

NATO UNCLASSIFIED

**NATO COMMUNICATIONS AND INFORMATION AGENCY AND
MISSILE DEFENCE COMMAND AND CONTROL DIRECTORATE
BALLISTIC MISSILE DEFENCE PROGRAMME**

**STATEMENT OF WORK –AMD1
NATO BMD INTEGRATION TEST BED
OPEN FRAMEWORK SERVICES
(ITB OFS)**

CP OA1303REV1

PROJECT SERIAL 2018/OVA03020

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NATO Communications and Information Agency
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VERSION 1.0

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VERSION HISTORY

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1. INTRODUCTION

1.1 Purpose / Background

[1] In operation since 2007, the BMD Integration Test Bed (ITB) has proven to be an essential and unique enabler for the integration, verification and validation of BMD Programme capabilities. By providing an environment that supports both simulated entities and live BMC3I systems, the ITB has proven essential to verifying BMD functions implemented in NCI Agency-developed services.

[2] With its unique ability to simulate and stimulate various national BMD weapon, sensor and BMC3I systems, the ITB has demonstrated the viability of TMD solutions such as the Air Command and Control System (ACCS) TMD1 and the Bi-Strategic Command Automated Information Services (Bi-SC AIS). Connected to forces through both NATO and National networks, the BMD ITB has established its value through participation in various national tests and exercises, including live BMD firing exercises.

[3] As the BMD Programme Implementation Projects delivered their first increments, the BMD ITB supported successive Ensemble Tests (ET) to verify BMC3I technical requirements. The ITB also supported integration tests as BMD systems were deployed to NATO Command Structure (NCS) sites. All these activities culminated with ITB simulation, data collection and analysis support during test events that supported the declarations of the BMD Interim Capability at the Chicago Summit in 2012 and of BMD IOC at the Warsaw Summit in 2016.

[4] To accomplish the expansion from Active Layered Theatre Ballistic Missile Defence to the current NATO BMD Programme mission to protect all NATO European populations, territory and forces, additional BMC3I projects and supporting Communications services have been initiated, including:

- a. ACCS BMD;
- b. Air Command and Control Information Services (AirC2IS);
- c. BMD Communications;
- d. Education, Training, Exercise and Evaluation (ETEE);
- e. Chemical Biological Radiological and Nuclear Functional Service (CBRN FS);
- f. Intelligence Functional Services (Intel FS);
- g. NATO Common Operational Picture (NCOP);
- h. Tool for Operational Planning, Force Activation and Simulation (TOPFAS);
- i. NATO Communications.

[5] To enable the verification and integration of these NATO BMC3I systems, the BMD ITB must itself be upgraded.

[6] This project will provide the sixth version or "Build" of the BMD ITB to provide the BMD Programme capability with the ability to both verify BMD-related NATO C2 system upgrades and support their integration into the NATO BMD Architecture.

[7] As the NCI Agency acquires Battle Management Command, Control, Communications and Intelligence (BMC3I) systems, individual projects verify that their systems meet BMD

requirements. The BMD Programme verifies that the BMD components are interoperable with NATO and national systems and integrates these BMD systems within NATO and with Alliance Nations. The BMD Programme uses the BMD ITB Laboratory as the main environment in which to perform test planning, test execution and results analysis to support verification of NATO BMD capabilities. In addition, the BMD ITB Laboratory supports stimulation of exercises to enable the military operators to conduct BMD operational validation exercises. With its unique modelling, simulation and verification assets, the BMD ITB laboratory provides a unique and essential NATO asset that links together NATO and national BMD systems over experimental and operational networks.

[8] The ITB provides an environment where C2 system requirements, especially the ones involving interfaces are tested in end-to-end workflows. The ITB provides a test environment where the systems are not tested in isolation (like in a FAT for instance), but in a representative functional multiple systems environment.

1.2 SOW Structure

1.2.1 SOW Main Body

[9] This SOW defines the general requirements for services and supplies provided with CLINs under this Contract.

[10] Section 1 provides an introduction to the SOW.

[11] Section 2 identifies applicable reference documents.

[12] Section 3 defines the CLIN 1, project management requirements of this Contract, including quality assurance and configuration management activities. Also, this section defines CLIN 5.

[13] Section 4 defines the CLIN 2, the system development requirements of this Contract.

[14] Section 5 defines the CLIN 3, defines the testing, verification and validation requirements and acceptance conditions of this Contract.

[15] Section 6 defines the CLIN 4 and CLIN 5, integrated logistics support requirements of this Contract, including training requirements

1.2.2 SOW Annexes

[16] The SOW has the following Annexes:

- a. Annex A – List of Requirements - which provides minimum requirements list related to the ITB OFS
- b. Annex B – TVV Definitions– which describes test, verification, validation related terms used in this SOW.
- c. Annex C – List of Purchaser Furnished Items – which lists the items under the Purchaser responsibility.
- d. Annex D –Personnel Qualification which describes the Contractor's personnel requirements.

- e. Annex E – ILS Definitions– which describes maintenance and support related terms used in this SOW.
- f. Annex F – Project Security Instructions Document
- g. Annex G – List of acronyms used in this SOW
- h. Annex H – Hosting Environment specifications are defined for ITB OFS
- i. Annex I – Template for ERR Form
- j. Annex J – Template for NOR Form
- k. Annex K - Template for SVD
- l. Annex L – Template for RFW and RFD Forms

1.2.3 Convention for the Statement of Work

[17] Requirements are formulated using the form “shall” and are numbered as [SOW-number].

[18] Context information supporting the requirements definition is provided using the form “will” and are numbered as [number].

[19] Whenever requirements are stated herein to “include” a group of items, parameters, or other considerations, “include” means “include but not limited to”.

[20] Whenever reference is made to a Section, tasks, or paragraph, the reference includes all subordinate and referenced paragraphs.

[21] The order of the SOW requirements is not intended to specify the order in which they must be carried out unless explicitly stated. The SOW defines the activities that the Contractor’s process shall cover, where the Contractor’s implementation plans determine the timing of detailed Contractor activities.

[22] For purposes of the SOW, the term “the Purchaser” means the NCI Agency or its authorised representatives. Where referenced standards, specifications, etc., refer to “the Government”, this shall be construed to mean “the Purchaser”.

SOW-1. The SOW and its Annexes shall take precedence over the Applicable Documents in Section 2 of this SOW.

1.3 Scope

1.3.1 ITB System Description

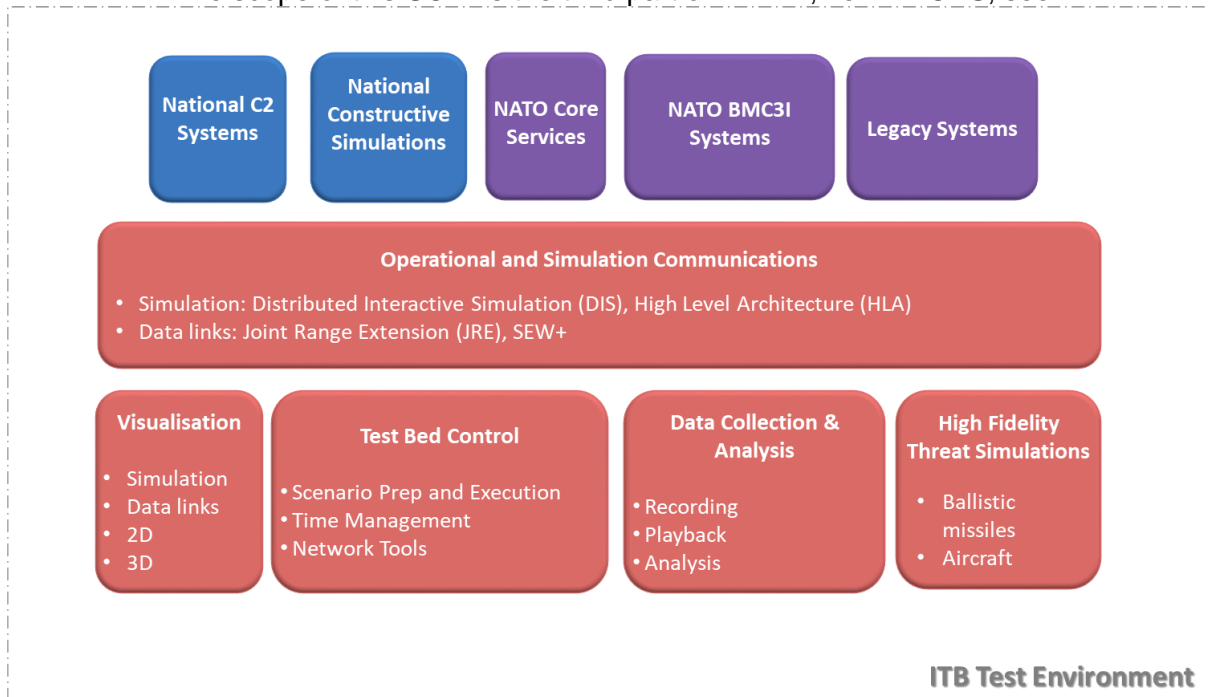
[23] The BMD ITB Test Environment (ITB TE) Build 6, hosts three different categories of components:

- a. First, NATO C2 systems, which are the systems under test. The ITB includes NATO C2 clients, while the NATO C2 servers are hosted in the datacentre under the responsibility of the BMD implementation Projects.
- b. Second, representations of National BMD contributions (National C2, sensor and shooter). These representations are used to generate a simulated

scenario environment to test the NATO C2 and to test the interoperability of National contributions with NATO C2 systems. National systems simulations, or remote access to National HWIL are available in the ITB.

- c. Third, ITB OFS which provides scenario preparation services, threat injections, recording, visualisation and analysis tools, as well as network connectivity and monitoring.

The scope of this SOW is the third part of ITB TE, i.e. ITB OFS, see



[24] Figure 1. The system to be acquired and defined by this SOW is called “**ITB OFS**” throughout this document.

[25] Hardware (HW) upgrades necessary for the ITB 6 is out of scope and will be delivered by the Purchaser as PFI.

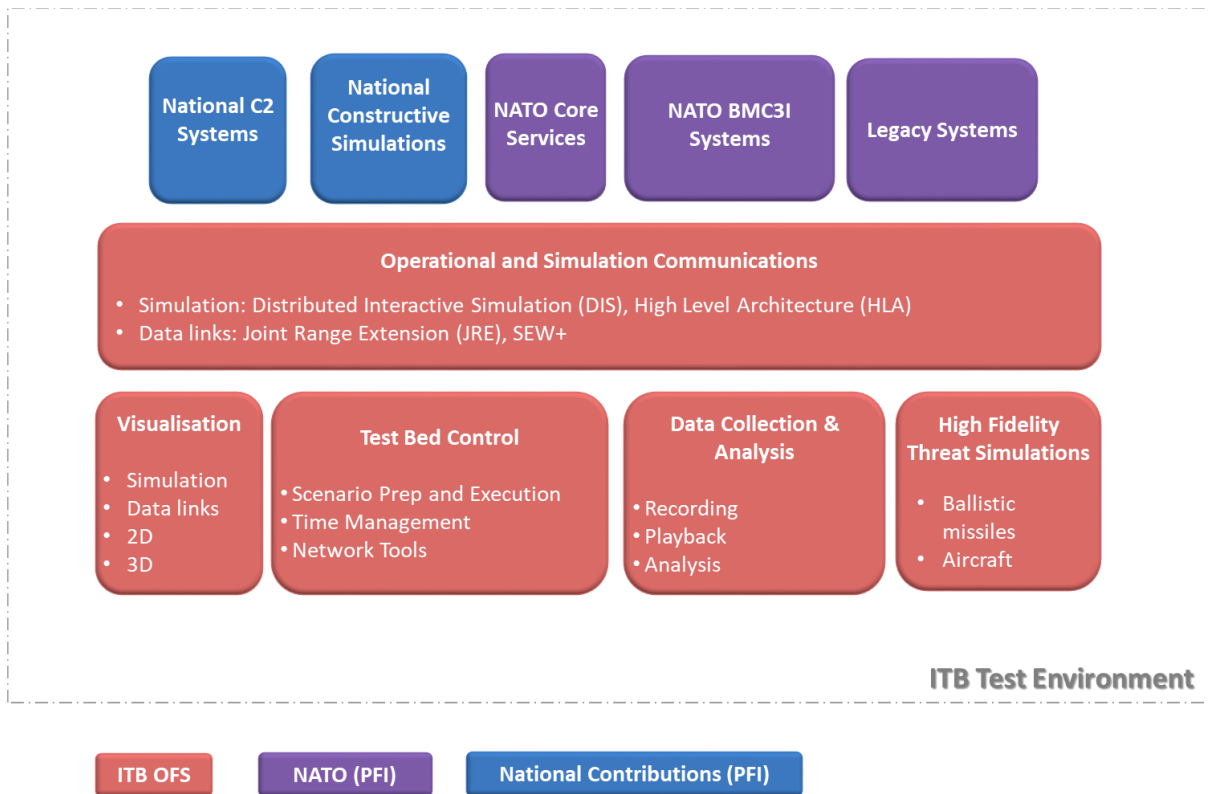


Figure 1 ITB Test Environment (ITB TE) Overview

1.3.2 ITB Hardware Components

[26] The general hardware description and functions for ITB TE as follows:

[27] Core ITB: Is only connected to the Combined Federated Battle Laboratories Network (CFBLNet) NATO red enclave and is used for exercises, risk reduction, tests, and trials with external systems that are connected to CFBLNet. The Core ITB shall meet all requirements of the ITB OFS. The Core ITB runs on a virtualized environment and is equipped with a high redundancy Blade server system, high bandwidth switches, and includes a mass storage system with a backup.

[28] Operational ITB (Ops ITB): Is only connected to the NS Wide Area Network (WAN) Operational Network that provides the services needed to support exercises and events executed on the operational network (e.g., data link connections, data collection, threat injection, ICC).. The Ops ITB runs on a virtualized environment and is equipped with a high redundancy Blade server system, high bandwidth switches, and includes a mass storage system with a backup.

[29] Portable ITB: Could be deployed to the field for threat injection and/or data collection and other functions needed in the field. The portable ITB is running on a laptop. The portable ITB can act as a back-up for the Ops ITB.

[30] Core ITB, Ops ITB and Portable ITB all runs on separate hardware and networks. The three instances are designed to provide the program with the ability to support concurrent and simultaneous test events and activities conducted on separate networks (See Figure 2).

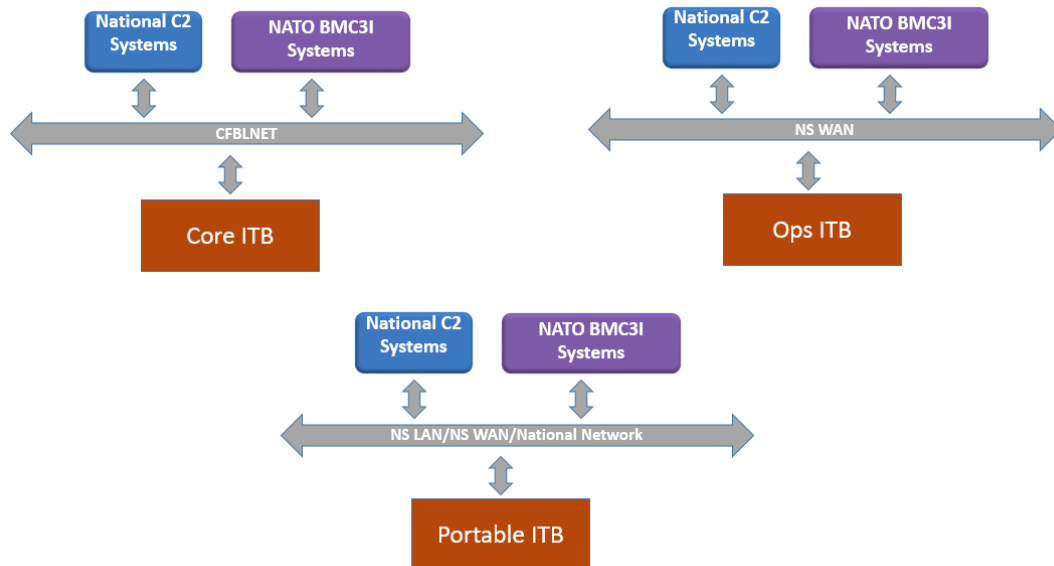


Figure 2 ITB HW Overview

1.3.3 ITB OFS Scope

[31] The work will be split as follow:

CLIN 1 will cover all project management to organize, schedule and conduct the work identified through present contract;

CLIN 2 will cover the System Requirements Analysis, System Design, and Development for ITB OFS.

CLIN 3 will be Acceptance and test activities

CLIN 4 will cover integrated logistic support including training activities.

CLIN 5 Options will cover optional extended warranty, training and intervention for additional warranty.

SOW-2. In order to improve ITB OFS with new technologies and capabilities from the Current state (see 1.3.4) to the End State (see 1.3.5), the Contractor shall :

- a. Organize, schedule and conduct the work to execute the identified CLINs defined above;
- b. Undertake the project management activities required to ensure delivery of the contract scope on time and to the quality standards specified in this SOW.

- c. Undertake the system design, development, provision, configuration, installation, integration and testing of the BMD ITB OFS, while meeting the functional and non-functional requirements provided in the ANNEX A and to be detailed in SRS developed by the Contractor.
- d. Conduct,
 - System Requirements Analysis. Through this stage, the Contractor shall refine and update the requirements identified in Annex A to ensure proper understanding of requirements within the various stakeholder communities (the Contractor, the Purchaser and the User) The SRS updates will go through a System Requirement Review (SRR). Upon Purchaser's acceptance of the updated SRS, the design stage will start.
 - System Design. Through this stage, the Contractor shall propose a design which meets the SRS requirements. This design will be submitted during the System Design Review. Upon Purchaser's approval of the System Subsystem Design Description (SSDD), the development stage will start.
 - Development and Integration. Through this stage, the Contractor shall develop new software (if required), implement and integrate COTS in accordance with SSDD. During this period, the Contractor shall grant access to all data regarding the Developmental Baseline to the Purchaser. At the end of this stage, the Contractor shall deliver a Product Baseline.
 - Testing. Through this stage, the Candidate Product Baseline of ITB OFS component shall go through different tests to support authorisation for deployment of the ITB OFS components into NATO operational network environment.
- e. Install/integrate/verify three identical instances of ITB OFS on the three HW platforms provided by the Purchaser, described in section 1.3.2.
- f. Integrate ITB OFS solution with other ITB TE components provided as PFI.
- g. Deliver all the documentation required as stated in Schedule of Supplies and Services (SSS) This SSS contains the list of deliverables required, with delivery deadlines.
- h. Support. Through this stage, the Contractor shall provide corrective maintenance and on-site support at Purchaser's facilities until the end of support & maintenance period.

SOW-3. The current Components of the ITB 5 capability shall be kept operational until replacement. The contractor may decide to keep, extend, or replace current BMD ITB Components.

[32] The list of the minimum requirements defining the boundary of ITB OFS to be acquired by this SOW, is given in ANNEX A.

1.3.4 ITB Current State

[33] The BMD ITB is currently operating in a configuration known as "ITB Build 5."

[34] This legacy ITB configuration was built according to original ALTBMD development contract requirements.

[35] The BMD ITB Lab is comprised of the following components

- a. NATO C2 systems (e.g. ACCS, AirC2IS, NCOP, ICC/LSID, TOPFAS)
- b. National Systems including the Surface to Air Missile Operation Centre (SAMOC) and constructive simulations such as the Extended Air Defence Simulator (EADSim) and Joint Research on Air Defence Systems (JROADS) featuring the ITB with the ability to simulate National BMD resources
- c. And the ITB Open Framework Services (OFS), subject of this SOW.

[36] The OFS enables connection of any combination of constructive simulations, National laboratories and live systems into a realistic friendly force structure, and enable injecting realistic threat scenarios into those integrated components for a variety of purposes that range from architecture interoperability assessment, to evaluating Concepts of Operation (CONOPs).

[37] Figure 3 illustrates the current state of the ITB Build 5 reference architecture;

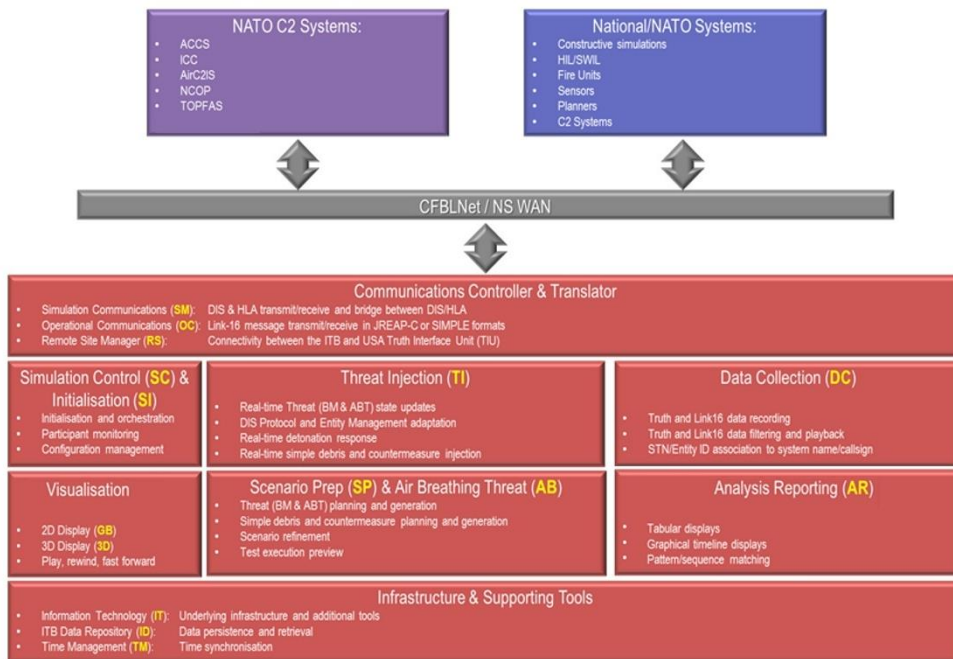


Figure 3 Current State of ITB (ITB Build 5)

[38] ITB Interfaces Description Document [ITB IDD]) identifies the services in Build 5 and their component capabilities.

[39] Table 1 identifies the services in Build 5 and their component capabilities.

Service Capability	Role
Gateway Services	Supports data exchange with other sites

Service Capability	Role
Simulation Communications	Enables High Level Architecture (HLA) and converts between HLA and Distributed Interactive Simulation (DIS) protocols
Operational Communications	Adapts simulation data to support national implementations
Remote Site Manager	Exchanges sim data and related files with USA systems
Preparation Services	Supports preparation of test and exercise scenarios
Air Breathing Threat	Simulates threat and friendly aircraft and cruise missiles
Scenario Preparation	Provides the capability for users to create and edit scenarios
TBM Threat Injection	Models ballistic missiles, decoys and chaff
Data Services	Supports data management
Data Capture	Records simulation, data link and message traffic
Analysis Results	Supports graphical and textual analysis of test results
Data Storage Services	Ensures highly reliable recording and retention of data
ITB Database Repository	Supports saving, searching, retrieval and editing of test data
Simulation Services	Supports all aspects of real-time test control
Gameboard	Provides a 2D display supporting extensive operator control
Visualization	Provides 3D visualisation of the scenario
Simulation Initialization	Prepares ITB simulations for participation in upcoming tests
Simulation Control	Supports management of local and remote test components
Time Management	Supports event time synchronization
IT Infrastructure	Comprises networks, files, audio-visual and related services

Table 1 BMD ITB Build 5 Capabilities

[40] The BMD ITB features three distinct sets of test environment and systems: Core ITB, Ops ITB and Portable ITB. In terms of software builds, these three instances will host identical builds of the ITB OFS.

- a. In the ET technical integration and verification series, BMD ITB engineers connect the primary set of ITB test components, known as the “Core ITB”, via CFBLNet to national BMC3I and weapon systems. National assets supported by the Core ITB may be located at national laboratories or at operational facilities with access to CFBLNet.
- b. To perform its operational integration and verification role, BMD ITB engineers connect a reduced set of ITB test components, known as the “Ops ITB”, via the NSWAN to national BMC3I and weapon systems. In comparison with the high performance “enclosure and multiple blades” hardware configuration used on the Core ITB, the Ops ITB currently consists of a lower performance single rack-mounted virtualised server that is now of insufficient performance. National assets supported by the Ops ITB may be located at national laboratories, operational facilities or deployed locations with access to the NSWAN. The same Ops ITB is used to support Operations and Exercises.
- c. To support testing at deployed locations where neither CFBLNet nor NSWAN connectivity is available, BMD ITB staff may deploy with a set of four laptops that are referred to collectively as the “Portable ITB.” One of these systems features a high performance virtual machine (VM) configuration based on the configuration of the Ops ITB. The other three laptops connect as clients to the VM host laptop for ITB services.

1.3.5 ITB End State

[41] The new BMD ITB will be operating in a configuration known as “ITB Build 6.”

[42] While the existing ITB Build 5 architecture is able to support verification of some of the newer (BMD) requirements, Build 5 has limited capability in specific areas such as advanced threat modelling, scenario preparation, national system modelling, visualisation and automated result analysis.

[43] The threat modelling capability is currently provided by the BMD ITB Build 5 Threat Injector (TI) application. This capability supports a TMD threat set defined under the ALTBMD Programme. The TI application is still available for use by the BMD Programme in the ITB, but does not model the more advanced BMD threats required by the Strategic Commands.

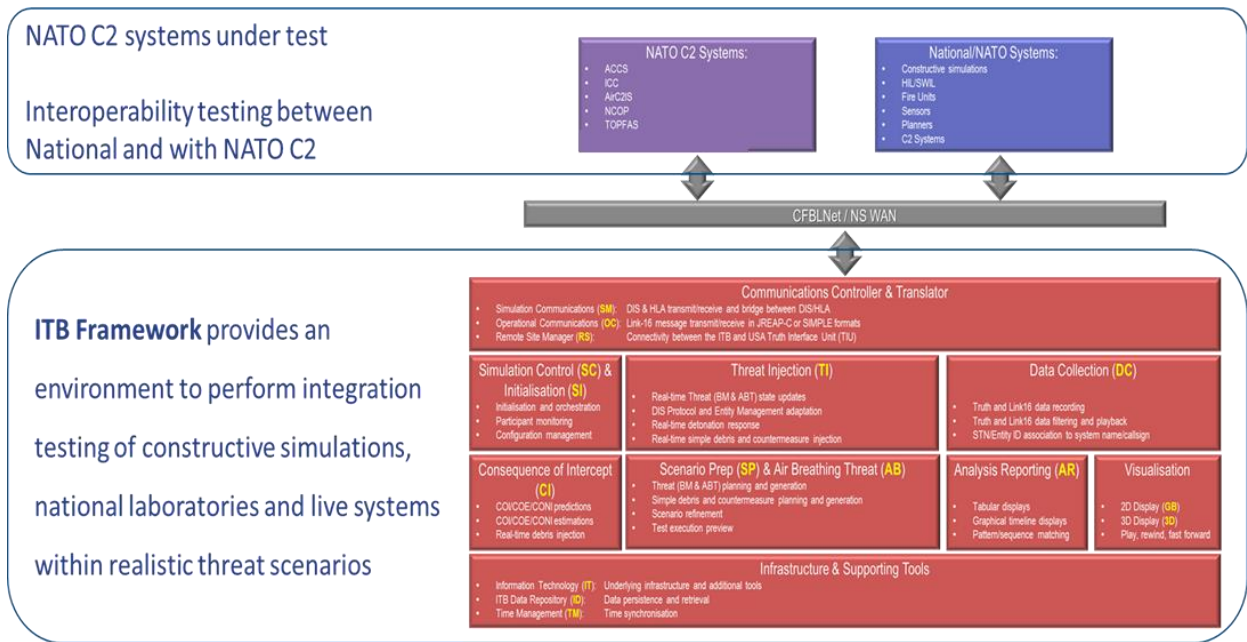


Figure 4 ITB TE System Breakdown

[44] ITB OFS are expected to provide continuation of existing Build 5 functions, update threat set and improved threat injection, provide new scenario planning tools integrated with threat injection and test execution monitoring and control. The project also upgrades also improves data analysis capability to support verification of new BMD System of System capabilities and upgrades analysis tools to meet current and future revision of the Link 16 STANAG and simulation standards.

[45] Hosting environment specification for ITB 6 OFS is given in ANNEX H.

SOW-4. The Contractor shall be responsible to integrate ITB OFS solution with National System representation in the ITB TE, provided as PFI.

SOW-5. The Contractor shall be responsible to integrate communication legacy applications mandated by the Nations (see ANNEX C) to support the exchange of simulation data with ITB TE.

SOW-6. The Contractor shall be responsible to integrate ITB OFS solution with NATO Systems in ITB TE.

2. REFERENCED DOCUMENTS

[46] This section provides guidance concerning documents to be used by the Contractor to support accomplishment of the tasks detailed in this SOW.

[47] The applicable and reference documents to be made available in a Bidder's library, are also indicated.

[48] The documents included in Bidder's Library will be provided by the Purchaser.

2.1 Applicable Documents

Reference number	Title	Edition/Date	Bidder's Library
REF-1	STANAG 4427, Configuration Management in System Life Cycle Management	Ed.3, 2014	No
REF-2	AQAP-2105, NATO Requirements for Deliverable Quality Plans	Edition 2, 2011	No
REF-3	AQAP-2110, NATO Quality Requirements for Design, Development and Production	Ed. D, Version 1, 2016	No
REF-4	ISO/IEC 25010, Systems and software engineering - - Systems and software Quality Requirements and Evaluation (SQuaRE) -- System and software quality models	2011	No
REF-5	ISO 9001:2015: Quality Management Systems	2015	No
REF-6	ISO 9241-210:2010 Ergonomics of human-system interaction -- Part 210: Human- centred design for interactive systems	2010	No
REF-7	ISO/IEC 12207:2008: Systems and Software Engineering - Software life cycle processes	2008	No
REF-8	IEEE Standard 1016-2009 - IEEE Standard for Information Technology--Systems Design-- Software Design Descriptions	2009	No

REF-9	Bi-SC Education And Individual Training Directive (E&ITD) 075-007	2015	Yes
REF-10	STANAG 6001, Language Proficiency Levels	Ed.4, 2010	No
REF-11	Concise Oxford English Dictionary	Ed.11	No
REF-12	ITB Interface Description Document (IDD)	2/27/2017	Yes
REF-13	AI TECH 06.02.14 Service Interface Profile For Geospatial Services – Map Rendering Service	06.02.14	Yes
REF-14	ADatP-34, NATO Interoperability Standards and Profiles Volume 1, Introduction	Edition M Version 1	Yes
REF-15	200902-C3-taxonomy-baseline	Baseline 4.0 August 2020	Yes

Table 2 Applicable Documents

2.2 Reference Documents

Reference number	Title	Version/Date	Bidder's Library
REF-16	STANAG 2290, NATO Unique Identification of Items	Ed. 2, 2010	No
REF-17	STANAG 4107, Mutual Acceptance of Government Quality Assurance and Usage of the Allied Assurance Publications (AQAP)	Ed. 9, 2016	No
REF-18	ACMP-2009, Guidance on Configuration Management	Ver.2, 2017	No
REF-19	STANAG 4728, System Life Cycle Management	Ed. 2, 2015	No

Reference number	Title	Version/Date	Bidder's Library
REF-20	AAP-20, NATO Programme Management Framework (NATO System Life Cycle Model)	Ed. C, Ver.1, 2015	No
REF-21	AAP-48, NATO System Life Cycle Processes	Ed. B, Ver.1, 2013	No
REF-22	STANAG 5516, TACTICAL DATA EXCHANGE - LINK 16	Ed. 4	No
REF-23	STANAG 5516, TACTICAL DATA EXCHANGE - LINK 16	Ed. 5	No
REF-24	STANAG 5516, TACTICAL DATA EXCHANGE - LINK 16	Ed. 6	No
REF-25	IEEE 1278.1 IEEE Standard for Distributed Interactive Simulation-- Application Protocols	2012	No
REF-26	STANAG 5518 (RD), Standard for Joint Range Extension Application Protocol (JREAP)	Ed 3, 2015	No
REF-27	STANAG 5602, Standard Interface for Multiple Platform Link Evaluation (SIMPLE)	Ed 2, 2006	No
REF-28	NCI Agency Directive 06.03.04 Test, Verification and Validation		Yes
REF-29	ISO/IEC/IEEE 29119:2013 Software and systems engineering - Software testing	2013	No
REF-30	IEEE Standard 829-2008 IEEE Standard for software and system test documentation	2008	No
REF-31	ACMP-2000, Policy on Configuration Management	Ed. A, Ver.2, 2017	Yes
REF-32	ACMP-2100,	Ed. A, Ver.2, 2017	Yes

Reference number	Title	Version/Date	Bidder's Library
	Configuration Management Contractual Requirements		
REF-33	AQAP-2000, NATO Policy on an Integrated Systems Approach to Quality through the Life Cycle	Ed. 3, 2009	No
REF-34	AQAP-2009, NATO guidance on the Use of the AQAP-2000 Series	Ed. 3, 2010	Yes
REF-35	AQAP-2120, NATO Quality Assurance Requirements for Production	Ed. 3, 2009	Yes
REF-36	AQAP-2210, NATO Supplementary Software Quality Assurance Requirements to AQAP-2110	Ed. 1, 2006	Yes
REF-37	ISO/IEC 20000-1:2011: Information Technology - Service Management, Part1: Specification; Part2: Code of Practice	2011	No
REF-38	AC/322-D/0048 INFOSEC Technical Implementation Directive For CIS Security	Rev3	Yes
REF-39	AC/322-D/0049, INFOSEC Technical & Implementation Directive for Transmission Security;	Rev2	Yes
REF-40	C-M(2002)49 - Security within the NATO - Enclosure F - CIS Security	2002	Yes
REF-41	AC/35-D/1014-REV3, Guidelines for the Structure and Content of Security Operating Procedures (SecOps) for Communication and Information Systems (CIS), (NU)	Rev. 3, 31 January 2012	Yes
REF-42	BMD-PO-PRG-SCG-108-2.0 NATO BMD Security classification guide	V. 2.0 30 Sep 2020	Yes

Reference number	Title	Version/Date	Bidder's Library
REF-43	AC/35-D/1015-REV3, Guidelines for the Development of Security Requirement Statements (SRS), (NR)	31 January 2012	No
REF-44	AC/35-D/1021-REV3, Guidelines for the Security Approval or Security Accreditation of Communication and Information Systems (CIS), (NR)	31 January 2012	No
REF-45	AC/35-D/2005-REV3, Management Directive on CIS Security, (NU)	12 October 2015	No
REF-46	AC/35-D Management Directive on CIS Security	Rev2, 2004	Yes
REF-47	AC/35-D Management Directive on CIS Security	Rev3, 2005	Yes
REF-48	NCSA OSLA-14-02, Preparation of NATO CIS Integrated Logistics Support Plans (ILSP), (NU)	2nd Revision	No
REF-49	UML, Unified Modelling Language, Object Management Group	V2.1	No
REF-50	Project Management Institute, Practice Standard for Work Breakdown Structures	Second Edition	No
REF-51	ALP 10, Guidance on ILS for Multinational Equipment Projects	2016	No
REF-52	AIA/ASD SX000i, International guide for the use of the S-Series Integrated Logistics Support (ILS) specifications	2016	No
REF-53	ITIL Service Transition (Best Management Practices)	V3, 2011	No
REF-54	AAP-44(A),	Ver. 2, 2010	Yes

Reference number	Title	Version/Date	Bidder's Library
	NATO Standard Bar Code Handbook		
REF-55	NATO ITB OFS Federation Agreement - BMD-IT-PRG-ITBFEDAG	Ver. 2.0 4 January 2017	Yes
REF-56	AC322D(2017)0016 (INV) Technical and Implementation Directive on Supply Chain Security for COTS CIS Security Enforcing Products	30 March 2017	Yes
REF-57	STANAG 5500 Concept Of NATO Message Text Formatting System (CONFORMETS) - ADATP-3	Edition 5 October 2006	No

Table 3 Reference Documents

3. **CLIN 1: PROJECT MANAGEMENT (PM)**

3.1 **Project Management Approach**

[49] The Purchaser will manage the projects of the BMD Programme using the Prince 2 Project Management (PM) methodology tailored to suit NATO and PO needs. The Purchaser will establish and chair a Project Board on which the Contractor will be represented.

SOW-7. The Contractor shall describe the method to be used for managing project team organization, project plans, project controls, risk management, quality management, and configuration management. The Contractor shall detail the standards intended to be applied to manage these processes.

SOW-8. The Contractor shall report project progress to the Programme Office.

SOW-9. The goal of the Contractor's project management shall be to guide the project through a controlled, well-managed, visible set of activities to achieve the desired results and, wherever possible, to eliminate problems and to ensure that those problems that do occur are identified early, assessed accurately, and resolved quickly in partnership with the Purchaser.

SOW-10. Location of work: Unless otherwise specified by this SOW or approved by the Purchaser, the main effort for this Project shall be carried out in the Contractor's premises.

3.1.1 **Purchaser Furnished Items**

[50] The Purchaser will provide the Contractor with available technical descriptions of existing NATO systems as required for the purpose of determining specific interface requirements between the ITB component and these systems.

[51] The Purchaser will make available to the Contractor the facilities necessary to test and demonstrate ITB component compliance with required interfaces to existing NATO systems.

[52] The list of PFI(s) is given in ANNEX C.

[53] The Purchaser will maintain configuration control for Purchaser Furnished Items.

3.2 Project Management Office

SOW-11. The Contractor shall establish and maintain a Project Management Office (PMO) to perform and manage all efforts necessary to discharge all his responsibilities under this Contract.

SOW-12. The Contractor shall provide all necessary manpower and resources to conduct and support the management and administration of operations in order to meet the objectives of the project, including taking all reasonable steps to ensure continuity of personnel assigned to work on this project.

SOW-13. The Contractor shall use PRINCE2 or an equivalent Project Management standard for the direction, governance and management activities for the entire project. If an equivalent Project Management standard is used, the Contractor shall prove that it at minimum meets all requirements stated in Section 3.

SOW-14. The personnel identified below with the qualifications defined in ANNEX D shall be considered as Key Personnel in accordance with the Special Provisions of this Contract.

- a. Project Manager
- b. Technical Lead
- c. Test Director

3.3 Risk Management

SOW-15. The Contractor shall establish a risk management process and perform risk management throughout the period of performance of this Contract.

SOW-16. The Contractor's Risk Management process shall at minimum enable and define identification of all types of risks, evaluation and prioritisation of each risk, definition of proposed response strategy, owner and actions and suggested monitor and control mechanisms.

3.3.1 Risk Management Plan (RMP)

SOW-17. As part of the Project Management Plan (PMP), the Contractor shall propose a Risk Management Plan (see section 3.3).

3.3.2 Risk register

SOW-18. The Contractor shall document, update and maintain status of all risks in the ITB6 project risk register.

SOW-19. The Contractor shall provide the Risk register listing the risks, and indicating for each one the following information (but not limited to):

- a. Risk identifier: unique code to allow grouping of all information on this risk;
- b. Description: brief description of the risk;
- c. Risk category (e.g. management, technical, schedule, quality and cost risks);
- d. Impact: effect on the project if this risk were to occur;
- e. Probability: estimate of the likelihood of the risk occurring;
- f. Risk rating (High, Medium, Low);
- g. Proximity: how close in time is the risk likely to occur;
- h. Response strategy: avoidance, mitigation, acceptance, transference
- i. Response plan(s): what actions have been taken/will be taken to counter this risk;
- j. Owner: who has been appointed to keep an eye on this risk;
- k. Author: who submitted the risk;
- l. Date identified: when was the risk first identified;
- m. Date of last update: when was the status of this risk last checked;
- n. Status: e.g. closed, reducing, increasing, no change.

SOW-20. The Contractor shall submit an initial version of the Risk register as part of the Project Management Plan (PMP) and maintain the log throughout the period of performance of this CLIN.

SOW-21. The Contractor shall update the Risk register at minimum on a monthly basis and upload it on the Project Website in a format agreed with the Purchaser (e.g. Microsoft Excel).

SOW-22. The Contractor shall brief the Risk register at all Project Checkpoint Reviews and Design Reviews.

SOW-23. The Contractor shall notify the Purchaser if a subcontract or order has been identified as constituting or involving risk.

3.4 Issue Management

[54] A Project Issue is anything that affects the Project, either detrimental or beneficial (e.g. problem, error, anomaly, risk occurring, query, change in the project environment, change request, off-specification). An issue is defined as, in accordance with PRINCE2 2009 ed.: “a relevant event that has happened, that was not planned, and requires management action. It can be any concern, query, and request for change, suggestion or off-specification raised during a project. Project issues can be about anything to do with the project”.

SOW-24. The Contractor shall establish and maintain a process for identifying, tracking, reviewing, reporting and resolving all project issues.

SOW-25. The Contractor shall describe the Issue Management Process in the Project Management Plan.

3.4.1 Issue Management Plan (IMP)

SOW-26. As part of the Project Management Plan (PMP), the Contractor shall propose an Issue Management Plan.

3.4.2 Issue Register (IReg)

SOW-27. The Contractor shall develop and maintain an Issue register where all project issues are recorded and tracked regardless of their status.

SOW-28. The Contractor shall ensure that the Issue register comprises the following information (but not limited to):

- a. Project Issue Number;
- b. Project Issue Type (Request for change, Off-specification, problem/concern, general issue);
- c. Author;

- d. Date identified;
- e. Date of last update;
- f. Description;
- g. Source (source event)
- h. Action item/Decision;
- i. Responsible person (individual in charge of the action item);
- j. Suspense date (Suspense date for the action item);
- k. Priority;
- l. Status.

SOW-29. The Contractor shall propose a template for the Issue register as part of the Project Management Plan (PMP).

SOW-30. The Contractor shall update and maintain the Issue register throughout the period of performance of this CLIN.

SOW-31. The Contractor shall upload the Issue register at minimum on a monthly basis on the Project Website in a format agreed with the Purchaser (e.g. Microsoft Excel).

SOW-32. The Contractor shall brief the Issue register at all Project Checkpoint Reviews and Design Reviews.

3.5 Project Management Milestones and Major Reviews

[55] Table 4 lists the project major milestones (typically tied to payments). The dates for milestones and Major Reviews are defined in the Schedule of Services and Supplies (SSS).

Code	Milestone
EDC	Start of Project (Effective Date of Contract)
KCK	Project Kick-off Meeting
PMR	Project Management Review
SRR	System Requirements Review
PDR	Preliminary Design Review
CDR	Critical Design Review
PSA	Provisional System Acceptance
FSA	Final System Acceptance

Table 4 Project Management Milestones and Major Reviews

[56] Figure 5 shows the implementation concept with the major milestones reflected.

SOW-33. The Contractor shall provide a detailed project schedule in Project Master Schedule (PMS) in compliance with Project Management Milestones and dates.

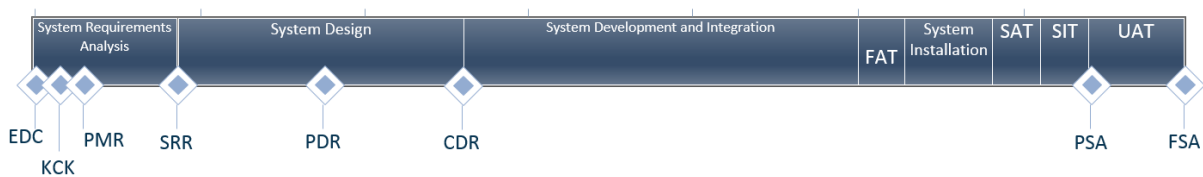


Figure 5 Project Implementation Concept

SOW-34. The Contractor shall present during the milestone meeting any changes to the following information:

- a. Any changes to the PMS;
- b. Any changes in risks or issues that have been identified based on the review for the Milestone;
- c. Any CRs that have been raised as a result of the review.

3.5.1 Common Meeting Requirements

SOW-35. Unless otherwise specified, at least two weeks before all meetings required under this Contract, the Contractor shall send an invitation to the Purchaser, including:

- a. Purpose.
- b. Agenda.
- c. List of participants.
- d. Date, time, duration, location (physical or virtual).

SOW-36. The Contractor shall record meeting minutes and post them on the Project Website within 3 working days.

SOW-37. If meeting facilities at a Purchaser location are not available at the specified Purchaser location in the time frame required to support a meeting, the Contractor shall:

- a. Reschedule the meeting to such time as meeting facilities are available at the Purchaser location, with no further adjustment to schedule or cost; or
- b. Arrange to host the meeting at suitable meeting facility (e.g., hotel meeting facility) for the meeting/review at no additional cost to the Purchaser; or
- c. Arrange to host the meeting at the Contractor's facility. This facility shall be provided at no additional cost to the Purchaser.

3.5.2 Minutes

SOW-38. The Contractor shall provide minutes of all meetings. The Minutes shall include:

- a. Date, place, and time of the meeting;
- b. Purpose of the meeting;
- c. Name of participants;
- d. Approval of previous meeting's minutes and all resolutions
- e. Record of principle points discussed, actions taken, and decisions made
- f. Copies of materials distributed at the meeting

SOW-39. The minutes shall not be used as a mechanism to change the terms, conditions or specifications of the Contract nor as a vehicle to alter the design or configuration of equipment or systems. Such changes shall only be made by agreement, amendment or by authorised mechanisms as set forth in the Contract.

3.5.3 Major Reviews

SOW-40. At least two weeks before each major review, the Contractor shall send an invitation to the participants including as a minimum the following:

- a. Monthly Project Highlight Report.

SOW-41. The Contractor shall provide the following, if applicable, at all major reviews:

- b. Changes to PBS.
- c. Changes to the PWBS.
- d. Changes to the PMS.
- e. Cost considerations.
- f. Risk assessment of proposed changes and an update of the Risk register.

3.5.4 Project Kick-Off Meeting

SOW-42. The Contractor shall meet with the Purchaser's Project Manager at the Purchaser's facility (either The Hague-Netherlands, Brussels-Belgium or Mons-Belgium, at the discretion of the Purchaser) within two weeks after EDC to review the schedule of activities and to discuss any preparations or coordination required to support ITB OFS components implementation effort.

SOW-43. Attendance in person is necessary.

SOW-44. The contractor shall be at least prepared to present

- a. Draft Project Management Plan,
- b. Project Master Schedule,
- c. Risk register, assumptions and restrictions;
- d. Configuration Management process, (section 3.15),
- e. Quality Management process.

SOW-45. The Contractor shall identify any pre requisites to support the implementation of the ITB OFS.

3.5.5 Project Management Review (PMR)

[57] The purpose of the PMR is to approve the scope and the plan for Contractor activities provided within this Contract.

SOW-46. The Contractor shall execute the PMR with the purpose of approving the scope and the plan for the Contractor activities provided within this Contract.

SOW-47. The PMR meeting shall be hosted by the Contractor. The PMR results are documented in Project Management Review Report.

The PMR criteria

SOW-48. The Contractor shall include in planning the PMR Entry Criteria given in Table 5 and make them available to the Purchaser at least two (2) weeks prior to the PMR

Requirement	
The Contractor shall provide the below deliverables listed in SSS	
CLIN1.6	Project Management Plan
CLIN1.7	Risk Management Plan
CLIN1.8	Responsibility assignment matrix
CLIN1.9	Project Master Schedule
CLIN1.10	Project Product Breakdown Structure
CLIN1.11	Project Work Breakdown Structure
CLIN1.12	Quality Assurance Plan
CLIN1.14	Risk Register
CLIN1.15	Issue Management Plan
CLIN1.16	Issue Register
CLIN1.17	Quality Register
CLIN1.19	Lessons Learned Register
CLIN1.23	Configuration Management Plan

Table 5 PMR Entry Criteria

SOW-49. The PMR success Criteria:

The purchaser will consider the PMR successful after the following requirements have been fulfilled by the contractor.

Requirement
The resulting overall management concept is feasible, complete, responsive to the operational requirements, and is consistent with project requirements and available resources in terms of cost, scope, schedule, staffing.
Approaches sufficiently cover the system development, test management, configuration management, service delivery, training, support and maintenance.

Major risks have been identified, and viable mitigation strategies have been defined. Steps to mitigate risks are identified in the Risk Register and Quality Register.

Table 6 PMR Success Criteria

3.5.6 Project Checkpoint Reviews (PCR)

SOW-50. The Contractor shall conduct Project Checkpoint Reviews (PCR) at least once a month throughout the Contract period of performance.

SOW-51. At each PCR, the Contractor shall provide:

- a. The status of all on-going tasks, identify any changes to the PMS and Risk register.
- b. The Configuration Status Accounting (Section 3.15 of the SOW).
- c. The status of documents. It shall include for each document:
 - i.* title,
 - ii.* Type of document (Technical note, report, etc.),
 - iii.* configuration identifier,
 - iv.* security classification,
 - v.* contractually required, planned and achieved delivery date,
 - vi.* Status of the document (outline available, being written, draft, accepted, approval process etc.).

SOW-52. The Contractor shall identify and discuss problems with the Purchaser's Project Manager promptly, however, and not delay this until the next PCR. The PCR results are documented in Project Checkpoint Review Report.

SOW-53. The PCR shall be conducted in one of the Purchaser's sites. By default, The Hague shall be considered as the location to conduct PCR. However, the location of PCRs may vary at the Purchaser discretion.

SOW-54. Attendance in person shall be the default way of conducting the reviews but video or telephone conferences may be accepted by the Purchaser.

SOW-55. The Contractor shall organise the first PCR no later than one month after the Effective Date of Contract (EDC).

3.5.7 Ad-hoc Meetings

SOW-56. In addition to the mandatory meetings, the Contractor shall support ad-hoc meetings of which scope and date shall be mutually agreed with the Purchaser.

SOW-57. These meetings shall be held in NCI Agency The Hague, Brussels or Mons.

3.6 Project Website

[58] The Purchaser will establish an NR NATO Portal (Project Website) to exchange project information (NR) and provide the Contractor with NATO NR AIS Laptops for the duration of the Project and warranty period.

SOW-58. The Contractor shall use provided NR Laptop to access project website on which all relevant NR project documentation shall be stored and maintain it throughout the period of performance of this CLIN.

SOW-59. The Contractor shall implement an access control mechanism to restrict viewing of all documentation on the Website to a list of users approved by the Purchaser and administered by the Contractor.

3.7 Project Management Plan (PMP)

SOW-60. The Contractor shall establish and maintain a Project Management Plan (PMP) which shall describe how the Contractor will implement the totality of the project, including details of the project control that will be applied.

SOW-61. The PMP shall identify all major Contractor operating units and any Subcontractors involved in the development of the ITB OFS capability and a description of the portion of the overall effort or deliverable item for which they are responsible.

SOW-62. The PMP shall cover all aspects of the project implementation, including the Contractor's project management structure and project control processes, personnel assignments, and external relationships necessary to provide the capability as required by this contract.

SOW-63. The PMP shall be sufficiently detailed to ensure that the Purchaser is able to assess the Contractor plans with insight into the Contractor's approach, capabilities, and ability to satisfactorily implement the entire project in conformance with the requirements as specified in this SOW.

SOW-64. The PMP shall describe how the various project management processes (configuration management, change management and quality control, etc.) are integrated, either via a tool set and/or project management practices.

SOW-65. The PMP shall cover at least the following areas:

- a. Project Scope:
 - Major deliverables
 - Assumptions
 - Constraints
- b. Project Organization:
 - Internal structure, including a project organizational diagram
 - Roles and responsibilities of each organizational unit
 - Key personnel, their qualifications, and their responsibilities
 - Organizational boundaries between the project organization and the parent and subcontracted organizations

c. Project Management Processes:

- Project execution, including staffing and project infrastructure,
- Project Control, including monitoring, reporting, and change management of CLINs
- Responsibility assignment matrix (Responsible, Accountable, Consulted, Informed – RACI)
- Issue Management, including the identification, reporting, assessment, and logging of project issues
- Communications Management, its establishment, maintenance and use, Project Highlight Reports, Project Checkpoint Reviews, and all other communications with the Purchaser;
- Risk Management, including the Contractor's process for risk identification, assessment, mitigation, monitoring, and reporting
- Quality Management, including quality assurance of work processes, internal verification and validation, joint reviews, and audits. The quality assurance and control process will be detailed in QAP as given in 3.16.
- Configuration Management, including configuration control and configuration audits,
- Security Management, including security of personnel, facility, industrial, documentation and CIS and reporting of security events in accordance with ANNEX F(REF-9REF-38 to REF-47)
- Purchaser, and if needed end-user, involvement, Technical Reviews, (in)formal meetings, reporting, modification and change, implementation, verification, approval, acceptance and access to facilities;

SOW-66. The PMP shall highlight the integration of the following supporting processes and their key deliverables and milestones within the overall project management process, but the plans reflecting these supporting processes shall be provided as separate project deliverables

SOW-67. The Contractor shall ensure that the PMP and supporting plans remains current throughout the duration of the project to reflect the actual state of the Contractor's organization and efforts.

3.8 Product Breakdown Structure

SOW-68. The PBS shall identify the physical outcomes of the project. It shall define all the products that the project has to produce.

SOW-69. The product breakdown structure shall show the scope broken down in a hierarchical manner and at a sufficient level to ensure a clear understanding of the product and its status. Physical outcomes include but not limited to the major components of the system, the Software Solution, the Infrastructure, the Service, the Equipment and the documentation required through present contract.

[59] The PBS components are defined under Configuration Identification Section 3.15.3

3.9 Work Breakdown Structure

SOW-70. The Contractor shall establish and maintain a Work Breakdown Structure (WBS).

SOW-71. The WBS shall define the major CLINs and the relationship between the CLINs and the end product.

SOW-72. The WBS shall describe the CLINs to a level that exposes all project risk factors and allows accurate estimate of each work item's duration, resource requirements, inputs and outputs, and predecessors and successors.

SOW-73. The WBS shall include for each work item its duration, resource requirements, inputs and outputs, predecessors and successors, assumptions, constraints, dependencies, and requirements for Purchaser support.

SOW-74. The WBS shall be used as the primary framework for Contract planning and reporting to the Purchaser.

SOW-75. The Contractor shall provide the initial baseline version of the WBS, within the time frame as stated in SSS and maintain it throughout the period of performance of this CLIN.

3.10 Project Master Schedule

SOW-76. The Contractor shall establish and maintain a Project Master Schedule (PMS) that contains all Contract events and milestones, including Contract-related Purchaser activities and events (e.g., Purchaser reviews, provision of specific Purchaser-furnished items).

SOW-77. The PMS shall include the delivery dates for all products identified in the SSS and performance milestones defined in Contract Special Provisions, if any.

SOW-78. The PMS shall correlate with the PWBS, the PBS and also be traceable to performance and delivery requirements of this SOW.

SOW-79. The PMS shall identify the start and finish dates, duration, predecessors, successors, and resource requirements for each work item.

SOW-80. The PMS shall identify the "physical" progress for each task;

SOW-81. The PMS shall include activity network, activity Gantt, milestone, and critical path views of the project schedule.

SOW-82. The PMS shall be based on Microsoft Project 2010. Any changes to this version shall be approved by the Purchaser.

SOW-83. The Contractor shall provide the initial baseline version of the PMS two weeks before PMR and maintain it throughout the period of performance of this CLIN.

SOW-84. The initial version of the PMS shall, upon Purchaser Acceptance, become a configuration item. Any changes in contractual items shall be subject to the Purchaser approval.

SOW-85. The Contractor shall maintain the baseline version of the PMS on the Project Website.

SOW-86. The Contractor shall brief the PMS at all Project Checkpoint Reviews.

3.11 Project Highlight Reports

SOW-87. The Contractor shall provide, beginning four weeks after EDC and continuing throughout the period of performance of this Task, a monthly Project Highlight Report.

SOW-88. The Contractor shall provide, no later than the third business day of each month, a Project Highlight Report. This report shall summarise activities, including:

- a. Summary of Contract activities during the preceding month, including the status of current and pending activities;
- b. Progress of work and schedule status, highlighting any changes since the preceding report;
- c. Test(s) conducted and results;
- d. Summary of any site surveys conducted;
- e. Status of action items;
- f. Updated risk register;
- g. Updated issue register;
- h. Updated quality register;
- i. Updated Product Breakdown Structure or Configuration Item log
- j. Summary of Change Requests requested or approved;
- k. Financial status and predicted expenditures;
- l. Changes in key Contractor personnel, as approved by the Purchaser;
- m. Report on maintenance calls by number, type, and actions taken; and
- n. Plans for activities during the following reporting period.
- o. Any security incidents related to the project or security incidents related to personnel involved in the project.

SOW-89. The Contractor shall maintain an archive of Project Highlight Reports on the Project Website.

3.12 Quality Register (QReg)

SOW-90. As part of the quality assurance program, the Contractor shall establish and maintain a Quality Register (QReg) that lists all planned and performed quality checks on contract deliverables; on readiness to present products to major milestone reviews and on internal work processes and products.

SOW-91. The QReg is a register containing summary details of all planned and completed quality activities. The QReg is used by the Project Managers and Project Assurance of both Contractor and Purchaser as part of the reviewing progress.

3.13 Communication Register (CReg)

SOW-92. The Contractor shall establish and maintain a project Communication Register (CReg) which lists all planned and performed communications on Contractor deliverables.

SOW-93. The CReg is a register containing a summary of all formal communications between The Contractor and The Purchaser. The CReg shall point to the associated minutes of meetings, reports or emails as a record of all actions, decisions, or information.

3.14 Lessons Learned Register (LLR)

SOW-94. The Contractor shall establish and maintain a project Lessons Learned Register (LLR).

SOW-95. The LLR shall include major problems encountered during the project implementation and identify improvements for the future projects.

SOW-96. The LLR shall include any lessons learned during the project execution and the information captured in the IReg, RReg and QReg.

SOW-97. The Contractor shall include any Lessons Learned associated with each major milestone.

3.15 Configuration Management

[60] Configuration Management is conducted to meet the requirements of STANAG 4427 Ed 3. Specifically for general guidance on the Configuration Management function within NATO the Contractor is recommended to study [ACMP-2009 Edition A Version 2]

3.15.1 General

SOW-98. The Contractor shall be responsible for all necessary Configuration Management activities throughout the duration of the Contract.

SOW-99. The Contractor shall establish and maintain a Configuration Management Plan (CMP) in compliance with Section 3.15.2 that describes how the Contractor will implement Configuration Management within the Contract.

SOW-100. The Contractor shall establish and maintain a CMDB that persists the Configuration Items (CIs) attributes, (inter-) relationships/ dependencies, and Configuration Baselines.

SOW-101. The CMDB shall be in such a format as to enable transfer of configuration information to the Purchaser at Handover.

SOW-102. Upon request from the Purchaser, the Contractor shall support configuration audits to demonstrate that the actual status of all CIs matches the state of CIs as registered in the CSA reports; this support shall include:

- (a) Providing the required baseline documentation;
- (b) Answering questions from the Purchaser's Auditor;
- (c) Summarizing the audit results in a Configuration Audit Report and providing this report the Purchaser's approval

SOW-103. The Contractor shall solve any deficiencies found during the Configuration Management Audits within the agreed timeframe and update the baseline accordingly

3.15.2 Configuration Management Plan

[61] The CMP template is available in CMP-2009 Edition A Version 2. Examples of CMP requirements are available in ACMP-2009-SRD-41 Edition A Version 2

SOW-104. Any requirements identified in the NATO ACMP templates or guidance that the Contractor considers not applicable for this contract shall be specifically defined in the CMP as not applicable (N/A) followed by a short justification why the requirement is not applicable e.g. entries associated with hardware.

SOW-105. The Contractor shall present a draft CMP for Purchaser review at the Project Kick-off Meeting and Approval within a further 4 weeks.

SOW-106. The Contractor shall ensure the CMP distinguish differences in the CM activities between the Contract development phase and the Contract maintenance phase (this should align with the Integrated Logistics Support Plan).

SOW-107. The CMP shall be placed under configuration control throughout the period of Contract performance and be maintained as a living document subject to revisions and updates, as required

SOW-108. The CMP shall identify the Contractor and Purchaser activities and milestones related to CM e.g. when Functional Baselines, Allocated baselines, Product Baselines, Configuration Audits, planned Status Accounting requirements etc. will be delivered

SOW-109. The CMP shall define an effective CM organisation to implement the CM Project and manage the CM functions during the contract lifecycle

SOW-110. The CMP shall describe Configuration Item (CI) selection criteria, Configuration Identification and CI management – this is expanded upon in Section 3.15.3

SOW-111. The CMP shall define the CI traceability (higher and subordinate CIs using CI identifiers or other CI attributes)

SOW-112. The CMP shall describe the effective implementation of the configuration control procedures which shall:

- (1) Ensure effective control of all CIs and their approved configuration documentation
- (2) Provide effective means for proposing engineering changes to CIs including Engineering Change Proposals ECP, Request For Deviation (RFD) (as defined in template ANNEX L); Request For Waiver (RFW) (as defined in template ANNEX L) pertaining to such items, preparing Notices Of Revision (NOR) (as defined in template ANNEX J) to support changes to documentation.
- (3) Ensure implementation of approved changes
- (4) Define the release procedures noting the Engineering Release Record (ERR) is the record to accompany baselines release and the Software Version Description (SVD) accompanies software releases as defined in templates ANNEX I, and ANNEX K, respectively.

SOW-113. The CMP shall define the Configuration Status Accounting (CSA) and reporting for all CIs as required for the Project Management Milestones and Reviews Section 3.5 and the Joint Technical Reviews Section 4.4. Note: The Purchaser may require additional CSA reports and these should be easily/quickly provisioned/automated e.g. through the CMDB

SOW-114. The CMP shall define the CM audit requirements (Physical Configuration Audit and Functional Configuration Audit) and when in the system lifecycle they should occur

3.15.3 Configuration Identification

SOW-115. To accomplish Configuration Identification, in accordance with STANAG 4427 Ed.3 the Contractor shall for all Materiel:

- (1) Select Configuration Items (CI) and component parts, subject to Purchaser approval: Note: each CI shall be related to a precise sub-set of the System Requirements Specification (SRS) or to the Contract.
- (2) Select configuration documentation, subject to Purchaser approval to be used to define configuration baselines for each CI
- (3) Define and document interfaces in accordance with Purchaser approved Interface Identification scheme
- (4) Establish the functional, allocated and product baselines at the appropriate points in the system/CI life cycle (to be described in the CMP and linked to SOW-108)
- (5) Ensure that the marking of items and documentation with their applicable identifiers enables correlation between each item, its configuration documentation, and other associated data, and is in accordance with the naming and identification rules established by the Purchaser
- (6) Ensure that the unique identifiers are embedded in source and object code and electronically embedded in firmware with matching physical labels and ensure that the information is accessible

SOW-116. The CI description shall be sufficient to understand the purpose and function of the product and the level of quality required of the product

SOW-117. Each CI shall be assigned a unique identifier

SOW-118. The product/service configuration information shall comprise of CI identification/part number, version and NATO Commercial and Government Entity (NCAGE) code/NATO System Classification Number (NSCM);

SOW-119. The associated configuration documentation shall be identified comprising document ID, revision, document type code (DTC) and NCAGE/NSCM. The Contractor can propose additional DTCs subject to the Purchaser's agreement.

3.16 Quality Management

3.16.1 General

[62] Quality Control (QC) is a procedure or set of procedures intended to ensure that a manufactured product or performed service adheres to a defined set of quality criteria or meets the requirements of the client or customer.

[63] Quality Assurance (QA) is as a procedure or set of procedures intended to ensure that a product or service under development meets specified requirements.

[64] Under this contract the Quality Assurance process is intended as Quality Assurance and Control Process. The term Quality Assurance will include also the Quality Control definition.

[65] Certificate of Conformity is a document, signed by the Supplier, which states that the product conforms to contractual requirements and regulations

[66] The Certificate of Conformity, verifies the process quality-enabled items produced or shipped comply with test procedures and quality specifications prescribed by the customer. It presents data derived from quality management information.

SOW-120. The Contractor shall establish, execute, and maintain an effective Quality Assurance (QA) process throughout the period of performance of this CLIN. It shall be based on [AQAP-2110, 2016], which incorporates by reference [ISO 9001, 2015] directive.

SOW-121. The Contractor's QA process shall ensure that procedures are developed, implemented and maintained to adequately control the design, development, production, testing, configuration management, and support of all deliverables.

SOW-122. The Contractor shall implement the Quality Assurance (QA) process as defined in the following sections.

SOW-123. The Contractor shall provide the Quality Assurance Plan (QAP) in accordance with Section 3.16.3 and maintain it throughout the period of performance of this CLIN.

3.16.2 Quality Assurance Process

[67] The Contractor shall establish, execute, and maintain an effective Quality Assurance process throughout the Contract lifetime.

SOW-124. The contractor shall base its Quality Assurance Process on [AQAP-2110, 2016], which incorporates by reference [ISO 9001, 2015] directive. The Quality Assurance (QA) implemented by the Contractor shall apply to all hardware, software (including firmware) and documentation being developed, designed, acquired, integrated, maintained, or used under the Contract. This includes non-deliverable test and support hardware and software.

SOW-125. The Contractor shall be responsible for the control of quality of all deliverables and associated Contractual products throughout the life-cycle of the Contract..

SOW-126. The Contractor's QA Process shall be described in the QA Plan as outlined below and shall be subject to approval by the Purchaser.

SOW-127. The Contractor shall use its own Quality Manual as a reference in the Quality Assurance Process.

SOW-128. The Contractor's Quality Manual shall outline the quality focus and the objectives in the Contractor's organization.

SOW-129. The Contractor shall demonstrate, with the Quality Assurance process, that the processes set up for design, develop, produce and maintain the product will assure the product will meet all the requirements.

SOW-130. If sub-contracted quality resources are used, the Contractor's Quality Management Process shall describe the controls and processes in place for monitoring the sub- Contractor's work against agreed timelines and levels of quality.

SOW-131. The Contractor shall assure that all the test and procedure used to demonstrate the requirements will be monitored and controlled under the QA process.

SOW-132. The Contractor shall document all the identified risks regarding the QA process in accordance with Risk Management (Section 3.3) and [AQAP-2110, 2016].

SOW-133. The Contractor shall periodically (at least once a year) review the QA process and audit it for adequacy, compliance and effectiveness, and report the result to the Purchaser QA Representative (QAR).

SOW-134. The Contractor shall flow down the applicable contractual requirements to Sub suppliers by referencing the stated contractual requirement, including relevant AQAP(s).

SOW-135. The Contractor shall be responsible of ensure that the procedures and processes required to fulfil contract requirements are fully implemented at the Sub-supplier's facilities.

SOW-136. The Contractor shall ensure that all contractual requirements, including NATO supplements, are included in internal audits.

3.16.3 Quality Assurance Plan (QAP)

SOW-137. The Contractor shall provide a QAP to the Purchaser in accordance with the requirements of [NATO AQAP-2105, 2011].

SOW-138. The Contractor's QAP shall be submitted to the Purchaser for review.

SOW-139. The Contractor's QAP shall distinguish between the Quality Assurance process and Quality Control Process and plan, manage and resource both.

SOW-140. The Contractor's QAP shall be structured as a living document subject to revision/update, as required, at least as a result of an annual review.

SOW-141. The Contractor's QAP shall reference or document and explain the Contractor's QA procedures for analysis, software support, development, design, production, installation, configuration management, control of Purchaser furnished property, documentation, records, programming standards and coding conventions, library controls, reviews and audits, testing, corrective action and certification as specifically related to this project.

SOW-142. The Contractor's QAP shall be compatible and consistent with all other plans, specifications, standards, documents and schedules, which are utilized under this Contract.

SOW-143. All Contractor procedures referenced in the QA Plan shall either be submitted with the plan, or described in the plan and made available for review by the Purchaser upon demand.

SOW-144. The QAP shall identify the organization and responsibilities of the QA team and its relation to the project team.

SOW-145. The QAP and all related QA procedures shall be subject to Purchaser QAR approval.

3.16.4 Certificate of Conformity

[68] The Contractor is solely responsible for the conformance to requirements, of products provided to the Purchaser.

SOW-146. The Contractor shall deliver all the Certificate of Conformity (CoC) for products, COTS SW (including firmware) and hardware released by the COTS Vendors unless otherwise instructed.

SOW-147. The CoCs delivered by the Contractor shall be part of the acceptance data package of the product.

3.16.5 Corrective Actions

SOW-148. The Contractor shall establish, implement and maintain the Analysis and Corrective Action System database as an essential part of the QA process to document and track, until closure, all failures, faults and problems applying to the QA process.

SOW-149. The contractor shall demonstrate that all the non-conformities are solved before the product acceptance.

SOW-150. The Contractor shall notify the Purchaser of proposed action, resulting from Review Output that will affect compliance with contractual requirements.

SOW-151. The Contractor's Review outputs shall, where action item(s) are identified, specify the responsible person/function and due date of the action item(s).

SOW-152. The Contractor shall issue and implement documented procedures which identify, control and segregate all non-conforming products. Documented procedures for the disposition of non-conforming product are subject to approval by the Purchaser when it can be shown that they do not provide the necessary controls.

SOW-153. The Contractor shall notify the Purchaser of non-conformities and corrective actions required, unless otherwise agreed with the Purchaser.

SOW-154. When the Contractor establishes that a subcontractor or a Government Furnished Equipment (GFE) product is unsuitable for its intended use, the Contractor shall immediately report to and coordinate with the Purchaser the remedial actions to be taken.

SOW-155. The Contractor shall ensure that only acceptable products, intended for delivery, are released.

SOW-156. The Contractor shall document the Corrective Action process in the QA Plan.

3.16.6 Organization

SOW-157. The Contractor shall appoint a QA person(nel) who shall be responsible for the establishment, implementation and effectiveness of the QA process and ensure that it conforms to the requirements of AQAP 2110.

SOW-158. The Contractor's QA personnel shall have sufficient responsibility, authority, organizational freedom and independence to review and evaluate activities, identify problems and initiate or recommend appropriate corrective action.

SOW-159. The Contractor's QA personnel shall have the requisite knowledge, skills, ability, practical experience and training for working with, and in accordance with the applicable NATO AQAPs and ISO standards

SOW-160. The Contractor's QA personnel shall have specific documented definitions of their assigned duties.

SOW-161. The Contractor's QA personnel shall not be the same personnel responsible for performing other tasks that are reviewed by QA.

SOW-162. The Contractor's QA personnel shall participate in the early planning and development stages to ensure that attributes of good quality for life-cycle procurement are specified in plans, standards, specifications and documentation.

SOW-163. After establishment of attributes, controls and procedures, Contractor's QA personnel shall ensure that all elements of the QA Process are properly executed, including inspections, tests, analysis, reviews and audits.

SOW-164. The Contractor's QA personnel shall be designated and identified in the Quality Assurance Plan as the Contractor's QA Management Representative and point of contact for interface with and resolution of quality matters raised by the Purchaser.

SOW-165. The Contractor shall ensure that Quality Management Personnel are of sufficient number and have sufficient resources to adequately and effectively monitor and control the QA Process.

3.16.7 Contractor (and subcontractor) Control and Audit

[69] The Purchaser reserves the right to perform Reviews, Quality and security audits at any of the Contractor (or Sub-Contractor(s)) facilities.

[70] Audit activities at Sub-supplier's facilities do not relieve the Contractor and Subcontractors from any contractual quality responsibilities.

SOW-166. The Contractor shall on request provide the Purchaser with a copy of any subcontracts or orders for products related to the contract.

SOW-167. The Contractor shall provide all necessary assistance to the Purchaser QAR/Auditors for review and audit of the QA process in accordance with AQAP-2110 and AQAP-2210 and in particular:

- a. Host inspection visits by Purchaser's auditors,

- b. Make himself available for answering questions and furnishing information related to the project,
- c. Allow the Purchaser's auditors to inspect and monitor testing activities, and
- d. Allow the Purchaser's auditors to inspect and monitor the Contractor's processes applicable to this project.

SOW-168. The Contractor shall transfer to the Purchaser's auditors all information deemed necessary to perform the activities, on his own initiative or on request by Purchaser's auditors.

SOW-169. The Contractor shall notify the Purchaser if a sub-supplied product is rejected or repaired which has been identified as involving risk or supplied by a Sub-contractor whose selection or subsequent performance has been identified as involving risk.

SOW-170. A non-exhaustive list of information that the Contractor shall transfer to the Purchaser's auditors includes minutes of meetings, planning documents, source code, requirements documents, and database, design, test and other technical documentation.

3.17 Documentation Requirements

3.17.1 General

SOW-171. The documentation shall be compliant with requirements identified in the Contract. If no standard has been identified, then the Contractor shall submit a proposal to the Purchaser to agree on the content of the document.

SOW-172. The Documentation shall adhere to the NATO C3 Taxonomy (REF-15)

SOW-173. All documentation and user interface shall be written in English with spelling and usage based on the [Concise Oxford English Dictionary, 11th edition](REF-11).

SOW-174. 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).

SOW-175. 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.

SOW-176. Documentation shall not be marked with corporate logos or contain warnings limiting the rights to use or reproduction.

SOW-177. The security classification of the documentation shall follow NATO Security guidelines and the BMD Security Classification Guide (REF-44, REF-43).

3.17.2 Reports

[71] For all reports delivered under this Contract, the Contractor is expected to ensure the following statements are met.

SOW-178. The report shall be candid, forthright, and complete. Material that is unflattering to the Purchaser or Contractor, but relevant to the purposes of process improvement, must be included.

SOW-179. The report shall provide evidence to support or justify the conclusions reached.

SOW-180. The report shall be concise. If necessary, supporting data shall be placed in appendices or referenced as backup material.

SOW-181. The report shall include an Executive Summary of not more than one page in length.

SOW-182. The report shall use charts, graphs, matrices, tables, and other illustrative techniques to present data in an easily-understood form. Each illustration shall be accompanied with a narrative showing how the data displayed is relevant to the process improvement.

3.17.3 Formatting

SOW-183. Unless otherwise directed by the Purchaser, the Contractor shall furnish requested documentation as follows:

SOW-184. All contractual documentation shall be delivered in electronic format (via Project Website).

SOW-185. All project management documentation (e.g., plans, schedules, reports, etc.) shall be delivered as electronic copies in MS Office format.

SOW-186. Documentation shall be distributed as follows:

- a. An electronic copy to the Project Workspace.
- b. Each document shall contain the following information for identification
- c. Version of the document.
- d. Due date.
- e. Delivery date.
- f. CLIN number or SOW reference.
- g. Status (e.g. accepted/approved/draft...).

3.17.4 Formal Reviews

SOW-187. The Contractor shall submit all documentation (including any sub-contractor documents) for Purchaser review as described below. At each review cycle, the Purchaser will state if the document is likely to be accepted in its Final version.

[72] During the development of a document, the Contractor may be required to provide subsequent versions of the documents (starting with version 0.1) for Purchaser review. The Purchaser may return a document without completing a review if it is deemed to have significant deficiencies, e.g. not complete in content and formatting.

[73] The Purchaser will provide comments to the Contractor within fifteen (15) working days of receipt. Comments will be returned by the Purchaser in the form of a Review Comments List; a standard list used by the Purchaser to manage and track comments on documentation deliverables;

SOW-188. The Contractor shall re-submit the deliverable as a revised draft (version 0.2) incorporating the Purchaser's comments within ten (10) working days after receipt of the Review Comments List. The Purchaser reserves the right to return without review a revised draft that has not adequately addressed the Purchaser provided comments;

SOW-189. The Contractor's changes shall be provided in the form of change pages for contractual documentation; pen and ink corrections or 'track changes' will not be acceptable. Track changes for all other project documentation requiring an iterative review processes is acceptable;

[74] The Purchaser will reiterate the previous two steps until the deliverable is considered eligible for acceptance.

SOW-190. The version number of a revised draft shall be incremented by 0.1 at each iteration.

SOW-191. When the Purchaser assesses a revised draft deliverable eligible for acceptance, the Contractor shall be asked to rename and reissue the revised draft as the final draft (version 1.0) for acceptance. The Contractor shall use the designation 'v1.0' only for this final submission.

SOW-192. The Contractor shall include and integrate all deliverable review cycles in the overall project master schedule. For this purpose, the Contractor shall assume that a normal review cycle contains at most two revised drafts (v0.2 and v0.3) where v0.3 is the revised draft judged to be eligible for acceptance and hence to be renamed and reissued as v1.0.

SOW-193. The Contractor shall provide this last draft version (e.g. identified as version 0.3) of each deliverable for Purchaser review by latest fifteen (15) working days before the date of the Final Purchaser Accepted Delivery specified in the SSS (unless specified differently in the SOW) and shall thus be substantially complete and correct.

[75] The Purchaser will provide comments, corrections, and suggested changes to this submitted draft version of the Contractor within fifteen (15) working days unless specified differently in the SOW.

SOW-194. The Contractor shall provide the Final version (version 1.0) of the document, for approval, within two (2) weeks after Purchaser review.

SOW-195. The Contractor shall not rely on the Purchaser review process to fill in deficiencies or obtain missing parts from Purchaser.

SOW-196. If the document is included as part of a Development Baseline, Product Baseline or Project Management documentation, the Contractor shall remain responsible for updating the document to reflect changes in: project management, system requirements, design, or support arrangements as part of Contractor's Configuration Management tasks until FSA.

[76] The Purchaser may agree on new approaches and techniques (like partial review for huge documents) to increase the efficiency of review process.

4. CLIN 2: SYSTEM DEVELOPMENT

4.1 General

[77] This section outlines the System Development and Implementation requirements of the ITB OFS implementation Contract.

[78] The scope for system development and implementation activities include:

- a. Requirements Capture and Analysis for the requirements or interfaces;
- b. Establish Architecture Vision, Implement System Architecture;
- c. System Design to satisfy non-functional/functional requirements and security constraints,
- d. System development to satisfy agreed system design,
- e. System Engineering, including configuration of the customisations, development of data migration/enhancement scripts and interfaces;

SOW-197. The Contractor shall demonstrate to the Purchaser that there is an engineering process in place for the project, with quality assurance oversight compliant to ISO 12207 (REF-7).

SOW-198. The Contractor shall provide and maintain a System Development Plan (SDP).

SOW-199. The SDP shall include all necessary activities for planning, managing and controlling the engineering efforts for specifying, designing, and implementing the ITB OFS capability.

SOW-200. The SDP shall describe the following:

- a. Engineering work packages and work items.
- b. The system development strategy including the organization resources, and methodologies.
- c. The identification of:

- i.* development standards and conventions to be used (including design standards and coding standards and SW development files);
 - ii.* specific libraries to be used;
 - iii.* Monitoring and reporting practices.
- d. The technical approach, including the relationship between bespoke (i.e. software specially written to specification) and OTS products (i.e. existing products that can be integrated with little or no customization).
- e. The engineering processes (e.g. development technologies, development practices, design methodologies, unit testing and system integration procedures, risks analysis, control and monitoring mechanisms).
- f. Demonstration plan during development and integration
- g. The User Experience (UX) process integrated with the Engineering Process and the engineering processes for defining and changing the Human-Machine Interface (HMI) including sufficient time for purchaser/users feedback.
- h. The developmental environment including COTS hardware, operating system and other infrastructure software.
- i. The development and test methodologies, standards, tools (including OTS products and programming or scripting languages), engineering environment, equipment, facilities, libraries, interfaces, plug-ins/add-ins, glue code and data.
- j. Purchaser/User participation (e.g., to provide subject matter expertise, definition of the HMI and information on NATO Core and Functional services).
- k. Access from the Purchaser to tools and information during development.
- l. Risk management for development.
- m. Further details (not covered by the PMP) for development.

[79] The ITB OFS project will use COTS products and out-of-the-box business processes as much as possible. It is assumed that minimal customisation will be required to adapt these products to meet the implementation requirements.

[80] No “public” cloud solution are permitted in technical solution of ITB OFS

SOW-201. The existing set of documentation (as listed in ANNEX C) will be provided to the Contractor to start as a baseline for documentation.

4.2 ITB OFS Development

SOW-202. The ITB OFS shall be an open-architecture framework that shall provide a common environment in which the integration and interoperability of NATO and national systems can be evaluated.

SOW-203. The ITB Core and ITB Ops and shall be located at NCIA The Hague. ITB Portable shall be used at different NATO or National sites. ITB OFS TVV activities shall be performed at NCIA The Hague for the Core, Ops and portable capabilities.

SOW-204. The Contractor shall describe how to build the ITB framework using/modifying either an existing capability or a new design or by the ITB Build 5 elements.

SOW-205. The Contractor shall re-use existing NATO and national modelling and simulation capabilities whenever practicable.

SOW-206. The Contractor shall be responsible for the following:

- a. The solution to achieve the required ITB OFS capabilities
- b. The viability of the solution for the ITB OFS framework to efficiently and robustly meet the minimum set of requirements for the ITB OFS given in Annex A
- c. Cost and space requirements for the hardware associated with the proposed solution
- d. Certification in software engineering processes (if any), and demonstrated experience in distributed modelling and simulation tools for the purpose of integration, test, and verification
- e. The viability of the open-architecture approach and the compatibility of the proposed solution with existing NATO and national models, laboratory facilities, and live weapons systems.
- f. Development of the conceptual models
- g. Verifying the fidelity of the simulation models
- h. Satisfying the Non-Functional Requirements defined in SRS delivered by the Contractor.
- i. The quantity and quality of the existing documentation for the baseline framework, if the Contractor's proposed solution uses an existing framework as the starting point.

[81] The system/software processes and products defined for this task have been tailored from existing national and international standards for software development. These define the scope of the intended processes and products for developing the ITB OFS. The Contractor

may propose alternative processes and products for the ITB OFS development as long as Contractor's proposals meet the minimum scope as defined in this SOW.

4.3 Development Phases

[82] In this section development activities are described.

[83] In SDP, the Contractor may propose interim deliveries to ITB Laboratory before FAT, for risk reduction purposes.

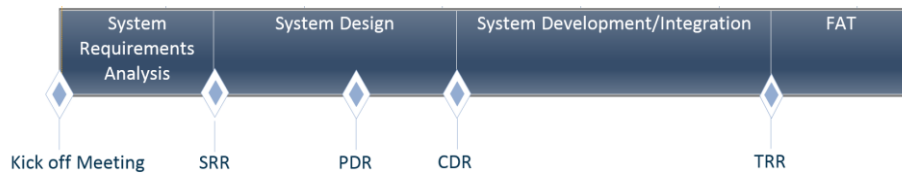


Figure 6 Development Phases

4.3.1 Requirements Analysis Phase

SOW-207. The Contractor shall apply a Requirements Analysis phase to develop an SRS document which satisfies/incorporates at least the minimum set of requirements listed in ANNEX A with sufficient detail to initiate the design activities.

SOW-208. The Contractor shall define the requirements management process in SDP and applies this process to manage stakeholder needs and requirements throughout the project life cycle

[84] The hosting environment for the ITB OFS will be provided by the Purchaser. The specification of hardware for ITB OFS is given in ANNEX H.

SOW-209. The requested changes for the hosting environment requirements shall be identified by the Contractor at this stage of the project.

SOW-210. The non-functional requirements shall be based on [ISO/IEC 25010, 2011].

SOW-211. As a part of Requirements Analysis phase, a requirements capturing event shall take place with Purchaser at Purchaser's Facility to analyse in depth the existing ITB 5 capabilities within the scope given in ANNEX A.

SOW-212. Throughout the Contract execution, The Contractor shall produce and maintain the Requirement Traceability Matrix (RTM) which includes all functional and non-functional requirements bi-directional traceability to higher level requirements/resource requirements/documents. The Purchaser will review and approve the proposed RTM. RTM will also include traceability to test artefacts as described in Section 5.

SOW-213. The Contractor shall conduct a Systems Requirements Review (SRR), see Section 4.4.1, at the Contractor's facility to present requirements developed based on the capabilities given in ANNEX A.

4.3.2 System Design Phase

SOW-214. The Contractor shall perform system design activities in compliance with the processes defined in [IEEE 12207, 2008].

SOW-215. The Contractor shall perform user interface design in compliance with the [ISO 9241-210:2010], and document in User Interface Specifications (UIS) document or in SSDD.

SOW-216. At the first stage of the design phase, architectural design, the architecture of the system shall be defined to provide a stable basis for detailed design and implementation effort in the development phase. During this phase architecture of the system is determined and system requirements are allocated to system components.

SOW-217. The architecture building blocks shall be identified and described consistently; and be traced to the requirements.

SOW-218. The proposed software architecture, development environment, middleware system and the separation of components (user interface, services, business layer and data) shall be documented and explained in detail in SSDD.

SOW-219. The Contractor shall conduct a Preliminary Design Review (PDR), see Section 4.4.3, at the Contractor's facility to present architectural design based on the requirements developed in SRS.

SOW-220. At the second stage of the design phase, detailed design, the following aspects of the system components determined in the architectural design phase shall be detailed and finalized:

- a. System architecture,
- b. System components and interactions among components
- c. Services, components and Human-Machine Interface and Human Factors justifications
- d. Interfaces among the components,
- e. High Level design of each component.

SOW-221. The requested changes for the hosting environment requirements shall be finalized by the Contractor at this stage of the project.

SOW-222. The system design shall be documented in System Subsystem Design Description (SSDD) document in compliance with [IEEE Standard 1016-2009].

SOW-223. SSDD shall address the following, as minimum:

- Constraints and dependencies
- Overall System Architecture
 - Logical Architecture
 - Functional Architecture
 - Infrastructure Architecture
 - Network Architecture
 - Security Architecture
- System Components and interfaces
- Operational Scenarios
- System External Interfaces

SOW-224. The Contractor shall identify system components as new, modified and use “as-is”, in SSDD. The re-used capabilities shall be identified clearly. There shall be no proprietary interface in design.

SOW-225. The Contractor shall conduct a Critical Design Review, see Section 4.4.4, at the Contractor’s facility to present system design based on the requirements developed in SRS and architecture developed during architectural design stage.

4.3.3 System Development and Integration

SOW-226. During System Development and Integration phase, the Contractor shall inform the Purchaser on technical progress and risks periodically, by technical coordination meetings, ad-hoc meetings and checkpoint reviews as defined in 3.5.1.

SOW-227. The Contractor shall establish an Integrated Project Team (IPT) including the Contractor and the Purchaser technical representative.

SOW-228. The Contractor shall present his team members, and methodology of the work/responsibilities carried out by IPT at Kick-Off meeting.

[85] The Purchaser will provide his IPT member names 2 weeks after Kick-Off meeting.

SOW-229. The Contractor shall establish, control and maintain a software development environment for the ITB to include Computer Aided Software Engineering (CASE) tools, software test environment, software development library, and software development files for each software unit or logically related software units. The Contractor may use non-deliverable CASE software in the development of deliverable ITB software as long as the operation and support of the ITB software after delivery do not depend on the non-deliverable software or provision is made to ensure that the Purchaser has the same software.

SOW-230. During development and integration stage, the Contractor shall plan and conduct multiple demonstrations, to let the Purchaser monitor the progress of development.

4.4 Joint Technical Reviews

4.4.1 General Requirements

SOW-231. The Contractor shall organise and conduct joint technical reviews, as defined in IEEE 12207, to address and resolve critical technical issues in advance of major reviews such as Requirements, Design or Test Reviews. See Section 3.5 for the list of the Joint Reviews.

SOW-232. The Contractor shall propose the subject and the timing of the joint technical reviews to ensure the most critical technical risks are raised and mitigated as early as possible. The joint technical reviews should be planned as early as possible but as a minimum 4 weeks in advance to provide sufficient time for the identification of appropriate operational users and arrangements for their participation.

SOW-233. The Contractor shall deliver the following information at least two weeks prior to each review: a meeting agenda and a list of issues to be reviewed, with an impact assessment, root cause of the issue (evidence) and possible solutions per issue.

SOW-234. Unless otherwise agreed by the Purchaser, all joint technical reviews, except the ones stated in specific joint review requirements, shall be conducted at a Purchaser facility, either NCIA Brussels, NCIA Mons or NCIA The Hague. The specific date and location must be agreed between the Contractor and the Purchaser's Project Manager.

SOW-235. The Contractor shall provide all relevant resources including personnel, hardware, software, and tools at each review.

SOW-236. The Contractor shall provide the following items at each review: presentation and discussion of each issue, including relevant technical material, such as requirements references, design specifications, views, use cases, operational employment scenarios, screenshots, or prototypes, or developmental baseline (functional and allocated baseline) release.

SOW-237. The Contractor shall deliver the following items within one week after each review: meeting minutes, updated risks/ issues log, and any resulting proposed change requests.

SOW-238. The Contractor shall deliverable all items associated with the subject review in accordance with SSS.

4.4.2 System Requirements Review (SRR)

SOW-239. The Contractor shall conduct SRR to ensure that the level of understanding of top-level system requirements is adequate to support further requirements analysis and design activities, and the system can proceed into architectural design with acceptable risk.

SOW-240. The SRR shall be considered as a major review and The Contractor shall apply requirements listed in Section 3.5.2 of the SOW.

SOW-241. The SRR shall confirm that;

- a. The Purchaser and the Contractor mutually understand the system requirements and performance requirements as captured in the SRS document.
- b. The technical requirements have been correctly and completely represented in the set of system requirements.
- c. System performance requirements, non-tailorable design requirements, available technology and program resources are understood and will support further definition of the system logical architecture.

The SRR entry criteria

SOW-242. The Contractor shall include in planning the SRR Entry Criteria given in the table below and make them available to the Purchaser at least two (2) weeks prior to the SRR:

Activities / Documents
A preliminary SRR agenda
SRS
Updated risk assessment and mitigations in the Risk Register

Table 7 SRR Entry Criteria

The SRR Success Criteria

[86] The purchaser will consider the SRR successful after the following requirements have been fulfilled by the contractor.

Requirement
Requirements Analysis is complete with respect to the Contractual requirements.
All changes to SRS are agreed, with sufficient detail to begin or continue with the system design and implementation work.
Detailed Hardware Requirements identified (To be finalized at PDR)

PMS has been updated to reflect the requirements to be implemented during the next contract steps.
Major risks have been identified, and viable mitigation strategies have been defined. Steps to mitigate risks are identified in the Risk Register.
The project utilizes a sound process for the control of requirements throughout all levels.

Table 8 SRR Success Criteria

4.4.3 Preliminary Design Review (PDR)

SOW-243. The PDR shall be conducted to ensure that the preliminary design for ITB OFS is sufficiently mature and ready to proceed into detailed design and can meet the stated performance requirements.

SOW-244. The PDR shall be considered as a major review. The Contractor shall apply requirements listed in Annex A of the SOW.

SOW-245. The PDR shall confirm that All system-level functional and performance requirements baselined at SRR have been:

- a. correctly decomposed or directly allocated to the lowest level of the specification tree for all system elements uniquely identified
- b. Sufficient requirements analysis have been conducted, supported by systems engineering trade-off analyses, to influence the system physical architecture and allocated requirements,
- c. The allocated baseline is complete,
- d. The design as disclosed satisfies all requirements in the approved system specification
- e. All system interfaces (system element to system element) have been documented in interface control documents (ICD). The verification approach to demonstrate achievement of all allocated performance requirements has been documented.
- f. All design constraints have been captured and incorporated into the allocated requirements and the design
- g. Bi-directional traceability exists between the source requirements and the design elements for all decomposed and allocated requirements.
- h. The set of system elements comprising the preliminary system design can achieve the complete set of allocated system baseline requirements, and forms a satisfactory basis for proceeding into detailed design with acceptable risk.
- i. All critical technologies have been demonstrated in a relevant environment and can be integrated into a system with acceptable risk.

- j. Risks have been identified and mitigation plans are in place.

SOW-246. The Contractor shall submit, 2 weeks before the PDR:

- a. The System Subsystem Design Description (SSDD) in accordance with Section 4.3.2 of the SOW.
- b. The Requirements traceability matrix in accordance with Section 4.3.1 of the SOW.
- c. Test Plans in accordance with Section 5 of SOW.

SOW-247. The Contractor shall provide the deliverables as listed in Schedule and Supplies and Services (SSS) document for the PDR.

PDR Entry Criteria

SOW-248. The Contractor shall include in planning the PDR Entry Criteria given in the table below and make them available to the Purchaser at least two (2) weeks prior to the PDR:

Activities / Documents
Success Criteria (enhanced or adapted)
Successful completion of the SRR and responses has been made to all SRR open issues, or a timely closure plan exists for those remaining open.
User HMI prototype
First (preliminary) version of System Subsystem Design Description (pSSDD)
Requirements Traceability Matrix between SSDD and SRS
Project Master Test Plan (PrMTP)
Updated PMS
Updated Risk Register
Change Requests – if require
Updated Product Breakdown Structure (section 3.8)

Table 9 PDR Entry Criteria

PDR Success Criteria

[87] The purchaser will consider the PDR successful after the following requirements have been fulfilled by the contractor.

Status / Documents
System components, interfaces between components are defined.
Requirements are allocated to defined system components.
High-level design of Information Entities is completed.
Overall system design and its interactions, Services, components and Human-Machine Interface and Human Factors justifications are defined.

For COTS products, the intended product and version, and note if any modifications, adaptations, or additional elements (such as macros or plug-ins) are required. Open Source Software (OSS) are to be disclosed (for review of OSS conditions by the Purchaser).
The verification and validation requirements and plans are complete.
The testing approach is comprehensive, and the planning for system integration, test, and operation is sufficient to progress into the next phase. Sequence and scope of tests and any requirements for Purchaser support and participation are defined. The Test procedures structure is comprehensive and the provided test procedures examples provide sufficient information to perform a test.
Risks are understood, and plans and resources exist to effectively manage them. Steps to mitigate risks are identified in the Risk Register.
Non-functional requirements have been adequately addressed in system and operational designs.
Consistency and traceability between the system requirements and system architecture design has been provided.
Detailed Hardware Requirements finalized
Capability Demonstration is performed for ITB OFS.

Table 10 PDR Success Criteria

4.4.4 Critical Design Review (CDR)

SOW-249. The Contractor shall conduct a CDR to ensure that the detailed design for the ITB OFS is adequate to proceed into development, system integration, demonstration and test and can meet stated performance requirements.

SOW-250. The CDR shall be considered as a major review. The Contractor shall apply requirements listed in Section 3.5.2 of the SOW.

SOW-251. The CDR shall confirm that:

- a. The initial product baseline is complete and describes the detailed design for production, fielding/deployment, and operations and support.
- b. The system detailed design, down to the lowest system element level is expected to satisfy the requirements of the system specification within current budget and schedule constraints.
- c. The set of system elements comprising the detailed system design, including all internal and external interfaces, forms a satisfactory basis for proceeding into development, integration and testing of system components with acceptable risk
- d. The detailed design of each individual configuration item (CI) that is an integral part of the system under review can meet the stated performance and engineering specialty requirements of the CI development specifications

within program budget, schedule, risk, and other program and system constraints.

- e. Fidelity of the simulation models
- f. The flow down of requirements from the functional baseline to the lowest-level system detailed design element for each end item in the specification tree is complete and captured in each CI detailed design.
- g. Bi-directional traceability exists between the source of the functional and allocated baselines and the lowest-level detailed design baselines
- h. The detailed designs for all external interfaces to the system satisfy the interface requirements contained in the system external interface control documentation defined at the PDR.
- i. The detailed designs for all interfaces internal to the system elements satisfy the interface requirements contained in the system internal interface control documentation defined at the PDR.
- j. Verification requirements to demonstrate achievement of all specified allocated performance characteristics have been documented.
- k. All design constraints and considerations have been captured and incorporated into the allocated requirements and the detailed design.
- l. All design items incorporate technologies that have been demonstrated in a relevant environment and can be integrated into a system with acceptable risk.
- m. The software logical and physical architectures and detailed design are complete to the extent specified in the SDP for the point in its life cycle at which CDR occurs, based on the selected lifecycle model.
- n. The program’s decision management process documentation shows that key decisions are fully documented, executable and accompanied by sufficient rationale that supports each decision.
- o. compliance of the design with NATO Security policy

SOW-252. The Contractor shall submit Final version of the System Subsystem Design Description (SSDD) in accordance with Section 4.3.2 of the SOW, 2 weeks before the CDR.

SOW-253. The Contractor shall provide the deliverables by latest on the date as listed in the SSS for the CDR.

CDR Entry Criteria

SOW-254. The Contractor shall include in planning the CDR Entry Criteria given in the table below and make them available to the Purchaser at least two (2) weeks prior to the CDR:

Activities / Documents
Success Criteria (enhanced or adapted)

Successful completion of the PDR and responses has been made to all PDR open issues, or a timely closure plan exists for those remaining open.
User HMI prototype
Final version of System Subsystem Design Description (SSDD)
Final version of Requirements Traceability Matrix between SSDD and SRS
Initial Draft test Procedures
Training Plan
System Transition Plan
Updated PMS
Updated Risk Register
Change Requests – if required
Updated Product Breakdown Structure (section 3.8)

Table 11 CDR Entry Criteria

CDR Success Criteria

[88] The purchaser will consider the CDR successful after the following requirements have been fulfilled by the contractor.

Status / Documents
The detailed design is expected to meet the requirements with adequate margins at an acceptable level of risk. System Element-level functionality, design and interfaces are defined.
System security, including Technical Services access-control mechanisms, data protection, backup and recovery, audit, interconnection, and information exchange security in context of the Services breakdown are defined.
For COTS products, the intended product and version, and note if any modifications, adaptations, or additional elements (such as macros or plug-ins) are required. Open Source Software (OSS) are to be disclosed (for review of OSS conditions by the Purchaser).
The verification and validation requirements and plans are complete.
The training approach is comprehensive. Sequence and scope of training and any requirements for Purchaser support and participation are defined.
System Transition Plan is complete to address solutions on transition from legacy ITB OFS to ITB OFS
Adequate technical and programmatic margins and resources exist to complete the development within budget, schedule, and risk constraints.

Risks are understood, and plans and resources exist to effectively manage them. Steps to mitigate risks are identified in the Risk Register.
Capability Demonstration is performed for ITB OFS.

Table 12 CDR Success Criteria

5. CLIN 3: TESTING AND ACCEPTANCE

5.1 General

[89] The ITB OFS requires a set of testing, verification and validation (TVV) activities to verify their compliance with the Contractual requirements.

[90] It's required to plan TVV activities for each instances of ITB OFS, although ITB OFS software is identical for each ITB type of hardware, namely, ITB Core, ITB Ops and ITB Portable.

[91] The expected test phases are depicted in Figure 7. The contractor may propose additional test phases.

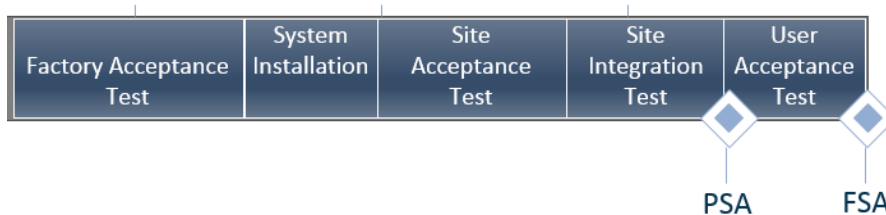


Figure 7 Test Phases

[92] The scope of this section includes all verification and validation principles, activities and processes that shall be executed by the Contractor during the various verification and validation stages of the project.

[93] This section defines the specific requirements to be applied by the Contractor to the Testing & Acceptance process, which is required for verification and validation of the requirements set forth under this Contract by the Purchaser.

SOW-255. All deliverables supplied by the Contractor under this contract shall be verified and validated to ensure they meet the requirements of this contract. Both fit-for-use and fit-for-purpose will be assessed using a quality based approach.

SOW-256. The Contractor shall demonstrate to the Purchaser that there is a testing process in place for the project, with quality assurance oversight.

SOW-257. The Contractor shall strictly follow the TVV process, document templates and guidance given in Section 2 unless officially agreed by the Purchaser.

SOW-258. The Contractor shall perform testing according to best practices, embodied in the referenced standards (Section 2), unless more specific testing process requirements and/or definitions are given in this document

SOW-259. The Contractor shall ensure that rigorous testing, including regression testing when required, is performed at every stage of the Project lifecycle in order to identify and correct defects as early as possible and minimise impact on cost and schedule.

SOW-260. All test, verification and validation material developed and used under this contract shall be delivered to the Purchaser.

SOW-261. In the context of this document the following test phases shall be considered as Contractual tests:

- a. Factory Acceptance Tests (FAT),
- b. Site Acceptance Test (SAT),
- c. Site Integration Test (SIT),
- d. User Acceptance Tests (UAT).

[94] The Contractor may propose additional / incremental deliveries test activities or more than one occurrence of the tests defined above (i.e. multiple FAT).

[95] The Purchaser reserves the right to develop additional test procedures and conduct independent testing.

SOW-262. For each event supporting a test phase defined in Table 13, the Contractor shall have the overall responsibility to perform the following activities:

- a. Planning and management of the test event and associated documentation required under this Contract;
- b. The design and development of all tests cases and associated documentation required under this Contract;
- c. The conducting of all testing (Except for UAT. UAT will be executed by the Purchaser);
- d. Reporting the results; and,
- e. Closure of the of test events (including the final version of all test artefacts created during the test event).

Test Phases	Scope	Purchaser Involvement
Engineering Tests	Internal tests executed during development phase of the system to ensure the system/software conforms to their design specifications.	Review: Development Test Reports
Factory Acceptance Test	To verify that production units comply with the requirement/design specifications at the Contractor Facility	Review: Test Plan, Test Cases/Scripts, Test Report, Test Data, Existing defects. Dry Run results. Participate: Dry Run (Optional Purchaser participation), TRR, Test Execution, Test Results Review
Site Acceptance Test (SAT)	Verification of each ITB OFS component separately at Purchaser's Facility (in the BMD ITB) on the real HW environment and virtual machines provided by the Purchaser. A separate SAT will be performed for each ITB OFS, ITB Core, ITB Ops and ITB Portable. For ITB Core, the procedures substantially similar to the FAT will be used, BMD Programme will support and witness the tests. For ITB Ops and ITB Portable, a subset of ITB Core tests procedures can be proposed by the Contractor. The scope of the proposed subset(s) is subject to the Purchaser approval.	Review: Test Plan, Test Cases/Scripts, Test Report, Test Data, Test Environment Baseline, Existing defects Participate: TRR, Test Execution, Test Results Review
Site Integration Test (SIT)	The purpose of this phase is to - Demonstrate that all components of the System/Application have been integrated (including other systems) to meet all the requirements of the SRS - Ensure end to end delivered system works as expected and can interoperate with other Purchaser equipment. Includes support to the security tests to be performed by the Purchaser, focused on ensuring the security requirements are met. SIT is also to ensure compatibility and integration of the product with the site	Review: Test Plan, Test Cases/Scripts, Test Report, Test Data, Test Environment Baseline, Existing defects Participate: TRR, Test Execution, Test Results Review

Test Phases	Scope	Purchaser Involvement
	<p>environment (Integration of ITB OFS with other ITB OFS Components).</p> <p>Migration related tests are also covered under this tests. This includes integration with PFEs.</p> <p>Successful completion of SIT leads Provisional System Acceptance (PSA, see 0).</p> <p>A separate SIT will be performed for each ITB OFS, ITB Core, ITB Ops and ITB Portable.</p> <p>For ITB Ops and ITB Portable, a subset of ITB Core tests procedures can be proposed by the Contractor. The scope of the proposed subset(s) is subject to the Purchaser approval.</p>	
<p>User Acceptance Tests (UAT)</p>	<p>Scenario based testing, focused on validating the system as per user needs.</p> <p>To ensure that site is successfully integrated and tested on the network level for both CFBLNET and NS.</p> <p>Successful completion of UAT leads Final System Acceptance (FSA, see 5.6.2).</p> <p>A separate UAT will be performed for each ITB OFS, ITB Core, ITB Ops and ITB Portable.</p> <p>For ITB Ops and ITB Portable, a subset of ITB Core tests procedures can be proposed by the Contractor. The scope of the proposed subset(s) is subject to the Purchaser approval.</p>	<p>Review: Test Plan, Test Cases/Scripts, Test Report, Test Data, Test Environment Baseline, Existing defects</p> <p>Conduct: Test Execution</p> <p>Participate: TRR, Test Results Review</p>

Table 13 List of Test Phases

[96] The Purchaser reserves the right to monitor and inspect the Contractor’s TVV activities to verify their compliance with the requirements set forth in this Contract.

SOW-263. The contractor shall provide a person to support the test execution during UAT.

SOW-264. The Contractor shall only proceed to the next formal test activity, after agreement and approval by the Purchaser.

5.2 System Installation

SOW-265. In addition to the test activities defined in Table 13, after successful completion of FAT, The Contractor shall perform a series of on-site activities until final acceptance of the ITB OFS.

[97] Prior the test, verification & validation activities defined in Section 5.1, installation related checks will be performed as described in this sections.

[98] For a certain period of time, ITB 5.3 and ITB 6 will work in parallel. The transition plan should address an appropriate approach to execute this phase.

SOW-266. The Contractor shall ensure the Purchaser is able to operate simultaneously, and independently the ITB Build 5 and Build 6 until FSA.

SOW-267. The Contractor shall provide the Purchaser a System Transition Plan to operate in parallel with existing ITB 5.

SOW-268. The Contractor shall confirm that the site infrastructure is ready to perform the installation.

SOW-269. The Contractor shall restore the previous system configuration in case the new deployment causes serious business impact.

SOW-270. The Contractor shall provide support to the Purchaser to ensure the integrity of the installed baseline is maintained and be prepared to execute the Roll-Back/Contingency Plan in the event of a major incident or problem.

SOW-271. The Contractor shall install the baselined ITB OFS operational software, along with any supporting/COTS software and documentation associated with the baseline, on the designated Purchaser environment according to Site Installation Procedures.

SOW-272. Using details provided by the Site, the Contractor shall plan the migration to achieve this in the Release and Deployment Plan (RDP). During installation and migration, the service interruption shall be kept to minimum. Precautions shall be taken for not losing any data, by backing up data before migration. Any system downtime occurring during normal business hours shall be coordinated and agreed with the Site POC.

SOW-273. The Contractor shall obtain server address and other site configuration details from the Site POC and activate all installed servers, workstation, and ancillary equipment on the Site's Local Area Network.

SOW-274. ITB OFS SW and Applications shall be capable of operating within the NS security environment (including servers, network, services and workstations) in the presence of the currently approved NATO Security Settings (target version to be provided by the Purchaser during the Design Stage). Any deviations from the approved security settings shall be identified by the Contractor prior to testing and shall be subject to approval of the Purchaser.

SOW-275. The Contractor shall install and configure COTS software applications included as part of the ITB OFS PBL for the site.

SOW-276. The Contractor shall configure all software settings to match the ITB OFS Product Baseline and site-specific requirements, and load any initial data included with the ITB OFS PBL.

SOW-277. The Contractor shall import and/or load any site-specific data (e.g. Group Policy Objects).

SOW-278. All software packages shall be delivered with latest security updates and proposed process and timescale for keeping them up-to date and security patched until PSA.

SOW-279. Upon completion of system installation work, the Contractor shall provide the Purchaser Site POC with a copy of the installation checklist. The Contractor shall resolve any discrepancies identified.

[99] The Purchaser will provide the Contractor with the licenses for the activation of the COTS software indicated in the software baseline maintained by the Purchaser unless otherwise specified (e.g. the Contractor purchases the software licenses on behalf of the Purchaser).

SOW-280. The Contractor shall deliver all required Technical Documentation for Operation and Maintenance of the ITB OFS.

SOW-281. The Contractor shall upgrade the ITB OFS Operational Software and the infrastructure (if any patch is available) on the installation sites after each new Baseline, and after each new software release, as defined in the CMP.

5.3 Test Planning

SOW-282. The Contractor shall produce a Project Master Test Plan (PrMTP) to address the plans for each TVV activities listed in this document.

SOW-283. The Contractor shall describe how the Quality Based Testing is addressed and implemented in the PrMTP, in comply with the Non-Functional requirements defined in ANNEX A.

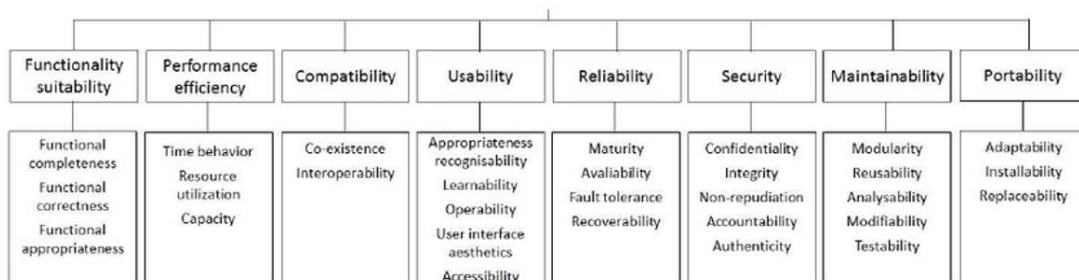


Figure 8 Product Quality Criteria

SOW-284. The Contractor shall describe all formal test, verification and validation activities in the PrMTP with a testing methodology and strategy that fit the development methodology chosen by the project.

SOW-285. The Contractor shall provide roles and responsibilities using a Responsible, Accountable, Consulted, Informed (RACI) matrix in PrMTP for each TVV activity.

SOW-286. The Contractor proposed testing methodology shall describe the method of achieving all the test phases, defined in Table 13, successfully.

SOW-287. The Contractor shall describe in the PrMTP how the following objectives will be met:

- a. Compliance with the requirements of the Contract
- b. Verification that the design produces the capability required
- c. Compatibility among internal system components
- d. Compliance with the SRS requirements
- e. Compliance with external system interfaces and/or systems
- f. Confidence that system defects are detected early and tracked through to correction, including re-test and regression approach
- g. Compliance with Purchaser policy and guidance (i.e. security regulations, etc.)
- h. Operational readiness and suitability
- i. Product Quality Criteria (Figure 8)
- j. Identify which platform(s) to be used for the test events and the responsibilities for operation and maintenance of the environment

SOW-288. The Contractor shall describe TVV activities for each instances of ITB OFS, although ITB OFS software is identical for each ITB type of hardware, namely, ITB Core, ITB Ops and ITB Portable.

SOW-289. The Contractor shall describe the Contractor’s test organization and its relationship with the Contractor’s Project Management Office and Quality Assurance (QA) functions in the PrMTP.

SOW-290. The Contractor shall describe in the PrMTP “Entry”, “Suspension”, “Resumption” and “Exit” criteria for each of the formal test events.

SOW-291. The Contractor shall use the categorization nomenclature for all defects and non-compliances as defined in ANNEX B.

SOW-292. The Contractor shall provide the schedule in the PrMTP for the provision of the test related deliverables and detail the conduct of testing.

SOW-293. In the PrMTP, the Contractor shall describe the defect/non-conformances reporting and management process during the performed tests defined in Table 13.

SOW-294. The PrMTP shall include the Contractor’s approach to Test Reviews including Test Readiness Reviews and Test Results Reviews for each test event.

SOW-295. The Contractor, shall provide their provisions and strategy for building/maintaining of Reference Environment in PrMTP.

SOW-296. The Contractor shall address the approach and proposed scope of the tests for ITB Core, ITB Ops and ITB Portable in PrMTP.

5.3.1 Test Readiness Reviews (TRR)

SOW-297. The Contractor shall conduct a TRR before each test event as defined in 5.2.

SOW-298. The TRR shall be considered as a major review. The Contractor shall apply requirements listed in Section 3.5.2 of the SOW.

TRR Entry Criteria

SOW-299. The Contractor shall include in planning the TRR Entry Criteria given in the table below and make them available to the Purchaser at least two (2) weeks prior to the TRR:

Serial	Activities / Documents
1	The conditions for exit from the previous test phase have been met
2	The Test Plan and Test Cases are completed and have been reviewed
3	A complete System/application baseline build is available.

4	Dry-Run Test are completed
7	Updated RTM has been provided by the Contractor
8	Updated VCRM has been provided by the Contractor

Table 14 TRR Entry Criteria

TRR Success Criteria

[100] The purchaser will consider the TRR successful after the following requirements have been fulfilled by the contractor.

Serial	Activities / Documents
1	Test Results of the dry-runs have been provided by the Contractor
2	Known issue are reviewed. No blocking issue identified.
3	The schedule for resolution of the issues are approved by the Purchaser.
4	The Test Plan and Test Cases approved by the Purchaser
5	The test environment and test data are ready.

Table 15 TRR Success Criteria

5.4 Test Preparation

[101] During Test Preparation phase the Contractor prepares test description documents which include test scripts/procedure to be executed during the tests.

SOW-300. The Contractor shall prepare Test Descriptions Documents (TDD) for each test phase defined in Table 1.

SOW-301. Each TDD shall cover the followings, as minimum:

- a. Test Environment
- b. Test Setup
- c. Test Cases/Specifications/Procedures/Scripts
- d. Bi-Directional Traceability (Test Cases – Requirements)
- e. The Contractor shall provide the Purchaser, the Test Description document 1 month before TRR for review.

5.5 Test Execution & Reporting

SOW-302. The Contractor shall convene a Test Readiness Review (TRR) at least one week prior to the events defined in Table 13. The TRR shall ensure that all entry criteria for events have been met (See Section 0). Documentation that requires review by the Purchaser prior to a TRR shall be provided no less than 4 weeks prior to TRR.

SOW-303. The Contractor shall obtain the approval of the Purchaser regarding the environments the formal events will take place on and in requesting the approval, indicate what support is required from the Purchaser to configure and prepare the environment. This includes any required data from the Purchaser required for the test event.

SOW-304. The Contractor shall provide all items under scope as defined in the Event Test Plan one month before the TRR meeting. The Purchaser has the right to cancel the TRR and/or formal test event if the evidence demonstrates that execution of the test event will not be effective.

SOW-305. The Contractor shall convene a Test Review Meeting (TRM) within 1 business day after test event completion. The TRM shall ensure that the event results and defect categorization is agreed upon.

SOW-306. The Contractor shall describe in the event test plan what training will be provided prior to formal TVV events.

SOW-307. The start and/or ending of any test session shall be subject to the Purchaser approval. In the event that critical issues are encountered which impact the process of the testing or if the other functions depends on the failed test cases, the Purchaser has the right to stop the testing for Contractor's investigation. The tests can only re-start if Purchaser agrees to continue testing from the point of failure or re-start testing from the beginning.

SOW-308. During formal TVV phases, a daily progress debrief shall be scheduled. Participation to the daily progress debrief will be agreed between Purchaser and Contractor. The aim of the debrief is to get a common understanding on what tests were run, which passed, which failed, and whatever defects were reported during the day.

SOW-309. For each test event, the Contractor shall provide log of the event, including but not limited to individual test results, test execution durations, deviations during execution.

SOW-310. At the end of the project, the Contractor shall provide the final version of all artefacts (regardless of format) created during the execution of all test, verification and validation activities. These artefacts shall be formally released as defined in the CMP.

SOW-311. The Contractor shall produce and maintain the Requirement Traceability Matrix (RTM) which includes all functional and non-functional requirements throughout the Contract execution to demonstrate that the verification and validation methods can successfully verify requirements and that those requirements are tracked. The Purchaser will review and approve the proposed RTM

SOW-312. The Contractor shall produce and maintain the Verification Cross Reference Matrix (VCRM) which defines how the requirement will be verified at each of the TVV activities:

- a. The verification method: Inspection, Analysis, Test or Demonstration (See ANNEX B for definition if the terms)
- b. Correspondent test phase(s), Table 13, for each requirement
- c. Coverage Status per test phases.

SOW-313. The Contractor shall provide the Purchaser with updates (via the automated tools) to the RTM and VCRM daily during the execution of an event, and following the conclusion of each event defined in Table 13. A workflow for updating the RTM and VCRM shall be proposed by the Contractor and approved by the Purchaser.

SOW-314. The Contractor shall provide a System Test Documentation Package as defined in ANNEX B.

SOW-315. If applicable, the Contractor shall develop and validate any Test Harnesses, simulators and stubs, including all script/code/data/tools required to execute the planned functional and non-functional tests in the Test Environment. The Test Harnesses for PFI will be provided by the Purchaser.

SOW-316. The Contractor shall ensure that all test/reference environments are under proper configuration control. The Configuration Control specific toolset and process shall be approved by the Purchaser as described in the CMP.

[102] The Contractor may request a Test Waiver if the Contractor has previously successfully completed qualification testing to national, or international standards for assemblies, subassemblies components or parts. The Purchaser, after review of test waivers and analysis of their impact, reserves the right to require test and certification of the modified equipment at no cost to the Purchaser. The Purchaser has the right to reject any test Waiver.

SOW-317. If the Purchaser grants the waiver, the Contractor shall execute the Testing in accordance with the waiver.

SOW-318. In respect to a requested waiver, the Contractor shall certify that the test environment to be implemented is identical to that which was originally used for testing, or advise the Purchaser of design/construction changes which affect form, fit or function.

SOW-319. The Contractor shall record and log all waiver requests along with their resolution submitted for the Purchaser's approval as defined in the CMP.

5.6 Acceptance

[103] The system ITB OFS acceptance will be at two stages:

- a. Provisional System Acceptance
- b. Final System Acceptance

5.6.1 Provisional System Acceptance (PSA)

[104] Provisional System Acceptance (PSA) occurs when all capability and services are provided to site.

SOW-320. The Contractor shall plan and conduct PSA to check the PSA Criteria, and submit a PSA Report within one week after the completion of PSA.

SOW-321. To request Provisional System Acceptance (PSA), the Contractor shall have completed the following actions:

- a. Successful completion of System Integration Tests (SIT), Section 5.1;
- b. Delivery of final product baselines.
- c. All documentation has been delivered according to SSS and this SOW.
- d. System Statement of Conformance from the local SAA has been delivered.
- e. ILS Plan (support POC and process) has been clearly explained to Purchaser POC as defined in Section 6 of this SOW.
- f. Support for the Physical and Functional Configuration Audit as defined section 3.15 of the SOW;
- g. Completion of the Administrator/User Operator training as defined section 6.9 of the SOW;

SOW-322. The Contractor shall request PSA from the Purchaser in writing. This written request shall be accompanied by a PSA Report.

SOW-323. The PSA Report shall identify:

- a. The delivered Product Baseline;

- b. Status of outstanding Deficiency Reports and a plan detailing how and when deficiencies will be fixed.
- c. For Admin/User Training:
- d. Student attendance and performance record.
- e. Student feedback forms.
- f. Problems encountered (if any).
- g. Actions taken or recommended.
- h. Suggested follow-up actions.
- i. Test results of site activation procedures.
- j. Site Material Data Sheet (included list of Product baseline Items delivered to the site and their associated version).
- k. System Statement of Conformance.
- l. Deficiency Report, including security deficiencies, and resolution plan
- m. Any discrepancies discovered during the PSA Review. They will be recorded on observation sheet(s) with a statement on their required resolution.

[105] Depending on the severity of the discrepancy discovered, PSA may be withheld until satisfactory resolution.

SOW-324. Remaining discrepancies identified at PSA shall be resolved before Final System Acceptance.

5.6.2 Final System Acceptance (FSA)

[106] Final System Acceptance (FSA) occurs when the Purchaser has evaluated the whole system and has determined that it meets the requirements of this Contract including all deliveries and services.

SOW-325. The Contractor shall plan and conduct FSA to check the FSA Criteria, and submit it within one week after the completion of FSA.

SOW-326. The Contractor shall have completed the following actions:

- a. Successful completion of User Acceptance Test (UAT), Section, 5.1;
- b. System has been successfully/installed and activated at all authorized sites, and evidences have been documented, signed and deliver to the Purchaser.
- c. Planned trainings of NATO personnel involved in system operation, support and maintenance of the capability is completed
- d. System and Software transition to Purchaser is completed
- e. All deficiencies identified have been addressed or agreed with Purchaser;
- f. Product baseline is updated due to the possible changes after PSA;
- g. All due deliverables are accepted in writing by the Purchaser,

- h. Status of Deficiency Reports are accepted by the Purchaser
- i. Delivery of on-site support until FSA;
- j. Post-Go Live support has been completed.
- k. Contractor has delivered all the required deliverables.
- l. Purchaser approval of the deliverables.

SOW-327. The Contractor shall request FSA from the Purchaser in writing. This written request shall be accompanied by a Final System Acceptance Report.

SOW-328. The Final System Acceptance Report shall:

- a. Provide a summary of activities done during level 2 and level 3 support;
- b. Identify the Final Product Baselines;
- c. The status of deficiencies;
- d. A Certificate of Conformity as defined in section 3.16.4.

[107] The Purchaser concludes that the FSA Success Criteria is accomplished to complete the objectives of the FSA.

SOW-329. Upon Purchaser's approval of FSA, the warranty shall start.

6. CLIN 4&CLIN 5: INTEGRATED LOGISTICS SUPPORT (ILS)

6.1 General

[108] This section outlines the supportability requirements of the project. It addresses the ILS elements requirements.

SOW-330. The Contractor shall establish, execute, and maintain an effective Integrated Logistic Support Program throughout the period of performance of this CLIN.

SOW-331. The Contractor shall implement the ILS program as defined in the following sections.

SOW-332. The Contractor shall use the [ALP 10 – 2016 and the AIA/ASD SX000i, 2016] specification as guidance when establishing and conducting the ILS Process, in accordance with the requirements of the contract.

6.2 Integrated Logistics Support Plan (ILSP)

[109] The ILSP is a standalone Product Lifecycle documents that will survive the project post-FSA.

SOW-333. The Contractor shall develop and maintain the Integrated Logistics Support Plan (ILSP) as defined in [ALP 10 – Annex E] that encapsulates all support element plans and concepts as defined below and covers both the project implementation period (from first delivery through to FSA) and the follow-on, in-service support period (from FSA onwards) which shall be an annex to ILSP as In-Service Support Plan.

SOW-334. The Contractor shall detail in the ILSP how Integrated Logistics Support will be designed, managed, procured and provided throughout the system lifetime.

SOW-335. The Contractor shall maintain and update the ILSP as required to reflect changes in the PBLs, in the SOW, or in support arrangements for any System.

SOW-336. ILSP shall include the following as minimum:

- 1) The Contractor's ILS organization, roles, responsibilities and procedures;
- 2) Maintenance Concept (Maintenance Plan, detailed Maintenance Level definitions and tasks);
- 3) Reliability, Availability, Maintainability and Testability (RAMT Programme);
- 4) Support and Test Software
- 5) Computer Resources (licenses, etc.);
- 6) Manpower and Personnel Requirements;
- 7) Technical Documentation as defined in the PBL;

SOW-337. In-Service Support Plan shall include Contractor's support and warranty organization, interfaces, processes, PoCs, maintenance and support tasks allocation to various parties based on the levels, performance monitoring and reporting, support and warranty request processes and response and restoration times)

6.3 Maintenance and Support Concept

SOW-338. As an Annex of the ILSP, the Contractor shall develop and maintain the system Maintenance and Support Concept, in accordance to the definitions in ANNEX E, which defines the maintenance and support environment, constraints, locations, procedures, artefacts, interfaces, organisation and personnel skills to maintain the Delivered Baselines of the System.

SOW-339. The Contractor's Maintenance and Support Concept shall meet the functional and non-functional Requirements of the system.

SOW-340. The Contractor's Maintenance and Support Concept shall define the Maintenance Operational and Support tasks at any level of support and at any level of maintenance for the ITB OFS.

SOW-341. The Contractor shall define the 2nd and 3rd Level Support process interfaces to the other processes, including the existing NCI Agency's Service Desk (1st Level of Support).

SOW-342. The Contractor's Support process interface definition shall include the input and output information, its structure, the communication path, POCs, the time constraints for sending and receiving information, and quality criteria to evaluate the integrity of the interface.

SOW-343. The Contractor's procedural description shall include objective(s), triggering event(s), input(s), output(s), task(s), roles and responsibilities using a Responsible, Accountable, Consulted, Informed (RACI) matrix, constraints, exceptional case(s), and tool(s) support.

6.4 ILS Design

SOW-344. The Contractor shall develop and maintain the necessary Support Cases in which all LSA activities shall be documented.

SOW-345. The Contractor shall ensure that the first issue of these support case is performed and delivered at CDR.

SOW-346. The Support Case shall include all the results of the required LSA analysis and , as a minimum:

- a. Reliability, Availability, Maintainability and Testability (RAMT) results and calculation (or demonstration) Input to this analysis are the Non Functional Requirements defined in the SRS;
- b. the complete data set of the Task Analysis, including listings of all operation tasks, SM&C tasks, corrective maintenance tasks and preventive maintenance tasks;
- c. The results of the Disaster Recovery Logistic Analysis;

- d. The results from the Operation and Maintenance Procedures Verification Test;
- e. The Obsolescence Analysis results.

SOW-347. The Support Case shall provide rationale and justifications for all data and formulas used in any of the calculations and models.

- a. Specific system level requirements and definition are included in the SRS.

6.5 Supply Support

[110] This section defines the general requirements that are applicable to all ITB OFS equipment Supply Support and Delivery

6.5.1 System Inventory

SOW-348. The Contractor shall provide the Purchaser's ILS POC with a System Inventory in electronic Microsoft Excel format at least ten (10) working days before each delivery of Software (SW).

SOW-349. The Contractor's System Inventory shall include, in separate chapters, all items furnished under this Contract, as follows:

- a. all SW – i.e. all SW tools, SW test equipment, etc. (where applicable);
- b. all Purchaser Furnished Item (PFI); (where applicable);
- c. all documentation, such as manuals, handbooks and drawings;
- d. All training materials.

6.5.2 Physical Labelling

SOW-350. All hardware (CD, USB, memory stick, hard drive etc.) that is used to deliver or transfer the software by the Contractor shall be physically labelled with the contract information, CLIN, identification, release date and security classification, NCAGE/NSCM. The label shall be durable and non-erasable to ensure proper identification is warranted at all times Software delivery

SOW-351. The Contractor shall provide a detailed Software Distribution List (SWDL), which details comprehensively all CSCIs and associated software, firmware or feature/performance licenses provided under this Contract.

SOW-352. The SWDL shall include, the following data elements:

- a. CSCI identification number;
- b. Nomenclature;
- c. Version number;

- d. License key (if applicable);
- e. License renewal date (if applicable);
- f. Warranty expiration date;
- g. Date of distribution;
- h. Distribution location (geographically);
- i. Distribution target (server).

SOW-353. The Contractor shall make sure that all licenses are registered with the NCI Agency as end-user.

6.5.3 Tools and Test Equipment

[111] Tools and Test Equipment fall into two (2) categories:

- a. "Special to Type" Tools and Test Software which are intrinsically related to ITB OFS.
- b. "Standard" Tools and Test Software which are common and are likely to be already available at NATO sites.

SOW-354. The Contractor shall deliver a fully detailed and priced Recommended Tools and Test software List (RTTL), covering the "Standard" Tools and Test Equipment.

SOW-355. The Contractor shall provide "Special to Type" tools and/or test software if required.

6.5.4 Customs

SOW-356. The Contractor shall be responsible for customs clearance and/or export licences of all deliveries into their destination countries. It is the Contractor's responsibility to take into account delays at customs. The Contractor shall therefore consider eventual delays and arrange for shipment in time. Under no circumstances can the Purchaser be held responsible for delays incurred, even when utilising Purchaser provided Customs Form 302 (if applicable).

6.5.5 Notice of Delivery

SOW-357. Ten (10) working days before each delivery, the Contractor shall provide the Purchaser with a Notice of Shipment comprising the following details:

- a. Shipment Date;
- b. Purchaser Contract Number;
- c. CLIN;
- d. Consignor's and Consignee's name and address;
- e. Number and type of Installation media and/or Packages/Containers;

SOW-358. The Contractor shall ship all required software, documentation, and installation or testing tools to the locations designated by the Purchaser.

SOW-359. The Contractor shall be responsible for resolving any loss incurred in shipping.

6.6 Warranty and Support

SOW-360. The Contractor shall warrant that all equipment and software (including COTS SW) furnished under this Contract, prepared and supplied documentation and all installation work performed under this Contract conform to the requirements and is free of any defect in material, code or workmanship for a warranty period starting FSA plus one year, in accordance to the definitions in ANNEX E.

SOW-361. The Contractor shall fix/test/reissue any CSCI and SW component upon discovery of design/integration/installation defects in accordance with CMP defined configuration control.

SOW-362. If the Contractor becomes aware at any time before acceptance by the Purchaser that a defect exists in any supplies, the Contractor shall coordinate with the Purchaser and promptly correct the defect.

SOW-363. Defective magnetic, solid state and electronic media storage devices (e.g. CD-ROMs, DVD-ROM's, solid state storage drives, hard drives) shall remain NATO property, at no additional cost, and not be returned to the Contractor when being replaced.

SOW-364. Any such defective storage devices shall be replaced by the Contractor with new storage devices at no additional cost to the Purchaser.

SOW-365. Between PSA and FSA, throughout the duration of warranty the Contractor shall be responsible for the provision of any alternative or superseding COTS SW and Licences, should the original one be no longer supported or available, ensuring compliance with the original design provided by this Contract. During this period, the Contractor shall be responsible for supplying all COTS software upgrades and updates.

SOW-366. The availability of COTS software upgrades and updates shall be made known to the Purchaser and, if proposed for introduction by the Contractor for whatever reason, including any corrective action for an identified fault, shall always be subject to Purchaser approval. Any upgrade or update shall be managed under formal configuration control.

SOW-367. The Contractor shall not be responsible for the correction of defects in Purchaser furnished property, except for defects in installation, unless the Contractor performs, or is obligated to perform, any modifications or other work on such property. In the event described above, the Contractor shall be responsible for correction of defects that result from the modifications or other work

SOW-368. The Contractor shall be responsible for shipment and delivery of faulty items for repair or replacement, and of the repaired or replaced item to the affected site. This support shall include cost of parts, travel and per diem and shall be provided at no additional cost to the Purchaser.

SOW-369. During deployment, the Contractor shall provide First, Second and Third Levels Support for any ITB OFS components until PSA.

SOW-370. The Contractor shall provide the appropriate level of support for each project stages as specified in the table below and shall detail how they will provide the warranty and support services under the In Service Support Plan (ISSP):

Stage	NCIA responsibility	Contractor's responsibility
From PSA to FSA (CLIN 4.14)	<ul style="list-style-type: none"> ▪ 1st Level maintenance and support, ▪ 2nd level maintenance and support 	<ul style="list-style-type: none"> ▪ 2nd level maintenance and support, if requested/required ▪ 3rd Level of support and maintenance ▪ 4th level maintenance
After FSA (During warranty and support for 1 years) (CLIN 4.15)	<ul style="list-style-type: none"> ▪ 1st Level support and Maintenance ▪ 2nd Level support and Maintenance ▪ 3rd Level support and maintenance (as per Purchaser capability based on the training and documentation provided) 	<ul style="list-style-type: none"> ▪ 3rd Level support and maintenance ▪ 4th Level maintenance
CLS Period, after Warranty period – Optional (CLIN 5.1.1- CLIN 5.1.4 and CLIN 5.3)	<ul style="list-style-type: none"> ▪ 1st Level support and Maintenance ▪ 2nd Level support and Maintenance ▪ 3rd Level support and maintenance (as per Purchaser capability based on the training and documentation provided) 	<ul style="list-style-type: none"> ▪ 3rd Level support and maintenance (For CLIN 5.3) ▪ 4th Level maintenance (For CLIN 5.1.1- CLIN 5.1.4)

Table 16 Maintenance and Support

SOW-371. For CLIN 4.14, the Contractor shall provide 3rd Level maintenance and support from his premises or on-site for the cases that remote resolution is not possible within requested timelines. This is considered under standard Deployment and Release Management that is initiated by problem management due to the bugs or faults in the software.

SOW-372. In addition to SOW-352; for CLIN 4.14 and CLIN 4.15, CLIN 5.3, the Contractor shall provide on-site or off-site 3rd level support when requested by the Purchaser for the support required due to the changes independent from the ITB-6 software. This support is considered as an additional scope to the warranty (i.e. bug fixing) and therefore be considered as optional service defined by CLIN 5.3. As an example, this request may be initiated by the configuration changes in the underlying hardware, firmware and software infrastructure, therefore requiring additional work from the Contractor to adapt the product to the new configuration in the operating environment.

SOW-373. For CLIN 4.14 and CLIN 4.15, the On-site support shall be provided during working hours which currently are 08:30 – 17:30. The on-site support staff shall have the appropriate means and skills to provide Second Level Maintenance and Support and to support the testing and deployment of the updated Product Baseline provided through Third Level Support.

[112] The Purchaser may need to enhance or upgrade each ITB OFS component during the support stage. This is outside corrective actions already covered via Third Level support. To that end, the Purchaser may provide, every six months, a list of changes.

SOW-374. As part of 3rd Level Support, the Contractor shall provide, 4 weeks after delivery of this list, an Engineering Change Proposal (ECP) for each proposed change.

6.6.1 Service Level of Support

SOW-375. Service Level agreements are defined in Requirements List (Annex A) SysRS_CR_62, SysRS_NFR_019.2, SysRS_NFR_020, SysRS_NFR_056, SysRS_NFR_023 and SysRS_NFR_029. In addition, in case of a critical failure, the Contractor shall provide the following service level, upon Purchaser's notification:

- a. A work around solution within 2 days;
- b. A patch fixing the failure within 10 days.
- c. Critical failure is defined as a failure that causes an immediate cessation of the ability to perform the required function/service.

6.7 System and Services Performances Monitoring and Reporting

[113] During Normal Operation period (after PSA), the NCI Agency Trouble-Ticketing (TT) system will be used for opening, modifying, tracking, and closing Trouble Tickets, and logging of all requests concerning the delivered capabilities.

[114] The Purchaser will use the TT system to verify if the Performance and RAM requirements in the SRS are met by the system in Service.

SOW-376. If the system fails to deliver within SRS performance and Quality requirements, the Contractor shall implement the necessary countermeasures to fulfil the requirements, providing the necessary patches and releases at no cost for the Purchaser and in addition is subject to service credits as described in clause 33 of Special Contract Provisions.

SOW-377. The Contractor shall provide a quarterly Warranty and Support Report, that summarises all Contractor performed tasks and deliverables under Support and Maintenance processes including Maintenance Records.

SOW-378. The Quarterly report shall include at least:

- a. PBL status
- b. Results from monitoring
- c. Number and status of defects (according to their severity);
- d. PBL roadmap;
- e. Costed suggestions for performance improvements.

6.7.1 Monthly Maintenance Review (MMR)

SOW-379. The Contractor shall conduct Monthly Maintenance Review (MMR) to plan the maintenance activities within that month.

SOW-380. The Contractor shall plan MMR in the first week of each month, starting from the beginning of the Maintenance Process until the end of the Contract.

SOW-381. The Contractor shall prepare a MMR Report that summarises all Contractor-performed maintenance tasks and deliverables and introduces suggestions for maintenance performance improvements. The MMR Report related to the previous month shall be delivered to the Purchaser until the fifth of each month. The MMR Report shall be reviewed during the MMR.

SOW-382. The Contractor shall provide the Maintenance Records to the Purchaser during the MMR.

6.8 System and Software Documentation

6.8.1 General

SOW-383. All the technical Documentation shall be kept updated by the Contractor and under configuration control for the entire life cycle of the Contract.

SOW-384. The Contractor's technical documentation shall be developed as on line or off line technical publication that will be accessible through the testing platform.

SOW-385. Technical documentation shall consist (as a minimum) of:

- a. Operating Documentation
 - i.* System User Manual (SUM)
 - ii.* Quick User Guide (QUG)
 - iii.* Briefing Manual
 - iv.* System Administrator Manual (SAM)
- b. Software Version Description
- c. Software Installation Guide
- d. "Read Me" files
- e. System Transition Manual
- f. System Support Manual
- g. System Maintenance Manual
- h. Training documentation
- i. Any other project documentation as required in this SoW

SOW-386. All the activities, milestones and actors associated with the development of technical documentation shall be described in the Contractor's ILSP.

SOW-387. The security classification of any on line Contractor's documentation shall not be higher than NATO RESTRICTED.

[115] The purchaser will provide to the Contractors access to documentation classified as up to NATO SECRET which is required to accomplish the task of this SOW.

SOW-388. All Contractor's documents, however short, shall identify the complete name and version identifier of the software they refer to, originator, date of production, the type of document, and configuration management information of the document itself.

SOW-389. All Contractor's documents shall contain a list of those CIs (title and version identifier) that the document or parts thereof refers to.

SOW-390. The Contractor shall submit all final and accepted versions of documentation deliverables in Portable Document Format (PDF), with an Object Character Recognition (OCR) capability format or in Microsoft Office Professional (MsWord) compatible format.

SOW-391. At end of warranty period all baselined documents shall be released to the Purchaser.

6.8.2 Software Version Description (SVD)

SOW-392. The Contractor shall produce a Software Version Description (SVD) for each release in accordance with the CMP.

SOW-393. The SVD shall list by identifying numbers, titles, abbreviations, dates, version numbers, and release numbers, as applicable, all physical media (for example, listings, disks) and associated documentation that make up the software version being released.

SOW-394. The SVD shall include applicable security and privacy considerations for the release.

SOW-395. The SVD shall contain a list of all changes incorporated into the software version since the previous version.

SOW-396. The SVD shall identify or reference all unique-to-site data contained in the software version.

SOW-397. The SVD shall identify any possible problems or known errors with the software version at the time of release, any steps being taken to resolve the problems or errors, and instructions (either directly or by reference) for recognizing, avoiding, correcting, or otherwise handling each one. The information presented shall be appropriate for the user who may need advice on avoiding errors.

6.8.3 Software Installation Guide (SIG)

[116] Software Installation Guide (SIG) provides information about all actions to take in order to install and configure the ITB OFS Operational Software, including COTS components.

SOW-398. The Contractor shall provide an installation supported by a complete (covering all aspects), clearly-worded (not ambiguous) Installation Guide.

SOW-399. The Software Installation Guide shall explain all actions to take in order to install and configure the subsystem, including COTS components. Every action shall be followed by a description (text and/or screenshots) of the feedback which will be displayed.

SOW-400. The SIG shall include the following:

- Prerequisites for installing ITB OFS (e.g. the necessary operating system access right to perform installation)
- The necessary supplementary software, drivers, etc. to install ITB OFS
- The required disk space
- Configuration file information (location, content, available settings of the items and their meaning)
- How to modify the configuration file
- How to configure the database management systems (including both the data model and access mechanisms)
- How to modify the system backbone to run ITB OFS
- Any additional information specific to the system.
- Text and/or screenshots of the system feedback which will be displayed after each action
- Detailed installation procedures for all services installed or migrated on new or existing platforms, allowing system administrators to rebuild services from scratch.

6.8.4 “Read Me” Files

[117] There may be additional “Read Me” files to explain specific information related to installation and configuration of certain components.

SOW-401. The ITB OFS “Read Me” files shall have at least the following information:

- The version number of the component to which the “Read Me” file applies
- Minimal system requirements necessary to run the specific component
- The functional changes since the latest release
- The solved problems
- Known errors
- Contact information for problem reporting.

SOW-402. The Contractor shall provide “Read Me” files in the installation package.

6.8.5 System Transition Plan (STP)

[118] System Transition Plan (STM) describes how to upgrade ITB OFS from one Baseline to another and from the legacy ITB OFS.

SOW-403. The STP shall include the plans, at least, for the followings:

- How to perform the transition from a legacy ITB OFS to ITB OFS Baselines in terms of functionality upgrade and migration of data
- How to perform the transition from one ITB OFS Baseline to the next Baseline in terms of functionality upgrade and migration of data
- How to convert the data from a legacy ITB OFS to ITB OFS Baselines
- How to convert the data from one ITB OFS Baseline to the next ITB OFS Baseline

6.8.6 System Transition Manual (STM)

[119] System Transition Manual (STM) describes how to upgrade software data from one Baseline to another and from the legacy ITB OFS.

SOW-404. The STM shall include at least the following:

- How to perform the transition from a legacy ITB OFS to ITB OFS Baselines in terms of functionality upgrade and migration of data
- How to perform the transition from one ITB OFS Baseline to the next Baseline in terms of functionality upgrade and migration of data
- How to update one ITB OFS installation to the next Baseline
- How to convert the data from a legacy ITB OFS to ITB OFS Baselines
- How to convert the data from one ITB OFS Baseline to the next ITB OFS Baseline
- How information can be exchanged between legacy ITB OFS and ITB OFS Baselines
- How information can be exchanged between different ITB OFS Baselines
- List of updated documentation.

6.8.7 System Support Manual (SSM)

SOW-405. The Contractor shall prepare and deliver the System Support Manual (SSM) for ITB OFS.

SOW-406. The SSM shall describe how to provide First and Second Level Support to the installed ITB OFS Operational Software.

SOW-407. The SSM shall provide information sufficient for a technician who has attended the System Administration Training Course to be able to operate the system without supervision and to perform fault finding in support of First Level Maintenance.

SOW-408. The SSM shall include at least the following information:

- Configuration settings for the modules, services and components
- How to configure the logging and uses of performance counters
- Interfaces and their settings
- Log file locations
- Logging categories
- Performance counter categories
- Additional notes specific to the systems
- An annex with trouble-shooting information (a break-down on actions to solve a full range of (potential) problems or provide workarounds)
- An annex with database management information describing a break-down from the GUI (fields and actions) down to the effected database tables, triggers and stored procedures, the ITB OFS Logical Data Model in full detail, the ITB OFS Physical Data Model, where at least triggers, foreign keys, tables/columns, stored procedures and parameters are described.
- An annex on back-up and restore procedures

6.8.8 System Maintenance Manual (SMM)

[120] The System Maintenance Documentation includes System Maintenance Manual (SMM) and Maintenance Records.

SOW-409. The Contractor shall prepare and deliver the System Maintenance Manual (SMM) for ITB OFS.

SOW-410. The SMM shall define the required Maintenance Tools and Equipment.

SOW-411. The Contractor shall use a reporting mechanism as Maintenance Records which shall include:

- Problem/deficiency reporting and resolution procedures – including scheduled replacement of system elements upon failure (reactive maintenance) and prior to failure (preventive maintenance).
- Maintenance Records including history of maintenance actions (reactive/preventive), failures, other trends to inform support and maintenance personnel, and other projects creating or utilizing similar system elements.
- Key maintenance related metrics such as Mean Time between Failures (MTBF), Mean Time between Failures (MTBCF), Mean Time to Recovery (MTTR), and ITB Availability.
- ITB memory and processing mean and peak of usage.
- Monitor and document user satisfaction with maintenance support.

6.8.9 Operating Documentation

[121] Documentation related to operating and maintenance of ITB OFS will cover how to use the ITB OFS functionality, how to install and configure ITB OFS, how to provide its security and how to maintain the software and hardware.

SOW-412. The Contractor shall deliver the Operating Documentation to be used by ITB OFS operational users and administrators as specified in the SRS.

SOW-413. The Contractor shall develop and maintain the Operating Documentation based on the DBL and PBL and shall describe the complete system by the explanation of functional blocks, components and system elements.

SOW-414. The Contractor shall make all Operating Documentation available as a printable document, printed hard copy and as an on-line source.

SOW-415. The Operating Documentation shall include at least the following:

- System User Manual (SUM)
- Quick User Guide (QUG)
- Briefing Manual
- System Administrator Manual (SAM)

6.9 Training

6.9.1 General

SOW-416. The Contractor shall establish, execute, and maintain an effective Training Program throughout the period of performance of this CLIN 4.16, CLIN 4.17, CLIN 4.18 and CLIN 5.2.

SOW-417. The Contractor shall provide all Training courses and all the required training documentation for each component of the system covering not only the new capabilities but also the Contractor's modifications to the existing capabilities and transition from Build 5 to Build 6.

SOW-418. The Contractor shall develop and deliver the Training Courses for ITB New Build 6 features from user (operational) and administrator (maintenance) perspectives to cover following topics/capabilities at minimum:

- a. Continuation of existing Build 5 functions within the new Build 6 software (and hardware in terms of dependencies)
- b. Updated threat set and improved threat injection capability
- c. High fidelity threat simulations
- d. Communications network (data links and simulation)
- e. Test bed control (scenario preparation, time management, network tools)
- f. Data collection and analyses (recording, playback, analysis, recovery)
- g. Interfaces to external systems (live systems, planners, labs, simulators)
- h. Training EXCEN (formerly "white cell") and connection to Education, Training Exercise and Evaluation (ETEE) capability.
- i. Scenario planning tools integrating scenario planning with threat injection and test execution monitoring and control.
- j. Analysis capability to support verification of new BMD System of System capabilities.

SOW-419. The Contractor shall be able to design, develop, deliver and perform the training as a combination of the following types of training:

- a. Classroom Training
- b. On-site Training (on-the-job)
- c. Computer based training (CBT)

[122] The Contractor may propose any other type of training, or combine or breakdown the following courses to tailor the training needs to this specific project.

SOW-420. Training courses shall be developed to support, in accordance to the definitions in ANNEX E:

- a. Administrator Tasks – Level 1, Levels 2 and 3;
- b. Usage of ITB OFS (User Operator training) to support testing events;
- c. Other courses following Training Need Analysis (TNA).

SOW-421. The Contractor's Administrator Training Level 1,2 and 3 shall provide as a minimum the following training on the platform:

- a. How to install, configure and maintain the Platform capability, including COTS components;
- b. How to maintain the Platform and how to use the logging and performance counters provided by the Platform which, as minimum, shall include:
- c. All the configuration settings for the Platform modules, services and components;
- d. How to configure the logging and uses of performance counters;
- e. Where to find the log files;
- f. The different categories of logging;
- g. The different performance counter categories;
- h. How to trouble shooting the system, including actions to solve a full range of (potential) problems or provide workarounds;
- i. How to manage database information, including database tables, triggers and stored procedures;
- j. How to perform back-up and restore procedures.

6.9.2 Training Needs Analysis (TNA)

SOW-422. The Training scope, process and procedures shall be based on the results of the TNA to be performed by the Contractor.

SOW-423. The Training Need Analysis (TNA) shall be produced in accordance with the [REF-9].

SOW-424. The Contractor shall provide a Training Need Analysis including:

- a. Performance Gap Analysis;
- b. Training Options Analysis.

SOW-425. The Performance Gap Analysis shall assess the gap between the current skills of users, support staff or Instructor and the tasks they will be expected to perform in the use and support of the Operational Baseline.

[123] The Contractor may assume that the audience of the trainings has domain and technology knowledge on Link-16, DIS, HLA, BMD Concepts.

SOW-426. The Contractor's TNA shall be based on the tasks resulting from Task Analysis carried out as part of the LSA Process and on the possible gaps highlighted during the site surveys (so called Target Audience Analysis).

SOW-427. The Contractor's Training Needs Analysis shall consider all assigned staff roles involved in the System operation, administration, maintenance and support at all levels

SOW-428. The TNA shall also identify and document the course pre-requisites for all training courses. The pre-requisite training shall be described in such a way as to allow the Purchaser to select students and organize pre-requisite training, in time, before execution of the Contractor's training programme commences.

SOW-429. The results of the TNA shall be captured in a TNA report as an annex to the Training Plan.

SOW-430. The TNA report shall be provided for SRR and final version for the CDR.

6.9.3 Training Plan

SOW-431. The Contractor shall develop and provide the system Training Plan, including the approach to training, milestones, resource requirements, training organization, interrelationships and other tasks related for training development.

SOW-432. The Contractor's Training Plan shall describe how it will meet the Training requirements found after the TNA for initial and follow-on training.

SOW-433. The Contractor's Training Plan shall address all stages of training development, delivery, and support covered under this Contract.

SOW-434. The Contractor's Training Plan shall include training design documentation using the Course Control Document III – Programme of Classes template provided in [Bi-SC D 075-007 2015] Annex R-4.

SOW-435. The Contractor shall recommend in this plan the mode(s) of training (e.g. formal classroom, on-the-job, commercial or a combination) and the rationale for those recommendations for each type of training (User , Administrator, etc.)

SOW-436. The following is the minimum acceptance criteria for the trainings. The Contractor shall recommend methods to verify the criteria:

- a. For User Operator training: Each trainee shall be able to operate the ITB OFS without help.
- b. For Administrator training: Each trainee shall be able to install, configure and maintain ITB OFS without help.

SOW-437. The contractor shall provide in the Plan the following information for each course:

- c. Course description. This shall be a narrative explanation of the subject matter of the specific course.
- d. Student prerequisites (if required).
- e. Course syllabus and length (including time devoted to each area of the course).
- f. Method of presentation for each element of the syllabus (i.e., lecture, demonstration, hands-on and directed study, computer-based-training (CBT), etc.).
- g. Method of evaluation.
- h. List of training material and training equipment required (including contractor-provided documents or materials).
- i. Description of the minimum capabilities of necessary training equipment, together with the logistic implications of using the training equipment.
- j. Recommended maximum size of course. Recommended location of training and type of facility required (i.e., classroom, auditorium, site, etc.)
- k. List of measurable objectives (tasks) required by graduates to demonstrate successful completion of course.
- l. Proposed schedule for training course.

6.9.4 Training Material

SOW-438. The Contractor shall develop and provide all the appropriate training documentation to support the Purchaser Personnel to test, operate and maintain the System and its support equipment.

SOW-439. The following Platform Training Material shall be generated by the Contractor:

- a. Training Syllabus;
- b. Student Manual(s);
- c. Instructor Manual;
- d. Upon completion - Training Certificate;
- e. Course evaluation feedback form.

SOW-440. The Contractor shall prepare and provide all materials that will be used for the training in electronic version recorded on CDs with cut and paste capability.

SOW-441. Presentation materials shall be provided in Microsoft PowerPoint.

SOW-442. The training material shall be available in a version approved by the Purchaser before the start of the training course(s).

SOW-443. The contractor shall reference all courses content to commercial or Contractor-developed documentation - preferably user or technical manuals - that describe the subject matter and that are available on-site to students after course completion.

SOW-444. The Contractor shall ensure that the Training Materials are all provided in the UK English language. It can be assumed that all Purchasers personnel selected to attend the courses will meet the minimum Standardised Language Proficiency (SLP) of 3232 in English as specified in [STANAG 6001].

SOW-445. The Contractor's Training materials shall include all slides or other information to be presented by the instructor during the course.

6.9.5 Training Syllabus

SOW-446. The Contractor's Platform Training Course (i.e., NATO End Users, Administrators, Solution Architects and Developers) shall include a Training Syllabus containing the following elements:

- a. course title;
- b. course description;
- c. learning objectives, as identified in the Training Needs Analysis and confirmed in the Training Plan;
- d. entry profile (student prerequisites);
- e. concepts, Functions and Features presented in the course;
- f. instructional methodologies to be employed in the delivery of the course;
- g. in-class assignments or laboratories;
- h. evaluation tools;
- i. Performance standards.

6.9.6 Student Manual(s)

SOW-447. The Contractor shall develop and provide a Student Manual for each course, with necessary information on all lesson objectives and contents, guidance for all learning activities and cross-references to assist the students in achieving the course objectives.

SOW-448. The Contractor's Student Manuals shall enable students to perform their major tasks.

SOW-449. The Contractor's training for users and administrators shall provide as a minimum the following training on the platform:

- a. how to install, configure and maintain the capability, including COTS components;
- b. how to maintain the Platform and how to use the logging and performance counters provided by the Platform which, as minimum, shall include:
- c. all the configuration settings for the Platform modules, services and components;
- d. how to configure the logging and uses of performance counters;
- e. where to find the log files;
- f. the different categories of logging;
- g. the different performance counter categories;
- h. how to trouble shooting the system, including actions to solve a full range of (potential) problems or provide workarounds;
- i. how to manage database information, including database tables, triggers and stored procedures;
- j. How to perform back-up and restore procedures.

6.9.7 Instructor Manual(s)

SOW-450. The Contractor shall provide an Instructor's Manual for each training course.

SOW-451. The Contractor's Instructor's Manual shall contain all necessary information to prepare and conduct lessons and to evaluate students, including exercises, quizzes, and examinations and their corresponding answer sheets

SOW-452. The Contractor's Instructor's Manual shall provide notes to instructors to assist in conducting the lecture or exercise.

SOW-453. The Contractor's Platform Instructor Manual Shall detail the sequence of course instruction, providing references to the applicable training presentation materials, assignments and laboratories, evaluation tools and answer keys, Student Manual, and the Platform on-line help function.

SOW-454. The Contractor's Platform Instructor Manual Shall include (as a minimum):

- a. materials for in-class assignments and laboratories;
- b. sample evaluation tools and answer keys;
- c. Training System installation and configuration procedures.

6.9.8 Training Assessment and Evaluation

SOW-455. The Contractor shall propose student's assessment and evaluation methodology to the Purchaser as part of the Training Plan.

SOW-456. The Contractor shall ensure that each student is instructed at the end of each course (or use of a CBT) to complete and return the course evaluation feedback form, provided as part of the training course or CBT/E-Learning product.

SOW-457. The Contractor shall consolidate and forward student feedback to the Purchaser following each training course in the form of a Training Evaluation Report.

SOW-458. The Contractor shall revise/ refine and reissue course material and CBT/E-Learning products to reflect the consolidated student feedback and proposed improvements in the training evaluation report.

SOW-459. The Contractor shall provide Training Certificates for each training session and student.

6.9.9 Training Database

SOW-460. The Contractor shall develop an operationally-realistic set of services component data, including a representative number of each information object to support training objectives for use in ITB OFS component Training Courses and Training Materials.

6.9.10 Training courses

SOW-461. The Contractor shall deliver training at NCIA Facilities in The Hague.

SOW-462. The Contractor shall provide each student attending a Training Course with a hard and electronic copy of the Training Material for that course.

SOW-463. As part of the system implementation the Contractor shall provide on-site training to all support staff designated by the Site POC and on all tasks required to operate and maintain and recover the system.

[124] To support training, the Purchaser will provide the following basic facilities: room, power supply, tables, chairs, network connectivity necessary to perform the trainings courses in the Purchaser's facilities.

SOW-464. The Contractor shall provide all other facilities, services and equipment (including servers and workstations for students and teachers, network equipment, all required SW, training data etc....) necessary to carry out the On-Site Training activities.

6.9.11 Number of trainees

SOW-465. The Contractor shall provide a training plan for the following number of trainees:

- a. Administrator training session will have no more than 5 trainees per session.
- b. User Operator training session will have no more than 10 trainees per session.

6.9.12 Duration and Number of the training

SOW-466. The contractor shall the duration of the training with the outcomes of the Training Needs Analysis.

SOW-467. The contractor shall assure that each session of Administrator –level 1 training – shall be no less than three days in duration and shall be conducted at least three time as defined below

- a. After completion of ITB OFS Installation
- b. Prior to PSA
- c. Prior to FSA

SOW-468. The contractor shall assure that each session of Administrator –levels 2&3 training –shall be no longer than five days in duration and shall be conducted at least three time as defined below

- a. Prior to PSA
- b. Prior to FSA

SOW-469. The contractor shall assure that each session of User Operator training shall be at least five days in duration and shall be conducted at least three time as defined below

- a. After completion of ITB OFS Installation
- b. Prior to PSA
- c. Prior to FSA

ANNEX A. List Of Requirements

The minimum set of system and user requirements that are part of this Statement of Work is provided separately as an MS Excel document, List of Requirements.

ANNEX B. TVV DEFINITIONS

Defect Categorization that is part of this Statement of Work is provided separately as an MS Word document.

ANNEX C. PURCHASER FURNISHED ITEMS (PFI)

The set Purchaser Furnished Items (PFI) list that are part of this Statement of Work is provided separately as an MS Word document.

ANNEX D. The Contractor's Personnel Qualification

The qualification for Personnel document as part of this Statement of Work is provided separately as an MS Word document.

ANNEX E. ILS DEFINITIONS

Support and Maintenance Concept Definitions which are part of this Statement of Work is provided separately as an MS Word document.

ANNEX F. PSI

Project Security Instructions Document which is part of this Statement of Work is provided separately as an MS Word document.

ANNEX G. Acronyms

Acronyms which is part of this Statement of Work is provided separately as an MS Word document.

ANNEX H. Host Environment Specification for ITB OFS

Host environment specifications which is part of this Statement of Work is provided separately as an MS Word document.

ANNEX I. ERR FORMTEMPLATE

As part of this Statement of Work is provided separately as an MS Word document.

ANNEX J. NOR FORMTEMPLATE

As part of this Statement of Work is provided separately as an MS Word document.

ANNEX K. SVD TEMPLATE

As part of this Statement of Work is provided separately as an MS Word document.

ANNEX L. RFW AND RFD FORMTEMPLATES

As part of this Statement of Work is provided separately as an MS Word document.