality, ownership and/or change of control of the Contractor and/or its Sub-contractor(s) shall be immediately notified in writing

to the Purchaser with all necessary details to allow the Purchaser to determine whether or not the Contractor and/or its Sub-contractors continue to comply with the Clauses above. Non-compliance with the Clauses above, by the Contractor and/or its Subcontractor may constitute ground for termination of this Contract under Clause 39 (Termination for Default).

10. SUB-CONTRACTS

- 10.1 The Contractor shall place and be responsible for the administration and performance of all Sub-contracts including terms and conditions which he deems necessary to meet the requirements of this Contract in full.
- 10.2 Prior to the Sub-contractors being given access to any classified information, the Contractor shall ensure that any Sub-contractor that has a need to access classified information for the performance of any part of this Contract has been granted the appropriate facility and personnel security clearances by the Sub-contractor's national authorities and that such clearances are still in effect at the time the information is disclosed and remains in effect throughout the performance of the work to be carried out under the Sub-contract concerned.
- 10.3 The Contractor shall seek the approval in writing of the Purchaser prior to the placing of any Sub-contract if:
- 10.3.1 the Sub-contract was not part of the Contractor's original proposal;
 - and
 - 10.3.2 the value of the Sub-contract is known or estimated to exceed 15 per cent of the total Contract value; or
 - 10.3.3 the Sub-contract is one of a number of Sub-contracts with a single Sub-contractor for the same or related Work under this Contract that in the aggregate are known or expected to exceed 15 per cent of the total Contract value.
- 10.4 The Contractor shall inform the Purchaser of any change in Sub-contractors for Sub-contracts of a value known or estimated to exceed 15 per cent of the total Contract value.
- 10.5 The Contractor shall submit a copy of any such proposed Sub-contract including prices when seeking approval to the Contracting Authority but such approval by the Contracting Authority shall in no way relieve the Contractor of his responsibilities to fully achieve the contractual and technical requirements of this Contract.
- 10.6 The Contractor shall, as far as practicable, select Sub-contractors on a competitive basis consistent with the objectives and requirements of the

Contract.

11. SECURITY

- 11.1 The Contractor shall comply with all security measures as are prescribed by the Purchaser and the national security authority or designated security agency of each of the NATO countries in which the Contract is being performed. The Contractor shall be responsible for the safeguarding of classified information, documentation, material and equipment entrusted to him or generated by him in connection with the performance of the Contract.
- 11.2 In particular the Contractor undertakes to:
- 11.2.1 appoint an official responsible for supervising and directing security measures in relation to the Contract and communicating details of such measures to the Purchaser on request;
 - 11.2.2 maintain, preferably through the official responsible for security measures, a continuing relationship with the national security authority or designated security agency charged with ensuring that all NATO classified information involved in the Contract is properly safeguarded;
 - 11.2.3 abstain from copying by any means, without the authorisation of the Purchaser, the national security authority or designated security agency, any classified documents, plans, photographs or other classified material entrusted to him;
 - 11.2.4 furnish, on request, information to the national security authority or designated security agency pertaining to all persons who will be required to have access to NATO classified information;
 - 11.2.5 maintain at the work site a current record of his employees at the site who have been cleared for access to NATO classified information. The record should show the date of issue, the date of expiration and the level of clearance;
 - 11.2.6 deny access to NATO classified information to any person other than those persons authorised to have such access by the national security authority or designated security agency;
 - 11.2.7 limit the dissemination of NATO classified information to the smallest number of persons (“need to know basis”) as is consistent with the proper execution of the Contract;
 - 11.2.8 comply with any request from the national security authority or designated security agency that persons entrusted with NATO classified information sign a statement undertaking to safeguard

that information and signifying their understanding both of their obligations under national legislation affecting the safeguarding of classified information, and of their comparable obligations under the laws of the other NATO nations in which they may have access to classified information;

- 11.2.9 report to the national security authority or designated security agency any breaches, suspected breaches of security, suspected sabotage, or other matters of security significance which would include any changes that may occur in the ownership, control or management of the facility or any changes that affect the security arrangements and security status of the facility and to make such other reports as may be required by the national security authority or designated security agency, e.g. reports on the holdings of NATO classified material;
- 11.2.10 apply to the Purchaser for approval before Sub-contracting any part of the work, if the Sub-contract would involve that the Sub-contractor would have access to NATO classified information, and to place the Sub-contractor under appropriate security obligations no less stringent than those applied to his own contract;
- 11.2.11 undertake not to utilise, other than for the specific purpose of the Contract, without the prior written permission of the Purchaser or his authorised representative, any NATO classified information furnished to him, including all reproductions thereof in connection with the Contract, and to return all NATO classified information referred to above as well as that developed in connection with the Contract, unless such information has been destroyed, or its retention has been duly authorised with the approval of the Purchaser. Such NATO classified information will be returned at such time as the Purchaser or his authorised representative may direct;
- 11.2.12 classify any produced document with the highest classification of the NATO classified information disclosed in that document.

12. RELEASE OF INFORMATION

- 12.1 Except as otherwise specified elsewhere in the Contract and to the extent that it is demonstratively unavoidable and without prejudice to the Clause 11 (Security), the Contractor and/or his employees shall not, without prior authorisation from the Purchaser, release to third parties any information pertaining to this Contract, its subject matter, performance there under or any other aspect thereof.

12.2 The Contractor shall seek the prior written approval of the Purchaser before publishing any press release or disclosing any other information, orally or in writing, in relation to the Contract. The approval of the Purchaser shall be required for both the opportunity and the content of the information.

12.3 This provision shall remain in effect after the termination of the Contract and shall cease to apply to any particular piece of information once that information becomes public knowledge other than through an act, default or omission of the Contractor or its Sub-contractors.

13. **PURCHASER FURNISHED PROPERTY**

13.1 The Purchaser shall deliver to the Contractor, for use only in connection with this Contract, the Purchaser Furnished Property at the times and locations stated in the Contract. In the event that Purchaser Furnished Property is not delivered by such time or times stated in the Schedule, or if not so stated, in sufficient time to enable the Contractor to meet such delivery or performance dates the Purchaser shall, upon timely written request made by the Contractor, and if the facts warrant such action, equitably adjust any affected provision of this Contract pursuant to Clause 16 (Changes).

13.2 In the event that Purchaser Furnished Property is received by the Contractor in a condition not suitable for its intended use, the Contractor shall immediately notify the Purchaser. The Purchaser shall within a reasonable time of receipt of such notice replace, re-issue, authorise repair or otherwise issue instructions for the disposal of Purchaser Furnished Property agreed to be unsuitable. The Purchaser shall, upon timely written request of the Contractor, equitably adjust any affected provision of this Contract pursuant to Clause 16 (Changes).

13.3 Title to Purchaser Furnished Property will remain in the Purchaser. The Contractor shall maintain adequate property control records of Purchaser Furnished Property in accordance with sound industrial practice and security regulations.

13.4 Unless otherwise provided in this Contract, the Contractor, upon delivery to him of any Purchaser Furnished Property, assumes the risk of, and shall be responsible for, any loss thereof or damage thereof except for reasonable wear and tear, and except to the extent that Purchaser Furnished Property is consumed in the performance of this Contract.

13.5 Upon completion of this Contract, or at such earlier dates as may be specified by the Purchaser, the Contractor shall submit, in a form acceptable to the Purchaser, inventory schedules covering all items of Purchaser Furnished Property.

- 13.6 The inventory shall note whether:
- 13.6.1 The property was consumed or incorporated in fabrication of final deliverable(s);
 - 13.6.2 The property was otherwise destroyed;
 - 13.6.3 The property remains in possession of the Contractor;
 - 13.6.4 The property was previously returned
- 13.7 The Contractor shall prepare for shipment, deliver DDP at a destination agreed with the Purchaser, or otherwise dispose of Purchaser Furnished Property as may be directed or authorised by the Purchaser. The net proceeds of any such disposal shall be credited to the Contract price or paid to the Purchaser in such other manner as the Purchaser may direct.
- 13.8 The Contractor shall not modify any Purchaser Furnished Property unless specifically authorised by the Purchaser or directed by the terms of the Contract.
- 13.9 The Contractor shall indemnify and hold the Purchaser harmless against claims for injury to persons or damages to property of the Contractor or others arising from the Contractor's possession or use of the Purchaser Furnished Property. The Contractor shall indemnify the Purchaser for damages caused by the Contractor to the Purchaser, its property and staff and arising out of the Contractor's use of the Purchaser Furnished Property.

14. **CONTRACTOR'S PERSONNEL WORKING AT PURCHASER'S FACILITIES**

- 14.1 The term "Purchaser Facilities" as used in this Clause shall be deemed to include sites, property, utilities, ships or vessels and the term "Facility Representative" shall be deemed to refer to the authority designated by the Purchaser responsible for the site, property, utility, ship or vessel.
- 14.2 The Facility Representative shall provide such available administrative and technical facilities for Contractor's personnel working at Purchaser's Facilities for the purpose of the Contract as in the opinion of the Facility Representative may be necessary for the effective and economical discharge of Work. The Facility Representative shall also determine whether these facilities will be provided free of charge to the Contractor or determine what charges are payable. The Contractor shall have no claim against the Purchaser for any such additional cost or delay or any additional cost or delay occasioned by the closure for holidays of said facilities, or other reasons, where this is generally published or made known to the Contractor

by the Purchaser or his authorised representatives.

- 14.3 The Contractor shall, except as otherwise provided for in the Contract, make good or, at the option of the Purchaser, pay compensation for all damage occurring to any Purchaser's Facilities occasioned by the Contractor, his servants, agents or Sub-contractors, arising from his or their presence and activities in, and use of, the Purchaser's Facilities; provided that this Condition shall not apply to the extent that the Contractor is able to show that any such damage was not caused or contributed to, by his neglect, or default or the neglect or default of his servants, agents or Sub-contractors, or by any circumstances within his or their control.
- 14.4 All property of the Contractor while at a Purchaser Facility shall be at the risk of the Contractor, and the Purchaser shall accept no liability for any loss or damage, except to the extent that any loss or damage is the result of a wilful act or gross negligence on the part of the Purchaser's employees or agents.

15. HEALTH, SAFETY AND ACCIDENT PREVENTION

- 15.1 If the Purchaser notifies the Contractor in writing of any non-compliance in the performance of this Contract with safety and health rules and requirements prescribed on the date of this Contract by applicable national or local laws, ordinances and codes, and the Contractor fails to take immediate corrective action, the Purchaser may order the Contractor to stop all or part of the Work until satisfactory corrective action has been taken. Such an order shall not entitle the Contractor to an adjustment of the Contract price or other reimbursement for resulting increased costs, or to an adjustment of the delivery or performance schedule.

16. CHANGES

- 16.1 The Purchaser may at any time, by written order of the Contracting Authority designated or indicated to be a change order ("Change Order") make changes within the general scope of this Contract, including, without limitation, in any one or more of the following:
- 16.1.1 Specifications (including drawings and designs);
 - 16.1.2 Method and manner of performance of the work, including engineering standards, quality assurance and configuration management procedures;
 - 16.1.3 Marking and method of shipment and packing;
 - 16.1.4 Place of delivery;

- 16.1.5 Amount, availability and condition of Purchaser Furnished Property.
- 16.2 The Purchaser shall submit a proposal for Contract amendment describing the change to the Contract.
- 16.3 If any such Change Order causes an increase in the Contractor's cost of, or the time required for, the performance of any part of the Work under this Contract, whether or not changed by any such order, the Contractor shall submit a written proposal for adjustment to the Purchaser describing the general nature and amount of the proposal for adjustment. The Contractor shall submit this proposal for adjustment within thirty (30) days after receipt of a written Change Order under (a) above unless this period is extended by the Purchaser.
- 16.4 If any such Change Order causes a decrease in the Contractor's cost of, or the time required for, the performance of any part of the Work under this Contract, whether or not changed by any such order, the Purchaser shall submit a proposal for adjustment within thirty (30) days from the issuance of the Change Order by submitting to the Contractor a written statement describing the general nature and amount of the proposal for adjustment.
- 16.5 Where the cost of property made obsolete or in excess as a result of a change is included in the Contractor's claim for adjustment, the Purchaser shall have the right to prescribe the manner of disposition of such property.
- 16.6 The Purchaser reserves the right to reject the introduction of the change, after the evaluation of the change proposal, even if the Purchaser initiated such change.
- 16.7 Failure to agree to any requested adjustment shall be a dispute within the meaning of the Clause 41 (Disputes). However, nothing in this Clause shall excuse the Contractor from proceeding with the Contract as changed.
- 16.8 No proposal for adjustment by the Contractor for an equitable adjustment shall be allowed if asserted after final payment and acceptance under this Contract.
- 16.9 Any other written or oral order (which, as used in this paragraph includes direction, instruction, interpretation, or determination) from the Purchaser that causes a change shall be treated as a Change Order under this Clause, provided, that the Contractor gives the Purchaser a written notice within thirty (30) Days after receipt of such order stating (i) the date, circumstances, and source of the order; (ii) that the Contractor regards the order as a Change Order; and (iii) a detailed cost and time analysis of the impact of the change, and that the Order is accepted in writing by the Purchaser as a Change Order. The timely written notice requirement, as detailed above, remains in force in all cases, even where, for example, the Purchaser has positive knowledge of the

relevant facts.

- 16.10 All tasks and activities carried out by the Contractor in relation to the processing of the Change Order or in relation to this Clause shall form part of the Contractor's routine work and cannot be charged as additional work.

17. STOP WORK ORDER

- 17.1 The Purchaser may, at any time, by written order to the Contractor, require the Contractor to stop all, or any part, of the Work called for by this Contract for a period of ninety (90) days after the order is delivered to the Contractor, and for any further period to which the Parties may agree.
- 17.2 Any such stop work order shall be specifically identified as a stop work order issued pursuant to this Clause (the "Stop Work Order"). The Stop Work Order may include a description of the Work to be suspended, instructions concerning the Contractor's issuance of further orders for material or services, guidance to the Contractor on actions to be taken on any Sub-contracts and any suggestion to the Contractor for minimizing costs.
- 17.3 Upon receipt of such a Stop Work Order, the Contractor shall forthwith comply with its terms and take all reasonable steps to minimise costs incurred allocable to the Work covered by the Stop Work Order during the period of work stoppage. Within a period of ninety (90) days after a Stop Work Order is delivered to the Contractor, or within any extension of that period to which the Parties shall have agreed, the Purchaser shall either:
- 17.3.1 cancel the Stop Work Order; or
 - 17.3.2 terminate the Work covered by such Stop Work Order as provided in Clause 40 (Termination for Convenience of the Purchaser).
- 17.4 If a Stop Work Order issued under this Clause is cancelled or the period of the Stop Work Order or any extension thereof expires, the Contractor shall resume work.
- 17.5 An equitable adjustment shall be made in the delivery schedule or Contract price, or both, and the Contract shall be modified in writing accordingly, if:
- 17.5.1 the Stop Work Order results in an increase in the time required for, or in the Contractor's cost properly allocable to, the performance of any part of this Contract, and;
 - 17.5.2 the Contractor asserts a Claim for such adjustment within thirty (30) days after the end of the period of work stoppage; provided that, if the Purchaser decides the facts justify such action, he may receive

and act upon any such claim asserted at a later date but prior to final payment under this Contract.

- 17.6 If a Stop Work Order is not cancelled and the Work covered by such Stop Work Order is terminated for the convenience of the Purchaser the reasonable costs resulting from the Stop Work Order shall be allowed in arriving at the termination settlement.

18. CLAIMS

- 18.1 The Contractor shall specifically identify the Contract Clause(s) under which the Claim(s) is/are based.

- 18.2 Claims shall be specifically identified as such and submitted:

18.2.1 within the time specified in the Clause under which the Contractor alleges to have a Claim. If no time is specified in the Clause under which the Contractor intends to base his Claim, the time limit shall be sixty (60) days from the date the Contractor has knowledge or should have had knowledge of the facts on which he bases his Claim; and

18.2.2 before final payment, pursuant to and with the exceptions specified in Clause 33 entitled "Release of Claims".

18.2.3 Section 18.2.2 above shall only apply to those Claims for which the Contractor could not have had earlier knowledge and were not foreseeable.

- 18.3 The Contractor shall be foreclosed from his Claim unless he presents complete documentary evidence, justification and costs for each of his Claims within ninety (90) calendar days from the assertion date of such Claims. Claims shall be supported by specifically identified evidence (including applicable historical and planned cost and production data from the Contractor's books and records). Opinions, conclusions or judgmental assertions not supported by such evidence will be rejected by the Purchaser.

- 18.4 An individual breakdown of cost is required for each element of Contractor's Claims at the time of claim submission or for any material revision of the Claim.

- 18.5 The Contractor shall present, at the time of submission of a Claim, an attestation as follows:

Ithe responsible senior company official authorised to commit the with respect to its claims dated being duly sworn, do hereby depose and say that: (i) the facts described in the claim are current, complete and accurate; and (ii) the conclusions in the claim accurately reflect the material

damages or contract adjustments for which the Purchaser is allegedly liable.

.....
.....

SIGNATURE

Date

- 18.6 Failure to comply with any of the above requirements shall result in automatic foreclosure of the Claim. This foreclosure takes effect in all cases and also where, for example, the Claim is based on additional orders, where the facts are known to the Purchaser, where the Claim is based on defective specifications of the Purchaser or an alleged negligence in the pre-contractual stage.
- 18.7 Claims submitted by the Contractor will be reviewed by the Contracting Authority. The Contracting Authority will respond within sixty (60) days with a preliminary decision, based on an assessment and evaluation of the facts presented by the Parties, as to whether the Contracting Authority considers the Claim to have merit for consideration. If the preliminary decision of the Contracting Authority is that the Claim, as submitted is without merit, the Contractor shall have fourteen (14) days to present a rebuttal to the Contracting Authority and request reconsideration of the Contracting Authority’s decision. Within thirty (30) days receipt of the Contractor’s request for reconsideration, the Contracting Authority will issue a decision. The time requirements stated herein may be extended by the Contracting Authority in order to accommodate additional preparation efforts and fact finding discussions but the Contracting Authority may not unreasonable extend such a period. A decision that the submitted claim is without merit will be identified as such, will be issued in writing by the Contracting Authority and will be conclusive. A decision may only be challenged by the Contractor through the Disputes provisions described herein.
- 18.8 A decision by the Purchaser that the claim has merit will result in a Contracting Authority request to enter into negotiations with the Contractor to arrive at a mutually agreed fair and equitable settlement. The Contracting Authority’s decision will contain a target date for the commencement and conclusion of such operations. If the Parties are unable to arrive at an agreement on a fair and reasonable settlement by the target date for conclusion, or any extension thereto made by the Contracting Authority, the latter may declare that negotiations are at an impasse and issue a preliminary decision as to the fair and reasonable settlement and the reasons supporting this decision. The

Contractor shall have a period of thirty (30) days to present a rebuttal to the Contracting Authority and request reconsideration of the Contracting Authority's decision. Within sixty (60) days of receipt of the Contractor's request for reconsideration, the Contracting Authority will issue its decision on the request for reconsideration. This timeframe will be respected unless an authorisation is needed from a NATO or other authority, the schedule for which is beyond the Contracting Authority's control. A decision of the Contracting Authority on the reconsideration of the matter will be identified as such, will be issued in writing by the Contracting Authority and will be conclusive. A decision on the reconsideration may only be challenged by the Contractor through the Disputes provisions described herein.

- 18.9 No Claim arising under this Contract may be assigned by the Contractor without prior approval of the Purchaser.
- 18.10 The Contractor shall proceed diligently with performance of this Contract, pending final resolution of any request for relief, claim appeal, or action arising under the Contract, and comply with any decision of the Contracting Authority.

19. PRICING OF CHANGES, AMENDMENTS AND CLAIMS

- 19.1 Contractor's pricing proposals for Changes, amendments and Claims shall be priced in accordance with the Purchaser's Pricing Principles (Annex 1 hereto and the sample spreadsheet and its "Instructions to Complete" at Appendix 1) or the national government pricing rules and regulations for the Contractor's own country, where in force. The Contractor shall provide cost information accompanied by appropriate substantiation as required by the Purchaser in accordance with Purchaser's Pricing Principles, or such other format as may be agreed between the Contractor and the Purchaser.
- 19.2 With respect to Clause 19.1 above, when the price or price adjustment is based on adequate price competition, established catalogue or market price of commercial items sold in substantial quantities to the general public, or prices set by law or regulation, the Contractor shall be responsible for substantiation of such cases to the satisfaction of the Purchaser.
- 19.3 For the purposes of verifying that the cost or pricing data submitted in conjunction with Clause 19.1 above are accurate, complete and current, the Purchaser or any Purchaser authorised representative shall have the right of access to the Contractor's facilities to examine, until the expiration of three (3) years from the date of final payment of all sums due under the Contract:
- 19.3.1 those books, records, documents and other supporting data which will permit adequate evaluation and verification of the cost or pricing data submitted; and/or
- 19.3.2 the computations and projections which were available to the Contractor as of the date of the Contractor price proposal.

- 19.4 The Contractor, subject to the provisions of this Clause, shall require Sub-contractors to provide to the Purchaser, either directly or indirectly:
- 19.4.1 cost or pricing data;
 - 19.4.2 access to Sub-contractor's facilities and records for the purposes of verification of such cost or pricing data; and
 - 19.4.3 a Certificate of Current Cost or Pricing Data, when required.
- 19.5 If any price, including profit, negotiated in connection with this Contract was proposed, taking any of the following into account:
- 19.5.1 the Contractor furnished cost or pricing data which was not complete, accurate and current as certified in the Contractor's Certificate of Current Cost or Pricing Data provided in accordance with Clause 19.6 below;
 - 19.5.2 a Sub-contractor, pursuant to Clause 19.4 above or any Sub-contract clause therein required, furnished cost or pricing data which was not complete, accurate and current as certified in the Sub-contractor's Certificate of Current Cost or Pricing Data;
 - 19.5.3 a Sub-contractor or prospective Sub-contractor furnished cost or pricing data which was required to be complete, accurate and current and to be submitted to support a Sub-contract cost estimate furnished by the Contractor but which was not complete, accurate and current as of the date certified in the Contractor's Certificate of Current Cost or Pricing Data; or
 - 19.5.4 the Contractor or a Sub-contractor or prospective Sub-contractor furnished any data, not within 19.5.1 through 19.5.3 above, which, as submitted, was not complete, accurate and current;
 - 19.5.5 then the price and/or cost shall be adjusted accordingly and the Contract shall be modified in writing as may be necessary to reflect such.
- 19.6 At the time of negotiating any price, including profit, which is based upon the submission of cost or pricing data by the Contractor, the Contractor shall be required to submit a certificate of current cost or pricing data ("Certificate").
- 19.6.1 Such Certificates will certify that, to the best of the Contractor's knowledge and belief, cost or pricing data submitted to the Purchaser in support of any proposal for a price, price adjustment or claim, are accurate, complete and current, as per the completion of the negotiations or, in the case of a claim, as per the submission date of the claim.

19.6.2 All such Certificates shall be in the format shown below and shall be dated and signed by a responsible officer of the company:

CERTIFICATE OF CURRENT COST OR PRICING DATA

This is to certify that cost or pricing data as submitted, either actually or by specific identification in writing to the Purchaser or his representative in support of.....(*Claim, Amendment, ECP#, etc.*) are accurate, complete and current as of(*Date*).

By submitting the price proposal, the Contractor/sub-Contractor or prospective sub-Contractor grant the Purchaser or his authorized representative(s) the right to examine those records, data and supporting information, used as a basis for the pricing submitted.

Name of Company

Signature

Printed Name of Signatory

Title of Signatory

Date of Signature

19.6.3 The Contractor shall insert the substance of this Clause 19.7 in each Sub-contract.

19.7 For all additional or follow-up agreements which are made for Work which are furnished to the Purchaser without competition, the Contractor shall offer prices on a "Preferred Customer" basis, that is offer prices which are as favourable as those extended to any Government, Agency, Company, Organisation or individual purchasing or handling like quantities of equipment and/or Parts covered by the Contract under similar conditions. In the event that prior to completing delivery under this Contract the Contractor offers any of such items in substantially similar quantities to any customer at prices lower than those set forth herein, the Contractor shall so notify the Purchaser and the prices of such items shall be correspondingly reduced by a supplement to this Contract. Price in this sense means "Base Price" prior to applying any bonus, export tax reduction, turn-over tax exemptions and other reductions based on National Policies.

20. **NOTICE OF SHIPMENT AND DELIVERY**

20.1 Except as may be specified in the Contract Special Provisions, delivery of all items under this Contract shall be made by the Contractor on the basis of "Delivery Duty Paid" (DDP) as defined by the INCOTERMS 2000 (International Chamber of Commerce Publication No. 560). It shall be noted, however, that because the Purchaser is exempted from direct taxes and duty as set forth in Clause 26 (Taxes and Duties), there is no duty to be paid by the Contractor.

20.2 "Delivery" of required Work by the Contractor does not constitute "Acceptance" by the Purchaser for purposes of meeting the requirements of the Contract Schedule where Purchaser acceptance is the stated payment or schedule milestone.

20.3 Thirty (30) Days, or such other period as specified in the Contract, prior to the delivery of any shipment of Work, the Contractor shall give prepaid notice of shipment to the Purchaser. The Notice of Shipment shall contain, as appropriate, the request for customs form 302, or equivalent document, which shall enable any carrier to conduct duty free import/export clearance through customs for the Purchaser on behalf of NATO.

20.4 The customs form 302 is an official customs clearance declaration issued in advance of shipment by the Purchaser to provide certified information as to the duty free import, export, or transit of NATO consignments between NATO countries.

20.5 The Notice of Shipment and request for Form 302 or equivalent document shall contain the following information:

20.5.1 Purchaser's Contract number;

20.5.2 Contract item number, designation and quantities;

20.5.3 destination;

- 20.5.4 number and description of the packages (gross and net weight);
 - 20.5.5 description of the goods and their value (for custom purpose only, not commercial value)
 - 20.5.6 consignor's name and address;
 - 20.5.7 consignee's name and address;
 - 20.5.8 method of shipment (i.e. road, rail, sea, air, etc.);
 - 20.5.9 name and address of freight forwarder.
- 20.6 Forwarding Agents, Carriers or other responsible organisations shall be informed by the Contractor of the availability of Form 302 or equivalent document and how the form shall be utilised to avoid the payment of custom duties. Form 302 or equivalent document shall be incorporated in all shipping documents provided to the carrier.
- 20.7 Upon receipt of the Notice of Shipment from the Contractor, the Purchaser may require the Contractor to send copies of the Notice of Shipment to the receiving parties and the Contractor shall comply with this requirement.

21. INSPECTION AND ACCEPTANCE OF WORK

- 21.1 For the purposes of this Clause, Work does not include documentation which is addressed in Clause 22 (Inspection and Acceptance of Documentation) hereafter.
- 21.2 Unless otherwise specifically provided for in the Contract, all Work and all Parts and equipment incorporated in the Work are to be new and of the most suitable grade of their respective kinds for the purpose, notwithstanding the requirements for testing, inspection and performance as required under this Contract. All workmanship shall be as specified under the Contract or, if no workmanship standards are specified, best commercial or "state of the art" complying with relevant (National and International) standards.
- 21.3 All Work may be subject to inspection and test by the Purchaser or his authorised representative(s) to the extent practicable at all times and places prior to Acceptance, including the period of manufacture, or after delivery or as otherwise specified in the Contract. For the purposes of inspection and testing the Purchaser may delegate as his representative the authorised National Quality Assurance Representative (NQAR) in accordance with STANAG 4107.
- 21.4 No representative or NQAR appointed by the Purchaser for the purpose of determining the Contractor's compliance with the technical requirements of the Contract shall have the authority to change any of the specifications. Such changes may only be made by the Contracting Authority in writing in accordance with Clause 16 (Changes).
- 21.5 The presence or absence of an NQAR or other Purchaser representative shall

- not relieve the Contractor from conforming to the requirements of this Contract.
- 21.6 Acceptance or rejection of the Work shall be made as promptly as practicable after delivery, except as otherwise provided in the Contract. Failure to timely accept or reject the Work shall neither relieve the Contractor from responsibility for such Work nor impose liability on the Purchaser.
- 21.7 In the event that any Work, or lots thereof, or services are defective in design, material, workmanship or manufacturing quality, or as a result of undue wear and tear or otherwise not in conformity with the requirements of this Contract, including any characteristic or condition which is or becomes at variance to the performance specifications, to the intended function of the Work or the function to which it could reasonably be expected that the Work would perform, the Purchaser shall have the right either to reject them (with or without instructions as to their disposition) or to require their correction or replacement. Work which has been rejected or required to be corrected or replaced shall, at the expense of the Contractor, be removed, or, if permitted or required by the Contracting Authority, corrected in place by the Contractor promptly after notice, and shall not thereafter be tendered for acceptance by the Contractor unless the former rejection or requirement of correction or replacement is withdrawn. If the Contractor fails promptly to remove, replace or correct such Work the Purchaser may either:
- 21.7.1 by contract or otherwise return, replace or correct such Work or services and charge to the Contractor the cost incurred by the Purchaser; and/or
 - 21.7.2 terminate this Contract for default as provided in Clause 39 (Termination for Default).
- 21.8 When NQAR is not applicable based on the scale of the project, the Purchaser reserves the right to perform inspections through his own staff in accordance with the latest ISO standard at the time of inspection.
- 21.9 Unless the Contractor corrects or replaces such Work within the delivery schedule, the Purchaser may require the delivery of such Work at a reduction in price which is equitable under the circumstances. Failure to agree to such reduction of price shall be a dispute within the meaning of Clause 41 (Disputes).
- 21.10 If any inspection or test is made by the Purchaser's representatives on the premises of the Contractor or Sub-contractor, the Contractor, without additional charge, shall provide all reasonable facilities and assistance for the safety and convenience of the Purchaser's representatives in the performance of their duties. The NQAR or other Purchaser representatives shall have the right of access to any area of the Contractor's or his Sub-contractor's premises where any part of the contractual work is being performed.
- 21.11 If Purchaser inspection or test is made at a point other than the premises of the Contractor or Sub-contractor, it shall be at the expense of the Purchaser except as otherwise provided in this Contract; provided, that in case of

rejection the Purchaser shall not be liable for any reduction in value of samples used in connection with such inspection or test.

- 21.12 All inspections and tests by the Purchaser shall be performed in such a manner as not to unduly delay the Work.
- 21.13 The Purchaser reserves the right to charge to the Contractor any additional cost of Purchaser inspection and test when Work is not ready at the time such inspection and test is requested by the Contractor or when re-inspection or retest is necessitated by prior rejection.
- 21.14 Acceptance or rejection of the Work shall be made as promptly as practicable after delivery, except as otherwise provided in this Contract, but failure to inspect and accept or reject Work shall neither relieve the Contractor from responsibility for such Work as are not in accordance with the Contract requirements nor impose liability on the Purchaser thereof.
- 21.15 The inspection and test by the Purchaser of any Work or lots thereof, or services, does not relieve the Contractor from any responsibility regarding defects or other failures to meet the Contract requirements which may be discovered prior to acceptance.
- 21.16 Acceptance of Work shall take place when the Contracting Authority confirms acceptance in writing of the Work in accordance with the procedure specified in the Contract, or if none is so specified then the Contracting Authority shall be deemed to have accepted the Work without prejudice to any other remedies, when and as soon as any of the following events have occurred:
- 21.16.1 the Purchaser has taken the Work into use, except as specifically provided by Clause 23 (Use and Possession Prior to Acceptance);
 - 21.16.2 the Purchaser has not exercised its right of rejection of the Work within any period specified for that purpose in the Contract;
 - 21.16.3 there being no period for exercising the right of rejection specified in the Contract, a reasonable time, all the circumstances having been taken into account, has elapsed since inspection of the Work was effected in accordance with the Contract.
- 21.17 Except as otherwise provided in this Contract, acceptance shall be conclusive except as regards latent defects, fraud, or such gross mistakes as amount to fraud.
- 21.18 Unless otherwise specified in this Contract, the Contractor shall have or establish, implement and maintain an effective and economical quality control system necessary to satisfy the Contract requirement. The system shall provide for the early and prompt detection of deficiencies, trends and conditions which could result in unsatisfactory quality and for timely and effective corrective action. Objective evidence that the system is effective shall be readily available to the Purchaser and its authorised representatives. Records of all inspection and testing work by the Contractor shall be kept complete and available to the Purchaser's representatives during the

performance of this Contract and for such longer periods as may be specified elsewhere in this Contract.

22. **INSPECTION AND ACCEPTANCE OF DOCUMENTATION**

- 22.1 The Contractor shall provide to the Purchaser a draft version of the required documentation as provided by the Contract Schedule and the Statement of Work. Review of draft documentation under this Contract will be made by the Purchaser upon the delivery of these items by the Contractor. The review will be conducted by the Purchaser through duly authorised representatives.
- 22.2 Upon delivery of the draft documentation, the Purchaser will have a period of review as provided by the Statement of Work. At the end of the review period or before if deemed practical by the Purchaser, the Purchaser's comments will be presented to the Contractor in writing. The substance of such comments will pertain to items of error, non-conformity, omission and guidance in relation to the requirements of the Statement of Work.
- 22.3 Purchaser Review of the delivered items will emphasise the conformity with the requirements of the Statement of Work, thoroughness of analysis, logical bases of conclusions and models and coherence and completeness of presentation. The review process will also examine editorial and grammatical correctness and the suitability and accuracy of graphics supporting the text.
- 22.4 The Contractor shall, after receipt of Purchaser comments, incorporate changes, revisions and corrections required by the Purchaser and present the revised documentation in final form to the Purchaser for inspection in accordance with the delivery date specified in the Schedule.
- 22.5 During the review process the Contractor is not required to halt efforts on further tasks as identified in the Statement of Work. The Purchaser, however, shall not be held liable for any work carried out by the Contractor which is based on draft documentation yet to be reviewed.
- 22.6 Upon receipt of the items in final form, the Purchaser will inspect the items for a period not exceeding two weeks (or as otherwise stated in the Statement of Work). At the end of the inspection, the Purchaser will notify the Contractor that:
- 22.6.1 the items have been accepted;
 - 22.6.2 the acceptance of the items is deferred pending further revision;
- or

22.6.3 The items are rejected and significantly fail to meet Contract requirements.

22.7 In the case of Clause 22.6.2 above, the Contractor shall only be responsible for those revisions and corrections requested by the Purchaser and the Purchaser may not request additional revisions during inspection after required revisions have been made. However, if the Purchaser determines that a directed revision has not been made or if such directed revision was cause for revision of other portions of content which were not made by the Contractor, the Purchaser may withhold acceptance until such revisions are made by the Contractor.

22.8 The Contractor shall provide to the Purchaser on request supporting technical data, computer software, databases and background analyses in order to validate findings contained in the delivered items.

22.9 Purchaser acceptance shall be made in writing by the Contracting Authority.

23. USE AND POSSESSION PRIOR TO ACCEPTANCE

23.1 Except as otherwise provided in the Contract Special Provisions, the Purchaser shall have the right to take possession of, or use, any completed or partially completed Work under the Contract at any time, when notified by the Contracting Authority, however such possession or use shall not constitute Acceptance by the Purchaser, as defined in the Contract.

23.2 While the Purchaser has such use or is in such possession, the Contractor shall be relieved of the responsibility for loss or damage to the Work concerned other than that resulting from the Contractor's fault, negligence or defect to the Work.

23.3 If such prior possession or use by the Purchaser delays the progress of the Work or causes additional expense to the Contractor, an equitable adjustment in the Contract price or the time of delivery will be made, in accordance with the Clause 16 (Changes), and the Contract shall be modified in writing accordingly.

24. OWNERSHIP AND TITLE

24.1 Except as may be otherwise stated in the Contract Special Provisions and Clause 23 (Use and Possession prior to Acceptance), ownership and title to all Work will pass to the Purchaser only upon Acceptance by the Contracting Authority in writing. Where the Contract provides for Provisional Acceptance and Final Acceptance, ownership and title will pass to the Purchaser upon written notification of Final Acceptance.

25. INVOICES AND PAYMENT

- 25.1 Unless otherwise specified in the Contract Special Provisions, invoices shall only be submitted after delivery and Acceptance of the Work and for the total prices and currency(ies) as set out under the Schedule of Work.
- 25.2 Invoices in respect of any Work or services shall be prepared and submitted to the Purchaser and shall contain all of the elements listed below:
- 25.2.1 Contract number;
 - 25.2.2 Purchaser's Purchase Order number;
 - 25.2.3 accounting codes (as specified in this Contract);
 - 25.2.4 item number (as defined in the Contract);
 - 25.2.5 Contract description of Work or services, sizes, quantities, unit prices, and extended totals (exclusive of taxes and duties for which relief is available); and
 - 25.2.6 extended totals. Details of Bills of Lading or Freight Warrant numbers and weight of shipment shall be identified on each invoice as appropriate.
- 25.3 In addition, documentary evidence of Acceptance including copies of certificates of conformity shall be submitted together with each invoice. Invoices shall not be submitted to the Purchaser without Acceptance having been previously made by the Purchaser.
- 25.4 Each copy of the invoice shall contain the following certificate which shall be signed by a duly authorised company official on the designated original invoice:
- "I certify that the above invoice is true and correct, that the delivery of the above described items has been duly carried out and the payment thereof has not been received.*
- Order placed for official use. Exemption from VAT Article 42, §3&3*of VAT Code for Belgium or Article 151, §1b of the Council Directive 2006/112/EC dd. 28 November 2006 on intra-community purchases and/or services."*
- 25.5 All invoices shall be addressed to the NCI Agency - Financial Management
- Either at the following addresses:
- NCI Agency * If used for NCI Agency Brussels
- NATO Communications and Information Agency

Finance, Accounting & Operations
Batiment Z
Av du Bourget 140
B-1140 Belgium

OR

shall be addressed to Financial Management at the following electronic address: accountspayable@ncia.nato.int

Note: When used for NCI Agency The Hague or Mons the addresses shall be dictated in the Contract Special Provisions

Once the manner of forwarding the invoice is chosen, the contractor shall keep this manner throughout the contract.

- 25.6 All invoices submitted shall include the address of the bank to which payment shall be made, together with **either** pertinent information concerning the International Bank Account Number (IBAN) and BIC/SWIFT address **or** pertinent information concerning transit number/sort code, account number and SWIFT address. The Purchaser makes payment only by wire transfer and therefore wire transfer particulars shall be included on the invoice.
- 25.7 Invoices will be settled by the Purchaser within sixty (60) days of receipt of a properly prepared and submitted invoice.
- 25.8 The Contractor shall mention on the invoice the payment conditions in line with the Contract.

26. **TAXES AND DUTIES**

- 26.1 The Purchaser, by virtue of his 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, certifies that the prices stipulated in this Contract do not include amounts to cover such direct taxes or customs duties.
- 26.2 The Contractor shall be responsible for ensuring that his respective Sub-contractors are aware that the Purchaser is exempt from taxes and customs duties. The Contractor (and his 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.
- 26.3 The Purchaser shall give reasonable assistance in providing

evidence/documents which might be required by the Contractor to ensure that NCI Agency receives tax exemption by virtue of its status under the Ottawa Agreement.

- 26.4 If, after complying with all national and local legal and administrative procedures, the authorities persist in attempting to impose taxes or duties on goods provided under this Contract, the Contractor shall inform the Contracting Authority providing the particulars of the situation, the procedures which have been followed and the point of contact at the national authority which is attempting to impose taxation or duty. The Contracting Authority will examine the situation and attempt to clarify the legal and administrative basis of the difficulty. If the Contracting Authority so directs, the Contractor shall pay the required taxes and duties and file for reimbursement or rebate from the national authorities in accordance with national legislative and administrative procedures.
- 26.5 In the event that the petition for reimbursement or rebate is denied by the national authorities concerned and providing that the Contractor and/or his Sub-contractor have complied with the national legislative and administrative procedures, the Purchaser shall reimburse the full amount of the payment(s) upon receipt of the Contractor's invoice indicating such tax or duty as a separate item of cost and fully identified by reference to any governmental law, regulation and/or instruction pursuant to which such tax or duty is enforced. The Contractor shall offer assistance and execute any such document that may be useful or required to ensure that Purchaser obtains the reimbursement of any tax or duty retained by a national authority.
- 26.6 In the event of the Contractor and/or Sub-contractor not complying with national legislative or administrative procedures, taxes and duties paid by the Contractor and/or Sub-contractors shall not be reimbursed by the Purchaser.
- 26.7 Following payment by the Purchaser of the taxes and/or duties pursuant to Clause 26.4 above, should the Contractor subsequently receive a rebate of any amount paid by the Purchaser, the Contractor shall immediately notify the Purchaser and the amount of such rebate shall be credited or reimbursed to the Purchaser, as directed. The Contractor shall be responsible for taking any and all action that could reasonably be required in order to obtain such rebate.
- 26.8 The Contractor shall be liable for all other taxes, assessments, fees, licences, 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 himself of his liability in each country where such liability may arise.

27. **WARRANTY OF WORK (Exclusive of Software)**

- 27.1 For the purpose of this Clause:
- 27.1.1 “Acceptance” shall mean the act of an authorised representative of the Purchaser by which the Purchaser assumes title and ownership of delivered Work 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;
 - 27.1.2 “Correction” shall mean the elimination of a defect;
 - 27.1.3 “Work” shall not include software.
- 27.2 The Contractor shall not be responsible under this Clause for the Correction of Defects in Purchaser Furnished Property, except for Defects in Contractor performed installation, unless the Contractor performs, or is obligated to perform, any modifications or other work on Purchaser Furnished Property. In that event, the Contractor shall be responsible for Correction of Defects that result from the modifications or other Work.
- 27.3 Unless another period of time is indicated in the Contract Special Provisions, the duration of the warranty provided by the Contractor and its Subcontractors shall be twelve (12) months from the date of Acceptance under this Contract as notified in writing by the Contracting Authority.
- 27.4 Any Work or parts thereof corrected or furnished in replacement and any services re-performed shall also be subject to the conditions of this Clause 27 to the same extent as Work initially accepted. The warranty, with respect to these Work, or parts thereof shall be equal in duration to that set forth in Clause 27.3, and shall run from the date of delivery of the corrected or replaced Work.
- 27.5 If the Contractor becomes aware at any time before Acceptance by the Purchaser (whether before or after tender to the Purchaser) or at a later time, that a Defect exists in any Work, the Contractor shall either promptly correct the Defect or promptly notify the Purchaser, in writing, of the Defect, using the same procedures prescribed in Clause 27.8.
- 27.6 The Purchaser will notify in writing the Contractor of the existence of a Failed Component and return to the Contractor the Failed Component within thirty (30) Days of the discovery of such failure. The transport of the Failed Component shall be at the expense of the Purchaser. The notification of the failure will include as much information as practicable about the circumstances and operating environment at the time of the failure. Upon receipt of such notification by the Purchaser (which may precede receipt of the Failed Component), the Contractor shall ship to the location of the Failed Component an identical component for installation by Purchaser personnel. The Contractor shall ship such replacement component(s) Delivery Duty Paid. Such transportation and replenishment charges are included in the cost of line

item of the Contract identified as the warranty.

- 27.7 In such rare cases where the Failed Component is either too large to be easily transported or the Failed Component cannot be readily identified and isolated within the larger entity, the Contractor shall be notified by the Purchaser of the failure immediately by telephone, fax or e-mail. The Contractor shall provide technical support to the Purchaser personnel in identifying the Failed Component so as to afford the Purchaser the opportunity to return the Failed Component. In such a case where the Failed Component cannot be identified or is not cost effective or practical to ship to the Contractor's facility, the Contractor may elect to send field service personnel to the site of the failure and repair such equipment on location. In this event, such field service personnel shall be dispatched to the site of the failure within forty-eight (48) hours of initial notification. The expense of the technical support and field service shall be borne by the Contractor.
- 27.8 The Contractor shall conduct analysis of all Failed Components which are returned to him by the Purchaser or repaired in the field by Contractor field service personnel to determine the cause of the failure. The Contractor shall issue a report to the Purchaser within thirty (30) days of receipt of a returned item or field repair which contains the results of the analysis. The report shall contain the conclusion of the Contractor as to whether the cause of the failure was due to a Manufacturing Defect or a Design Defect and declare what course of remedial action the Contractor shall implement to prevent further failures of a similar nature. Repetitive failures of the same component may be grounds for a de facto determination by the Purchaser that a Design Defect exists.
- 27.9 If the Purchaser determines that a Design Defect exists in any of the Work accepted by the Purchaser under this Contract, the Purchaser shall promptly notify the Contractor of the Defect, in writing, within ninety (90) days after discovery of the Defect. Upon timely notification of the existence of a Defect, or if the Contractor independently discovers a Design Defect or Manufacturing Defect in accepted Work, the Contractor shall submit to the Purchaser, in writing within thirty (30) days, a recommendation for corrective actions, together with supporting information in sufficient detail for the Purchaser to determine what corrective action, if any, shall be undertaken.
- 27.10 The Contractor shall also prepare and furnish to the Purchaser data and reports applicable to any Correction required under this Clause (including revision and updating of all other affected data and already accepted documentation called for under this Contract) at no increase in the Contract price.
- 27.11 In the event of timely notice of a decision not to correct or only to partially correct, the Contractor shall submit a technical and cost proposal within forty-five (45) days to amend the Contract to permit Acceptance of the affected Work in accordance with the revised requirement, and an equitable reduction in the Contract price shall promptly be negotiated by the Parties and be reflected in

a supplemental agreement to this Contract.

- 27.12 Within thirty (30) days after receipt of the Contractor's recommendations for corrective action and adequate supporting information in accordance with Clause 27.9, the Purchaser using sole discretion, shall give the Contractor written notice not to correct any Defect, or to correct or partially correct any Defect within a reasonable time.
- 27.13 The Contractor shall promptly comply with any timely written direction from the Purchaser to correct or partially correct a manufacturing or Design Defect, at no increase in the Contract price.
- 27.14 The Purchaser shall give the Contractor a written notice specifying any failure or refusal of the Contractor to:
- 27.14.1 conduct analyses of Failed components and implement a course of remedial action as required by Clauses 27.7 and 27.8;
 - 27.14.2 provide replacement components, technical support or on-location field repair service in accordance with Clauses 27.6 and 27.7; or
 - 27.14.3 prepare and furnish data and reports as required by Clause 27.10.
- 27.15 The notice referred to in Clause 27.14 shall specify a period of time following receipt of the notice by the Contractor in which the Contractor must remedy the failure or refusal specified in the notice.
- 27.16 If the Contractor does not comply with the Purchaser's written notice in Clause 27.14, the Purchaser may by Contract or otherwise:
- 27.16.1 Obtain detailed recommendations for corrective action from its own resources or third parties and either:
 - 27.16.2 correct the Work;
 - 27.16.3 replace the Work, and if the Contractor fails to furnish timely disposition instructions, the Purchaser may dispose of the non-confirming Work for the Purchaser's account in a reasonable manner, in which case the Purchaser is entitled to reimbursement from the Contractor, or from the proceeds, for the reasonable expenses of care and disposition, as well as for excess costs incurred or to be incurred;
 - 27.16.3.1 obtain applicable data and reports; and/or
 - 27.16.3.2 charge the Contractor for the costs incurred by the Purchaser.
- 27.17 In no event shall the Purchaser be responsible for any extension or delays in the scheduled deliveries or periods of performance under this Contract as a

result of the Contractor's obligations to correct Defects, nor shall there be any adjustment of the delivery schedule or period of performance as a result of the Correction of Defects unless provided by a supplemental agreement with adequate consideration.

- 27.18 The rights and remedies of the Purchaser provided in this Clause shall not be affected in any way by any terms or conditions of this Contract concerning the conclusiveness of inspection and Acceptance and are in addition to, and do not limit, any rights afforded to the Purchaser by any other Clause of this Contract or applicable law.

28. RIGHT OF ACCESS, EXAMINATION OF RECORDS

- 28.1 The Contractor shall give to the Purchaser and/or his representative(s) full and free access to his premises as and when required for the purpose of this Contract and shall ensure the same right of access to the premises of his Sub-contractors, by the inclusion in any such Sub-contracts of a provision substantially as set forth in this Clause.
- 28.2 The Purchaser and/or his representative(s) shall continue to have such right of access and examination of records as set forth in Clause 28.1 above until final payment under the Contract or the end of the warranty provisions under the Contract, whichever occurs later.
- 28.3 The expiration of the Purchaser's rights as set forth in Clause 28.2 is further subject to the provisions of Clause 19 (Pricing of Changes, Amendments and Claims), where a three (3) year right is established following the agreement of contractual amendments or the settlement of claims based upon the submission of cost and pricing data.
- 28.4 The period of access and examination described in Clause 28.1 above for records not related to cost aspects of a dispute or claim but which relate to issues of fact arising under either proceedings under Clause 41 (Disputes) or Clause 42 (Arbitration), or the settlement of claims made by either Party pursuant to the performance of this Contract, shall continue until such appeals, litigation or claims have been disposed of.

29. PATENT AND COPYRIGHT INDEMNITY

- 29.1 The Contractor shall assume all liability against any and all third party claims that the services, Work and/or parts thereof, in whole or in part, infringe(s) an IPR in force in any countries, arising out of the manufacture, import, export, performance of the services or delivery of Work and/or out of the use or disposal by, or for the account of, the Purchaser of such Services and/or Work. The Contractor shall reimburse and/or indemnify the Purchaser, its officers, agents, employees and/or consultants: (i) for all costs, fees, damages, awards, settlement amounts and any other expenses awarded to

the third party right holder against Purchaser and/or the final beneficiaries of the Work in relation to said third party claim; and (ii) for the costs and expenses incurred by the Purchaser in relation to said third party claims, including attorney fees. The Contractor shall be responsible for obtaining any licences necessary for the performance of this Contract and for making all other arrangements required to indemnify the Purchaser from any liability for IPR infringement in said countries.

29.2 Each Party shall immediately notify the other of any intellectual property infringement claims of which he has knowledge and which pertain to the Work under this Contract.

29.3 This indemnity shall not apply under the following circumstances:

29.3.1 Patents or copyright which may be withheld from issue by order of the applicable government whether due to security regulations or otherwise;

29.3.2 An infringement resulting from specific written instructions from the Purchaser under this Contract;

29.3.3 An infringement resulting from changes made to the Work by the Purchaser without the Contractor prior written consent;

29.3.4 An infringement resulting from changes or additions to the Work subsequent to final delivery and Acceptance under this Contract.

30. INTELLECTUAL PROPERTY

30.1 Purchaser Background IPR

30.1.1 The Contractor is licensed to use, non-exclusively and royalty-free any Purchaser Background IPR that is or will be made available for the sole purpose of carrying out the Work.

30.1.2 The Contractor shall not use any Purchaser Background IPR other than for the purpose of carrying out the Work without the prior written agreement of the Purchaser. Any such agreement shall include the terms relating to such use.

30.1.3 The Purchaser gives no warranty as to the validity of any Purchaser Background IPR. The Contractor shall not do anything or act in any way which is inconsistent with or prejudicial to the ownership by the Purchaser of any Purchaser Background IPR.

30.2 Contractor Background IPR

30.2.1 Any use of Contractor Background IPR for the purpose of

carrying out the Work pursuant to the Contract shall be free of any charge to Purchaser. The Contractor hereby grants to NATO a non-exclusive, royalty-free and irrevocable licence to use and authorise others to use any Contractor Background IPR for the purpose of exploiting or otherwise using the Foreground IPR.

- 30.2.2 Any use of Contractor Background IPR is not limited to the number of users or the number of licenses required by the Contract for the use of system. The Purchaser reserves the right to use the Contractor Background IPR for any number of users and number of licenses as required, at no additional cost to the Purchaser.

30.3 **Foreground IPR**

- 30.3.1 All Foreground IPR is the property of the Purchaser on behalf of NATO. Consequently, no statement shall be made restricting the rights of the Purchaser in the Foreground IPR.
- 30.3.2 The Contractor shall ensure that suitable arrangements are in place between its employees, agents, consultants and itself regarding Foreground IPR generated by said employees, agents, Subcontractors and consultants to allow the Contractor to fulfil its obligations under Clause 30.3.1 above.
- 30.3.3 The Contractor shall be entitled to use Foreground IPR on a non-exclusive, royalty free basis solely for the purpose of carrying out the Work.
- 30.3.4 The Contractor shall not use any Foreground IPR other than for the purpose of carrying out the Work without the Purchaser's prior written agreement. Any such agreement shall include terms relating to such use.
- 30.3.5 The Contractor shall provide the Purchaser, at the latest upon delivery of the Work and thereafter for the duration of the warranty and any purchased CLS agreement period, with full documented records of information in relation to the Work, including but not limited to, all drawings, specifications and other data that is necessary or useful to further develop, maintain and operate the Work.
- 30.3.6 The Contractor shall:
- 30.3.6.1 do all things necessary and sign all necessary or useful documents to enable the Purchaser to obtain

the registration of the Foreground IPR as the Purchaser may require and select; and

30.3.6.2 to execute any formal assignment or other documents as may be necessary or useful to vest title to any Foreground IPR in the Purchaser.

30.3.7 The Contractor undertakes:

30.3.7.1 to notify the Purchaser promptly of any invention or improvement to an invention or any design conceived or made by the Contractor; and

30.3.7.2 to provide the Purchaser with such information as the Purchaser may reasonably request in order to: (i) determine the patentability of such invention or improvement; (ii) assess the need for registering such invention or improvement; and (iii) evaluate the potential value to the Purchaser of such a patent or registration if issued.

30.3.8 If the Purchaser determines that it wishes to apply for one or more patents for the disclosed invention or improvement or for a registration for the disclosed design, it will prosecute such application(s) at its own expense. The Contractor undertakes to provide the Purchaser, at the Purchaser's expense, with such information and assistance as the Purchaser shall reasonably require to prosecute such application(s).

30.4 Third Party IPR

30.4.1 Any use of Third Party IPR for the purpose of carrying out the Work pursuant to the Contract shall be free of any charge to the Purchaser. The Contractor hereby grants to NATO a non-exclusive, royalty-free and irrevocable licence to use and authorise others to use any Third Party IPR for the purpose of exploiting or otherwise using the Foreground IPR.

30.4.2 With the exception of COTS items, any use of Third Party IPR is not limited to the number of users or the number of licenses required by the Contract for the use of system. With the exception of COTS items, the Purchaser reserves the right to use the Third Party IPR for any number of users and number of licenses as required, at no additional cost to the Purchaser.

30.4.3 For COTS items, the Contractor shall be responsible for

obtaining licences from the Third Party in line with the requirements of the Statement of Work (including numbers and locations of licences).

- 30.4.4 Where Third Party IPR is the subject of a licence or other agreement between the third party and the Purchaser or the Contractor, the Contractor shall not use any Third Party IPR for the purposes of carrying out work pursuant to the Contract without the prior written approval of the Purchaser. Contractor shall inform Purchaser in advance of any restrictions on the Purchaser's use.
- 30.4.5 If, after the award of the Contract, the Contractor becomes aware of the existence of any Third Party IPR which the Contractor is using or believes is needed for the performance of the Contract, the Contractor shall immediately give the Purchaser a written report identifying such IPR and if they are compliant with the other provisions in the contract. Any Third Party IPR under this clause is subject to the prior written approval by the Purchaser.
- 30.4.6 The Purchaser may consider open source solutions alongside proprietary ones in developments provided that such solutions are fully compliant with the requirements of this Contract. Contractor shall disclose in advance the open source license associated with the contemplated open source solution. The Purchaser reserves the right to refuse the incorporation of open source solutions that are deemed inadequate for incorporation in a NATO application (e.g. post-back obligations).

30.5 Subcontractor IPR

- 30.5.1 When placing a Sub-contract which is concerned with or involves the creation of IPR, the Contractor shall ensure that the Sub-contractor enters into the same agreement for the use of the IPR as stipulated in this Contract in such a way that the Purchaser will be entitled to use the IPR as agreed between the Purchaser and the Contractor. The Contractor shall include in the Sub-contract the content of the provisions of this Clause.

31. SOFTWARE WARRANTY

31.1 Statement of the Warranties

- 31.1.1 The Contractor warrants that each Software delivered under this Contract will conform to all requirements specified in the Contract.

This will also include Software design specifications, including software configuration.

- 31.1.2 Regardless of the Purchaser initiation of or participation in developing Software design or specifications, each Software delivered under this Contract will conform to the essential Performance requirements set forth in this Contract, as those essential Performance requirements measured, tested, and verified by tests and procedures set forth in this Contract.

31.2 Notification Requirement

- 31.2.1 The Contractor agrees to notify the Purchaser in writing immediately after he first discovers that a defect(s) may exist in Software delivered under this Contract, unless the Purchaser has first notified the Contractor, in writing, of the same defect(s).

- 31.2.2 The Purchaser shall notify the Contractor upon discovery that a defect(s) may exist in any Software accepted by the Purchaser under this Contract, unless the Contractor has first notified the Purchaser, in writing of the same defect(s).

31.3 Duration of the Warranty

- 31.3.1 For each Software delivered under this Contract, the Contractor Warranties stated in paragraph 31.1 above shall extend to all defects discovered within 12 months from the date of acceptance of the Software by the Purchaser.

31.4 Purchaser Remedies for Breach

- 31.4.1 The rights and remedies of the Purchaser under this Software Warranty:

- 31.4.2 Are in addition to any rights and remedies of the Purchaser under any other provision of this Contract, including, but not limited to, the Purchaser's rights in relation to latent defects, fraud, or gross mistakes that amount to fraud; and

- 31.4.3 Shall apply notwithstanding inspection, acceptance, or any other clauses or terms of this Contract;

- 31.4.4 In the event of any defect as defined herein with respect to a Software delivered under this Contract, the Purchaser, in its sole discretion may:

- 31.4.4.1 Require the Contractor to take such action as may be necessary to eliminate the defect, at no

additional cost to the Purchaser for materials, labour, transportation, or otherwise;

31.4.4.2 Require the Contractor to supply, at no additional cost to the Purchaser, all materials and instructions necessary for the Purchaser to eliminate the defect and to pay costs reasonably incurred by the Purchaser in taking such action as may be necessary to eliminate the defect, or;

31.4.4.3 Equitably reduce the contract price

31.4.5 The Purchaser may elect the remedies provided in paragraph 31.4.4.1 or 31.4.4.2 above notwithstanding any dispute respecting the existence of or responsibility for any alleged defect as defined herein with respect to any Software delivered under this contract, provided that the Contractor will not be required to pay costs incurred by the Purchaser under paragraph 31.4.4.2 until final determination of the defect. In the event that the alleged defect is subsequently determined not to be a defect subject to this warranty but the Contractor has incurred costs under paragraph 31.4.4.1 and 31.4.4.2 as required by the Contract by virtue of this paragraph 31.4.3, the contract price under this contract shall be equitably adjusted.

31.4.6 Election by the Purchaser of the remedy provided under paragraph 31.4.4.1 and 31.4.4.2 above shall not preclude subsequent election of a different remedy under paragraph 31.4.4 if the defect is not successfully eliminated under the prior election with one month of the notification under paragraph 31.4.2 above.

31.5 Limitations and Exclusions from Warranty Coverage

31.5.1 This Software Warranty shall not apply to alleged defects that the Contractor demonstrates to be in or otherwise attributable to the Purchaser furnished property as determined, tested, and verified by the tests and procedures set forth in this Contract. Notwithstanding this paragraph, a defect is not attributable to Purchaser furnished property if it is the result of installation or modification of Purchaser furnished property by the Contractor or of the integration of Purchaser furnished property into any Software delivered under this Contract.

31.5.2 Any Purchaser Furnished Property needs to be checked and approved by the Contractor. Approval is implied once the Contractor starts using the Purchaser Furnished Property.

31.6 Markings

- 31.6.1 All Deliverables under this Contract will identify the owner of the Deliverable and if applicable, will prominently include notice of the existence of its warranty, its substance, its duration, and instructions to notify the Purchaser promptly if the Software is found to be defective. The markings should also be included in the operating and/or maintenance manuals or instructions accompanying such Software.
- 31.6.2 All Deliverables regardless of the media they are delivered onto and which are subject to export control restrictions shall be clearly marked indicating the type and nature of restriction as well as the national law imposing such restrictions. Nothing in this provision is intended to invalidate, void, or otherwise limit the rights of the Purchaser under this Contract.

32. NATO CODIFICATION

- 32.1 For the purposes of this Clause "Technical Data" means the drawings, specifications and technical documentation of those items designated by the Purchaser to support the equipment covered by the Contract, and required to fully identify the items and, if applicable, draft item identifications to the extent and in the form to be agreed between the Codification Authority and the Contractor.
- 32.2 In order to ensure the orderly identification of equipment, the Contractor shall furnish at the request of the Codification Authority the Technical Data required for the identification of the items of supply to the NATO codification system in the time scale stated in this Contract.
- 32.3 A recommended spare parts list or a similar data carrier prepared in accordance with instructions provided by the Purchaser as the basis for codification shall be supplied by the Contractor by the date established in this Contract.
- 32.4 The Contractor shall supply or require his Sub-contractor(s)/supplier(s) to supply on request for the period of time specified in the Contract the relevant Technical Data for all items and sub-contracted items to the Codification Authority and the Purchaser. The Contractor shall require that each Sub-contractor/supplier shall include identical conditions in any subsequent order which he may place.
- 32.5 The drawings, specifications, related documentation and, if applicable, draft

item identifications, prepared when possible by the true manufacturer of the item, shall be supplied by the Contractor or his Sub-contractor(s)/supplier(s) direct to the Codification Authority and, if required, to the Purchaser as and when they become available or, at the latest within the time limits specified in the Contract. The Contractor shall inform the Codification Authority and Purchaser within 21 Days of receipt of the request if the required Technical Data are not immediately available, and shall impose a similar obligation upon his Sub-contractor(s)/supplier(s).

- 32.6 Except as hereinafter provided, the Contractor shall require the Sub-contractor(s)/supplier(s) to furnish on request the information direct to the Codification Authority in the Sub-contractor(s)/supplier(s)' country, but the Contractor shall remain responsible for ensuring that the information is so furnished. In the event of a Sub-contract order being placed with a manufacturer in a non-NATO country, the Contractor shall be responsible for obtaining Technical Data from the Sub-contractor/supplier and furnishing it to the Purchaser.
- 32.7 Technical Data relating to any Sub-contractor's/supplier's items shall include but not be limited to the name and address of the true manufacturer(s), his/their true reference number(s), drawing or item Part number(s) and applicable data in addition to any Part or reference number(s) allocated by the Contractor, plus draft item identification(s) if required by the Codification Authority.
- 32.8 The Contractor shall provide the Technical Data required for codification of those items ordered with this Contract and also for the pertaining support items ordered with future contracts, including updating information regarding all agreed modifications, design or drawing changes made to the equipment or detailed Parts.
- 32.9 If the Contractor has previously supplied Technical Data (for the purpose stated in Clause 31.2), the Contractor is to state this fact and indicate to whom they were supplied and the Contractor shall not under normal circumstances be required to make a further supply of the Technical Data already provided. The Technical Data furnished by the Contractor and Sub-contractor(s)/supplier(s) are to be presented in accordance with the requirements for the preparation of item identification(s) as outlined in the Guide for Industry provided by the Codification Authority.
- 32.10 The Contractor should contact the Codification Authority for any information concerning the NATO codification system. This information is to be found at: "http://www.nato.int/structur/ac/135/ncs_guide/e_guide.htm"

32.11 Markings

- 32.11.1 All Deliverables under this Contract will identify the owner of the Deliverable and, if applicable, will prominently include notice of the existence of its warranty, its substance, its duration, and instructions to notify the Purchaser promptly if the Software is found to be defective. The markings should also be included in the operating and/or maintenance manuals or instructions accompanying such Software.
- 32.11.2 All Deliverables regardless of the media they are delivered onto and which are subject to export control restrictions shall be clearly marked indicating the type and nature of restriction as well as the national law imposing such restrictions. Nothing in this provision is intended to invalidate, void, or otherwise limit the rights of the Purchaser under this Contract.

33. RELEASE FROM CLAIMS

- 33.1 Prior to final payment under this Contract, the Contractor and each assignee under this Contract shall execute and deliver a release discharging the Purchaser, its officers, agents and employees from all liabilities, obligations and claims arising out of or under this Contract subject only to the following exceptions:
- 33.1.1 specified claims in stated amounts or in estimated amounts where the amounts are not susceptible to exact statement by the Contractor;
- 33.1.2 claims for reimbursement of costs (other than expenses of the Contractor by reason of his indemnification of the Purchaser against patent liability) including reasonable expenses incidental thereto, incurred by the Contractor under the provisions of this Contract relating to patents.
- 33.1.3 a patent infringement resulting from specific written instructions from the Purchaser under this Contract.
- 33.1.4 a patent infringement resulting from changes or additions to the goods and services subsequent to final delivery and acceptance under this Contract.

34. ASSIGNMENT OF CONTRACT

- 34.1 The Purchaser reserves the right to assign this Contract, in whole or in part, to another NATO body, agency or representative within NATO or NATO Nations.

In such a case, the Purchaser shall notify the Contractor accordingly in writing.

- 34.2 NATO shall remain responsible for its obligations under the Contract and for the actions of the body, agency or representative to which this Contract may be assigned.

35. TRANSFER AND SUB-LETTING

- 35.1 The Contractor shall not give, bargain, sell, assign, sub-let or otherwise dispose of the Contract or any part thereof or the benefit or advantage of the Contract or any part thereof without the prior written consent of the Purchaser.

36. PURCHASER DELAY OF WORK

- 36.1 If the performance of all or any part of the Work is delayed or interrupted by an act of the Purchaser in the administration of this Contract, which act is not expressly or implicitly authorised by this Contract, or by the Purchaser's failure to act within the time specified in this Contract (or within a reasonable time if no time is specified), an adjustment shall be made for any increase in the cost of performance of this Contract caused by such delay or interruption and the Contract modified in writing accordingly.

- 36.2 Adjustment shall be made also in the delivery or performance dates and any other contractual provision affected by such delay or interruption. However, no adjustment shall be made under this Clause for any delay or interruption:

36.2.1 to the extent that performance would have been delayed or interrupted by any other cause, including the fault or negligence of the Contractor; or

36.2.2 for which an adjustment is provided or excluded under any other provision of this Contract.

- 36.3 No claim under this Clause shall be allowed:

36.3.1 if the Contractor has failed to notify the Purchaser in writing of the act or failure to act, indicating that this act or failure to act will result in a delay or increased costs;

36.3.2 for any costs incurred more than twenty (20) Days before the Contractor shall have notified the Purchaser in writing of the act or failure to act involved; and

36.3.3 unless the monetary claim, in an amount stated, is asserted in writing as soon as practicable after the termination of such delay or interruption, but not later than the date of final payment under the Contract.

37. CONTRACTOR NOTICE OF DELAY

- 37.1 In the event that the Contractor encounters difficulty in complying with the Contract schedule date(s) for whatever reason, including actual or potential labour disputes, the Contractor shall immediately notify the Contracting Authority in writing, giving pertinent details. This data shall be deemed to be informational in character and shall not be construed as a waiver by the Purchaser of any schedule or date, or of any rights or remedies provided by law or under this Contract.
- 37.2 Notwithstanding the above the Contractor shall be deemed to be in delay without notice from the Purchaser and only by simple expiry of the due date.

38. LIQUIDATED DAMAGES

- 38.1 If the Contractor:
- 38.1.1 fails to meet the delivery schedule of the Work or any performance milestones specified in the Schedule of Work to this Contract, or any extension thereof, or
 - 38.1.2 fails to obtain acceptance of the delivered Work as specified in the Contract, or, if no time for acceptance is specified in the contract within a reasonable time after work is delivered.
- 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, for each day of delinquency in achieving the deadline or milestone, fixed and agreed liquidated damages of .1% (one tenth of per cent) per day of the associated payment set forth in the Schedule of Payments provided in the Contract Special Provisions. If no Schedule of Payments is specifically set forth in the Contract Special Provisions, the liquidated damages will be assessed against the price of the applicable contract line item (CLIN) of the Schedule of Supplies, Services and Prices.
- 38.2 In addition to the liquidated damages referred to above, the Purchaser shall have the possibility of terminating this Contract in whole or in part, as provided in Clause 39 (Termination for Default). In the event of such termination, the Contractor shall be liable to pay the excess costs provided in Clause 38.5.
- 38.3 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 Clause 39.6 (Termination for Default). In such event, subject to the provisions of Clause 41 (Disputes), 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 the fact justify an extension.
- 38.4 Liquidated damages shall be payable to the Purchaser from the first day of

delinquency and shall accrue at the rate specified in Clause 38.1 to 20% of the value of each line item individually not to exceed 15% of the value of the total Contract. These liquidated damages shall accrue automatically and without any further notice being required.

- 38.5 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.

39. TERMINATION FOR DEFAULT

- 39.1 The Purchaser may, subject to Clause 39.6 below, by written notice of default to the Contractor, terminate the whole or any part of this Contract if the Contractor, inclusive but not limited to:

- 39.1.1 fails to make delivery of all or part of the Work within the time specified in the contract or any agreed extension thereof;
- 39.1.2 fails to make progress as to endanger performance of this Contract in accordance with its terms;
- 39.1.3 fails to meet the technical requirements or the Specifications of the Contract;
- 39.1.4 fails to comply with Clause 11 (Security);
- 39.1.5 transfer this Contract without the Purchaser's prior written consent; or,
- 39.1.6 breaches any provision of this Contract.

- 39.2 In the case of any of the circumstances set forth in Clause 39.1 above, the Purchaser shall issue a letter to the Contractor stating that an actual or potential default exists and requiring a response from the Contractor within ten (10) Days that identifies:

- 39.2.1 in the case of late delivery of Work, when the Contractor shall deliver the Work and what circumstances exist which may be considered excusable delays under Clause 39.6.
- 39.2.2 in the case of the other circumstances identified in Clause 39.1 above, what steps the Contractor is taking to cure such failure(s) within a period of ten Days (or such longer period as the Purchaser may authorize in writing) after receipt of notice in writing from the Purchaser specifying such failure and identifying any circumstances which exist

which may be considered excusable under Clause 39.6.

- 39.3 The Purchaser shall evaluate the response provided by the Contractor or, in the absence of a reply within the time period mentioned in Clause 39.2, all relevant elements of the case, and make a written determination within a reasonable period of time that:
- 39.3.1 sufficient grounds exist to terminate the Contract in whole or in part in accordance with this Clause and that the Contract is so terminated;
 - 39.3.2 there are mitigating circumstances and the Contract should be amended accordingly; or
 - 39.3.3 the Purchaser will enter a period of forbearance in which the Contractor must show progress, make deliveries, or comply with the Contract provisions as specified by the Purchaser. The Purchaser may apply other remedial actions as provided by this Contract during such period of forbearance. This period of forbearance shall in no event constitute a waiver of Purchaser's rights to terminate the Contract for default.
- 39.4 At the end of the period of forbearance, which may be extended at the Purchaser's discretion, the Purchaser may terminate this Contract in whole or in part as provided in Clause 39.1 if the Contractor has not made adequate progress, deliveries or compliance with the Contract provisions which were the terms of the period of forbearance.
- 39.5 In the event the Purchaser terminates this Contract in whole or in part, as provided in Clause 39.1, the Purchaser may procure, upon such terms and in such manner as the Purchaser may deem appropriate, Work similar to those so terminated, and the Contractor shall be liable to the Purchaser for any excess costs for such similar Work; however, the Contractor shall continue the performance of this Contract to the extent not terminated under the provisions of this clause.
- 39.6 Except with respect to the default of Sub-contractors, the Contractor shall not be held liable for a termination of the Contract for default if the failure to perform the Contract arises out of causes beyond the control and without the fault or negligence of the Contractor.
- 39.6.1 Such causes may include, but are not restricted to, acts of God, acts of the public enemy, acts of the Purchaser in its contractual capacity, acts of sovereign governments which the Contractor could not reasonably have anticipated, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather; but in

every case the failure to perform must be beyond the control and without the fault or negligence of the Contractor.

39.6.2 If the failure to perform is caused by the default of a Sub-contractor, and if such default arises out of causes beyond the control of both the Contractor and Sub-contractor, without the fault or negligence of either of them, the Contractor shall not be held liable for a termination for default for failure to perform unless the Work to be furnished by the Sub-contractor were obtainable from other sources in sufficient time to permit the Contractor to meet the required delivery schedule.

39.7 If this Contract is terminated as provided in Clause 39.1, the Purchaser, in addition to any other rights provided in this Clause and the Contract, may require the Contractor to transfer title and deliver to the Purchaser, in the manner and to the extent directed by the Purchaser:

39.7.1 any completed Work with associated rights ;

39.7.2 such partially completed Work, materials, Parts, tools, dies, jigs, fixtures, plans, drawings, information, and Contract rights (hereinafter called "Manufacturing materials") with associated rights as the Contractor has specifically produced or specifically acquired for the performance of such part of this Contract as has been terminated;

39.8 In addition to Clause 39.7, the Contractor shall, upon direction of the Purchaser, protect and preserve property in the possession of the Contractor in which the Purchaser has an interest.

39.9 Payment for completed Work delivered to and accepted by the Purchaser shall be at the Contract price.

39.10 Payment for manufacturing materials delivered to and accepted by the Purchaser and for the protection and preservation of property shall be in an amount agreed upon by the Contractor and Purchaser, failure to agree to such amount shall be a dispute within the meaning of Clause 41 (Disputes).

39.11 The Purchaser may withhold from amounts otherwise due to the Contractor for such completed Work or manufacturing materials such sum as the Purchaser determines to be necessary to protect the Purchaser against loss because of outstanding liens or claims of former lien holders.

39.12 If, after notice of termination of this Contract under the provisions of this Clause, it is determined for any reason that the Contractor was not in default under the

provisions of this Clause, or that the default was excusable under the provisions of this Clause, the rights and obligations of the Parties shall be the same as if the notice of termination had been issued pursuant to Clause 40 (Termination for the Convenience of the Purchaser).

- 39.13 If after such notice of termination of this Contract under the provisions of this Clause, it is determined for any reason that the Contractor was not in default under the provisions of this Clause and that the Parties agree that the Contract should be continued, the Contract shall be equitably adjusted to compensate for such termination and the Contract modified accordingly. Failure to agree to any such adjustment shall be a dispute within the meaning of Clause 41 (Disputes).
- 39.14 The rights and remedies of the Purchaser provided in this Clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this Contract.

40. TERMINATION FOR THE CONVENIENCE OF THE PURCHASER

- 40.1 The performance of Work under this Contract may be terminated by the Purchaser in accordance with this Clause in whole, or from time to time in part, whenever the Purchaser shall determine that such termination is in the best interest of the Purchaser.
- 40.2 Any such termination shall be effected by delivery to the Contractor of a written notice of termination, signed by the Contracting Authority, specifying the extent to which performance of Work under the Contract is terminated, and the date upon which such termination becomes effective.
- 40.3 After receipt of a Notice of Termination and except as otherwise directed by the Contracting Authority, the Contractor shall:
- 40.3.1 stop the Work on the date and to the extent specified in the notice of termination;
 - 40.3.2 place no further orders or Sub-contracts for Work, Parts, materials, services or facilities, except as may be necessary for completion of such portion of the Work under the Contract as is not terminated;
 - 40.3.3 terminate all orders and Sub-contracts to the extent that they relate to the performance of Work terminated by the Notice of Termination;
 - 40.3.4 assign to the Purchaser, in the manner, at the times and to the extent directed by the Purchaser, all of the right, title and interest of the Contractor under the orders and Sub-contracts so

terminated, in which case the Purchaser shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and Sub-contracts;

- 40.3.5 settle all outstanding liabilities and all claims arising out of such termination of orders and Sub-contracts, with the approval or ratification of the Purchaser to the extent he may require, which approval or ratification shall be final for all the purposes of this Clause;
- 40.3.6 transfer title and deliver to the Purchaser in the manner, at the times, and to the extent, if any, directed by the Contracting Authority of:
 - 40.3.6.1 the fabricated parts, work in process, completed work, Work, and other material produced as a part of, or acquired in connection with the performance of the Work terminated by the notice of termination, and
 - 40.3.6.2 the completed or partially completed plans, drawings, information, and other property which, if the Contract had been completed, would have been required to be furnished to the Purchaser;
- 40.3.7 use his best efforts to sell, in the manner, at the times, to the extent, and at the price or prices directed or authorised by the Contracting Authority, any property of the types referred to in Clause 40.3.6 above. However, the Contractor:
 - 40.3.7.1 shall not be required to extend credit to any Buyer; and
 - 40.3.7.2 may acquire any such property under the conditions prescribed by and at a price or prices approved by the Purchaser; and provided further that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the Purchaser to the Contractor under this Contract or shall otherwise be credited to the price or cost of the Work or paid in such manner as the Contracting Authority may direct;

- 40.3.8 complete performance of such part of the Work as shall not have been terminated by the Notice of Termination; and
- 40.3.9 take such action as may be necessary, or as the Purchaser may direct, for the protection and preservation of the property related to this Contract which is in the possession of the Contractor and in which the Purchaser has or may acquire an interest.
- 40.4 The Contractor may submit to the Purchaser a list, certified as to quantity and quality, of any or all items of termination inventory not previously disposed of, exclusive of items the disposition of which has been directed or authorized by the Purchaser, and may request the Purchaser to remove such items or enter into a storage agreement covering the same; provided that the list submitted shall be subject to verification by the Purchaser upon removal of the items, or if the items are stored, within forty-five (45) Days from the date of submission of the list, and any necessary adjustment to correct the list as submitted shall be made prior to final settlement.
- 40.5 After receipt of a notice of termination, the Contractor shall submit to the Purchaser his termination Claim for the Work covered by the notice of termination, in the form and with certification prescribed by the Purchaser. Such claim shall be submitted promptly but in no event later than six (6) months from the effective date of termination, unless one or more extensions are granted in writing by the Purchaser, upon request of the Contractor made in writing within such six-month period or authorized extension thereof. However, if the Purchaser determines that the facts justify such action, the Purchaser may receive and act upon any such termination claim at any time after such six-month period or any extension thereof. Upon failure of the Contractor to submit his termination claim within the time allowed, the Purchaser may determine on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.
- 40.6 Subject to the provisions of Clause 40.5, the Contractor and the Purchaser may agree upon the whole or any part of the amount or amounts to be paid to the Contractor by reason of the total or partial termination of Work pursuant to this Clause, which amount or amounts may include a reasonable allowance for profit on work done; provided that such agreed amount or amounts exclusive of settlement costs shall not exceed total Contract price as reduced by the amount of payments otherwise made and as further reduced by the Contract price of the Work not terminated. The Contract shall be amended accordingly and the Contractor shall be paid the amount agreed.
- 40.7 In the event of the failure of the Contractor and the Purchaser to agree as provided in Clause 40.6 upon the whole amount to be paid to the Contractor by reason of the termination of Work pursuant to Clause 40, the Purchaser shall

pay to the Contractor the amounts determined by the Purchaser as follows, but without duplication of any amounts agreed upon in accordance with Clause 40.6 the total of:

- 40.7.1 for completed Work accepted by the Purchaser (or sold or acquired as provided in Clause 40.3 above) and not therefore paid for, a sum equivalent to the aggregate price for such Work computed in accordance with the price or prices specified in the Contract, appropriately adjusted for any saving of freight or other charges;
- 40.7.2 the costs incurred in the performance of the Work terminated including initial costs and preparatory expense allocable thereto, but exclusive of any costs attributable to Work paid or to be paid for under Clause 40.7.1;
- 40.7.3 the cost of settling and paying claims arising out of the termination of work under Sub-contracts or orders, as provided in Clause 40.3.5, which are properly chargeable to the terminated portion of the Contract, exclusive of amounts paid or payable on account of Work or materials delivered or services furnished by Sub-contractors or vendors prior to the effective date of the notice of termination, which amounts shall be included in the costs payable under Clause 40.7.2; and
- 40.7.4 a sum, as profit on Clause 40.7.1 above, determined by the Purchaser to be fair and reasonable; provided, however, that if it appears that the Contractor would have sustained a loss on the entire Contract, had it been completed, no profit shall be included or allowed and an appropriate adjustment shall be made reducing the amount of the settlement to reflect the indicated rate of loss; and
- 40.7.5 the reasonable costs of settlement, including accounting, legal, clerical and other expenses reasonably necessary for the preparation of settlement claims and supporting data with respect to the terminated portion of the Contract and for the termination and settlement of Sub-contracts there under, together with reasonable storage, transportation, and other costs incurred in connection with the protection, or disposition of property allocable to this Contract.

40.8 The total sum to be paid to the Contractor under Clause 40.7 shall not exceed

the total Contract price as reduced by the amount of payments otherwise made and as further reduced by the Contract price of Work not terminated.

- 40.9 Except for normal spoilage, and except to the extent that the Purchaser shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor, as provided in Clause 40.7 above, the fair value, as determined by the Purchaser, of property which is destroyed, lost, stolen, or damaged so as to become undeliverable to the Purchaser, or to a buyer pursuant to Clause 40.3.7 above.
- 40.10 The Contractor shall have the right to dispute, under the Clause 41 (Disputes), any determination made by the Purchaser under Clauses 40.5 and 40.7, except that if the Contractor has failed to submit his claim within the time provided in Clause 40.5 and has failed to request extension of such time, the Contractor shall be foreclosed from his right to dispute said determination. In any case where the Purchaser has made a determination of the amount due under Clauses 40.5 and 40.7, the Purchaser shall pay the Contractor the following:
- 40.10.1 if there is no right of appeal hereunder or if no timely appeal has been taken, the amount so determined by the Purchaser, or
- 40.10.2 if an appeal has been taken, the amount finally determined on such appeal.
- 40.11 In arriving at the amount due to the Contractor under this Clause there shall be deducted:
- 40.11.1 all unliquidated advance or other payments on account theretofore made to the Contractor, applicable to the terminated portion of this Contract;
- 40.11.2 any claim which the Purchaser may have against the Contractor in connection with this Contract; and
- 40.11.3 the agreed price for, or the proceeds of the sale of, any materials, Work, or other things acquired by the Contractor or sold, pursuant to the provisions of this Clause, and not otherwise recovered by or credited to the Purchaser.
- 40.12 If the termination hereunder is partial, prior to the settlement of the terminated portion of this Contract, the Contractor may file with the Purchaser, in accordance with Clause 16 (Changes), a request in writing for an equitable adjustment of the price or prices relating to the continued portion of the Contract (the portion not terminated by the notice of termination), and such equitable adjustment as may be agreed upon shall be made in such price or prices.

- 40.13 The Purchaser may from time to time, under such terms and conditions as it may prescribe, make partial payments and payments on account against costs incurred by the Contractor in connection with the terminated portion of this Contract whenever in the opinion of the Purchaser the aggregate of such payments shall be within the amount to which the Contractor will be entitled hereunder. If the total of such payment is in excess of the amount finally agreed or determined to be due under this Clause, such excess shall be payable by the Contractor to the Purchaser upon demand, together with interest calculated using the average of the official base rate(s) per annum of the deposit facility rate as notified by the European Central Bank or such other official source as may be determined by the Purchaser, for the period from the date the excess is received by the Contractor to the date such excess is repaid to the Purchaser, provided, however, that no interest shall be charged with respect to any such excess payment attributed to a reduction in the Contractor's claim by reason of retention or other disposition of termination inventory until ten days after the date of such retention or disposition or such later date as determined by the Purchaser by reason of the circumstances.
- 40.14 Unless otherwise provided for in this Contract, the Contractor, from the effective date of termination and for a period of three years after final settlement under this Contract, shall preserve and make available to the Purchaser at all reasonable times at the office of the Contractor, but without direct charge to the Purchaser, all his books, records, documents, computer files and other evidence bearing on the costs and expenses of the Contractor under this Contract and relating to the work terminated hereunder, or, to the extent approved by the Purchaser, photographs, micro-photographs, or other authentic reproductions thereof.

41. DISPUTES

- 41.1 Except to the extent to which special provision is made elsewhere in the Contract, all disputes, differences or questions which are not disposed of by agreement between the Parties to the Contract with respect to any matter arising out of or relating to the Contract, other than a matter as to which the decision of the Contracting Authority under the Contract is said to be final and conclusive, shall be decided by the Contracting Authority. The Contracting Authority shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Contractor.
- 41.2 The Contracting Authority shall not proceed with the evaluation and decision in respect of any claim until and unless the Contractor has submitted the attestation as foreseen in Clause 18 (Claims), as well as the complete proof and evidence of the claim (either by submission or by identification of the relevant documentation).
- 41.3 The Contracting Authority's decision shall be final and conclusive unless, within 30 Days from the date of receipt of such copy, the Contractor mails or otherwise

furnishes to the Contracting Authority his decision to open arbitration proceedings in accordance with the Clause 42 (Arbitration). The burden of proof for both receipt and delivery of such documentation shall be by signed and dated registered mail receipt or by hand receipt as acknowledged and signed by the Contracting Authority.

- 41.4 Pending final decision of a dispute, the Contractor shall proceed diligently with the performance of the Contract, unless otherwise instructed by the Contracting Authority.

42. ARBITRATION

- 42.1 Within a period of thirty days from the date of receipt of the notification referred to in Clause 41.3 above, the Parties shall jointly appoint an arbitrator. In the event of failure to appoint an arbitrator, the dispute or disputes shall be submitted to an Arbitration Tribunal consisting of three arbitrators, one being appointed by the Purchaser, another by the other contracting party and the third, who shall act as President of the Tribunal, by these two arbitrators. Should one of the Parties fail to appoint an arbitrator during the fifteen days following the expiration of the first period of thirty days, or should the two arbitrators be unable to agree on the choice of the third member of the Arbitration Tribunal within thirty days following the expiration of the said first period, the appointment shall be made, within twenty-one days, at the request of the Party instituting the proceedings, by the Secretary General of the Permanent Court of Arbitration at The Hague.
- 42.2 Regardless of the procedure concerning the appointment of this Arbitration Tribunal, the third arbitrator will have to be of a nationality different from the nationality of the other two members of the Tribunal.
- 42.3 Any arbitrator must be of the nationality of any one of the member states of NATO and shall be bound by the rules of security in force within NATO.
- 42.4 Any person appearing before the Arbitration Tribunal in the capacity of an expert witness shall, if he is of the nationality of one of the member states of NATO, be bound by the rules of security in force within NATO. If he is of another nationality, no NATO classified documents or information shall be communicated to him.
- 42.5 An arbitrator, who, for any reason whatsoever, ceases to act as an arbitrator, shall be replaced under the procedure laid down in Clause 42.1 above.
- 42.6 The Contractor agrees to submit to the Arbitration Tribunal only such issues, facts, evidence and proof which the Contractor had beforehand identified and submitted to the Contracting Authority for decision in accordance with Clause 41 (Disputes). The jurisdictional authority of the Arbitration Tribunal shall be restricted to consider only those identical issues, facts, evidence and proof so

identified and submitted to the Contracting Authority.

- 42.7 The Purchaser likewise agrees to restrict its submissions only to the information on which the Contracting Authority based its decision and not to introduce new information and arguments which cannot reasonably be deduced or inferred from the written decision of the Contracting Authority in response to the original dispute.
- 42.8 The Arbitration Tribunal will take its decisions by a majority vote. It shall decide where it will meet and, unless it decides otherwise, shall follow the arbitration procedures of the International Chamber of Commerce in force at the date of signature of the present Contract.
- 42.9 The awards of the arbitrator or of the Arbitration Tribunal shall be final and there shall be no right of appeal or recourse of any kind. These awards shall determine the apportionment of the arbitration expenses.
- 42.10 Pending final decision of a dispute, the Contractor shall proceed diligently with the performance of the Contract, unless otherwise instructed by the Contracting Authority.

43. SEVERABILITY

- 43.1 If one or more of the provisions of this Contract is declared to be invalid, illegal or unenforceable in any respect under any applicable law, the validity, legality and enforceability of the remaining provisions shall not be affected. Each of the Parties shall use its best efforts to immediately and in good faith negotiate a legally valid replacement provision.

44. APPLICABLE LAW

- 44.1 This Contract shall be governed, interpreted and construed in accordance with the private contract law of the Kingdom of Belgium.

* *

ANNEX 1 TO GENERAL PROVISIONS: PURCHASER'S PRICING PRINCIPLESA. General

1. With regard to all actions included in Clause 19," Pricing of Changes, Amendments and Claims", the Parties agree that the Purchaser's Pricing Principles contained herein shall govern.
2. As may be requested by the Purchaser, the Contractor shall provide documentation that the standards or principles employed in the submission of cost or pricing data are in conformance with governing national policies and regulation. The Contractor, when submitting a price proposal based upon national standards and regulations, shall provide a point of contact within the national body governing such standards and regulations in order to allow Purchaser verification and audit.
3. Where such conformance cannot be demonstrated to the satisfaction of the Purchaser, the Purchaser's Pricing Principles will govern.
4. The Contractor shall clearly state whether national standards and rules or the Purchaser's Pricing Principles and formats are the basis for the price proposal.
5. Whether national standards or Purchaser pricing principles are applied, all cost and pricing data shall be verifiable, factual and include information reasonably required to explain the estimating process.
6. The Contractor shall also incorporate provisions corresponding to those mentioned herein in all sub-contracts, and shall require price and cost analysis provisions be included therein.

B. Purchaser's Pricing Principles

1. Allowable cost

A cost is allowable for consideration by the Purchaser if the following conditions are fulfilled:

- (a) it is incurred specifically for the Contract or benefits both the Contract and other work or is necessary to the overall operation of the business although a direct relationship to any particular product or service cannot be established and is allocated to them in respective proportion according to the benefit received;

- i. Direct Costs

A direct cost is any cost which can be identified specifically with a particular cost objective as generally accepted. Direct costs are not limited to items which are incorporated in the end product as material or labour.

- ii. Indirect Costs

An indirect cost is one which is not readily subject to treatment as a direct cost. When presented these costs shall be accumulated in logical cost groupings in accordance with sound accounting principles and the Contractor's established practices. An indirect cost may be allocated to more than one final cost objective. An indirect cost shall not be allocated to a final cost objective if other costs incurred for the same purpose, in like circumstances, have been included as a direct cost of that or any other final cost objective. Such costs shall be presented as overhead rates and be applied to each related direct cost grouping.

- (b) The Contractor shall specify the allocation of costs to either of the cost groupings. The method by which costs are accumulated and distributed as part of direct or indirect costs cannot be modified during the duration of the Contract.
- (c) It is reasonable and expedient in its nature and amount and does not exceed that which would be incurred by an ordinary prudent person in the conduct of competitive business;
- (d) It is not liable to any limitations or exclusion as to types or amounts of cost items as set forth herein.
- (e) The Purchaser will review other costs presented against the contract and will determine if they would be allowable.

2. Unallowable Costs

In general all costs which cannot be shown by the contractor to be directly or indirectly of benefit to the Contract are totally unallowable. Examples of such costs are, among others:

- (a) Advertising costs
- (b) Costs of remuneration, having the nature of profit sharing.
- (c) Costs of maintaining, repairing and housing idle and excess facilities.
- (d) Fines and penalties as well as legal and administrative expenses resulting from a violation of laws and regulations.
- (e) Losses on other contracts or on expected follow-on contracts
- (f) Costs incurred for the creation of reserves for general contingencies or other reserves (e.g. for bad debts, including losses).
- (g) Losses on bad debts, including legal expenses and collection costs in connection with bad debts.
- (h) Costs incurred to raise capital.

- (i) Gains and losses of any nature arising from the sale or exchange of capital assets other than depreciable property.
- (j) Taxes on profits.
- (k) Contractual penalties incurred.
- (l) Commissions and gratuities.
- (m) Interest on borrowings.

3. Rates and Factors

- (a) The Contractor shall inform the Purchaser of his rates and factors the basis upon which they were computed.
- (b) If the Contractor's rates and factors for similar contracts placed with national or international public services have not been established or approved by a government agency or an agency accepted by his government, the Contractor shall provide the necessary data to support the proposed rates.
- (c) The term "provisional " used in the title of a rate or factor means a tentative rate established for interim billing purposes pending negotiation and agreement to the final rate or factor.
- (d) A rate or factor is pre-determined if it is fixed before or during a certain period and based on (estimated) costs to be incurred during this period. A rate or factor is post-determined if it is fixed after a certain period and based on costs actually incurred during this period. Pre-determined rates or factors shall be agreed upon as final rates whenever possible; otherwise the provisions of paragraph 3c above shall apply pending agreement to post-determined rates or factors.
- (e) Such rates or factors shall be determined on the basis of Contractor's properly supported actual cost experience.
- (f) If the rates or factors of the Contractor for similar contracts placed by national or international public services have been established or approved by a government agency or an agency accepted by his government and the Contractor proposes the application of these rates, he shall state the name and address of the agency which has accepted or approved the rates and the period for which they were established. If he proposes rates which vary from the rates mentioned above, he shall furthermore provide a justification for the difference.

4. Profit/Benefit

- (a) Over the entire life cycle of a given acquisition, Profit and/or Benefit may be subject to negotiation.
- (b) Subcontracting profit/benefit amounts are dependent upon the size, nature and oversight needs of the subcontract(s) the prime contractor will use for work performance period.
- (c) Profit/benefit is considered by the Purchaser to be directly related to the anticipated risk of the Contractor during the performance of the Contract.



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

**PROVIDE AIR AND MISSILE DEFENSE (AMD) SIMULATION
SYSTEM WITHIN BALLISTIC MISSILE DEFENCE (BMD) FUNCTIONS
IN EDUCATION, TRAINING, EXERCISE AND EVALUATION (ETEE)
FUNCTIONAL SERVICES (FS)**

IFB-CO-115113-ETEE AMD SIM

BOOK II – PART IV
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..... 7

 1.4. High-level Contract Objectives..... 7

 1.5. Contract Requirements 10

2. Task 1: Project Management..... 10

 2.1. Scope 10

 2.2. Project Management Start Date and Schedule 11

 2.3. Project Management Key Personnel..... 12

 2.5. Project Management Location of Work..... 13

 2.6. Purchaser Responsibilities..... 14

 2.7. Project Management Control (Meeting & Project Highlight Report)..... 14

3. Task 2: Software Engineering 15

 3.1. Scope 15

 3.2. Software Engineering Start Date and Schedule..... 15

 3.3. Software Engineering Key Personnel 15

 3.4. AMD Simulation System Requirements..... 17

 3.5. Purchaser Responsibilities..... 17

 3.6. Software development methodology..... 17

 3.7. Software architecture..... 18

 3.8. Software implementation location of work, environment and tools 19

 3.9. Software development configuration management..... 21

 3.10. Software implementation, Test and Acceptance plan 21

 3.11. Test scenario data..... 25

 3.12. Cyber Security requirements 25

 3.13. Quality assurance..... 25

 3.14. Coding principles and guidelines 26

 3.15. On-line Help 26

 3.16. Contribution to training materials for operational Users 26

 3.17. Contribution to training for system administrators..... 26

 3.18. Software licenses 26

4. Task 3: Integrated Support 26

4.1. Baseline deployment 26

4.2. Initial Operation support 26

4.3. Configuration Management 29

5. Contract Documentation Requirements..... 30

5.1. General 30

5.2. Reports..... 32

6. Definitions..... 33

ANNEX A: Concept of utilisation and Software Requirement Specifications 33

ANNEX B: System Architecture 33

ANNEX C: Coding principles and guidelines 33

1. Introduction

1.1. Introduction to the ETEE FS BMD Project:

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

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

1.1.3. The aim of the ETEE FS BMD project is to provide an enhanced JEMM system, an Air and Missile Defence (AMD) simulation system including simulation federation management on the basis of ITC and a BMD Exercise Information Management Portal Template system. A specific Work Package for each of these systems is a part of the ETEE FS BMD project. The Work Packages for the systems are numbered 1 through 3. This Contract is for Work Package Number 2. In addition the ETEE FS BMD project includes a fourth Work Package that will support the operational assurance of the systems that are delivered through the ETEE FS BMD project. Work Package 4 will assist the Purchaser in the testing of the individual systems and of their integration. Hand-over to the User, training and mentoring will also be a part of Work Package 4.

1.1.4. Each system aims to provide a logical grouping of functionality from a User perspective which are referred to as User Applications as shown in Figure 1.1.

1.1.5. The interactions between the systems are shown in Figure 1.1

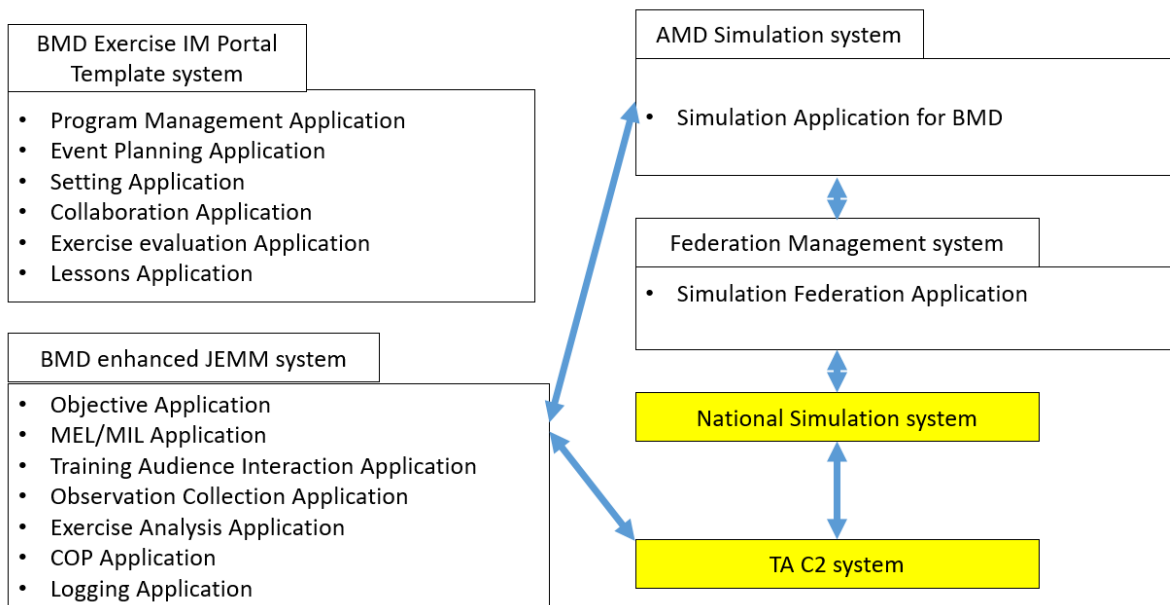


Figure 1.1 System Interaction Diagram

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

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

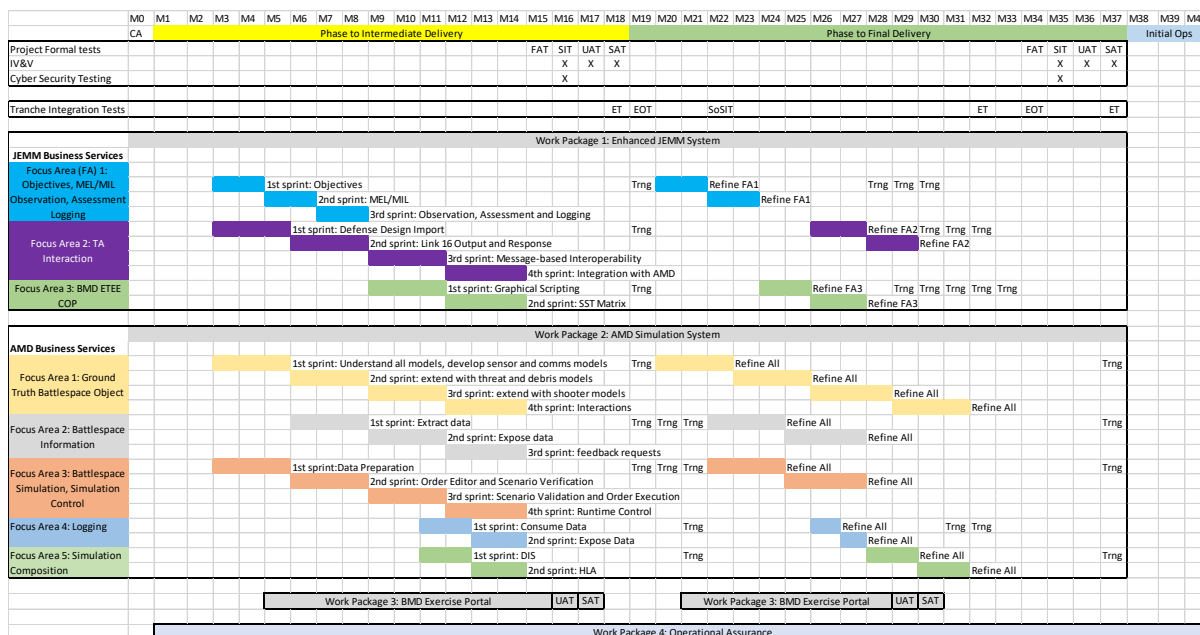


Figure 1.2: Project Schedule

1.1.8. The detailed schedule for Work Package 2, the object of this Contract, is described in Section 1.4.

1.1.9. Integration of functionality that is developed under the ETEE FS BMD project into the yearly maintenance release of the JEMM and of the ITC/AMD simulation system will be decided by the Purchaser and is outside the scope of this Work Package 2 Contract.

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

1.2. Purpose and Scope of this Contract

1.2.1. The purpose of this Contract for ETEE Work Package 2 is to implement the AMD Simulation system on the basis of the ITC simulation system to meet the BMD requirements for training and exercises, to support the AMD Simulation system training periods, and to provide initial support to its operation by the User community.

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

1.3. Statement of Work Organization

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

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

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

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

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

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

1.3.1.6. Section 6 contains a set of relevant definitions.

1.4. High-level Contract Objectives

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

1.4.2. Design and implement the required AMD Simulation software for integration by the Purchaser into the ITC/AMD system baselines according to an agile development methodology in a distributed working environment.

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

1.4.3.1. BMD Battlespace Simulation Service - Moderate enhancement

1.4.3.2. Simulation Control Service - Major enhancement

1.4.3.3. Simulation Composition Service - Major enhancement

1.4.3.4. Battlespace Information Service - Major enhancement

1.4.3.5. Ground Truth Battlespace Object Services - Major enhancement

1.4.3.6. Logging Service - Major enhancement

1.4.4. Perform development Sprints that deliver software that in the end fulfils all the software requirements defined in ANNEX A for the AMD business services. Services requiring minor enhancements will consist of one (1) to two (2) Sprints, moderate enhancements will consist of two (2) to four (4) Sprints whereas major

enhancements will consist of four (4) to eight (8) Sprints. The Sprints will be distributed over the two (2) delivery phases. Sprints will focus on specific areas of related functionality as indicated in Annex B section 3.4.

- 1.4.5. Deliver working software as the outcome of each iteration.
- 1.4.6. Deliver working software and the associated documentation as the outcome of each Sprint.
- 1.4.7. Design and implement the software requirements defined in ANNEX A for the AMD business services with specific software engineering teams that focus on five (5) distinct areas:
 - 1.4.7.1. Focus Area 1 (FA1): Ground Truth Battlespace Object
 - 1.4.7.2. Focus Area 2 (FA2): Battlespace Information
 - 1.4.7.3. Focus Area 3 (FA3): BMD Battlespace Simulation, Simulation Control
 - 1.4.7.4. Focus Area 4 (FA4): Logging
 - 1.4.7.5. Focus Area 5 (FA5): Simulation Composition
- 1.4.8. Design and implement the software requirements defined in ANNEX A for the AMD business services with specific software engineering teams according to the schedule defined in Tables 1-1 and 1-2 for respectively the intermediate and the final delivery phase. The schedule is expressed in months (M) relative to the Effective Date of Contract award (EDC). The start dates specify a not-later-than constraint. Final Contract Acceptance (FCA) is deemed to occur at the acceptance of the SIT for the Final Delivery Phase and the completion of all Training Period 2 activities.

Focus Area	Activity	Business Services	Start Date	Duration
FA1	Sprint 1	Ground truth sensor and communications models	EDC+2M	3M
FA1	Sprint 2	Ground truth threat and debris models	EDC+5M	3M
FA1	Sprint 3	Ground truth shooter models	EDC+8M	3M
FA1	Sprint 4	Ground truth object interactions	EDC+11M	3M
FA2	Sprint 1	Battlespace Information Extract Data	EDC+5M	3M
FA2	Sprint 2	Battlespace Information Expose Data	EDC+8M	3M
FA2	Sprint 3	Battlespace Information Feedback requests	EDC+11M	3M
FA3	Sprint 1	Battlespace Simulation	EDC+2M	3M

FA3	Sprint 2	Simulation Control Order Editor and Scenario Verification	EDC+5M	3M
FA3	Sprint 3	Simulation Control Scenario Validation and Order Execution	EDC+8M	3M
FA3	Sprint 4	Simulation Control Runtime Control	EDC+11M	3M
FA4	Sprint 1	Logging Consume Data	EDC+10M	2M
FA4	Sprint 2	Logging Expose Data	EDC+12M	2M
FA5	Sprint 1	Simulation Composition DIS	EDC+10M	2M
FA5	Sprint 2	Simulation Composition HLA	EDC+12M	2M
All FAs	FAT	All	EDC+14M	1M
All FAs	SIT	All	EDC+15M	1M
All FAs	IOS	All	EDC+16M	20M

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

Focus Area	Activity	Business Services	Start Date	Duration
FA1	Training 1	All FA1 Services	EDC+18M	1M
FA1	Sprint 1	All FA1 Services	EDC+19M	3M
FA1	Sprint 2	All FA1 Services	EDC+22M	3M
FA1	Sprint 3	All FA1 Services	EDC+25M	3M
FA1	Sprint 4	All FA1 Services	EDC+28M	3M
FA1	Training 2	All FA1 Services	EDC+36M	1M
FA2	Training 1	All FA2 Services	EDC+18M	3M
FA2	Sprint 1	All FA2 Services	EDC+21M	3M
FA2	Sprint 2	All FA2 Services	EDC+24M	3M
FA2	Training 2	All FA2 Services	EDC+36M	1M
FA3	Training 1	All FA3 Services	EDC+18M	3M
FA3	Sprint 1	All FA3 Services	EDC+21M	3M
FA3	Sprint 2	All FA3 Services	EDC+24M	3M
FA3	Training 2	All FA3 Services	EDC+36M	1M
FA4	Training 1	All FA4 Services	EDC+20M	1M
FA4	Sprint 1	All FA4 Services	EDC+25M	1M
FA4	Sprint 2	All FA4 Services	EDC+26M	1M
FA4	Training 2	All FA4 Services	EDC+30M	2M
FA5	Training 1	All FA5 Services	EDC+20M	1M
FA5	Sprint 1	All FA5 Services	EDC+27M	2M
FA5	Sprint 2	All FA5 Services	EDC+29M	2M
FA5	Training 2	All FA5 Services	EDC+36M	1M
All FAs	FAT	All FAs Services	EDC+33M	1M

All FAs	SIT	All FAs Services	EDC+34M	1M
All FAs	IOS	All	EDC+37M	12M

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

- 1.4.9. To contribute to the FAT and SIT test events and to support Independent Verification & Validation (IV&V) that shall be conducted during these tests.
- 1.4.10. To deliver software that complies with NATO cyber security regulations as defined in Section 3.12.
- 1.4.11. To support the training periods indicated in the schedules as defined in Section 1.4.8 and further detailed in section 3.16.
- 1.4.12. To provide Initial Operations Support (IOS) from SIT acceptance of the Intermediate Delivery Phase until twelve (12) months after FCA.
- 1.5. Contract Requirements
 - 1.5.1. The requirements for Project Management are described in Section 2.
 - 1.5.2. The requirements for the Software Engineering are described in Section 3.
 - 1.5.3. The software requirements for the AMD simulation system are included in ANNEX A and are identified as “AMD – NNN - XXX”.
 - 1.5.4. The requirements for the manner in which the software application components that realise business services are designed and implemented are described by the architecture described in ANNEX B and in the coding principles and guidelines described in ANNEX C.
 - 1.5.5. The requirements for training support are described in Section 3.
 - 1.5.6. The requirements for integrated support are described in Section 4.
 - 1.5.7. The requirements for documentation are described in Section 5.

2. Task 1: Project Management

2.1. Scope

- 2.1.1. This task outlines the Project Management activities for the Work Package 2 of the ETEE FS BMD project Contract. The Contractor shall provide Project Management for the execution of the Contractor-assigned work items and shall also provide Project Management support for the Purchaser through specified reporting requirements detailed in Section 2.7.
- 2.1.2. The goal of the Contractor’s Project Management shall be to manage the Contractor-assigned work items in a controlled, transparent and resilient manner to achieve the desired results and, wherever possible, to eliminate problems and

to ensure that those problems that do occur are identified early, assessed accurately, and resolved quickly in partnership with the Purchaser.

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

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

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

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

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

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

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

2.1.5. The Project Manager shall ensure and provide proof that all Contractor and Subcontractor personnel that shall work on a NATO site or have access to classified information and facilities shall have, at a minimum, a valid NATO SECRET (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

NATO UNCLASSIFIED

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

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

2.3. Project Management Key Personnel

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

2.3.1.1. Project Manager (Key Personnel)

2.3.1.2. Deputy Project Manager

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

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

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

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

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

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

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

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

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

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

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

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

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

2.3.7. The deputy PM shall meet the same qualifications as the PM and be able to substitute for the PM at any given time.

2.4. Project Management Methodology

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

2.5. Project Management Location of Work

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

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

2.5.3. Work at Purchaser Sites

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

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

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

2.5.3.3.1. A desk,

2.5.3.3.2. Standard office furniture,

2.5.3.3.3. Common expendable office supplies,

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

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

2.5.4. Project Management Collaborative Work Environment

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

2.6. Purchaser Responsibilities

2.6.1.1. The Purchaser's Project Manager (PPM) together with the Purchaser's Technical Lead (PTL) shall act as the Purchaser's representative and shall be the primary interface between the Contractor and Purchaser after the Effective Date of Contract (EDC).

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

2.6.1.3. Neither the Purchaser Project Manager nor any other NATO personnel, may make changes to the terms and conditions of the Contract but may only provide the Purchaser's interpretation of technical matters. All changes to the Contract shall be made only through the Purchaser's Contracting Authority.

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

2.7.1. Project Management Milestones and Approval

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

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

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

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

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

3. Task 2: Software Engineering

3.1. Scope

3.1.1. The scope of the software engineering work consists of the support by specified Software Engineering Key Personnel for the implementation, testing and integration of the Work Package scope defined in Section 1.4 and detailed in ANNEX A in accordance with the schedule defined in Section 1.4 and in compliance with the development and implementation methodology described in Sections 3.6 through 3.9 and with the requirements expressed in Section 3.12. In addition software engineering support shall be provided for the initial operation of the system as described in Section 4.2.

3.2. Software Engineering Start Date and Schedule

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

3.3. Software Engineering Key Personnel

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

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

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

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

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

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

- 3.3.4.3. A thorough knowledge of the English language to the proficiency of at least Level 3 as specified in STANAG 6001 for all language aspects.
- 3.3.4.4. A minimum of three (3) years of experience of using the DevOps environment to support the agile process with the technologies specified for the Focus Area in the architecture description at ANNEX B
- 3.3.5. The Scrum Master shall meet the following desirable qualifications:
- 3.3.5.1. More than three (3) years of experience with fulfilling the role of Scrum Master in a multi-cultural, international environment.
- 3.3.6. For each Focus Area specified in Section 1.4.7, the Contractor shall assemble a suitably sized and qualified software engineering team, to the Purchaser's full and complete satisfaction, to implement the software requirements specified in ANNEX A according to the schedule specified in Tables 1-1 and 1-2. The Scrum framework will be used to manage the development approach.
- 3.3.6.1. For the first phase of the project all software requirements defined for the AMD Simulation system in ANNEX A shall be addressed.
- 3.3.6.2. For the second phase of the project, the total effort of the Sprints for a Focus Area shall represent 50% of the total effort associated with the Sprints of the Focus Area of Phase 1.
- 3.3.7. The role of the coding team will be to implement the User stories associated with the application functions defined in ANNEX B that are part of a Sprint or iteration, to test them independently and to submit them for integration according to the approach specified in Sections 3.6 through 3.16.
- 3.3.8. The members of the coding team shall all meet the following essential qualifications:
- 3.3.8.1. A minimum of three (3) years of proven experience within the last 5 years of developing software using an agile development approach.
- 3.3.8.2. A minimum of three (3) years of proven experience within the last 5 years of developing software using the technologies specified for the Focus Area in the architecture description at ANNEX B or one of its predecessors not older than five (5) years from the date of bid submission.
- 3.3.8.3. A minimum of three (3) years of proven experience within the last 5 years in developing software using the software implementation environment described in Section 3.8.12 or one of its predecessors not older than five (5) years from the date of bid submission.
- 3.3.8.4. A minimum of three (3) years of proven experience within the last 5 years in developing software using the Collaboration environment described in Section 3.8.11 or one of its predecessors not older than five (5) years from the date of bid submission.

- 3.3.8.5. A thorough knowledge of the English language equivalent to the proficiency of at least Level 3 as specified in STANAG 6001 for all language aspects.
- 3.3.9. Within the Coding Team the Lead Engineer is identified as Key Personnel and shall have at least three (3) years of proven working experience within the last 5 years with the architectural concepts used in the architecture modelling language ArchiMate or an equivalent language.
- 3.3.10. At least one of the members of the coding team shall have at least three (3) years of proven working experience within the last 5 years with the design, execution and documentation of unit testing.
- 3.3.11. The members of the coding team shall meet the following desirable qualifications:
- 3.3.11.1. Experience with the actual subject domain of the Focus Area.

3.4. AMD Simulation System Requirements

- 3.4.1. The software requirements for Work Package 2 (this Contract) are incorporated in the overall software requirements for Work Packages 1 and 2 that are described in ANNEX A. The software requirements are organized along the complete concept of utilisation of the BMD ETEE FS in order to provide insight in the overall operational context and to provide traceability from operational requirements to implemented solutions.
- 3.4.2. The Purchaser will refer to the document in ANNEX A to perform the role of Scrum Product Owner.
- 3.4.3. The software requirements that will be addressed under Work Package 2 are identified by the code that starts with “AMD”. Software requirements not specifically identified with the “AMD” code are not included within the scope of this Contract.

3.5. Purchaser Responsibilities

- 3.5.1. The Purchaser Technical Lead or appointed members of his team shall perform the roles of Product Owner and of Tester as defined by the Scrum framework at www.scrum.org.
- 3.5.2. The Purchaser shall produce regular releases based on Contractor deliveries for release testing, for integration testing and for end User testing as described in Section 3.10.

3.6. Software development methodology

- 3.6.1. For Focus Area 1 of Work Package 2 a series of Sprints will address specific modelling areas identified in ANNEX A and specified in ANNEX B for the system. The Sprints will be organised in a number of iterations which will specifically target

capabilities that need to be simulated. For each capability, the necessary interfaces will be defined and the required behaviour will be described. Consequently the cognition, equipment, message and effect models that need to be modified or created will be identified and implemented. Finally units of the required types will be assembled and tested.

3.6.2. For Focus Areas 2, 4 and 5 of Work Package 2, a series of Sprints will address the various aspects that are required to enable AMD Simulation data to be accessed by external business services. The Sprints will be organised in a number of iterations that specifically target selected model or interaction data.

3.6.3. For Focus Area 3 of Work Package 2, a series of Sprints will address groupings of business services included in the Focus Area. The Sprints will be executed in a way that initially targets the presentation aspect of the business services, the supported business process and the business objects and their logic. Subsequently the data services and associated data storage will be addressed in a more complete and consistent manner while further refinement is done for the presentation, business process, business objects and logic.

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

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

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

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

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

3.7. Software architecture

3.7.1. The complete architecture is at ANNEX B.

3.7.2. The architecture description for Work Package 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 3.6.6 above, the refined architecture design will be available at EDC to support the agile software development process.

3.8. Software implementation location of work, environment and tools

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

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

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

3.8.3.1. A desk

3.8.3.2. Standard office furniture

3.8.3.3. Common expendable office supplies

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

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

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

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

3.8.5.1. A desk

3.8.5.2. Standard office furniture

3.8.5.3. Common expendable office supplies

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

- 3.8.6. For each service listed in Section 1.4.3 the technologies that are intended to be used for their implementation including third party components are described in the architecture at ANNEX B.
- 3.8.7. The Purchaser will make provisions to provide the Contractor with a maximum of 16 virtual development machines and 3 FLAMES development license dongles that are fully configured to support the required development work for the duration of the Contract. The Contractor shall specify the number of virtual development machines that are required concurrently over the duration of the Contract. If the number of virtual development machines required concurrently by the Contractor exceeds 16, the Purchaser will provide the additional machines at the Contractor's expense.
- 3.8.8. The Contractor shall provide a physical development workstation to each member of the Contractor's team to host the virtual development machine. The physical development workstation shall meet at least the following specifications:
- 3.8.8.1. 64-bit CPU with 8 high-performance cores (comparable to Intel Core i7-10700 or better),
 - 3.8.8.2. At least 32 GB DDR4 RAM,
 - 3.8.8.3. 100 Mbps network card or faster,
 - 3.8.8.4. 1TB SSD disk or larger,
 - 3.8.8.5. Full disk encryption for mobile devices including laptops,
 - 3.8.8.6. 64-bit Operating System supported to run VMWare Workstation, McAfee Endpoint Security and VPN Client,
 - 3.8.8.7. VMWare Workstation 15.5 or later,
 - 3.8.8.8. Weekly software patching,
 - 3.8.8.9. McAfee Endpoint Security with daily updates,
 - 3.8.8.10. VPN Client (will be specified at Contract Award) equivalent to Cisco AnyConnect.
- 3.8.9. The physical development workstation shall be dedicated to this project and not be used for any other activities.
- 3.8.10. The Contractor shall provide the necessary networking facilities and supporting software to connect into the Purchaser's collaborative development environment.
- 3.8.11. The collaboration environment shall be based on the integrated use of Microsoft Teams and of the Azure DevOps Services.

3.8.12. The software development environment shall be based on the Azure DevOps Services and on Visual Studio 2019.

3.9. Software development configuration management

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

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

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

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

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

3.9.6. The Contractor shall set up a daily backup schedule for the development virtual machines and keep a log of the backup time, date and location. The Purchaser shall be given a copy of the log on a weekly basis.

3.9.7. Upon completion of the project, The Contractor shall return the development virtual machines to the Purchaser and erase them from their hosts and erase all their backups.

3.10. Software implementation, Test and Acceptance plan

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

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

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

- 3.10.4. Testing will be conducted as part of the agile development process as a part of each Sprint and iteration. The Purchaser will provide the Contractor with the necessary mock-ups or stubs to perform unit/component testing agreed for the Sprint or iteration.
- 3.10.5. Formal testing prior to the intermediate and final delivery of the baseline that contains the BMD ETEE functionality will comprise of Factory Acceptance Test (FAT), System Integration Test (SIT), User Acceptance Test (UAT) and Site Acceptance Test (SAT).
- 3.10.6. The FAT will be performed by the Purchaser and will verify that all the AMD Simulation software requirements associated with the business processes described at ANNEX A can be executed successfully. The test results will be logged by the Purchaser including the test data, outcome and comments. The tests shall be classed as successful, partially successful or failed. Partially successful or failed tests will be addressed and corrected by the Contractor to the Purchaser's full satisfaction. Amended software shall be submitted to the Purchaser in the same manner as for a Sprint release. The Purchaser shall repeat the test a maximum of three (3) times. In the event that a test fails three (3) times, the requirement shall be marked and definitively considered as unfulfilled.
- 3.10.7. The SIT will be performed by the Purchaser and will verify that all the AMD Simulation requirements associated with the business processes described at ANNEX A can be executed successfully and that the interaction with systems external to the AMD Simulation as depicted in Figure 1.1 function correctly. The test results will be logged. The partially successful and failed tests associated with AMD Simulation requirements will be resolved by the Contractor in the same manner as for the FAT.
- 3.10.8. IV&V testing will also be included in the SIT. The same logging and resolution approach as for FAT and SIT will be applied.
- 3.10.9. Cyber security testing by the Purchaser will also be included in the SIT. Testing will be logged by the Purchaser in the specific format used by the Purchaser's change management process. Vulnerabilities shall be classified as critical, high, medium or low. The Contractor shall be responsible for resolving, to the Purchaser's full satisfaction, all critical and high vulnerabilities that are attributed to the software that the Contractor has delivered.
- 3.10.10. The FAT, SIT and UAT will be conducted at the Purchaser site. The Purchaser will ensure the availability of the facilities that are necessary to test and accept AMD Simulation compliance with the required interfaces to existing NATO capabilities.
- 3.10.11. The Contractor shall participate in the FAT and SIT and shall at least be attended by the Project Manager. The Contractor is not required to participate in the UAT and in the SAT.

- 3.10.12. The Contractor is not required to participate in Tranche integration tests: Ensemble Test (ET), Ensemble Operator Test (EOT) and System of Systems Integration Test (SoSIT).
- 3.10.13. The following software acceptance tests will be performed by the Purchaser at the end of each iteration:
- 3.10.13.1. Review that software has been written according to the software coding principles and guidelines specified in ANNEX C.
- 3.10.13.2. Test, verify and validate that the iteration fulfils the Purchaser specified set of User stories that belong to an application function that support a software requirement.
- 3.10.13.3. Verify and validate that all the quality assurance criteria mentioned in Section 3.13 have been met.
- 3.10.13.4. The Purchaser will provide initial Iteration acceptance test results within 10 working days after the receipt of the pull request.
- 3.10.14. The following software acceptance steps will be performed by the Purchaser at the end of each Sprint:
- 3.10.14.1. Review that software has been written according to the software coding principles and guidelines in ANNEX C.
- 3.10.14.2. Verify and validate that the software complies with the cyber security requirements defined in Section 3.12.
- 3.10.14.3. For the first phase of development that leads to intermediate delivery, test, verify and validate that the Sprint fulfils the full set of application functions associated with the software requirements for the business services addressed in the Sprint.
- 3.10.14.4. For the second phase of development leading to final delivery, test, verify and validate the enhancements of modifications to application functions of the software requirements specified by the Purchaser at the start of the Sprint for the Focus Area.
- 3.10.14.5. Verify and validate that the quality criteria of performance, usability and issue reporting as defined in Section 3.13 are met.
- 3.10.14.6. The Purchaser will provide initial Sprint acceptance test results within 20 working days after the receipt of the pull request.
- 3.10.15. Acceptance of an iteration shall be conditional on:
- 3.10.15.1. Compliance of the software with at least 90% of the coding principles and guidelines defined in ANNEX C.

- 3.10.15.2. No failed tests and not more than 10% of the User Stories specified by the Purchaser at the start of the iteration being evaluated as partially successful with a work-around in place.
- 3.10.15.3. All quality assurance criteria being met.
- 3.10.16. Purchaser acceptance of a Sprint shall be conditional upon:
 - 3.10.16.1. Compliance of the software with at least 90% of the coding principles and guidelines defined in ANNEX C.
 - 3.10.16.2. Compliance of the software with all the cyber security non-functional requirements described in ANNEX B.
 - 3.10.16.3. All tests described in Section 3.10.14 being successful with a maximum number of partially successful tests with a work-around in place not greater than 10% of the full set of application functions identified in ANNEX B for the software requirements described in ANNEX A for the AMD Simulation business service(s) addressed in the Sprint or of the application functions for the software requirements specified by the Purchaser at the start of the Sprint for the Focus Area and zero (0) failed tests.
 - 3.10.16.4. The quality criteria of performance, usability and issue reporting as defined in Section 3.13 being met.
- 3.10.17. Sprint acceptance failure shall not impact the start of follow-on Sprints.
- 3.10.18. In addition, the following intermediate and final delivery acceptance steps will be performed by the Purchaser as part of the FAT and of the SIT:
 - 3.10.18.1. Verify and validate that all critical and high cyber vulnerabilities introduced in Contractor-delivered software have been resolved by the Contractor and verified by cyber security testing.
 - 3.10.18.2. Verify and validate that all partially failed and failed tests recorded by the IV&V testing in Contractor-delivered software have been resolved by the Contractor and confirmed by the IV&V team.
 - 3.10.18.3. Verify and validate that the baseline release meets the performance and usability quality criteria described in Section 3.13 and that any failures in quality cannot be attributed to Contractor-delivered software.
 - 3.10.18.4. Verify and validate that all specified on-line help as described in Section 3.15 is available.
 - 3.10.18.5. Verify and validate that all operational User training materials as specified in Section 3.16 are available and are complete and correct.
 - 3.10.18.6. Verify and validate that the system administration documentation as specified in Section 3.17 is complete and correct.

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

3.11. Test scenario data

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

3.12. Cyber Security requirements

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

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

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

3.13. Quality assurance

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

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

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

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

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

- 3.13.1.5. Issue incidence rate: the number of new issues that arise from one release to the next should decrease by a factor of at least 30%.
- 3.14. Coding principles and guidelines
- 3.14.1. The coding principles and guidelines are described at ANNEX C.
- 3.15. On-line Help
- 3.15.1. The Contractor shall include tool tips for each presentation aspect of the services that are implemented by the Contractor. The tool tip shall include the description of the requirement and how the functionality is to be used as a part of the User story.
- 3.16. Contribution to training materials for operational Users
- 3.16.1. The Contractor shall contribute to the training of operational Users by including an interactively accessible description of the business process that the implemented component supports at the level of detail as described for the Concept of Utilization in Annex A.
- 3.16.2. During the training periods indicated in the schedule in Tables 1-1 and 1-2, the training support shall consist of 3rd level support by the Contractor to respond to incident reports, to fix bugs and to implement change requests to improve the usability of the Contractor-delivered software. This support shall be scoped at an effort of 30 man-days per calendar month. Support will be executed in the same manner as described for Sprints in Section 3.6.4.
- 3.17. Contribution to training for system administrators
- 3.17.1. The Contractor shall contribute to the training for system administrators by producing a specific text document that describes the global configuration variables, file system locations or URLs that affect the operation of the components that the Contractor has implemented.
- 3.18. Software licenses
- 3.18.1. The Contractor shall not include without prior written approval of the Purchaser any software requiring a specific license agreement or any software to which background Intellectual Property Rights apply.

4. Task 3: Integrated Support

4.1. Baseline deployment

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

4.2. Initial Operation support

- 4.2.1. The NCI Agency operates each system according to a specific Service Delivery Model (SDM). For ITC and consequently for the AMD Simulation, the following levels of support have been and will be defined in the SDM:
- 4.2.1.1. Level 0 support: customer self-help. The self-help consists of two generic activities:
- 4.2.1.1.1. If the AMD Simulation functionality to which the User has access does not appear to be functioning, refer to the scenario administrator guide or to an experienced AMD Simulation User.
- 4.2.1.1.2. If the User does not have access to AMD Simulation functionality that would be expected, contact the AMD Simulation administrator.
- 4.2.1.2. Level 1 support: performed by the NCI Agency Centralized Service desk (CSD) or by the local NCI Agency CIS Supporting Unit (CSU)
- 4.2.1.2.1. CSD will refer AMD Simulation incidents to Level 2 support when supporting and enabling services have been ruled out as potential causes of the incident.
- 4.2.1.2.2. CSUs will provide support for:
- 4.2.1.2.2.1. Service operation:
- 4.2.1.2.2.1.1. Verify that the physical access and connectivity to the service is operational,
- 4.2.1.2.2.1.2. Monitor that local AMD Simulation servers are operational;
- 4.2.1.2.2.1.3. Inform the User of scheduled maintenance outages.
- 4.2.1.2.2.2. Incident response:
- 4.2.1.2.2.2.1. Verify that an incident is indeed related to AMD Simulation and not related to supporting and enabling services,
- 4.2.1.2.2.2.2. Refer incident reports to CSD or directly to Level 2 support.
- 4.2.1.2.2.3. Request fulfilment:
- 4.2.1.2.2.3.1. Request fulfilment by acting on User standard requests;
- 4.2.1.2.2.3.2. Request fulfilment by acting on User change requests with regards to the AMD Simulation service by transmitting change requests to the AMD Simulation service delivery managers.
- 4.2.1.3. Level 2 support:
- 4.2.1.3.1. Analyse reported incidents;
- 4.2.1.3.2. Consult knowledge base of known issues and workarounds and assess incidents accordingly;

- 4.2.1.3.3. Provide work-around information to incident owner;
- 4.2.1.3.4. Refer incident to Level 3 support when required;
- 4.2.1.3.5. Support User standard requests with regards to AMD Simulation data stored on centralised AMD Simulation servers: copy, rename, hide, share Users, transfer, backup and restore;
- 4.2.1.4. Level 3 support provides corrective, preventive and adaptive maintenance and implements the Deployment and Release Management process in accordance with the ISO/IEC 20000 and ITIL framework or equivalent. The Deployment and Release Management process receives the approved Change Request from the 2nd Level Support and performs the following tasks (not limited to):
 - 4.2.1.4.1. Activating Level 3 maintenance when new solutions shall be developed;
 - 4.2.1.4.2. Identify root cause of an incident and develop courses of action (e.g. Code fix, work around, configuration change);
 - 4.2.1.4.3. Refer incident to Level 4 contractor support if the root cause is identified to reside in the contractor provided software components;
 - 4.2.1.4.4. Development of the solution (e.g. new Fix, Integrate contractor provided software updates, Repair, Replacement, Patch, or Release);
 - 4.2.1.4.5. Testing of the solution (e.g. Regression testing, issue/deficiency replication testing);
 - 4.2.1.4.6. Update of baseline content and status;
 - 4.2.1.4.7. Release of the solution (release unit/record);
 - 4.2.1.4.8. Delivery and deployment of the solution.
- 4.2.2. The Contractor shall provide Level 4 corrective maintenance support with a target of a two (2) working day restoration time from SIT acceptance of the Intermediate Delivery until twelve (12) months after the Final Contract Acceptance (FCA) for the software code that the Contractor has delivered. Bug fixing support will be delivered according to the same process as described in Sections 3.8.8 and 3.9. The bug fixing shall not affect the delivery of Sprints, Iterations or Training periods of the second phase in both schedule and scope.
- 4.2.3. The Contractor shall provide a fix or workaround within the target restoration time for 90% of the reported incidents. For 100% of the reported bugs a permanent fix shall be provided within 10 working days. Failure to deliver Level 4 bug fixes adequately three (3) times according to the same acceptance criteria as defined for Sprints in Section 3.10.16 shall constitute a default on the part of the Contractor.

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

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

- 4.2.5.1. The Contractor's support organization;
- 4.2.5.2. Initial Operations concept;
- 4.2.5.3. Required computer resources;
- 4.2.5.4. Support activities until FCA including the response times;
- 4.2.5.5. Support activities between FCA and end of Initial Operations Support including the response times.

4.3. Configuration Management

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

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

- 4.3.2.1. Project Management documents
- 4.3.2.2. Engineering support documents
- 4.3.2.3. Training documents
- 4.3.2.4. Operation Support documents

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

- 4.3.3.1. Unique identification number
- 4.3.3.2. Version number
- 4.3.3.3. Change record
- 4.3.3.4. Release date
- 4.3.3.5. Comments received
- 4.3.3.6. Status
- 4.3.3.7. Relation (e.g. iteration, sprint, test, training, incident, project CLIN)

- 4.3.4. The Contractor shall provide an extract of its own CMDB to the Purchaser on request and at contract completion.
- 4.3.5. The Contractor shall provide a Configuration Management Plan (CMP) in accordance with [STANAG 4427, 2014], [ACMP-2000, 2017], [ACMP 2009, 2017] and [ACMP-2100,2017], tailored to the requirements in this SOW.
- 4.3.5.1. In producing the CMP, the Contractor shall define the organisation and procedures used to configuration manage the CIs.
- 4.3.5.2. The Contractor's CMP shall address all disciplines within this Section and shall as a minimum include, but not be limited to the following Sections:
- 4.3.5.2.1. Introduction;
- 4.3.5.2.2. Organisation;
- 4.3.5.2.3. Configuration Identification and Documentation;
- 4.3.5.2.4. Configuration Control;
- 4.3.5.2.5. Configuration Status Accounting;
- 4.3.5.2.6. Configuration Audits;
- 4.3.5.2.7. Configuration Management Database (CMDB).

5. Contract Documentation Requirements

5.1. General

- 5.1.1. All documentation delivered to the Purchaser shall be written in English with spelling and usage based on the Concise Oxford English Dictionary, 11th edition.
- 5.1.2. The convention to be used for numbers appearing in textual documents is for a comma to be the thousands separator and a period to be the decimal separator (e.g., 1,365,276.24).
- 5.1.3. The convention to be used for dates appearing in free text (e.g., quoting dates of meetings) is day-month-year and not month-day-year.
- 5.1.4. All documentation deliverables must be "stand-alone" with no dependence on other documentation or applications in the Contractor's environment for its comprehension. Likewise, if there are hyperlinks to other areas of the Contractor environment, they must be explained to the Purchaser's full satisfaction.
- 5.1.5. Documentation shall not be marked with corporate logos or contain warnings or proprietary markings limiting in any way the Purchaser's rights to use, reproduce, or distribute.
- 5.1.6. All delivered documentation may be subject to review by the NATO IV&V Contractor.

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 Contractor;

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

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

5.1.8.1. Version of the document and version history;

5.1.8.2. Version date;

5.1.8.3. Contract and associated CLIN number(s);

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

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

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

- 5.1.9.2. The first draft shall be substantially complete and correct.
- 5.1.9.3. The Purchaser will provide comments, corrections, and suggested changes to the Contractor within two (2) weeks of receipt.
- 5.1.9.4. The Purchaser reserves the right to return without review a document that the Purchaser considers to have significant deficiencies.
- 5.1.9.5. The Contractor shall not rely on the Purchaser review to fill in deficiencies, perform deliverable quality control, or obtain missing information.
- 5.1.9.6. The Contractor shall resubmit the document as a revised draft incorporating addressing all the Purchaser's comments within two (2) weeks after receipt.
- 5.1.9.7. The Purchaser will review the changes made to the revised draft and will endeavour to provide further comments, corrections, and suggested changes to the Contractor within two (2) weeks of receipt.
- 5.1.9.8. When all comments, corrections and suggested changes have been incorporated in the document, to the Purchaser's full satisfaction, the Contractor shall provide the final (version 1.0) document within two (2) weeks of receipt of the Purchaser's comments on the revised draft.
- 5.1.9.9. If the document in question is a management document or included as part of the product baseline, the Contractor shall remain responsible for continuing updating the document during the approval review cycle to reflect changes in the software requirements, design, or support arrangements.

5.2. Reports

- 5.2.1. In addition to the general documentation requirements specified in Section 5.1, all reports delivered under this Contract shall meet the following standards:
 - 5.2.1.1. The report shall be truthful, forthright and complete;
 - 5.2.1.2. The report shall contain only material that can be supported by objective evidence and confirmed by independent analysis;
 - 5.2.1.3. The report shall provide evidence to support or justify the conclusions reached;
 - 5.2.1.4. The report shall be concise. If necessary, supporting data should be placed in appendices, provided as separate annexes, or referenced as backup material;
 - 5.2.1.5. Any report that is over five (5) pages long, excluding the front and the Table of Contents, shall include an Executive Summary of not more than one (1) page in length.

6. Definitions

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

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

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

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

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

ANNEX A: Concept of utilisation and Software Requirement Specifications

ANNEX B: System Architecture

ANNEX C: Coding principles and guidelines



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

**PROVIDE AIR AND MISSILE DEFENSE (AMD) SIMULATION SYSTEM WITHIN BALLISTIC MISSILE
DEFENCE (BMD) FUNCTIONS IN EDUCATION, TRAINING, EXERCISE AND EVALUATION (ETEE)
FUNCTIONAL SERVICES (FS)**

IFB-CO-115113-ETEE AMD SIM

BOOK II – PART IV

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.	<ul style="list-style-type: none"> • JEMM-ADM-01 (ID: ETEE-FS-173): JEMM [JEMM-O-21] JEMM shall provide the ability to specify <ul style="list-style-type: none"> • 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)

	<ul style="list-style-type: none">• 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:<ul style="list-style-type: none">• <u>Initial</u>: (created, not configured) access limited to scenario administrator• <u>Development</u>: No automatic send of any injection mean• <u>Rehearsal</u>: simulation ready for execution, scheduled scenario elements might be sent automatically, No message sent to Training Audience (sent to specific address), No other restriction• <u>Execution</u>: 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• <u>AAR mode</u>: View only on all data except for the scenario administrator. analysis and observations, recordings replay remain accessible• <u>Archive</u>: 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:<ul style="list-style-type: none">• <u>BMD Profile</u>: 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• <u>CI Profile</u>: Give access to Intel Functionalities
--	---

<p>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.</p>	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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
<p>3. The NCS training officer will use JEMM to prepare and execute exercises.</p>	<ul style="list-style-type: none"> • 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 <u>ADMIN - DATABASE - Create</u> 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.
<p>4. The NCS training officer will use AMD/ITC to prepare and execute Air Computer Aided eXercises.</p>	<ul style="list-style-type: none"> • 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
<p>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</p> <p>Note: Reference set of TOs is already supported in JEMM 4.0</p>	<ul style="list-style-type: none"> 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.
<p>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</p>	<ul style="list-style-type: none"> 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. <ul style="list-style-type: none"> The user shall have the ability to <u>manage (CRUD) Event</u>

	<ul style="list-style-type: none"> • 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.
<p>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.</p>	<ul style="list-style-type: none"> • JEMM-ADM-08 (ID: ETEE-FS-180): JEMM [JEMM-O-03] JEMM shall provide the ability to specify the Exercise Mode (initial, Development,

	<p>Rehearsal, Execution, AAR or Archive) for each event</p> <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • <u>Development</u>: No automatic send by any injection means • <u>Rehearsal</u>: simulation ready for execution, scheduled scenario elements might be sent automatically, No message sent to Training Audience (sent to specific address), No other restriction • <u>Execution</u>: 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 • <u>AAR mode</u>: View only on all data except for the scenario administrator. analysis and observations, recordings replay remain accessible • <u>Archive</u>: 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

	<ul style="list-style-type: none"> JEMM-TO-04 (ID: ETEE-FS-270): JEMM TO [JEMM-O-02] <u>TO Display</u> Function shall be updated to visualize TA and related Events 															
<p>5. The BMDOC Training officer will use JEMM to assess the achievement of Training objectives by TAs across Multiple exercises/events ETE.10.090</p> <table border="1" data-bbox="205 461 1316 654"> <thead> <tr> <th></th> <th>Event 1</th> <th>Event 2</th> <th>Event 3</th> <th></th> </tr> </thead> <tbody> <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> </tbody> </table> <p>Note: TOs Analysis is already supported in JEMM 4.0</p>		Event 1	Event 2	Event 3		TA1	TO1	TO1, TO3	TO3		TA2		TO2			
	Event 1	Event 2	Event 3													
TA1	TO1	TO1, TO3	TO3													
TA2		TO2														

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
<p>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</p>	<ul style="list-style-type: none"> • 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.
<p>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.</p>	<ul style="list-style-type: none"> • 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]
 - JEMM Actions shall have a type similar to injections i.e. lead-in, rewarding, encouraging.
 - 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

	<p>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.</p> <p>Note: An Action will have a maximum of one virtual Activity.</p> <ul style="list-style-type: none"> • AMD-SCL-01 (ID: ETEE-FS-124): AMD Order Editor <ul style="list-style-type: none"> ○ AMD shall be able to return a categorized list of supported virtual activities. ○ 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 <p>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.</p> • JEMM-MM-10 (ID: ETEE-FS-205): MEL/MIL [JEMM-O-09]
--	---

	<p>JEMM shall store the AMD order script with the virtual activity.</p> <ul style="list-style-type: none"> • 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] <u>Story Line – Chart View</u> Function shall display the ISO start and end time. • JEMM-MM-12 (ID: ETEE-FS-207): JEMM MEL/MIL [JEMM-O-04] <u>Story Line – Timeline View</u> Function shall visualize ISO start and end time. • JEMM-MM-13 (ID: ETEE-FS-208): JEMM MEL/MIL [JEMM-O-04] <u>Story Line – Dependency View</u> 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] <u>Story Line - Shift Time</u> Function shall shift the ISO start time and take into
--	--

	<p>consideration the time dependencies between ISO and other Storyline elements.</p> <ul style="list-style-type: none"> • JEMM-MM-15 (ID: ETEE-FS-210): JEMM MEL/MIL [JEMM-O-04], [JEMM-O-06], [JEMM-O-07], [JEMM-O-08] <u>Import/Export Story Line</u> Function shall take into consideration all data Object changes: <ul style="list-style-type: none"> • 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] <u>Manage Action</u> Function shall provide the ability to manage: <ul style="list-style-type: none"> • 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] <u>Export Action</u> Function shall transform the Action's Time
--	---

	<p>dependency on an ISO end time to an absolute time.</p> <p><u>Import/Export Action</u> Function shall import/export also:</p> <ul style="list-style-type: none"> • Action Type and Action Category • Virtual activity <ul style="list-style-type: none"> • JEMM-MM-18 (ID: ETEE-FS-213): JEMM MEL/MIL [JEMM-O-07] <u>Manage Injection</u> 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] <u>Export Injection</u> 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] <u>Manage Return</u> 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] <u>Export Return</u> 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] <ul style="list-style-type: none"> • <u>Exercise Script</u> Function shall:
--	--

	<ul style="list-style-type: none"> • 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 • <u>Exercise Script</u> 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] <u>Report-Exercise Script</u> Function shall take into account data structure changes
<p>3. The BMDOC training officer will import the Defense Design from AIRC2IS into the ACCS BMD exercise string</p>	<p>No changes to ETEE FS</p>
<p>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</p>	<p>No changes to ETEE FS</p>

<p>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</p> <p>Note: The ORBAT will be built for the whole JEMM scenario however a particular unit might be active or not for one event.</p> <p>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.</p>	<ul style="list-style-type: none"> • 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
--	---

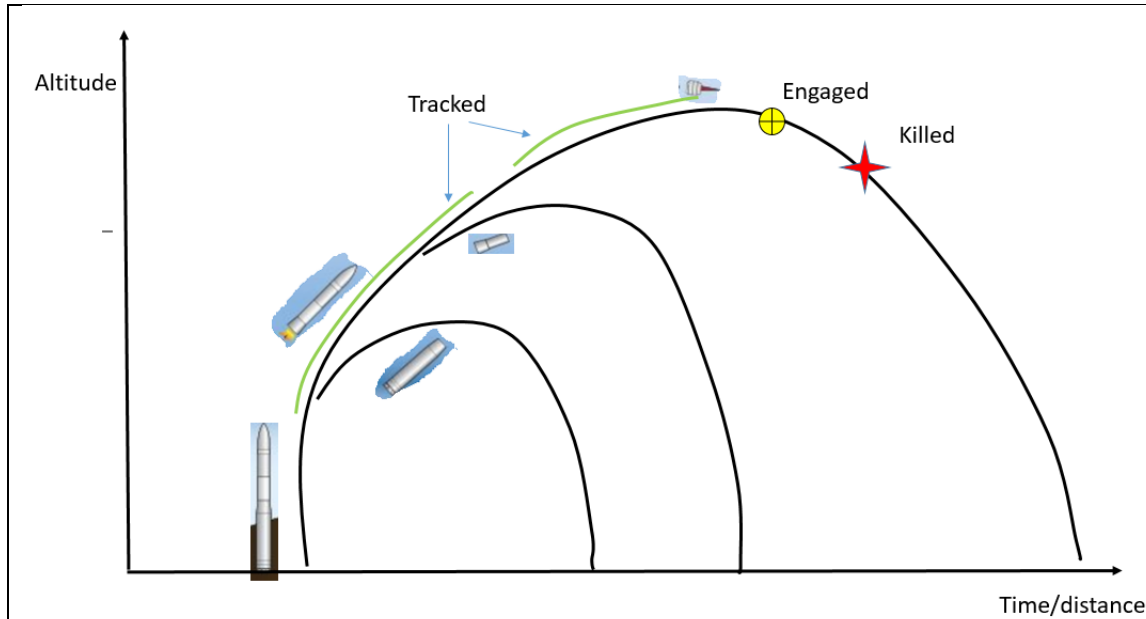
	<p>Graphical Scripting Module and other consumers. The Module shall be able to offer the source file from which the data was derived to the JEMM Graphical Scripting Module and other consumers.</p> <ul style="list-style-type: none"> • JEMM-RP-15 (ID: ETEE-FS-235): JEMM Graphical Scripting Module [JEMM-O-10] The user shall have the ability to create/Update the Blue and Red sides of the ORBAT. <ul style="list-style-type: none"> • The blue ORBAT shall include: <ul style="list-style-type: none"> • 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
--	--

	<ul style="list-style-type: none"> • For weapon systems, the user shall be able to CRUD them. Weapon systems will be of a certain type which will determine its attributes
<p>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</p>	<ul style="list-style-type: none"> • 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

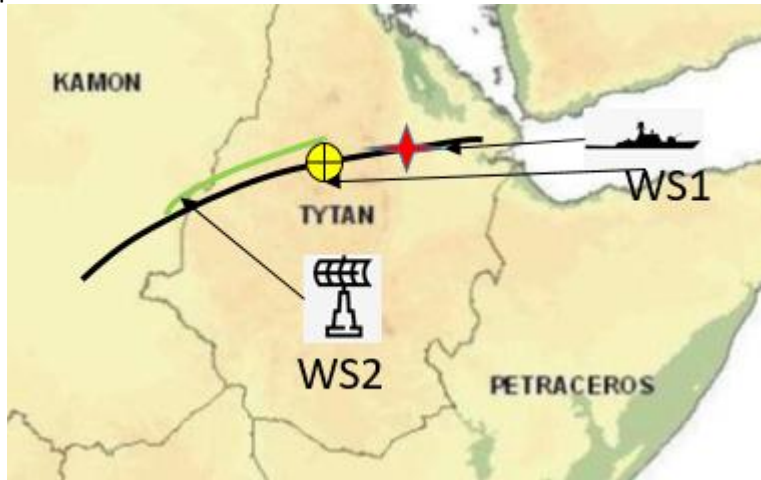
	<p>defense design selected from a list of available defense design plan files</p> <p>Note: This JEMM Graphical Scripting Module will be implemented based on EXCON COP and lessons learned from JOB/JOMM fat client application.</p>
<p>7. The BMDOC training officer will use the <u>JEMM MEL/MIL editor</u> or the <u>JEMM Graphical Scripting Module</u> to:</p> <ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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

	<p>displaying the ORBAT in a tree in the Graphical Scripting Module.</p> <ul style="list-style-type: none"> • 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.
--	---

		Note: The JEMM Graphical Scripting Module will be implemented based on EXCON COP	
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		<ul style="list-style-type: none"> 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 SST Matrix (Sensor/Shooter/Threat matrix) [JEMM-O-13] <ul style="list-style-type: none"> 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 	
	Story Line 1		
	Action1 (BM Type) Expectation		Action1 –Actual
WS1	TUL (Tracking Upper Level) or TLL (Tracking Lower Level)		Bo1-TUL (Ballistic Stage 1-TUL), Wh-TUL (Warhead – TUL)
WS2	EE (Engaging, Engaging) implies no kill		
WS3		E, K (Engaging, Kill)	
Trajectory View per WS			



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

	<p>entity and either the middle point or the start point or end point of the virtual activity, depending on the ORBAT entity type.</p>
<p>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.</p>	<ul style="list-style-type: none"> • 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.
<p>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.</p>	<ul style="list-style-type: none"> • JEMM-MM-25 (ID: ETEE-FS-219): JEMM MEL/MIL

<p>ETE.10.140</p> <p>The validation activities will be executed by the AMD simulation that portrays Ballistic Missile Threat trajectories, Detections, Weapon system engagement and interceptions.</p> <p>ETE.10.020</p>	<p>The user shall be able to select a particular event or scenario and verify all the associated virtual activities:</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> • AMD-BS-01 (ID: ETEE-FS-111): AMD Scenario Verification module The module shall: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • The user shall be able to submit the content of the SST matrix for preview.
--	--

	<ul style="list-style-type: none"> • 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
--	---

	<ul style="list-style-type: none"> • 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 entites 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: <ul style="list-style-type: none"> • 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
--	--

	<p>and log the execution of the simulation.</p> <ul style="list-style-type: none"> • AMD-GT-01 (ID: ETEE-FS-115): AMD Sensor Modeling <ul style="list-style-type: none"> • The AMD FLAMES sensor models owned by NATO shall be extended to: <ul style="list-style-type: none"> • simulate realistic behaviors 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 <ul style="list-style-type: none"> • 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
--	--

	<ul style="list-style-type: none">• The AMD FLAMES network models owned by NATO shall be extended to:<ul style="list-style-type: none">• 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<ul style="list-style-type: none">• The AMD FLAMES threat and debris models owned by NATO shall be extended to:<ul style="list-style-type: none">• simulate realistic behaviours for the Ballistic Missiles specified in Section 9• Have operator configurable attributes to create and simulate specific weapon system types
--	---

	<ul style="list-style-type: none">• Accept and interpret the relevant orders specified in section 8.• AMD-GT-06 (ID: ETEE-FS-120): AMD Shooter Modeling<ul style="list-style-type: none">• The AMD FLAMES shooter models owned by NATO shall be extended to:<ul style="list-style-type: none">• 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<ul style="list-style-type: none">• The AMD FLAMES interaction models owned by NATO shall be extended to:<ul style="list-style-type: none">• simulate realistic interactions for the sensors, air defense systems and Missiles
--	--

	<p>and Ballistic Missiles specified in section 9</p> <ul style="list-style-type: none"> • Have operator configurable attributes to specify interaction outcomes.
<p>11. The NCI Agency exercise simulation specialist will adapt simulation entities parameters to achieve the required behaviour. ETE.10.020</p>	<p>No change (using the FLAMES framework- FORGE)</p>
<p>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</p>	<p>No change (FLAMES Framework - FLAMES Advanced Correlated Terrain Importer).</p>
<p>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</p>	<ul style="list-style-type: none"> • 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.
<p>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</p>	<ul style="list-style-type: none"> • 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.
<p>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</p>	<ul style="list-style-type: none"> • JEMM-MM-26 (ID: ETEE-FS-220): MEL/MIL Module

	<p>The user shall be able to initiate the AMD simulation initialization for a specific scenario or event.</p> <ul style="list-style-type: none"> • 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.
<p>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</p> <p>Note: In this execution preview mode, other potential simulations will not be connected and no information will be sent to the Training Audience.</p>	<p>Notes: Same functionalities as for the scenario validation.</p>
<p>17. The training officer will use the JEMM observation service to create and manage the exercise observation plan. ETE.10.120, ETE.10.110</p>	<ul style="list-style-type: none"> • 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

	<p>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.</p>
<p>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</p>	<ul style="list-style-type: none"> • 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.

	<ul style="list-style-type: none"> 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
<p>1. The BMDOC and other participating unit training officer(s) will use JEMM to execute, monitor and modify the associated JEMM scenario or event.</p> <p>ETE.10.160</p> <p>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.</p> <p>An exercise control story line containing the STARTEX, ENDEX pause actions will be available for reuse as required.</p> <p>ETE.15.050</p> <p>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.</p>	<ul style="list-style-type: none"> JEMM-ADM-12 (ID: ETEE-FS-184): JEMM administration [JEMM-O-15] <ul style="list-style-type: none"> The user shall be able to specify the <u>simulation order execution service</u> 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 <ul style="list-style-type: none"> 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.

	<ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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
<p>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</p>	<ul style="list-style-type: none"> • JEMM-TI-09 (ID: ETEE-FS-256): JEMM administration [JEMM-O-20] <ul style="list-style-type: none"> • 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

	<ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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
--	--

	<ul style="list-style-type: none"> • 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.
<p>3. The training officers will get operational messages from the Training audience and will store them in the MEL/MIL as JEMM Returns.</p> <p>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.</p> <p>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'.</p> <p>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'.</p> <p>ETE.15.060, ETE.15.040, ETE.15.150</p> <p>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.</p>	<p>Note: Returns already exist</p> <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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.

	<p>If there are multiple storyline observation tasks the user shall be able to select one.</p> <ul style="list-style-type: none"> • JEMM-RP-33 (ID: ETEE-FS-249): JEMM Graphical Scripting Module <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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
<p>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</p> <p>Note: No Change, already supported by JEMM</p>	<ul style="list-style-type: none"> • JEMM-OB-02 (ID: ETEE-FS-226): Observation <u>OPCAR</u> Function shall be updated as follows: <ul style="list-style-type: none"> • The observation task list view shall visualize the TA in a column.
<p>5. The NCI Agency exercise technical controller will use JEMM to:</p> <ul style="list-style-type: none"> - start, stop, save and re-start the simulation. - Control speed of execution with respect to real time. 	<ul style="list-style-type: none"> • 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:

<p>ETE.10.150</p>	<ul style="list-style-type: none"> - 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.
<p>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</p>	<ul style="list-style-type: none"> • JEMM-RP-35 (ID: ETEE-FS-251): JEMM Graphical Scripting Module <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • The service shall transform the AMD JEMMIS extracted information into JEMMIS-compliant Data Objects to

	<p>provide the AMD JEMM Feedback with the necessary information to respond to feedback requests.</p> <ul style="list-style-type: none"> • AMD-BI-03 (ID: ETEE-FS-110): AMD JEMMIS Extraction <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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.
<p>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</p>	<ul style="list-style-type: none"> • JEMM-LOG-02 (ID: ETEE-FS-195): NIRIS Link16 JEMMIS feedback <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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

	<ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • the entry entered during preparation • Multiple SST feedbacks (entity, type and associated code). • JEMM-RP-04 (ID: ETEE-FS-230): JEMM SST Matrix <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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
<p>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</p>	<ul style="list-style-type: none"> • JEMM-RP-36 (ID: ETEE-FS-252): JEMM Graphical scripting module <ul style="list-style-type: none"> • The user with system controller role shall have the ability to control simulation and simulated entities: <ul style="list-style-type: none"> • Controller orders for entities: Move, Modify (state and holdings), kill

	<ul style="list-style-type: none"> • 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.
<p>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</p>	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • BM Tracks <ul style="list-style-type: none"> ▪ J3.6 Space Track – This message shall be used to identify the <u>TBM while in-flight</u>. Note: Already implemented ▪ J3.0 Reference Point – This message shall be used to identify the <u>launch and impact point</u> of the TBM while in-flight. (location, Ellipse) Note: Already implemented ▪ J3.5 Land Point/Track – This message shall be used to identify the <u>enemy launcher</u> 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 <u>engaging weapon system</u> and interceptor while the TBM is in-flight

	<p>(Weapon assigned/ allocated, Missile Tracked, Weapon fired, Missile destroyed)</p> <ul style="list-style-type: none"> ▪ J7.0 Track Management – This message shall be broadcast when a <u>Space Track has been lost</u> 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 <ul style="list-style-type: none"> ▪ 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 <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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 modeling module <ul style="list-style-type: none"> • 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).
<p>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</p>	<ul style="list-style-type: none"> • AMD-SCN-02 (ID: ETEE-FS-133): <u>AMD Simulation Federation interoperability</u> <ul style="list-style-type: none"> ○ The user shall be able to define DIS properties for simulation entities and interactions in order to maintain interoperability with other simulations through DIS.

<p>Note: COTS solutions will be used for DIS or HLA to DIS bridges.</p>	
<p>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</p>	<p>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.</p>
<p>12. The JEMM automated messaging service will be able to respond to Link-16 requests for additional TDL data. ETE.xx.xx</p>	<ul style="list-style-type: none"> • 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).
<p>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</p>	<ul style="list-style-type: none"> • JEMM-RP-37 (ID: ETEE-FS-253): JEMM Graphical scripting module <ul style="list-style-type: none"> • The user with system controller role shall have the ability to: <ul style="list-style-type: none"> • 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
<p>1. The NCI Agency Technical Controller will replay the exercise message traffic (DIS and TDL) as required for AAR. ETE.15.090</p> <p>Note: Will rely on COTS for DIS and NIRIS for TDL.</p>	<p>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.</p>

<p>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</p>	<ul style="list-style-type: none"> • 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 <u>OPCAR- ANALYSIS</u> function shall be updated as follows: <ul style="list-style-type: none"> • 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
<p>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</p>
<p>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.</p>
<p>JEMM-O-03: JEMM MEL/MIL (Logical Data Structure) EVENT The JEMM EVENT logical data structure shall be changed to include at least:</p> <ul style="list-style-type: none"> - a START and END DATE/TIME - the EXERCISE MODE (Development, Rehearsal, Execution, AAR mode or Archive)

Logical Data structure changes
<p>JEMM-O-04: JEMM MEL/MIL (Logical Data Structure)</p> <p><u>ISO</u></p> <p>The JEMM logical data structure of ISO shall be changed to have:</p> <ul style="list-style-type: none"> - a START DATE/TIME either independent or dependent on another storyline element - a DURATION.
<p>JEMM-O-05: JEMM Scenario administration (Logical Data Structure)</p> <p><u>ISO State</u></p> <p>The JEMM logical data structure of <u>ISO State</u> shall be changed to include at least the following new fields:</p> <ul style="list-style-type: none"> - ISO State triggering Encouraging action and Injection - ISO State triggering Rewarding action and Injection - ISO Trigger observation (Y/N)
<p>JEMM-O-06: JEMM MEL/MIL (Logical Data Structure)</p> <p><u>ACTION</u></p> <p>The JEMM logical data structure of ACTION shall be changed as follows:</p> <ul style="list-style-type: none"> - Rename existing field ACTION TYPE to ACTION CATEGORY - New field ACTION TYPE (Lead In, Encourage, Reward) - DATE/TIME dependency might depend on ISO
<p>JEMM-O-07: JEMM MEL/MIL (Logical Data Structure)</p> <p><u>INJECTION</u></p> <p>The JEMM logical data structure of INJECTION shall be changed as follows:</p> <ul style="list-style-type: none"> - DATE/TIME dependency might depend on ISO
<p>JEMM-O-08: JEMM MEL/MIL (Logical Data Structure)</p> <p><u>RETURN</u></p> <p>The JEMM logical data structure of RETURN shall be changed as follows:</p> <ul style="list-style-type: none"> - DATE/TIME dependency might depend on ISO
<p>JEMM-O-09: JEMM MEL/MIL (Logical Data Structure)</p> <p><u>ACTION-VIRTUAL ACTIVITY</u></p> <p>The JEMM logical data structure shall be changed to:</p> <ul style="list-style-type: none"> - 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
<p>NAME</p> <ul style="list-style-type: none"> - store the Virtual Activity order file.
<p>JEMM-O-10: JEMM Graphical Scripting Module (Logical Data Structure)</p> <p><u>ORBAT</u></p> <p>The JEMM logical data structure shall be changed to:</p> <ul style="list-style-type: none"> - 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
<p>JEMM-O-11: JEMM Graphical Scripting Module (Logical Data Structure)</p> <p><u>ORBAT STARTEX</u></p> <p>The JEMM logical data structure shall be changed to:</p> <ul style="list-style-type: none"> - 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
<p>JEMM-O-12: JEMM Graphical Scripting Module (Logical Data Structure)</p> <p><u>EVENT</u></p> <p>The JEMM logical data structure shall be changed to store a Defence Design Plan as an attachment to an EVENT.</p>
<p>JEMM-O-13: SST Matrix (Spreadsheet, Trajectory, Map) (Logical Data Structure)</p> <p><u>SST MATRIX</u></p> <p>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.</p>
<p>JEMM-O-14: JEMM Graphical Scripting Module (Logical Data Structure)</p> <p><u>WEAPON SYSTEM and MISSILE</u></p> <p>The JEMM logical data structure shall be changed to store a list of valid WEAPON_SYSTEM and MISSILE.</p>
<p>JEMM-O-15: JEMM Scenario administration (Logical Data Structure)</p> <p><u>VIRTUAL ACTIVITY STATE</u></p> <p>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</p>

Logical Data structure changes
<p>JEMM-O-20: JEMM Scenario administration (Logical Data Structure)</p> <p><u>INJECTION MEANS</u></p> <p>The JEMM logical data structure of INJECTION MEANS shall be changed:</p> <ul style="list-style-type: none"> • 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)
<p>JEMM-O-21: JEMM MEL/MIL (Logical Data Object)</p> <p><u>SCENARIO</u></p> <p>The JEMM SCENARIO logical data structure shall be changed to include at least:</p> <ul style="list-style-type: none"> - 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 modeling module shall accept as simulation orders.

8.1.3 The AMD modeling module shall model as behaviors 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
<ul style="list-style-type: none"> • Game control 		
<ul style="list-style-type: none"> ○ Start game 	Yes	startup through ITCCO
<ul style="list-style-type: none"> ○ Pause game 	Yes	API Call: FRCLPause
<ul style="list-style-type: none"> ○ Resume Game 	Yes	API Call: FRCLResume
<ul style="list-style-type: none"> ○ Stop Game 	Yes	ALTER SERVICE FExecutive STOP_TIME = TO_DATE("0:0:0");
<ul style="list-style-type: none"> ○ Set speed 	Yes	ALTER SERVICE FExecutive RATE_MODE = "CLOCK", RATE_FACTOR = 2.0; Speed rate is not unlimited!
<ul style="list-style-type: none"> ○ Take checkpoint 	Yes	ALTER SERVICE "FCPRManager" CHECKPOINT_TIME = "NOW";
<ul style="list-style-type: none"> ○ Resume from checkpoint 	Yes	
<ul style="list-style-type: none"> • Magic Move Unit/system 		
<ul style="list-style-type: none"> ○ Set location (Apply to Unit cognition model) 	Yes	INITIATE MAGIC_MOVE on CAOC/Flight/Ground/Ship Alternatively: API call FRCLSendPosition
<ul style="list-style-type: none"> ○ Set system operational status: <ul style="list-style-type: none"> ▪ 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.

<ul style="list-style-type: none"> ○ Set weapon system Stock level (Apply to Unit cognition model to apply to equipment weapon system) 	No	<p>Magic: currently it is not possible to change the number of available missiles during execution</p>
<ul style="list-style-type: none"> ○ Set Comm. Link down/up (Apply to Unit cognition model to apply to equipment communications device model) 	No	<p>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.</p>
<ul style="list-style-type: none"> ○ Set unit as active/inactive in simulation (Apply to Unit cognition model) 	No	<p>Unit shall stop acting and only respond to an activate order.</p>
<ul style="list-style-type: none"> ● Entity orders 		
<ul style="list-style-type: none"> ○ Move (Apply to Unit) 	Yes	<p>Reposition Ground or Ship Platform;</p>
<ul style="list-style-type: none"> ○ Set weapon ROE (Apply to Unit cognition model or all teams in scenario) 	Partially	<p>CHANGE_ROE on CAOC, ALTER SERVICE STCVROE at team level and at unit level to engage a specific track.</p> <p>The ROE shall be a set for a unit or team in relation to other teams.</p> <p>ROE in ITC/FLAMES are “Ignore”, “Engage”, “Shadow”, “Escort”.</p> <p>It shall be extended with “Weapons hold”, “Weapons tight”, “Weapons free”.</p>
<ul style="list-style-type: none"> ○ Allocate sector (Apply to Unit cognition model) 	Partially	<p>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.</p> <p>It shall be extended to enable SAM systems (GBAD and SBAD) to protect a MEZ that they are not located in.</p>
<ul style="list-style-type: none"> ○ Switch on/off sensor (sectors, etc.) (Apply to a Unit or Equipment) 	Partially	<p>INITIATE “CONTROL” SENSOR = “OFF” switch on all active sensors; to change the direction of the point azimuth (Primary Target Line in the</p>

		C2 system) CONTROL “SENSOR” COMMAND (POINTING_AZIMUTH = 90); Same as “Magic” commands
○ Fire Ballistic Missile (Apply to Unit)	Yes	LAUNCH at unit/feature/coordinate. Depending on the munition model, trajectory might be calculated or pre-planned.
○ 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.
○ 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.
○ 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		
○ destroy a simulation missile (Apply to simulation Entity)	Yes	KILL
○ destroy missile debris (booster) and warhead (Apply to simulation Entity)	No	New functionality
• Also the SSTO order should be able to be supported:	Partially	

○ assign Engagement Area (no permission required to engage) (Apply to Unit cognition model)	Yes	Already covered above Combination of assign zone and ROE.
○ 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
○ 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.
○ 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
<ul style="list-style-type: none"> The AMD FLAMES models shall be extended to simulate realistic behaviors and interactions for the following simulation sensors, systems, networks and Missiles: 	
<ul style="list-style-type: none"> 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)	
<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> It shall simulate multiple Stage booster debris, multiple warheads, chaffs and decoys 	Current: only 2-stage missiles with no debris/decoys are modelled.
<ul style="list-style-type: none"> Munition impact accuracy and effect 	Currently available
<ul style="list-style-type: none"> Flight path (depressed/lofted/optimal) 	Currently available: depressed or lofted. Also currently available is a curve-fitting algorithm.
<ul style="list-style-type: none"> Radar Cross Section for all phases 	Exists for the missile itself; Shall be extended for booster, warhead and decoys.
<ul style="list-style-type: none"> Trajectory taking into account at least: drag, gravity, atmospheric density, per stage: empty mass, fuel mass, burn rate, thrust, burn time 	Currently available
<ul style="list-style-type: none"> Predefined trajectory 	Currently available
<ul style="list-style-type: none"> Different end phase trajectories: RV (Ballistic Re-entry Vehicle) 	New
<ul style="list-style-type: none"> SEW network capability model 	New, it shall portray detection by the entire network and not by individual sensors.
<ul style="list-style-type: none"> Sensor model: at least AN/TPY-2, AN/SPY-1, AN/SPY-6 	
<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> Jamming (sensor can be jammed or not) 	Current capability
<ul style="list-style-type: none"> Minimum/ maximum range 	Current capability
<ul style="list-style-type: none"> Altitude range 	Current capability
<ul style="list-style-type: none"> Ground detection 	Current capability
<ul style="list-style-type: none"> Weather influence 	Current capability
<ul style="list-style-type: none"> Over-the-horizon capable (no need for Line Of Sight) 	New
<ul style="list-style-type: none"> Radar Cross Section of objects to detect 	Current capability
<ul style="list-style-type: none"> Velocity gate 	Current capability
<ul style="list-style-type: none"> Frequency Range, transmission power, noise, Signal to Noise ration threshold, scan period, scan angle 	Current capability

<ul style="list-style-type: none"> • Capability to discriminate between warhead / non-threat 	New
<ul style="list-style-type: none"> • Emission Control 	New (current: sensor on/off is instant)
<ul style="list-style-type: none"> • Track quality (J 7.1) 	
<ul style="list-style-type: none"> • Cueing of other systems 	New
<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • The models shall have operator configurable attributes to simulate specific air defense systems and missiles such as: <ul style="list-style-type: none"> - Land Based: Patriot PAC-3, THAAD, Aegis ashore (SM-3), SAMP/T (Aster 30), - Ship based: ASTER 30 (Ship Based). Aegis ship (SM-3) 	New
<ul style="list-style-type: none"> • Setup / teardown procedure 	New
<ul style="list-style-type: none"> • Receive cueing from other systems 	New
<ul style="list-style-type: none"> • TBMD Air Defense Network model: sensor, AD, unit C2 node network: TPY-2 cueing LL AD 	New
<ul style="list-style-type: none"> • Simulation of communication network failure 	New
<ul style="list-style-type: none"> • Sensors capable of cueing other systems (LL AD) 	New
<ul style="list-style-type: none"> • Platform model 	No change
<ul style="list-style-type: none"> • 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)
<ul style="list-style-type: none"> • 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)



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

**PROVIDE AIR AND MISSILE DEFENSE (AMD) SIMULATION
SYSTEM WITHIN BALLISTIC MISSILE DEFENCE (BMD) FUNCTIONS
IN EDUCATION, TRAINING, EXERCISE AND EVALUATION (ETEE)
FUNCTIONAL SERVICES (FS)**

IFB-CO-115113-ETEE AMD SIM

BOOK II – PART IV
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 IFB.

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

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

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

1.1 Purpose of the Architecture

This project solution architecture has the following purpose:

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

- b) It allocates the application functions to the sprints defined in the statement of work;
- c) It has only limited documentation of existing components that don't need to be changed;
- d) It should minimize the number of diagrams and text that would need to be maintained.

1.2 Terminology and Notation

The following terminology and notations are used in the document:

- **Development Status**
 - New – new component or functionality, from the perspective of this project.
 - New COTS – new component that is not developed but acquired as COTS;
 - Update – existing functionality that needs to be updated by this project;
 - Existing – existing functionality that will most likely not be affected by this project or it may integrate new or updated application components.
- **Stereotypes** – the following stereotypes are applied in the model:
 - <<admin>>: event from the administrator role;
 - <<api>>: API interface;
 - <<apiclient>>: client side of the API interface;
 - <<cots>>: commercial off the shelf software;
 - <<data>>: data artefact;
 - <<external>>: function, data object, component, etc., that is external to the project;
 - <<generic>>: function, data object, component, etc., that is generic (inherited from) or represents multiple specific instances;
 - <<internal>>: low-level internal application service;
 - <<legacy>>: existing function, data object, component, etc., that may be replaced or become obsolete by this project, or is low-level technical;
 - <<license>>: license artefact;
 - <<new>>: function, data object, component, etc., that is new for this project;
 - <<nonfn>>: non-functional requirement;
 - <<physical>>: requirement for physical characteristics
 - <<property>>: data object that is a property of another data object;
 - <<standard>>: standard reference artefact;
 - <<stub>>: component representing data and behaviour of another component;
 - <<timer>>: timer-based event;
 - <<update>>: existing function, data object, component, etc., that is updated by this project;
 - <<user>>: event triggered by the user interaction.

1.3 Meta-model

The meta-model provides a definition of all the types of building blocks that may exist within an architecture, showing how these building blocks can be described and related to one another.

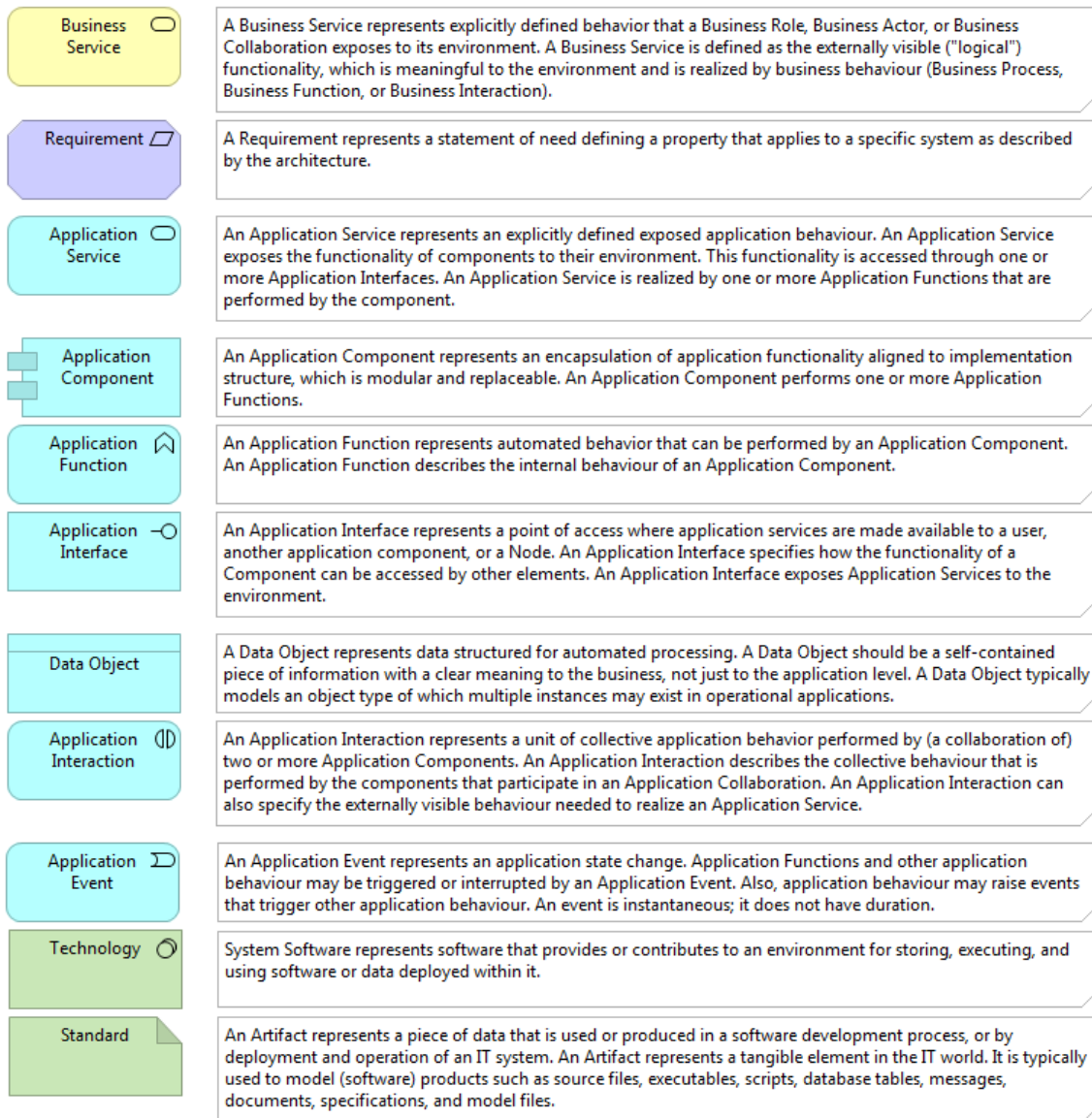


Figure 1: Model building blocks

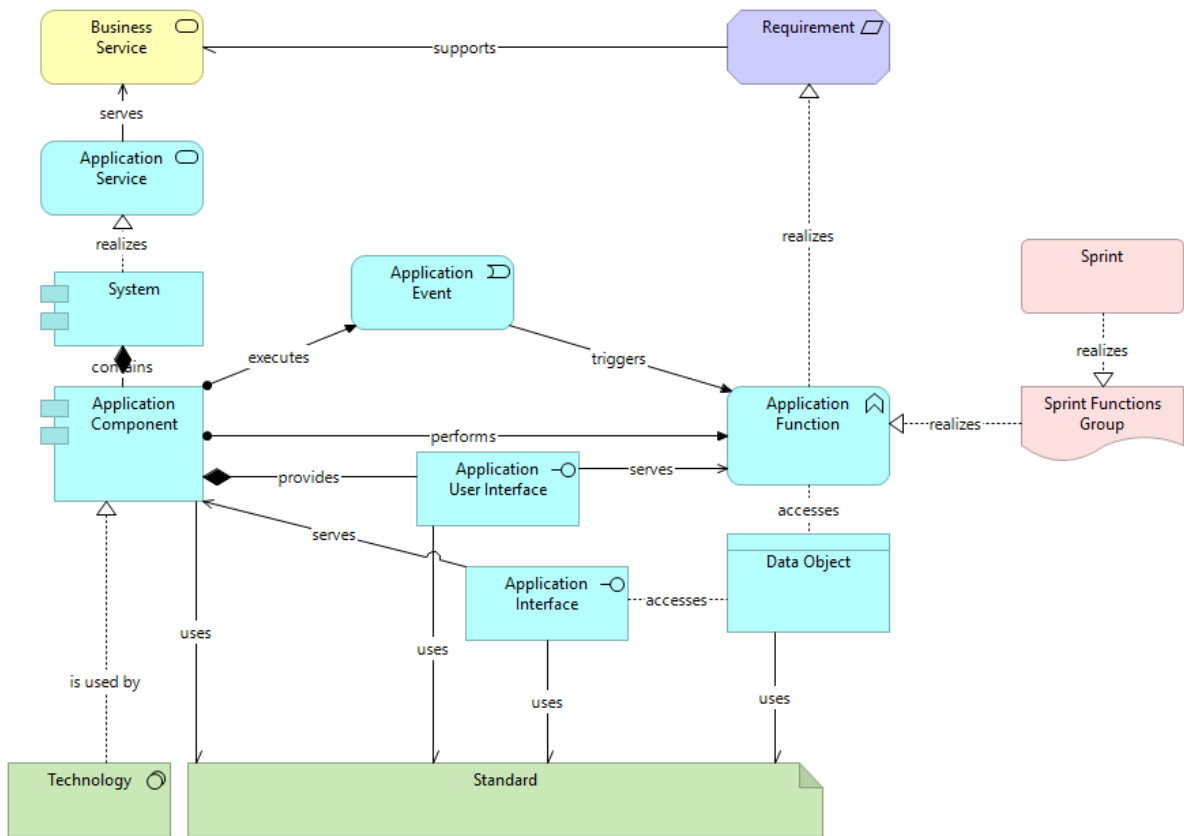


Figure 2: Relations between model building blocks

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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 Windows 10	Angular.JS 1.7 Bootstrap 4 Edge 80 Firefox 68 ESR Leaflet.JS 1.6 MS Devops Server 2019 git Visual Studio 2019 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 2019 Windows 10	Edge 80 Firefox 68 ESR Leaflet.JS 1.6 MS Devops Server 2019 git Visual Studio 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 Windows 10	Angular.JS 1.7 Bootstrap 4 Edge 80 Firefox 68 ESR Leaflet.JS 1.6 MS Devops Server 2019 git Visual Studio 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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 2019 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	<ul style="list-style-type: none"> FLAMES FORGE UI (existing) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> FLAMES FORGE UI (existing) 	<ul style="list-style-type: none"> 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		<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> FLAMES FORGE UI (existing) 	<ul style="list-style-type: none"> 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							<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • FLAMES FORGE UI (existing) 	<ul style="list-style-type: none"> • 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		<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • FLAMES FORGE UI (existing) 	<ul style="list-style-type: none"> • 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		<ul style="list-style-type: none"> • 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		<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • AMD JEMMIS Data API (new) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • AMD Entity Mapping UI (existing) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • AMD Initialization UI (new) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • AMD Initialization UI (new) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • AMD JEMMIS 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> AMD Virtual Activity Form view (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> AMD JEMMIS Data API (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> AMD JEMMIS Data API (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> AMD Virtual Activity Form view (new) 	<ul style="list-style-type: none"> 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/ORBA T representation of each virtual activity	new	<ul style="list-style-type: none"> AMD JEMMIS Data API (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> AMD JEMMIS 	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> AMD Control API (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> AMD JEMMIS Data API (new) 	<ul style="list-style-type: none"> 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		<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> AMD Control API (new) AMD Control Command view (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> AMD Control API (new) 	<ul style="list-style-type: none"> 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
								<ul style="list-style-type: none"> • AMD Control Command view (new) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • AMD Control API (new) • AMD Control Command view (new) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • AMD Control API (new) • AMD Control Command view (new) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • AMD Control API (new) • AMD Control Command view (new) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • AMD Control API (new) • AMD Control 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • AMD Control API (new) • AMD Control Command view (new) 	<ul style="list-style-type: none"> • 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		<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • AMD JEMMIS Data API (new) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • AMD DIS Entity editor view (existing) 	<ul style="list-style-type: none"> • 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		<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> DIS Logger JEMMIS Data API (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> DIS Record/Replay view (new) 	<ul style="list-style-type: none"> 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		<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Reference TO-SL tree view (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Reference TO-SL tree view (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Create TO view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> TO Display view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> TA/Event matrix view with cell containing assigned TO (new) TO/Event matrix view with filter on TA (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> JEMM UI (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> JEMM UI (update) 	<ul style="list-style-type: none"> 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		<ul style="list-style-type: none"> 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
									<ul style="list-style-type: none"> • 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		<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Create ISO view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Create Storyline view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Edit MELMIL Entity view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> JEMM UI (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> JEMM SL Chart view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> JEMM SL Dependency view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> JEMM SL Timeline view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Event TO/TA matrix view with identified Storyline (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> MELMIL Event view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Injection view (existing) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Return view (existing) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Action view (update) Storyline view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> MELMIL Event view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Edit ISO view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> JEMM EBT Report view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> MELMIL Event view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Edit Action view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Edit Action view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> MELMIL Event view (update) Storyline view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> MELMIL Event view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Storyline view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> MELMIL Event view (update) 	<ul style="list-style-type: none"> 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
									<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • JEMM Exercise Script view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • JEMM Exercise Script view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • OPCAR Analysis view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • OPCAR Analysis view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • OPCAR Analysis view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> JEMM EBT Report view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Create Observation view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> NIRIS JEMMIS Data API (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> MELMIL Event view (update) OPCAR Tasking view (update) 	<ul style="list-style-type: none"> 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
									<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Observation Task List view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • JEMM Scenario Administration view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • JEMM Scenario Administration view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • JAMM UI (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • JAMM UI (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> CAX configuration editor (new) 	<ul style="list-style-type: none"> 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		<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> SEW interface (new) 	<ul style="list-style-type: none"> 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		<ul style="list-style-type: none"> 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		<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> TDL Link16 interface (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> JEMMIS Notification interface (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> E-mail interface (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> INTEL-FS interface (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> XMPP Interface (new) 	<ul style="list-style-type: none"> 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								<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Service Configuration view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Simulation control view (new) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • MELMIL Event view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • JEMM UI (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • JEMM UI (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Service Monitor view (new) 	<ul style="list-style-type: none"> • 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								<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Service Monitor view (new) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • JEMM Scenario Administration view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • JEMM Scenario Administration view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • JEMM Scenario Administration view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • CAX configuration editor (new) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> JEMM Scenario Administration view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> CAX configuration dashboard view (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> ORBAT view (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> JEMM Map view (update) JEMM SL Timeline view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> JEMM SL Timeline 	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • JEMM Map view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • JEMM Map view (update) • JEMM SL Timeline view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • JEMM Map view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • JEMM ORBAT tree view (update) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • JEMM Map view (update) 	<ul style="list-style-type: none"> • 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
									<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> JEMM Map view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> JEMM ORBAT tree view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> JEMM SL Timeline view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Simulation control view (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> ORBAT view (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> ORBAT view (new) 	<ul style="list-style-type: none"> 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
									<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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
								<ul style="list-style-type: none"> JEMM Map view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> ORBAT view (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> JEMM UI (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> JEMM Scenario view (update) MELMIL Event view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> AMD Control API client (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> JEMM Scenario view (update) MELMIL Event view (update) 	<ul style="list-style-type: none"> 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		<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> ORBAT view (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> ORBAT view (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> ORBAT view (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> STARTEX view (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> • ORBAT view (new) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Action view (update) • Edit Virtual Activity view (new) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Verification Report view (new) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • ORBAT view (new) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> JEMM Scenario Administration view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> SST Matrix table view (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> SST Matrix Trajectory view (new) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> JEMM Map view (update) 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> SST Matrix table view (new) 	<ul style="list-style-type: none"> SST Matrix (ReadWrite)

Sprint	Sprint Function Group	Business Service	Requirements	System	Application Component	Application Function	Application Function Development Status	Application Interfaces	Data Object Access
									<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Scenario Replay UI (new) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • SST Matrix table view (new) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • SST Matrix table view (new) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • SST Matrix table view (new) 	<ul style="list-style-type: none"> • 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
									<ul style="list-style-type: none"> • 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 2019		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 (LTF) 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.openeospatial.org/is/04-094r1/04-094r1.html
Web Mapping Services	WMS 1.1	OGC WMS 1.1.0 http://portal.openeospatial.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.

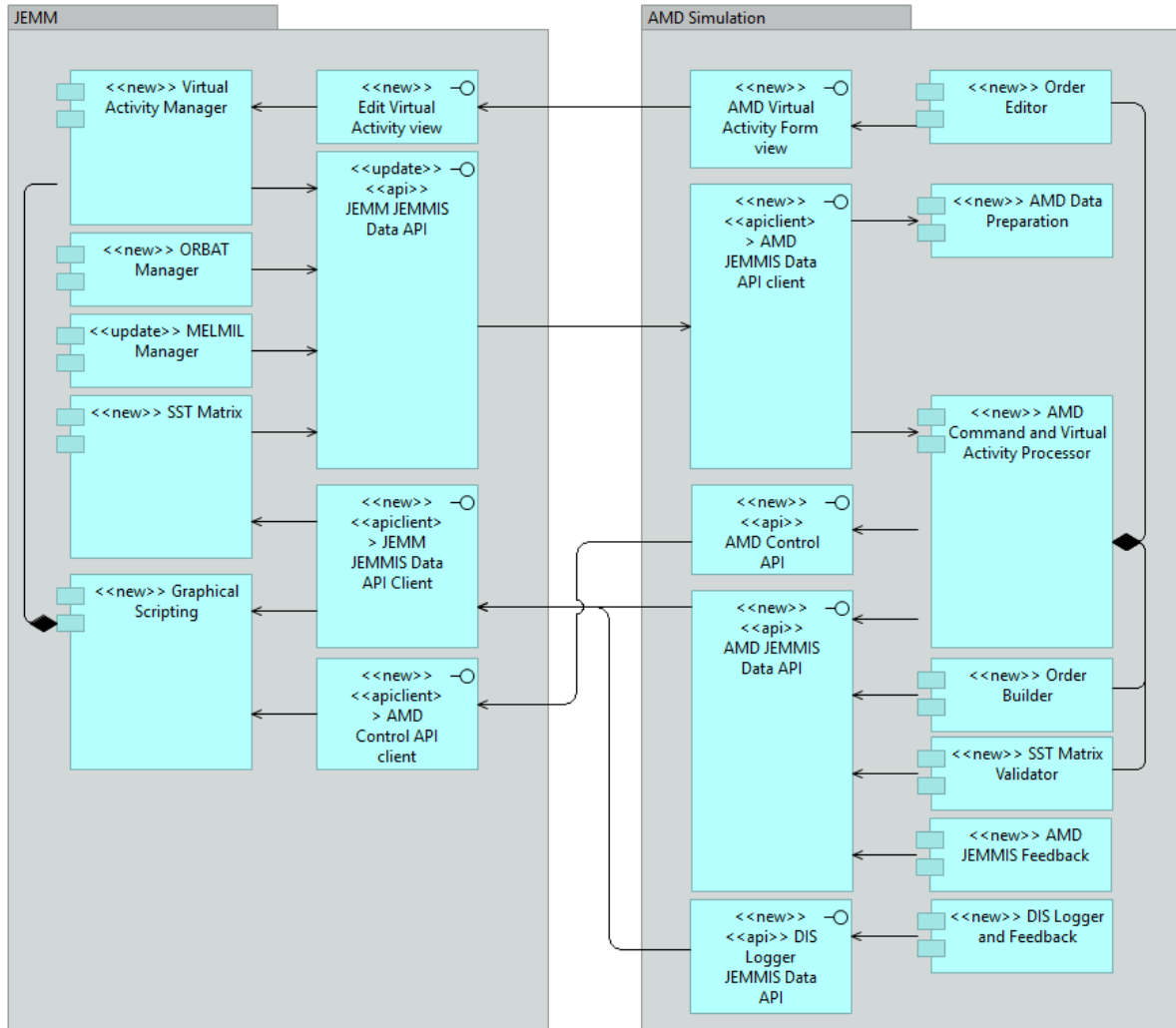


Figure 3: Interactions between JEMM and AMD Simulation, and interfaces used

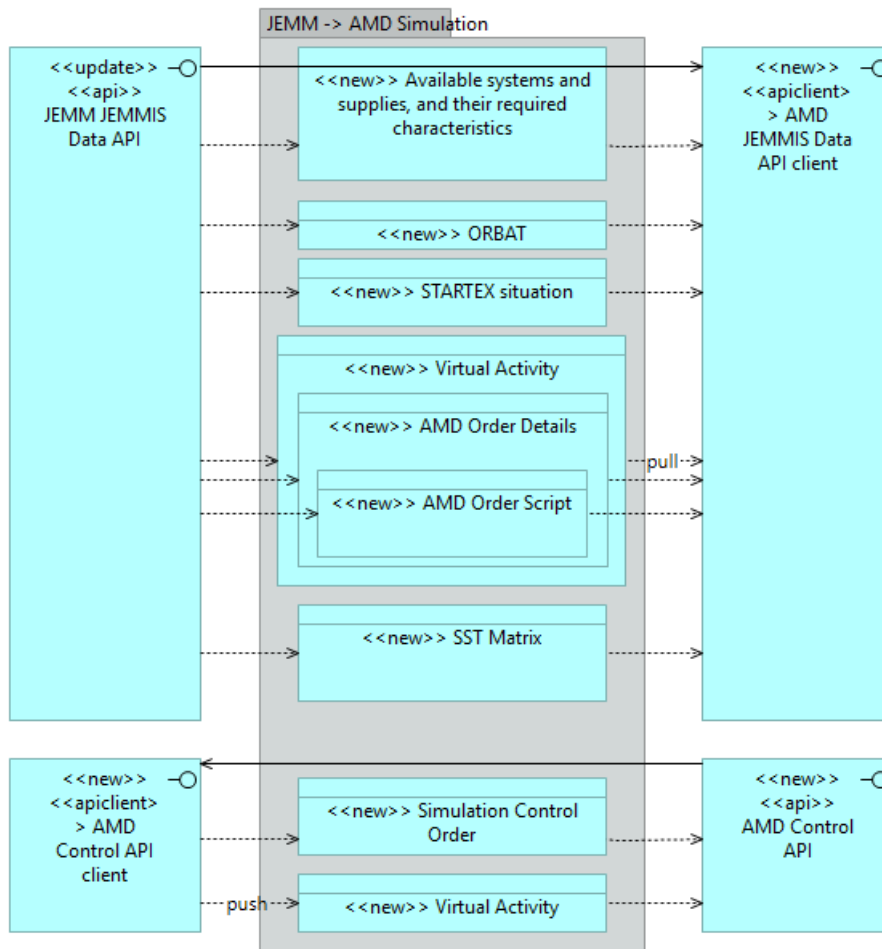


Figure 4: Data exchanged between JEMM and AMD Simulation

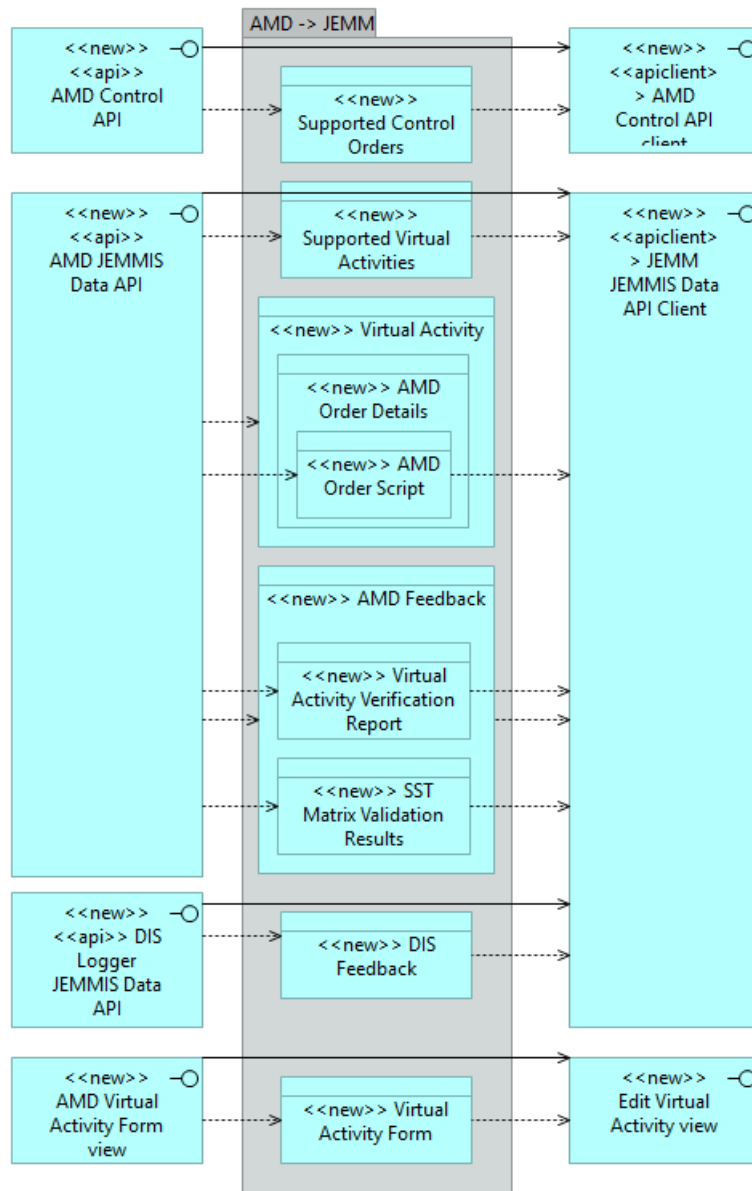


Figure 5: Data exchanged between JEMM and AMD Simulation

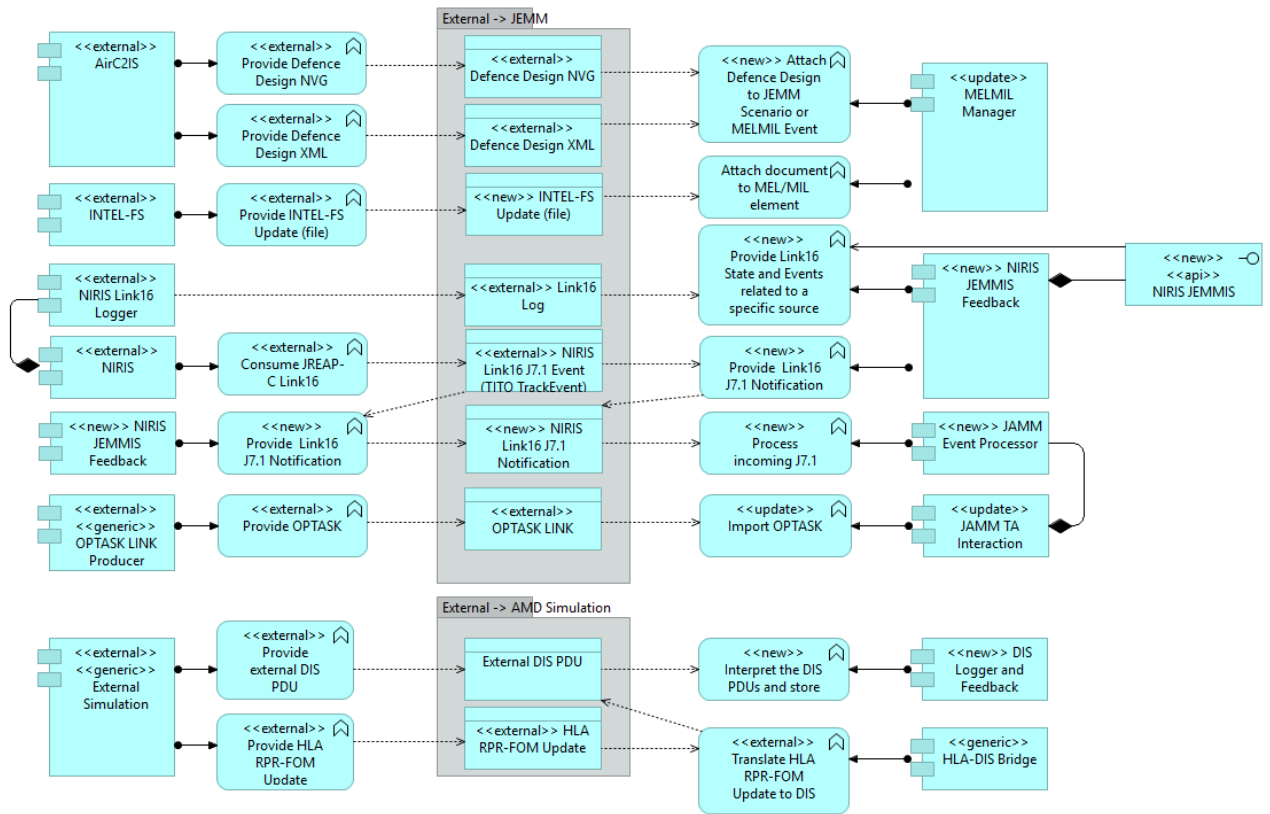


Figure 6: Data received from external systems by JEMM and AMD Simulation

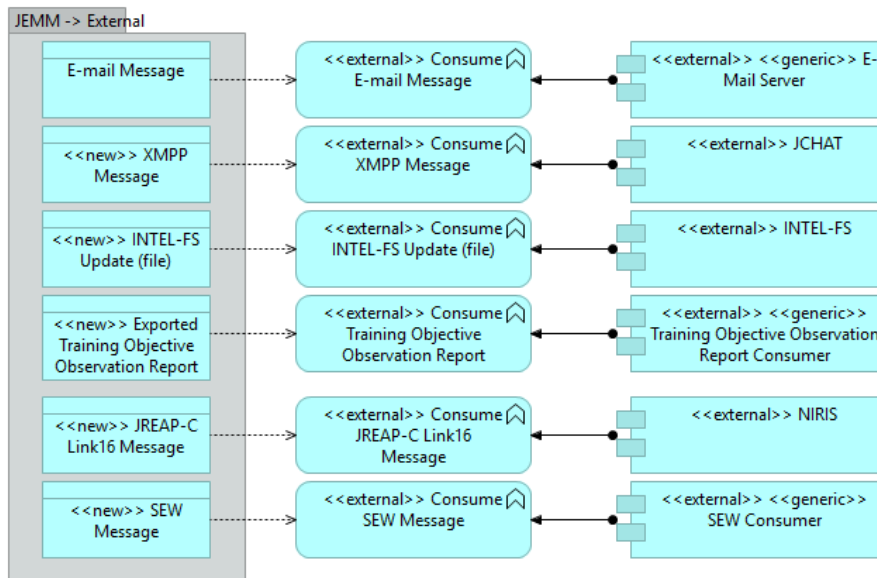


Figure 7: Data sent to external systems by JEMM

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.

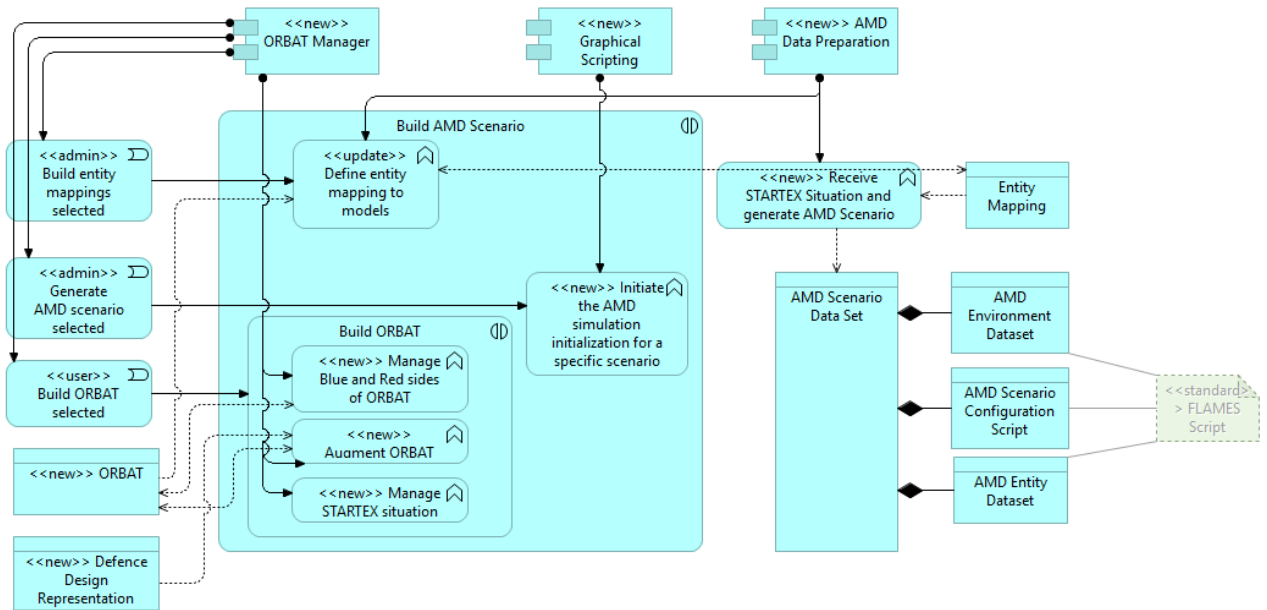


Figure 8: Build AMD Simulation Scenario

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.

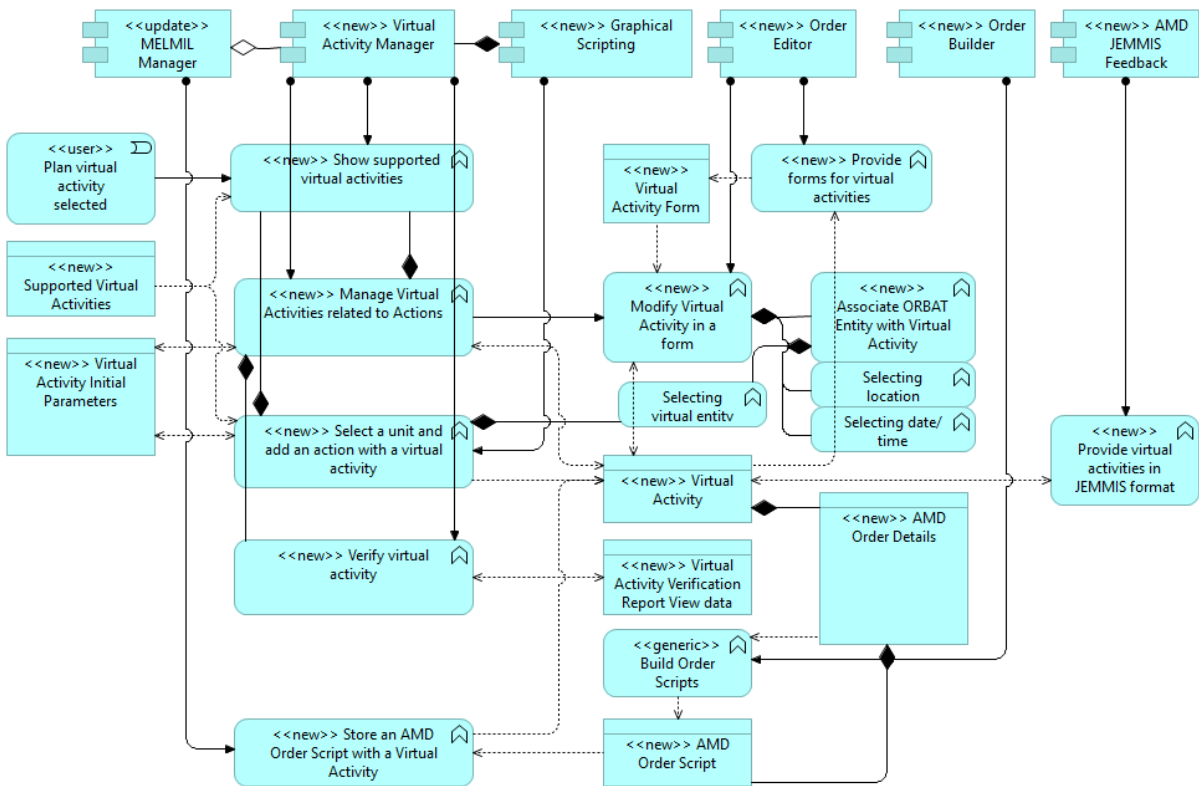


Figure 9: Manage Virtual Activity

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.

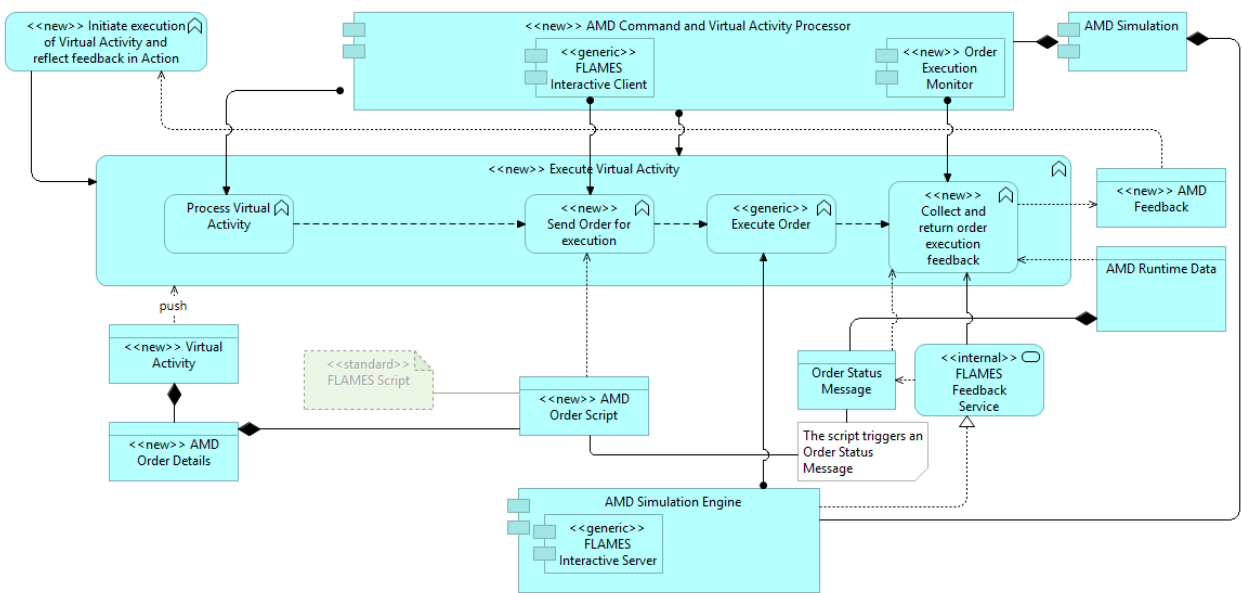


Figure 10: Execute Virtual Activity

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.

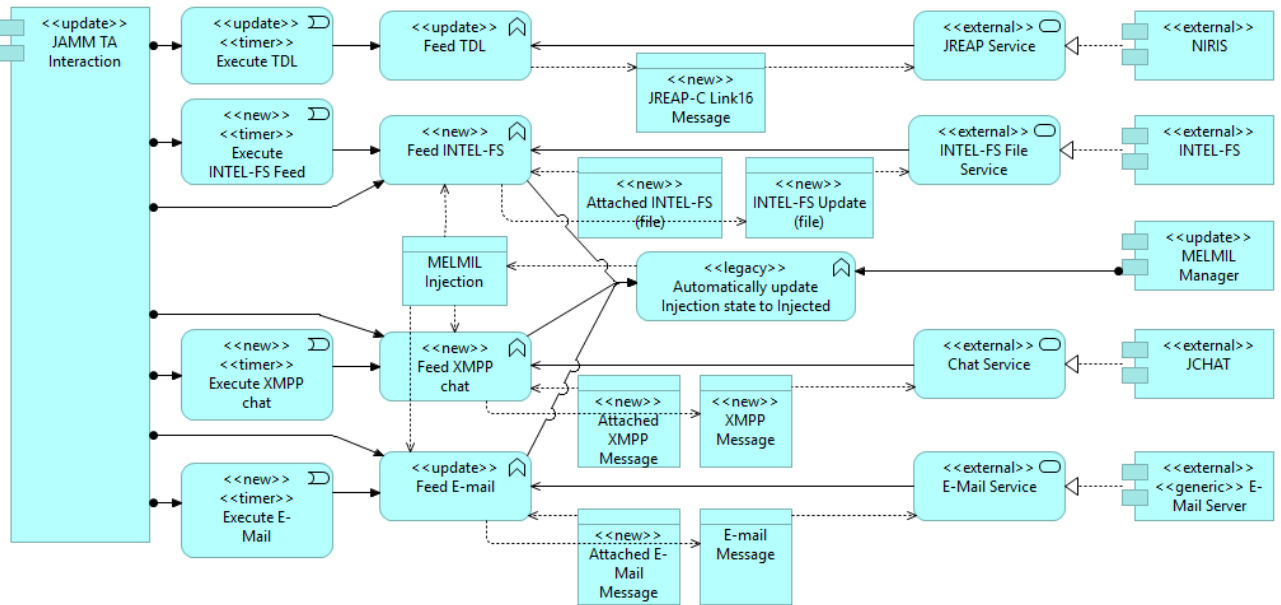


Figure 11: Feed Systems used by the Training Audience

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.

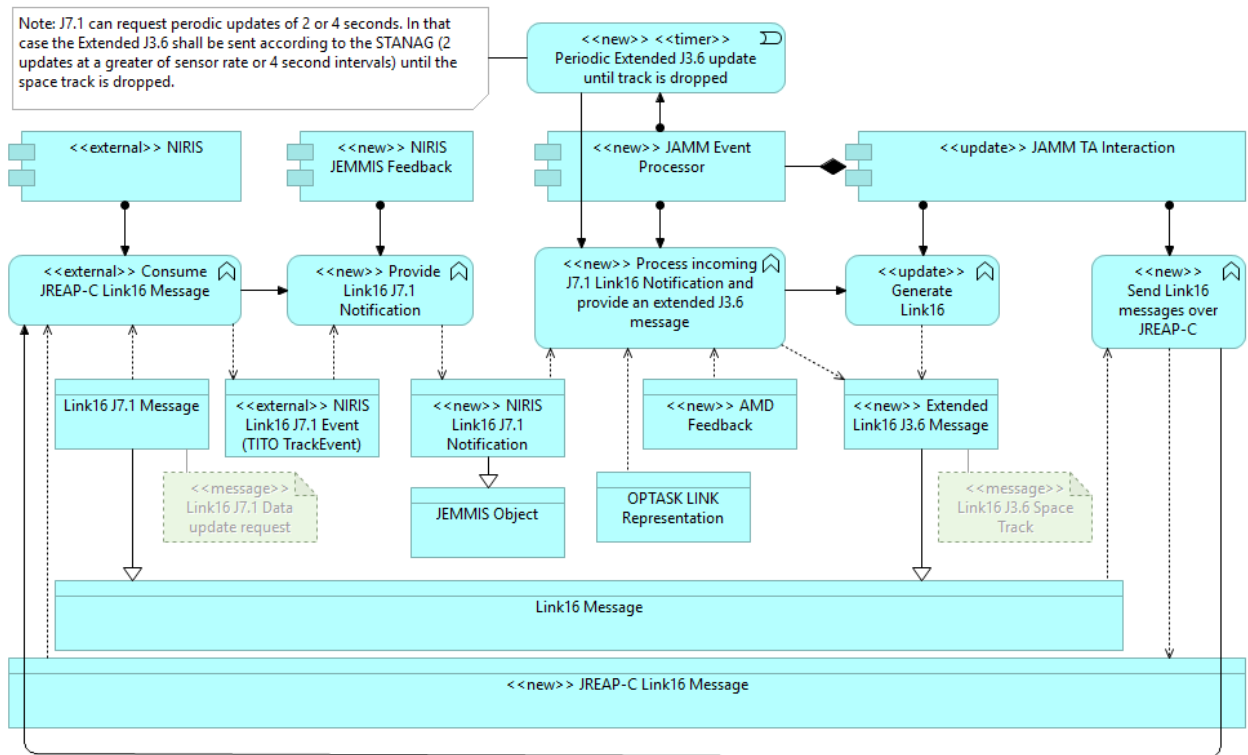


Figure 12: Process incoming J7.1 Link16 Message

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.

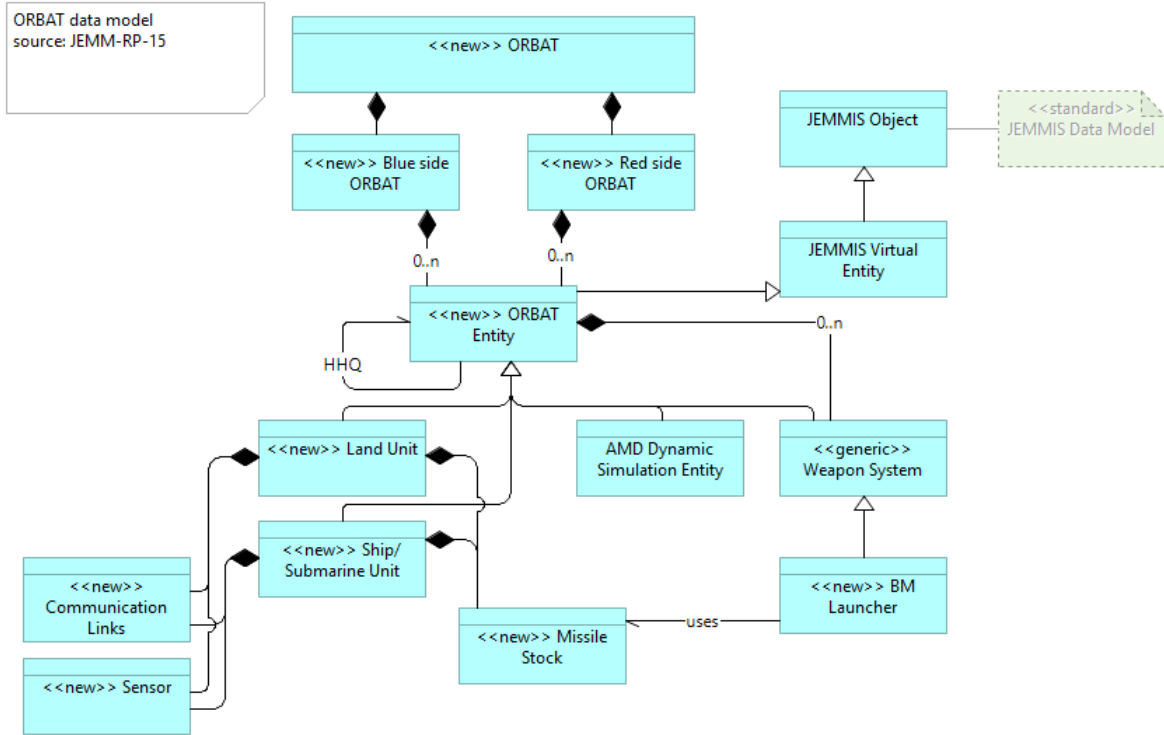


Figure 13: ORBAT data model

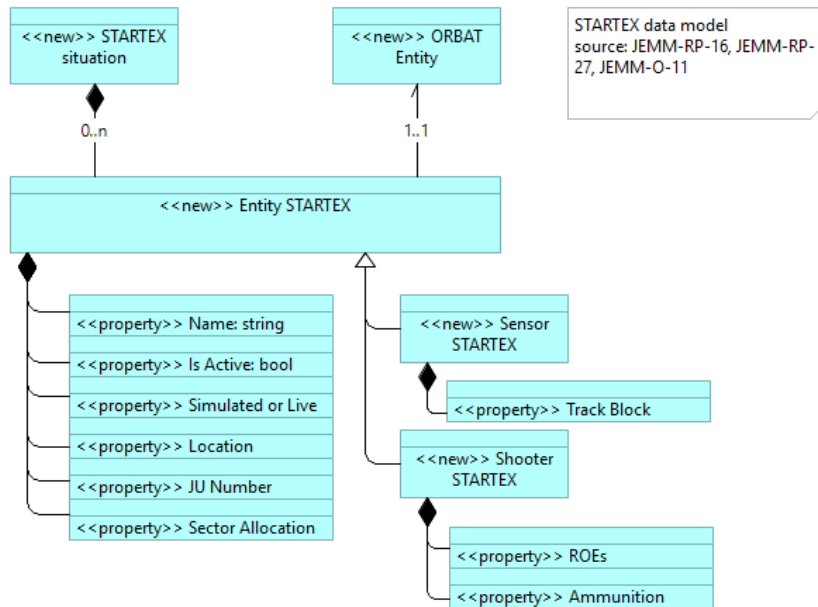
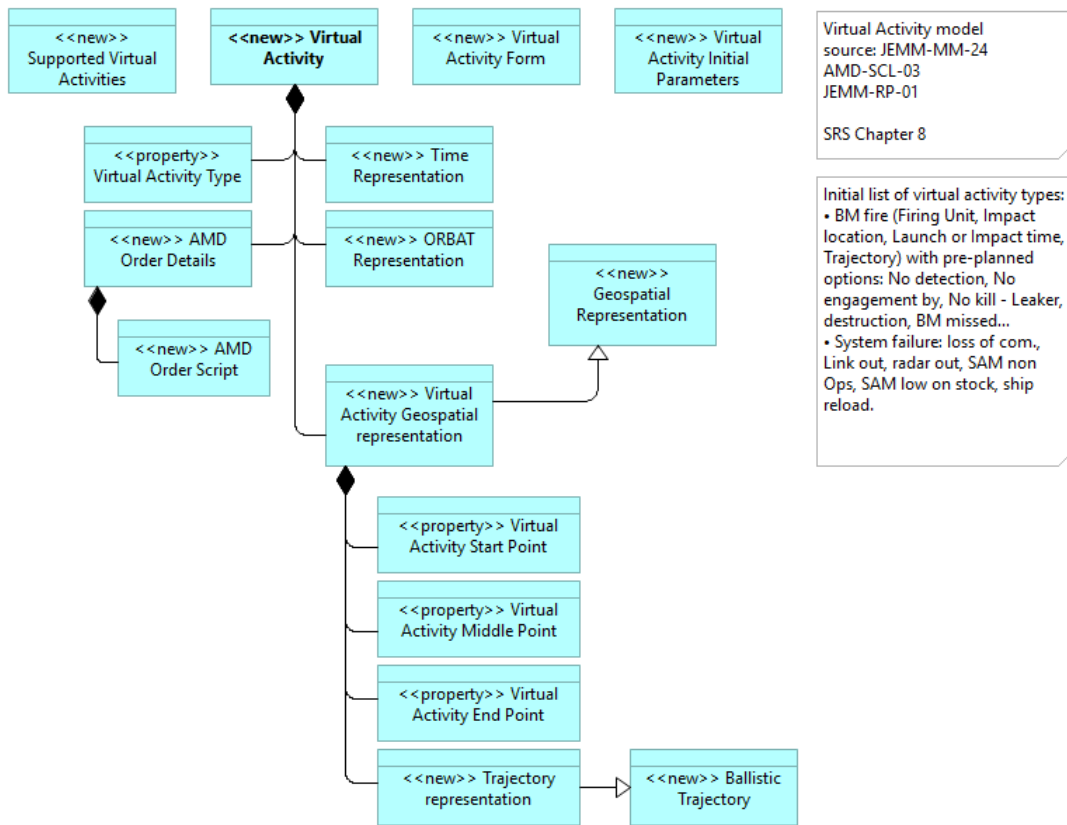


Figure 14: STARTEX data model



Virtual Activity model
 source: JEMM-MM-24
 AMD-SCL-03
 JEMM-RP-01
 SRS Chapter 8

Initial list of virtual activity types:
 • BM fire (Firing Unit, Impact location, Launch or Impact time, Trajectory) with pre-planned options: No detection, No engagement by, No kill - Leaker, destruction, BM missed...
 • System failure: loss of com., Link out, radar out, SAM non Ops, SAM low on stock, ship reload.

Figure 15: Virtual Activity data model

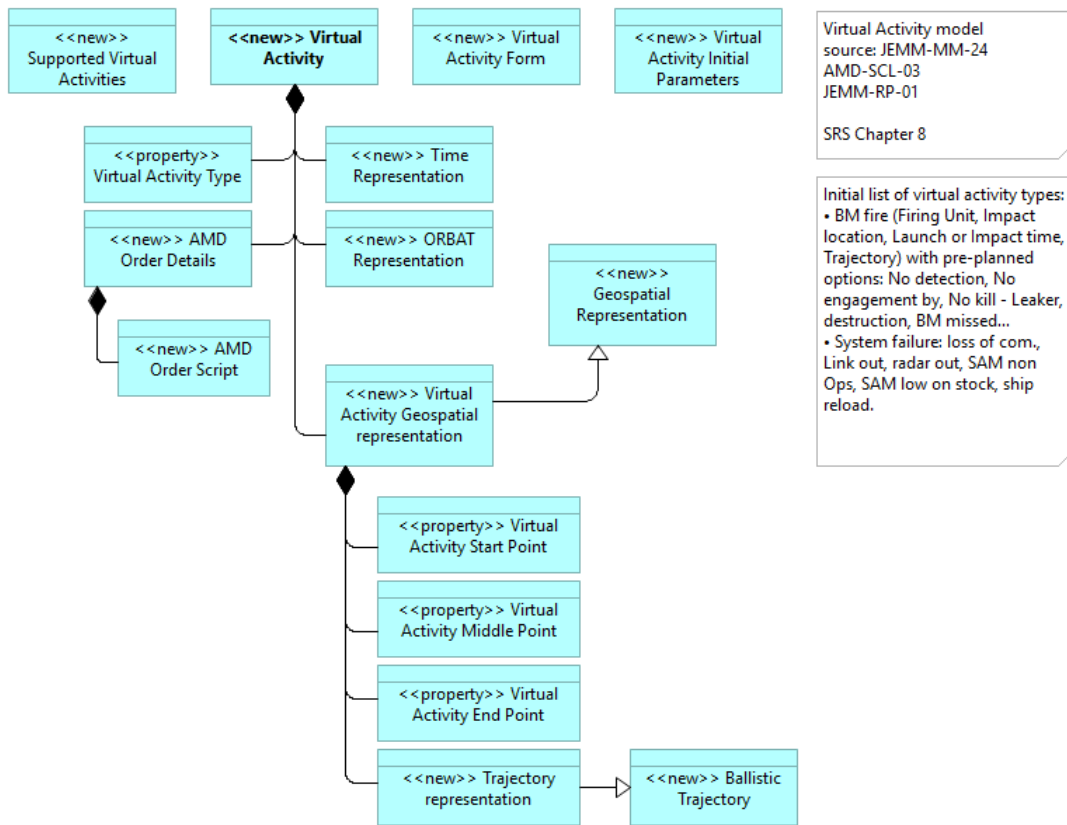
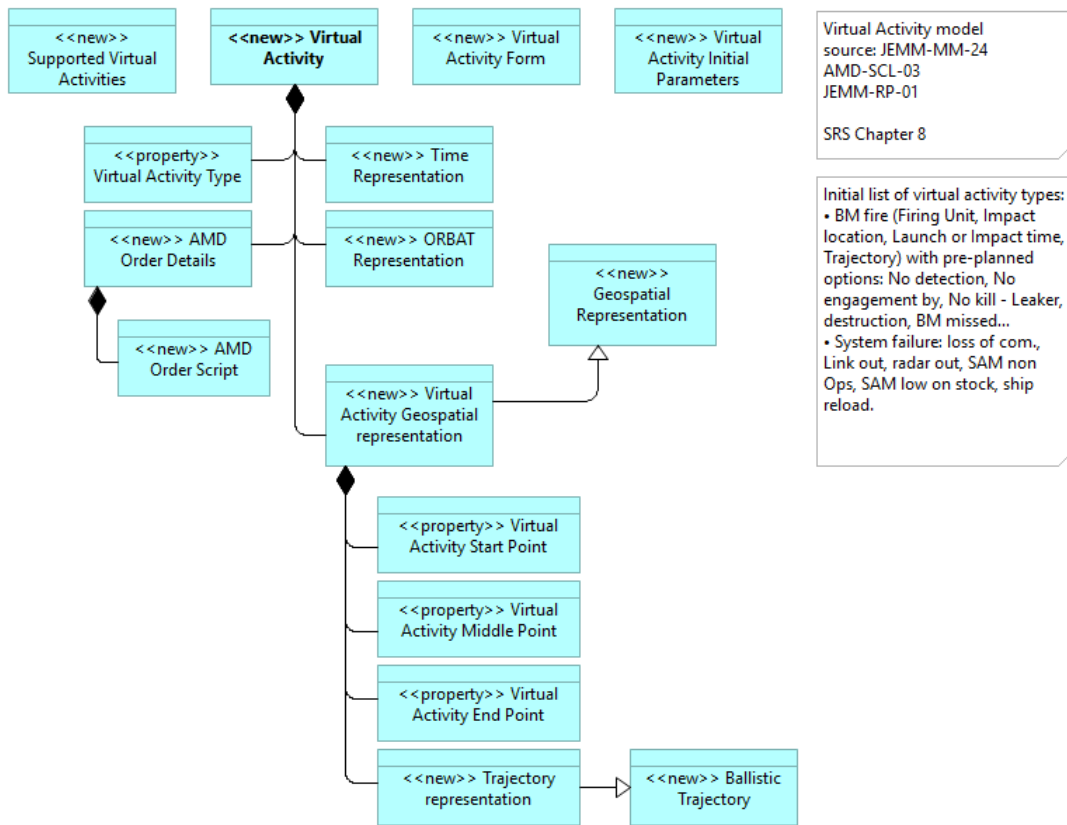


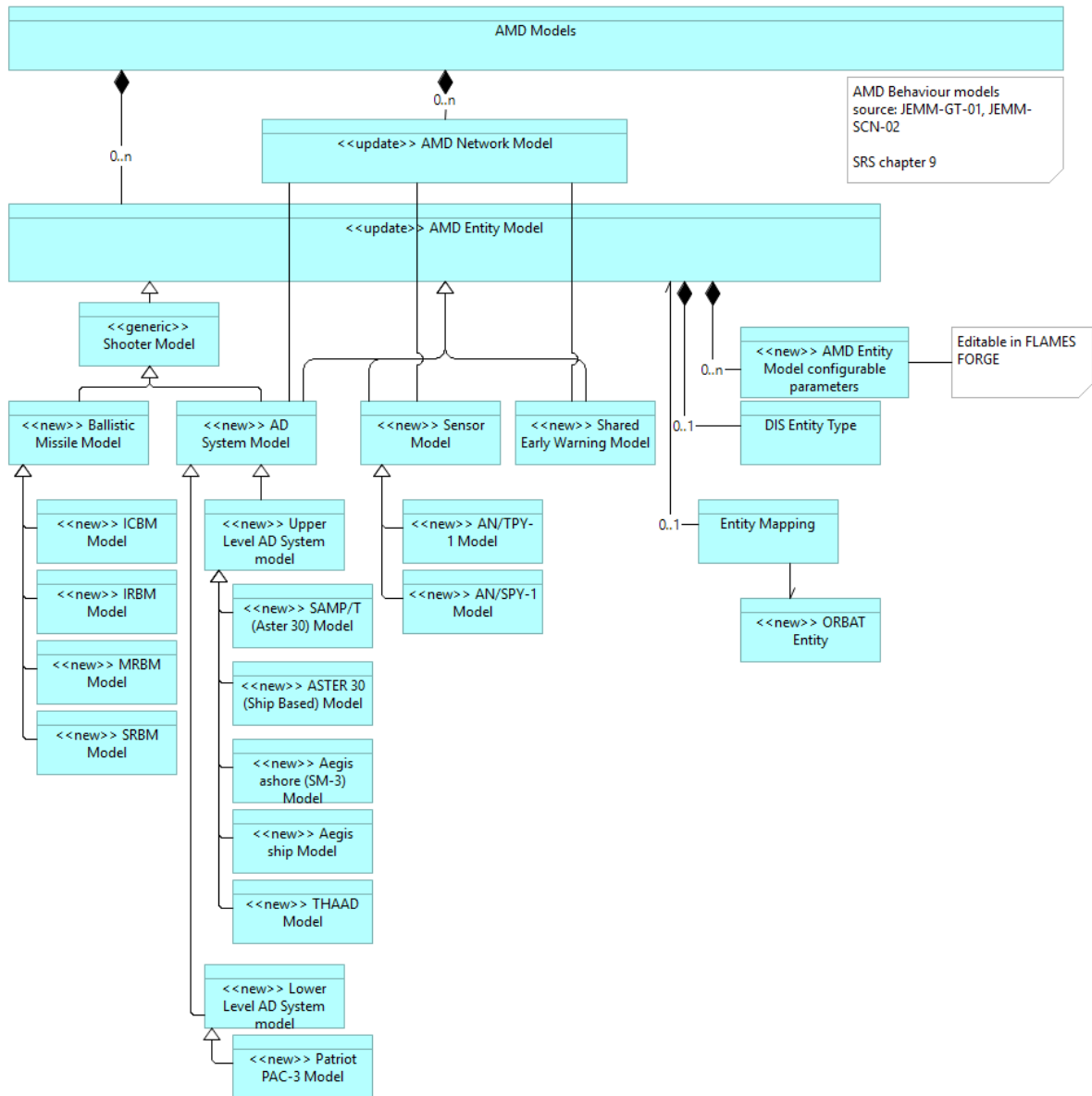
Figure 16: SST Matrix data model



Virtual Activity model
 source: JEMM-MM-24
 AMD-SCL-03
 JEMM-RP-01
 SRS Chapter 8

Initial list of virtual activity types:
 • BM fire (Firing Unit, Impact location, Launch or Impact time, Trajectory) with pre-planned options: No detection, No engagement by, No kill - Leaker, destruction, BM missed...
 • System failure: loss of com., Link out, radar out, SAM non Ops, SAM low on stock, ship reload.

Figure 17: SST Matrix Execution Situation data model



AMD Behaviour models
source: JEMM-GT-01, JEMM-SCN-02
SRS chapter 9

Editable in FLAMES FORGE

Figure 18: AMD Models

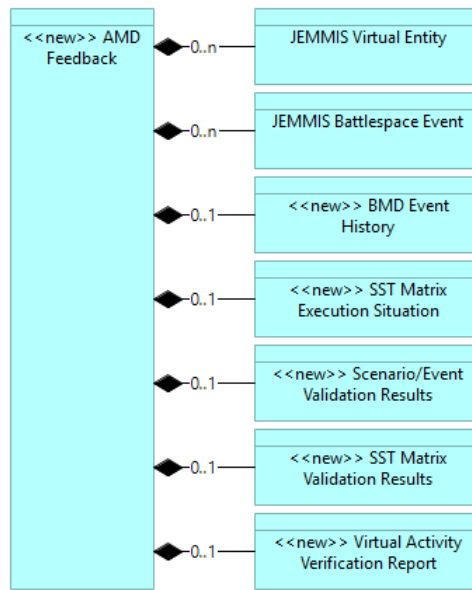


Figure 19: AMD Feedback data model for scenario verification and validation

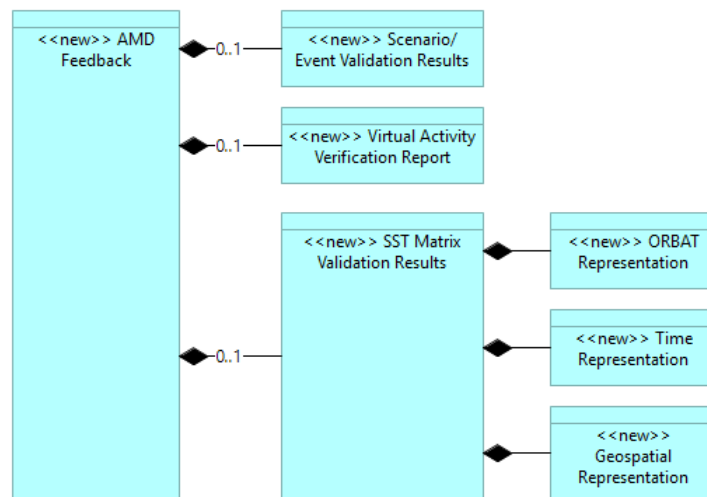


Figure 20: AMD Feedback data model

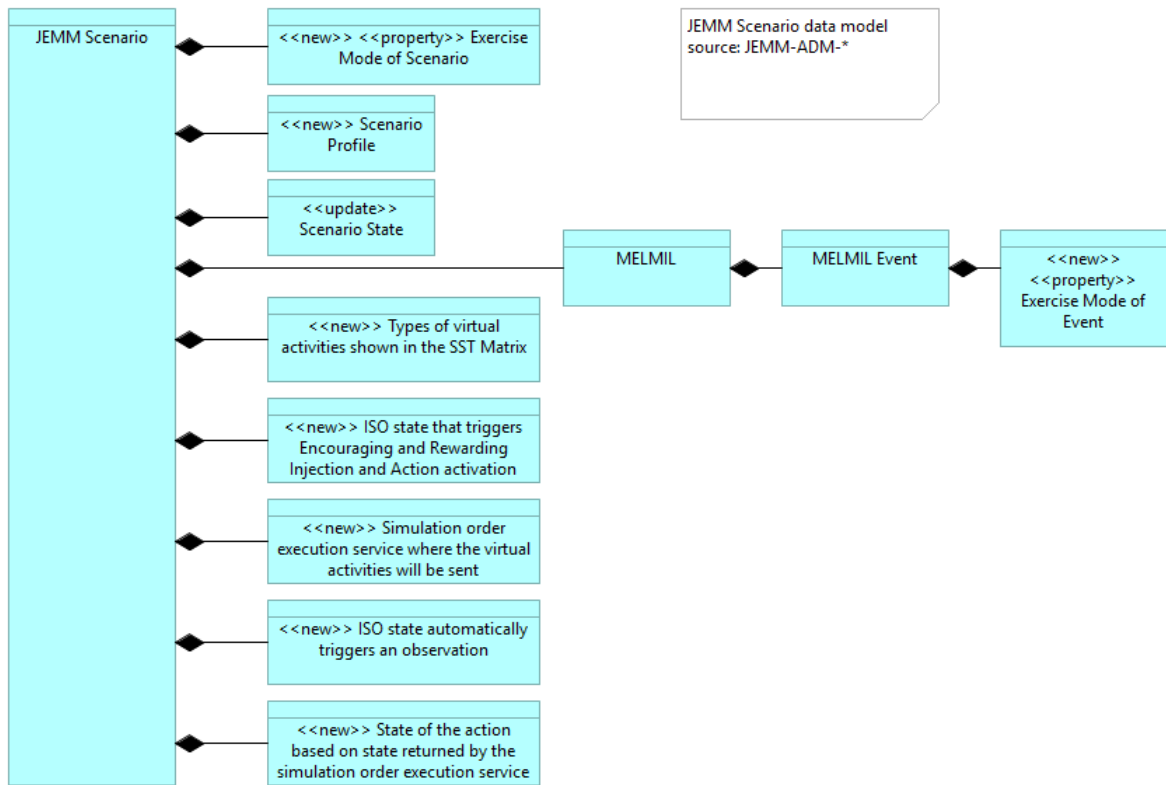


Figure 21: JEMM Scenario Administration data model



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

**PROVIDE AIR AND MISSILE DEFENSE (AMD) SIMULATION
SYSTEM WITHIN BALLISTIC MISSILE DEFENCE (BMD) FUNCTIONS
IN EDUCATION, TRAINING, EXERCISE AND EVALUATION (ETEE)
FUNCTIONAL SERVICES (FS)**

IFB-CO-115113-ETEE AMD SIM

BOOK II – PART IV

STATEMENT OF WORK

Annex C: Coding Principles and Guidelines

Annex C: Coding Principles and Guidelines

1 Coding Convention

- 1.1 The following coding conventions shall be adopted and applied consistently by the Contractor across all code artefacts for each programming language employed, as specified in the table below:

Language	Coding convention
C#	Microsoft C# Coding Conventions (https://docs.microsoft.com/en-us/dotnet/csharp/programming-guide/inside-a-program/coding-conventions) Apply the Java section of CMU SEI Confluence (https://wiki.sei.cmu.edu/confluence)
C++	SEI CERT C++ Coding Standard (https://wiki.sei.cmu.edu/confluence/pages/viewpage.action?pageId=88046682) CMU SEI Confluence (https://wiki.sei.cmu.edu/confluence)
C	SEI CERT C Coding Standard (https://wiki.sei.cmu.edu/confluence/display/c/SEI+CERT+C+Coding+Standard) CMU SEI Confluence (https://wiki.sei.cmu.edu/confluence)
JavaScript	Google JavaScript Style Guide (https://google.github.io/styleguide/jsguide.html)
Other	CMU SEI Confluence (https://wiki.sei.cmu.edu/confluence)

2 User Interface Styling

- 2.1 Web-based User Interface styling details shall be kept separate from application code using cascading style sheets (css).

3 Conformance to design best practices

- 3.1 The delivered source code shall follow object oriented design principles known by the SOLID¹ acronym for all code written in the C# or C++ language.

4 Conformance to coding quality best practices

- 4.1 The delivered source code shall be written using commonly applied quality standards to ensure maintainability, reusability, readability and efficiency. Error proneness shall be avoided.
- 4.2 The delivered source code shall contain no more than 5 instances per 100 lines of code of potential mistakes as listed in the MITRE Common Weakness Enumeration (<https://cwe.mitre.org/data/definitions/699.html>)

¹ Single responsibility, Open-closed, Liskov substitution, Interface segregation, Dependency inversion, see <http://butunclebob.com/ArticleS.UncleBob.PrinciplesOfOod>