

- designed, acquired, integrated, maintained, or used under the Contract. This includes non-deliverable test and support hardware and software.
- QA-19 The Contractor's QA Process shall ensure that procedures are developed, implemented and maintained to adequately control the development, design, production, testing and configuration of all deliverables.
- QA-20 Personnel performing QA functions shall have specific documented definitions of their assigned duties. In no case shall the QA personnel managing or performing QA functions be the same personnel responsible for performing other tasks that are reviewed by QA.
- QA-21 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.
- QA-22 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.
- QA-23 The Contractor shall assure that all the test and procedure used to demonstrate the requirements will be monitored and controlled under the QA process.
- QA-24 The Contractor shall periodically review the QA process and audit it for adequacy, compliance and effectiveness, and report any changes to the Purchaser POC.
- QA-25 The Contractor shall on request provide the Purchaser with a copy of any subcontracts or orders for products related to the contract.
- QA-26 The Contractor shall notify Purchaser if a subcontract or order has been identified as constituting or involving risk.
- QA-27 The Contractor shall flow down the applicable contractual requirements to Sub-suppliers by referencing the stated contractual requirement, including relevant AQAP(s).
- QA-28 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.

7.3 Auditing of Contractor Performance

- [52] The Purchaser reserves the right to perform Reviews and Quality audits at any of the Contractor (or Sub-Contractor(s)) facilities.
- [53] Audit activities at Sub-supplier's facilities do not relieve the Contractor and Subcontractors from any contractual quality responsibilities.
- [54] The Purchaser may engage auditors to evaluate the performance of the Contractor (or Sub-Contractor(s)) and verify, validate Contractor (or Sub-Contractor(s)) deliverables. The auditors can also monitor, assess, and report any perceived problem areas.
- QA-29 The auditors may be requested by the Purchaser to monitor Contractor activities at Contractors' facilities or other sites related to the development, testing and

implementation of the contract. The Contractor shall fully support such activities and in particular:

- Host inspection visits by Purchaser's auditors;
- Make himself available for answering questions and furnishing all the information related to the project;
- Allow the Purchaser's auditors to inspect and monitor testing activities;
- Allow the Purchaser's auditors to inspect and monitor the Contractor's processes and tools applicable to this project.

- QA-30 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.
- QA-31 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.
- QA-32 Based on the Audit results if there are any disconformities or irregularities with the contract requirements, the Contractor shall immediately make necessary corrections and take necessary precautions to ensure the satisfaction of the requirements.

7.4 Certificate of Conformity

- [55] The Certificate of Conformity (CoC) is a document, signed by the Supplier, which states that the product conforms with contractual requirements and regulations.
- [56] The CoC 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.
- QA-33 The Contractor shall be solely responsible for the conformance to requirements, of products provided to the Purchaser.
- QA-34 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.
- QA-35 Any CoC delivered by the Contractor shall be part of the acceptance data package of the product and shall be provided before Batch Delivery Acceptance.

Appendix A Applicable and Reference Documentation

A.1 Applicable documentation for IPS

Abbreviation	Full document Name and Reference
[STANAG 4728, Ed.2]	System Life Cycle Management. Ed.2, 2015.
[AAP-20, Ed.C, Ver.1]	NATO Programme Management Framework (NATO Life Cycle Model). Ed.C, Ver.1, 2015.
[AAP-48, Ed.B, Ver.1]	NATO System Life Cycle Processes. Ed.B, Ver.1, 2013.
[ALP-10, Ed.C, Ver.1]	NATO Guidance on Integrated Logistics Support for Multinational Armament Programmes. Ed.C, Ver.1, 2017.
[STANAG 6001, Ed.5]	Language Proficiency Levels. Ed.5, 2014.
[STANAG 4280]	NATO Levels of Packaging
[STANAG 4281, Ed.3]	NATO Standard Marking for Shipment and Storage. Ed.3, 2016.
[STANAG 4329, Ed.4]	NATO Standard Bar Code Symbologies – AAP-44(A). Ed.4, 2010.
[AAP-44]	NATO Standard Bar Code Handbook

A.2 Reference documentation for IPS

Abbreviation	Full document Name and Reference
[ISO/IEC 15288, 2015]	Systems and software engineering – System life cycle processes
[ISO/IEC 12207, 2008]	Systems and software engineering – Software life cycle processes
[ISO/IEC 25010, 2011]	Systems and software engineering – Systems and software Quality Requirements and Evaluation (SQuaRE) – System and software quality models
[IEC 60050]	International Electrotechnical Vocabulary (IEV) (www.electropedia.org)
[AIA/ASD SX000i, 2021]	International specification for Integrated Product Support (IPS) – Issue 3, (2021)
[AIA/ASD S3000L, 2021]	International procedure specification for Logistics Support Analysis (LSA) – Issue 2 (2021)
[AIA/ASD S2000M, 2017]	International Specification for Material Management. Issue 6.1, 2017
[AIA/ASD S1000D, 2019]	International Specification for Technical Publications. Issue 5, 2019
[MIL–HDBK–338B]	Electronic Reliability Design Handbook
[MIL–STD–1629A]	Procedures for performing a Failure Mode, Effects and Criticality Analysis
[IEC 60812:2018]	Failure modes and effects analysis (FMEA and FMECA) - Ed.3 (2018)
[SD–22]	Diminishing Manufacturing Sources and Material Shortages (DMSMS). 2016
[Bi-SC Directive 075-003]	Collective Training and Exercise Directive, 02 October 2013, NU
[Bi-SC Directive 075-007]	Education and Individual Training Directive, 10 September 2015, NU

Abbreviation	Full document Name and Reference
[NATO C3 Taxonomy] Enclosure 1 to AC/322- D(2016)0017	“C3 Taxonomy Baseline 2.0”, 10 November 2015

A.3 Applicable documentation for CM

Abbreviation	Full document Name and Reference
[STANAG 4427, Ed.3]	Configuration Management in System Life Cycle Management. Ed.3, 2014.
[ACMP-2000, Ed.A, Ver.2]	Policy on configuration management. Ed.A, Ver.2, 2017.
[ACMP-2009, Ed.A, Ver.2]	Guidance on Configuration Management. Ed.A, Ver.2, 2017.
[ACMP-2100, Ed.A, Ver.2]	The Core Set of Configuration Management Contractual Requirements. Ed.A, Ver.2, 2017.

A.4 Reference documentation for CM

Abbreviation	Full document Name and Reference
[ISO 10007:2003]	Quality Management System – Guidelines for Configuration Management. Second edition, 2003.

A.5 Applicable documentation for QA

Abbreviation	Full document Name and Reference
[STANAG 4107, Ed.11]	Mutual Acceptance of Government Quality Assurance and Usage of the Allied Quality Assurance Publications. Ed.11, 2019.
[AQAP-4107, Ed.A, Ver.2]	Mutual Acceptance of Government Quality Assurance and Usage of the Allied Quality Assurance Publications (AQAP). Ed. A, Ver.2, 2018.
[AQAP-2000, Ed.3]	NATO Policy on an Integrated System Approach to Quality Through the Life Cycle. Ed.3, 2009.
[AQAP-2070, Ed.B, Ver.3]	NATO Mutual Government Quality Assurance (GQA). Ed.B, Ver.3, 2015.
[AQAP-2105, Ed.C, Ver.1]	NATO Requirements for Quality Plans. Ed.C, Ver.1, 2019.
[AQAP-2110, Ed.D, Ver.1]	NATO Quality Assurance Requirements for Design, Development and Production. Ed.D, Ver.1, 2016.
[AQAP-2131, Ed.C, Ver.1]	NATO Quality Assurance Requirements for Final Inspection and Test. Ed.C, Ver.1, 2017.
[AQAP-2210, Ed.A, Ver.2]	NATO Supplementary Software Quality Assurance Requirements to AQAP-2110 or AQAP-2310. Ed.A, Ver.2, 2015.
[AQAP-2310, Ed.B, Ver.1]	NATO Quality Assurance Requirements for Aviation, Space and Defence Suppliers. Ed.B, Ver.1, 2017.

Appendix B Content and structure for Integrated Product Support Deliveries

B.1. Integrated Product Support Plan (IPSP)

IPS-88 The Contractor shall provide the IPSP in accordance with the following content and structure.

Structure	Content
1	Introduction
2	Documents and Acronyms
2.1	List of Applicable Documents
2.2	List of Reference Documents
2.3	List of Acronyms
3	System Overview
3.1	Architecture
3.2	Operational scenario
3.3	Maintenance Concept
3.4	Support Concept
4	IPS Management
4.1	IPS team and sub-contractors
4.2	IPS processes and procedure overview
4.3	IPS constraints
4.4	IPS tools
4.5	IPS Contractual Documentation Requirements List (CDRL)
5	Reliability, Availability, Maintainability and Testability (RAMT)
6	Failure Mode Effects Analysis (FMEA)
7	Logistics Support Analysis (LSA)
7.1	Maintenance Concept
7.1.1	Preventive/Scheduled maintenance
7.1.2	Corrective/Unscheduled maintenance
7.1.3	Hardware Maintenance Concept
7.1.4	Software Maintenance Concept
7.2	Maintenance Levels Description
7.3	Support Concept
7.4	Support Levels Description
7.5	Maintenance Task Analysis (MTA)
7.6	Level Of Repair Analysis (LORA)
7.7	Product Support Database
8	Supply support
8.1	Manpower and personnel
8.2	Spare Parts
8.3	Tool and Test Equipment
8.4	Facilities
8.5	Packaging, Handling, Storage and Transportation (PHST)
8.5.1	Packing, Coding and Labelling (Packaging)
8.5.2	Delivery and Shipment (Handling and Storage)
8.5.3	Transportation
9	Parts Obsolescence Management
9.1	Evaluation criteria
9.2	Resolution strategies
10	Technical Publications
11	Training
12	In Service Support (ISS)
12.1	Warranty period
12.2	Post Warranty period
12.2.1	Post Warranty Services (PWS): Repair On Need
12.2.2	Performance Based Services

Structure	Content
12.3	Sub-Contractors

B.2. Product Support Data Package

IPS-89 The Contractor shall provide the Product Support Data Package in accordance with the following content and structure. Artifacts to support the data shall be appendices of the document.

Structure	Content
1	Introduction
2	Documents and Acronyms
2.1	List of Applicable Documents
2.2	List of Reference Documents
2.3	List of Acronyms
3	System Breakdown Description
4	Reliability, Availability, Maintainability and Testability data
5	Failure Mode Effects Analysis (FMEA)
6	Maintenance Tasks data
7	Level of Repair data
8	Repair Price List

IPS-90 The Contractor shall provide for RAMT data one .xls spreadsheet as annex of the Product Support Data Package in accordance with the following content and structure.

- Product Breakdown
 - Level
 - Description
 - Cage Code
 - Part Number
 - Quantity
- Reliability
 - Critical item (Y/N)
 - Source data (Calculated / Predicted / Estimated / Supplier evidence)
 - Failure rate (fpmh)
 - MTBF (h)
 - Redundancy model
 - MTBCF (h)
- Maintainability
 - TTR (h)
 - MTTR (h)
 - MTTRS (h)
 - MTBPM (h)
 - Mpt (h)
- Testability
 - Fault Detection (FD%)
 - Fault Isolation:
 - FI(1LRU)%
 - FI(2LRU)%
 - FI(3LRU)%
 - FI(>3LRU)%

- IPS-91 Mean Time Between Failures (MTBF) shall represent the Basic Reliability, where 'failure' is understood to mean any condition in which an item, assembly, sub-system or the entire system is not operating according to specifications.
- IPS-92 Mean Time Between Critical Failures (MTBCF) shall represent the Mission Reliability, where 'critical failure' is understood to mean any condition in which the entire system is not operating according to specifications.
- IPS-93 Mean Time To Repair (MTTR) shall be provided for all kind of failures (Critical and non critical) and shall include fault isolation, access, disassembly, remove and replace, reassembly, configuration, check-out and start-up, and to exclude administrative and logistics delay times.
- IPS-94 Mean Time to Restore the System (MTTRS) shall be provided for critical failures only and shall include fault isolation, access, disassembly, remove and replace, reassembly, configuration, check-out and start-up, and to exclude administrative and logistics delay times.
- IPS-95 Fault Detection (FD) shall be provided to include Built-In Test (BIT) and/or Built-In Test Equipment (BITE) capable of on-line detection of failure modes (Fault Detection rate).
- IPS-96 Fault Isolation (FI) shall be provided to include Built-In Test (BIT) and/or Built-In Test Equipment (BITE) capable to isolate the detected failure (Fault Isolation rates) with or without ambiguity.
- IPS-97 The Contractor shall provide for the FMEA one .xls spreadsheet as annex of the Product Support Data Package in accordance with the following content and structure.
- Product Breakdown
 - Level
 - Description
 - Cage Code
 - Part Number
 - Failure Mode Effects Analysis (FMEA)
 - Failure Modes
 - Mission Phase / Operational Mode
 - Failure effects
 - Local Effects
 - Next Higher Level
 - End Effect
 - Failure Detection Method
 - Compensating Provisions
 - Severity Classification
 - Remarks
- IPS-98 The Contractor shall provide for Maintenance Tasks data one .xls spreadsheet as annex of the Product Support Data Package with the following tables in:
- Logistic Breakdown Report – LBR : worksheet that hierarchically list the logistic breakdown and the link with the PBL containing at least the following information:

- Indenture level, Breakdown Element Identifier, Cage code, Part Number, Breakdown Element Name, Part as Designed Name, SMR Code, Qty, Qty for End Item, Unit of Measure (UM), MTBF, UM, MTTR, UM
- Maintenance Index Report – MIR : worksheet that list all maintenance (scheduled and unscheduled) containing at least the following information:
 - Indenture level, Breakdown Element Identifier, Cage code, Part Number, Breakdown Element Name, Part as Designed Name, SMR Code, Task Identifier, Task Name, Type, Task Frequency, UM, Task Duration, UM, MTBF, UM, MTTR, UM, Task Labour Time, UM,
- Maintenance Report – MR : worksheet that details all maintenance (scheduled and unscheduled) including all resources details (materials, personnel, facilities) with subtasks and duration details per skill and per subtask.
- Material Resource Report – MRR : shall include the following vistas:
 - Material Resource List : the list of all the resources with associated type (e.g.: spare, consumable, common tools, special tools);
 - Material Resource Utilization: the list of all the resources with associated maintenance where the resource is used;
 - Material Resource Annual Use: the list of all the resources with the calculated annual use based on the task frequency.
- Personnel Report – PR : shall include the following vistas (same as MRR but for personnel): Personnel List, Personnel Utilization, Personnel Annual Use
- Facilities Report – FR : shall include the following vistas (same as MRR but for facilities): Facilities List, Facilities Utilization, Facilities Annual Use

IPS-99 The Contractor shall provide for Maintenance Tasks data the following summary tables as annex of the Product Support Data Package:

- Quantity of maintenance

Level of maintenance	Scheduled			Unscheduled			Total		
	HW	SW	Sum	HW	SW	Sum	HW	SW	Sum
HL1/SL1									
HL2/SL2									
HL3/SL3									
HL4/SL4									
Total									

- Mean Annual Downtime and Mean Annual Workload (one table for HW+SW Maintenance, one table for HW Maintenance, one table for SW Maintenance)

Level of maintenance	Scheduled		Unscheduled		Total	
	Elapsed time (h)	Man workload (h)	Elapsed time (h)	Man workload (h)	Elapsed time (h)	Man workload (h)
HL1/SL1						
HL2/SL2						
HL3/SL3						
HL4/SL4						
Total						

- Scheduled maintenance grouped by periodicity using as many columns as periodicity defined (one table for HW+SW maintenance, one table for HW maintenance, one table for SW maintenance)

Level of maintenance	(e.g.: daily)					...
	Quantity	Mean elapsed time (h)	Mean man workload (h)	Total elapsed time (h)	Total man hours (h)	
HL1/SL1						
HL2/SL2						
HL3/SL3						
HL4/SL4						
Total						

IPS-100 The Contractor shall provide a Product Support Database in .xls that shall match the PBL and shall include information fields required for each HW and SW (including Firmware) item to be provided/updated as annex of the Product Support Data Package:

- **Indenture level:** Level of indenture starting from the system that is the first level and classified as End Item
- **Breakdown Element Identifier (BEI):** String of characters used to uniquely identify a Breakdown Element and to differentiate it from other Breakdown Elements that comprise a product. Note: used to establish a hierarchical structure of the technical system.
- **Reference Designator;**
- **Subsystem;**
- **Breakdown Element Name:** Word or phrase by which the breakdown element is known and can be easily referenced.
- **Part Logistic Category²;**
- **Manufacturer item data:** Cage Code, Part Number, Part Nomenclature;
- **Vendor/Contractor item data:** Cage Code, Part Number, Part Nomenclature;

² The **Part Logistic Category** is a classification that defines an item (HW or SW) as designed in the context of product support. In particular these identifications can be used:

- **EI** - End Item and **SS** – System Subsystem
- Hardware (HW) Maintenance Significant Items (MSI): **LS** - Statistical Life LRUs (e.g.: Computers, Power PCs, Switches, Routers, IF modules, RF modules, Breakers, Power Supplies, Monitors, Modems, Power Amplifiers); **LL** – Limited Life LRUs (e.g.: Batteries, flexible waveguides, oscillators); **II** – Insurance Items [e.g.: docking stations, Keyboards, Mice, Cables, mechanical parts (e.g. Racks, drawers), simple E/M parts (e.g. patch panels)]; **C[T]** – Technical Consumables (e.g.: fuse, gas discharger, surge protection devices, lamps, bulbs, led); **C[NT]** – Non-Technical Consumables [e.g.: POL (Petrol, Oils, Lubricants), water, gas]; **C[G]** – Generic Consumables (e.g.: printer cartridges, toners, printers' paper); **AP** – Attaching Parts [e.g.: washers, gaskets (not EMI), nuts, bolts, screws].
- Software (SW): **SWA** – Application Software [e.g.: contractors' developed application SW, COTS application SW (e.g. MS Office, Adobe Acrobat)]; **SWO** – Software Operating Systems (e.g.: Linux, Unix, MS Windows, LynxOS, Android, IOS); **FW** – Firmware; **DD** – Device drivers.
- Support equipment and tools: **CHT** (Common Hand Tool), **CSE** (Common Support Equipment), **PSE** (Peculiar Support Equipment);

- **Item characteristics:**
 - LRU (Y/N), Serialized Item (Y/N); Mean Time Between Failure (MTBF) (in hours); Mean Time To Repair (MTTR) (in hours);
 - LRU Maintenance Level (HL/SL 1 to 3 included); HW part repairability (Y/N);
 - NATO Stock Number (NSN); Unit Price and Currency;
 - Provisioning Lead Time (PLT) (days); Turn Around Time (TAT) (days).
- **Quantity:** Qty per line item; Qty in Next Higher Assy; Qty in End item.

B.3. Obsolescence Report

IPS-101 The Contractor shall provide an Obsolescence Report jointly with a .xls file that shall include information fields required for each HW and SW (including Firmware) item to be provided/updated:

- **Breakdown Element Name:** Word or phrase by which the breakdown element is known and can be easily referenced.
- **Manufacturer item data:** Cage Code, Part Number, Part Nomenclature;
- **Vendor/Contractor item data:** Cage Code, Part Number, Part Nomenclature;
- **Quantity:** Qty in End item;
- **Product current status:** Cancelled without alternative Form Fit and Function (FFF) replacement, Off production but on the stock (last buy), On production, Cancelled with alternative FFF replacement;
- **Product current status rationale/evidences:**
 - for HW [e.g.: production started in "year", last update in "year", support availability till "year" or End of life date (if any)]
 - for SW (e.g.: release date of the item, support of this version till "year")
- **Warranty and Service:**
 - for HW (e.g.: warranty duration granted when procured, Provisioning Lead Time, Repair cycle time)
 - for SW (e.g.: software community (shareware/freeware), open source, ...)
- **Risk - Item criticality:** This risk category addresses the degree to which an item (whether or not it is an assembly or a component used to repair an assembly) is critical to the functionality of the system and ultimately the operational readiness of the unit employing that system. (e.g.: from FMECA criticalities 2 - red, 3 - yellow, 4 - green). Please note that FMECA criticality 1 shall require Fault Tree Analysis
- **Risk - Supply chain vulnerability:** This risk category represents a key difference between electronic items and Materials and Structural, Mechanical and Electrical (MaSME) items.
 - Electronic items: often becomes obsolete because of technology changes (e.g.: red, yellow, green).
 - MaSME items: obsolescence is usually related to a source going out of business or changing its product line (e.g.: red, yellow, green).
- **Risk - Time to implement a resolution:** This risk category addresses how long it will take to implement a resolution to a Obsolescence issue for an item or material in comparison to the stocks that the program has on hand. If there is more than enough

stock on hand and the time to implement is short, then the risk to the program would be viewed as lower; however, if there is a long lead time to implement a resolution and the stocks on hand are not sufficient, then this indicates high risk. (e.g.: red, yellow, green)

- **Risk category rationale/evidences:** Narrative for each risk category rank
- **Risk Level:** product of the above risk ranks
- **Proposed mitigation:** FFF alternative (ECP type 1), Function alternative (ECP type 2), Redesign of higher level, To Be Defined, Not Applicable, Other;
- **Proposed mitigation rationale:** Narrative for the proposed mitigation.

B.4. In Service Support Plan (ISSP)

IPS-102 The Contractor shall provide the In Service Support Plan (ISSP) in accordance with the following content and structure.

Structure	Content
1	Introduction
2	Documents and Acronyms
2.1	List of Applicable Documents
2.2	List of Reference Documents
2.3	List of Acronyms
3	System Overview
3.1	Architecture
3.2	Operational scenario
3.3	Maintenance Concept
3.4	Support Concept
4	ISS Management
4.1	ISS team
4.2	ISS processes and procedure overview
4.3	ISS RACI Matrix
4.3	ISS constraints
4.4	ISS tools
4.5	ISS Contractual Documentation Requirements List (CDRL)
5	System Breakdown
6	Engineering Support (ES)
6.1	Framework and processes description
6.2	Data Reporting Analysis and Corrective Action System
6.3	Product Support deliveries update
6.4	Key Performance Indicators for ES
6.5	Supportability Evaluation and performance analysis
7	Material Management (MM)
7.1	Framework and processes description
7.2	Materials and maintenance concept
7.3	Stock
7.4	Key Performance Indicators for MM
8	Field Engineering (FE)
8.1	Framework and processes description
8.2	Manpower and support concept
8.3	Facilities
8.4	Key Performance Indicators for FE
9	Cost Model for ISS Activities

Appendix C List of Acronyms

Acronym	Description
ACMP	Allied Configuration Management Publication
ACP	Allied Communications Publications
AES	Advanced Encryption Standard
AFPL	Approved Fielded Product List
BDA	Batch Delivery Acceptance
CAB	Change Advisory Board
CBRN	Chemical Biological Radiological Nuclear
CES	Core Enterprise Services
CIS	Communications and Information System
CLIN	Contract Line Item
CMDB	Configuration Management DataBase
CMP	Configuration Management Plan
COTS	Commercial Off The Shelf
CoC	Certificate of Conformity
CSSC	CIS Sustainment Support Centre
DSGT	Deployable Satellite Ground Terminal
DVD	Digital Video Disk
EDC	Effective Date of Contract
EPM	Electronic Protective Measures
EUR	Euro
FAT	Factory Acceptance Testing
FAST	First Article System Testing
FIPS	Federal Information Processing Standards
FMECA	Failure Mode, Effects and Criticality Analysis
FDMA	Frequency Division Multiple Access
FSA	Final System Acceptance
IPS	Integrated Product Support
IPSP	Integrated Product Support Plan
IMS	International Military Staff

Acronym	Description
INFOSEC	Information Security
INV	Investment
ISO	International Organisation for Standardisation
ISS	In Service Support
ISSP	In Service Support Plan
IPSEC	Internet Protocol Security
ITSM	IT Service Management
IVV	Independent Validation and Verification
KOM	Kick-Off Meeting
LSA	Logistic Support Analysis
MACSEC	Standard for Security in Ethernet Local Area Networks
MIB	Management and Information Base
MFM	Mini Flayaway Modem
MIL	Military
MILSATCOM	Military Satellite Communications
MPLS	Multiprotocol Label Switching
MTBCF	Mean Time Between Critical Failure
MTBF	Mean Time Between Failure
MTP	Media Termination Point
MTTR	Mean Time To Restore
MTTRS	Mean Time To Restore Service
MTU	Maximum Transmission Unit
NATO	North Atlantic Treaty Organization
NCI	NATO Communications Infrastructure
NCIA	NATO Communications and Information Agency
NCISG	NATO CIS Group
NCISS	NATO Communications and Information Systems School
NCS	NATO Command Structure
NCSA	National CIS Security Authority
NFS	NATO Force Structure

Acronym	Description
NGCS	NATO General Communications System
OID	Object Identifier
PBL	Product Baseline
PBR	Policy Based Routing
PBS	Project Breakdown Structure
PFE	Purchaser Furnished Equipment
PHS	Packaging, Handling, Storage
PIP	Package Implementation Plan
PMO	Programme Management Office
PMP	Project Management Plan
PMS	Project Master Schedule
PMT	Project Management Team
PMTP	Project Master Test Plan
POC	Point of Contact
PRM	Project Review Meeting
PSA	Provisional System Acceptance
QAP	Quality Assurance Plan
RAMT	Reliability, Availability, Maintainability and Testability
RfC	Request for Concession
RFI	Ratio Frequency Interference
RIL	Recommended Items List
RMA	Reliability, Maintainability and Availability
RMP	Risk Management Plan
RSPL	Recommended Spare Parts List
RTM	Requirements Traceability Matrix
SATCOM	Satellite Communications
SCR	SATCOM Convergence Router
SGS	Satellite Ground Station
SGT	Satellite Ground Terminal
SHAPE	Supreme Headquarters Allied Powers Europe

Acronym	Description
SHF	Super High Frequency
SOW	Statement of Work
SRS	System Requirements Statement
SSS	Schedule of Supplies and Services
STANAG	Standardization Agreement
STD	Standard
TVV	Test Validation and Verification



NATO Communications and Information Agency
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RFQ-CO-115455-SGSBS

PROVIDE SATCOM GROUND SEGMENT BASEBAND SYSTEMS

PROVISION OF NON-PROTECTED MODEMS (WP 1)

BOOK II

PART IV

STATEMENT OF WORK (SOW)

ANNEX A – SYSTEM REQUIREMENTS SPECIFICATION (SRS)

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1 Introduction

- [1] This System Requirements Specification (SRS) document details the requirements, characteristics and functionalities of Super High Frequency (SHF) Military Satellite Communications (MILSATCOM) Frequency Division Multiple Access (FDMA) Modems without Electronic Protective Measures (non-EPM) to be procured through this Contract and its subordinate documents (SSS and SoW).

1.1 Scope

- [2] The specification in this SRS covers the following:
- 1) Introduction (Section 1)
 - 2) Context (Section 2)
 - 3) Functional Requirements (Section 3)
 - 4) Technical Requirements (Section 4)
 - 5) Performance Requirements (Section 4.1)
 - 6) Interface Requirements (Section 4.2)
 - 7) Monitoring and Control Requirements (Section 4.3)
 - 8) Power and Electrical Requirements (Section 4.4)
 - 9) Physical User Interface Requirements (Section 4.5)
 - 10) Supportability Requirements (Section 4.6)
 - 11) Mechanical and Environmental Requirements (Section 4.7)
 - 12) EMI/EMC Requirements (Section 4.8)
 - 13) Safety Requirements (Section 4.9)

1.2 Conventions

- [3] Requirements are numbered as SRS-#. Informational text is numbered as [###].
- [4] Statements in numbered lists (i= 1...n) under a SRS-# requirement are to be considered individual requirements under the "shall" statement of the parent requirement. As such, they shall be traced (as SRS-#-i) and be subject to verification individually.
- [5] Information and requirements contained under a "General" heading are applicable to all the elements covered by the corresponding section.
- [6] Requirements are provided at both system-level and subsystem-level. The specification contains Implementation Constraints, which the Contractor shall adhere to when preparing the Low Level Design (LLD) specification.

- [7] Requirements stating a capability to be "supported" (i.e. "shall support") shall be understood as the ability of the Purchaser to configure the capability to be active or not active at his discretion. This means that the capability is implemented and available upon delivery, and shall be available in its full extent, without restrictions and without additional cost.
- [8] Requirements stating a capability to be "implemented" (i.e. "shall implement") shall be understood as requiring the capability to be implemented and configured for use in the delivered system.
- [9] Requirements stating to be supported or implemented "fully conformant" to an architecture shall be understood as requiring full correspondence between architecture specification and implementation, where all features of this specific requirement are implemented in accordance with the architecture specification and there are no features of this specific requirement implemented that are not covered by the architecture specification.
- [10] The term "including" as used throughout this Annex is never meant to be limiting - the list that follows is always non-exhaustive.
- [11] Any requirements using the term "target" shall be interpreted as hard constraints to be respected during the design process, with any deviation being subject of agreement by the Purchaser.
- [12] The use of the term "notional" is to be interpreted as guidance only.

2 Context

- [13] The information in this paragraph is given in order to provide a high-level overview and context of the usage of the project deliverables.
- [14] The Purchaser operates multiple types of modems supporting various waveforms. Modems procured under this contract will modernize the current fleet of baseband modem systems and replace the end-of-life components.
- [15] Modems specified in this document will be integrated or used with different NATO SATCOM assets, including but not limited to, those listed below (Note: Integration work is not in the scope of this SoW):
- 1) NATO Static Anchoring Components (SGT and SGS): these are NATO static SATCOM sites.
 - 2) Transportable Satellite Ground Terminals (TSGT) : these are containerized systems mounted on military vehicles
 - 3) Deployable Baseband Augmentation Components (DBACs): these are transportable and deployable ruggedized cases hosting NATO communications equipment.
 - 4) Hosted Baseband Augmentation Components (HBACs): these are transportable and deployable cases hosting NATO communications equipment, which can be deployed at NATO member nations or 3rd party teleports.
 - 5) Small rugged outdoor terminals, typically sub 1.3 meter size, which will integrate a small form factor Original Equipment Manufacturer (OEM) card or module, referred to as “Small Form Factor Modems (SFFM)”, fully interoperable with the other modems provided according to this SRS, and whose specific requirements are listed in APPENDIX B.
- [16] Multiple network topologies (star, star-overlay/mesh), channel access methods (SCPC, MCPC) will be supported based on the mission requirements.

3 Functional Requirements

3.1 General Requirements

- SRS-1 The modem shall provide the following main functions, as described in this SRS, (supplemented by its annexes, appendixes and cross-referenced documents), both in terms of functionality and performance, over the range of specified environmental conditions:
- 1) Transmission function,
 - 2) Reception function,
 - 3) TRANSEC Protection,
 - 4) Frequency Reference function,
 - 5) Monitor and Control (M&C) function.
- SRS-2 The transmission function shall accept data signals from a digital data source and use these digital data signals to modulate an IF carrier in accordance with one or more prescribed modem standards. The transmission function shall then send this IF signal to an IF output interface.
- SRS-3 The reception function shall receive a minimum of four (4) IF signals from an IF input interface. The reception function shall then demodulate these IF signals in accordance with one or more prescribed modem standards and send the digital data to the Ethernet data interface.
- SRS-4 The TRANSEC function, described in Section 3.3, shall protect the channel activity and associated signalling information, and provide modem authentication.
- SRS-5 The frequency reference function shall include the provision of an internal frequency reference and the acceptance of an external frequency reference.
- SRS-6 The Monitoring and Control function shall allow the operator to undertake monitoring (carrier and modem status, alarms and warnings, command acknowledgments.) and control (carrier and modem configuration) and of all modem functions, either directly by local action on the unit and indirectly via a dedicated M&C interface.

3.2 SATCOM Network Architecture Driven Requirements

- SRS-7 The modem shall be DVB-S2X waveform compliant. (ETSI EN 302 307-2).
- SRS-8 The modem shall be able to operate in the “Professional services” and “VL-SNR” application areas as defined in the DVB-S2X standard (ETSI EN 302 307-2) with the full set of “Normative” functionalities and associated performance.
- SRS-9 The modem shall utilize Generic Stream Encapsulation (GSE) on forward and return links that complies with ETSI EN 302 307-2 and ETSI TS 102 606.
- SRS-10 The modem shall provide Variable Coding and Modulation (VCM) and Adaptive Coding and Modulation (ACM) as per DVB-S2X standard (ETSI EN 302 307-2).

- SRS-11 The modem shall implement Ethernet VLANs (IEEE 802.1q) mapping in VCM and ACM multi stream configuration (ETSI TS 102 606 and ETSI TS 102 771).
- SRS-12 The modem shall be able to provide at least 5 streams per VCM outbound carrier.
- SRS-13 The modem shall be able to transparently transport Ethernet frames (L2 bridging).
- SRS-14 Maximum Transmission Unit (MTU) size up to 9000 bytes (Jumbo Frame) shall be implemented.
- SRS-15 The modem shall be able to operate in full mesh and partial mesh topologies without a need of an external hub or external modem controller.
- SRS-16 The modem shall be able to establish point-to-point (SCPC) and point-to-multipoint (MCPC) links with other deployed and static terminals equipped with any of the same modems procured through this contract.
- SRS-17 Each modem shall be able to simultaneously:
- 1) transmit a single DVB-S2X carrier (SCPC or MCPC);
 - 2) receive minimum four (4) DVB-S2X carriers (SCPC or MCPC).
- SRS-18 The modem shall implement modulation and demodulation functions, and data rates as described in Section 3.4.
- SRS-19 Each demodulator shall operate independently.
- SRS-20 Transmit and receive functions of the modem shall operate independently of each other.
- SRS-21 The modem shall be capable of operating simplex (transmit only and receive only) and full duplex modes.
- SRS-22 Modem shall be able to transmit Continuous Wave (CW). The activation and deactivation of CW shall be conditional to operator selection.
- SRS-23 The modem shall be equipped with an internal 10 MHz frequency source reference
- SRS-24 The modem shall accept an external 10MHz frequency reference.
- SRS-25 It shall be possible to configure the primary and secondary frequency reference source of the modem (i.e. internal or external).
- SRS-26 In case of failure of the primary frequency reference source, it shall be possible to automatically switch to the secondary frequency source.
- SRS-27 The modem shall be able to maintain Date and Time synchronization internally (via internal clock) and externally acquired from an NTP server (via M&C or LAN interface).

3.3 TRANSEC Requirements

- SRS-28 The modem shall implement a Transmission Security (TRANSEC) mechanism that provides bulk encryption of over-the-air data including payloads and headers, signalling, and control and management information.

- SRS-29 Cryptographic algorithms implemented as part of the TRANSEC mechanism shall be Type B. (Note: Type B algorithm includes government designed and public domain designed cryptographic algorithms, both published and unpublished, and evaluated and approved by a NATO member nation National CIS Security Authority (NCSA).
- SRS-30 TRANSEC products mechanisms shall be approved by the National CIS Security Authority (NCSA) of a NATO member nation.
- SRS-31 The provision of configuration data with a potential to impact the functionality and/or security of a TRANSEC product or mechanism shall be under the control of the appropriate NCSA.
- SRS-32 TRANSEC products or mechanisms shall be developed, produced and implemented in a NATO member nation.
- SRS-33 TRANSEC mechanism shall employ a design that is resistant to spoofing of BLACK messages or transmissions.
- SRS-34 TRANSEC mechanism shall anonymize internal source and destination identifiers to the maximum extent possible.
- SRS-35 TRANSEC mechanism shall employ techniques that prevent an adversary from learning traffic size, patterns and timing to the maximum extent possible
- SRS-36 TRANSEC shall be implemented both for point-to-point (SCPC) and point-to-multipoint (MCPC) unidirectional links.
- SRS-37 TRANSEC mechanism shall be COTS and not require any special handling and storage. It shall be treated as an unclassified device even when keyed and enabled.
- SRS-38 It shall be possible to activate and disable the TRANSEC feature by the operator.
- SRS-39 Local and remote zeroising feature shall be implemented which shall zeroise all the crypto keys and sensitive information when applied.
- SRS-40 TRANSEC operation shall not require any external key generation system, nor any specific key fill device support (e.g. EKMS).
- SRS-41 The TRANSEC functionality shall provide key update and rollover functions.
- SRS-42 The TRANSEC functionality shall allow the “keying out” of any terminal or modem suspected to be compromised.
- SRS-43 Configuration of the TRANSEC parameters shall be subject to specific authentication of the operator.
- SRS-44 The TRANSEC functionality shall include internal logging and management (read, export/save, clear) of TRANSEC related commands and events.

3.4 Waveform and Data Rate Requirements

3.4.1 Modulation schemes

SRS-45 The modem shall provide modulation and demodulation functions compliant with DVB-S2X (ETSI EN 302 307-2) standard including the framing, MODCODs and roll-off factors as defined in the standard.

SRS-46 The following MODCODs shall be implemented as minimum:

Table 1 : Implemented MODCODs

Modulation and Coding				
DVB-S2X (EN 302 307-2)	Normal FEC Frame	QPSK	13/45, 9/20, 11/20	
		8PSK	23/36, 25/36, 13/18	
		8APSK-L	5/9, 26/45	
		16APSK	26/45, 3/5, 28/45, 23/36, 25/36, 13/18, 7/9, 77/90	
		16APSK-L	5/9, 8/15, 1/2, 3/5, 2/3	
		32APSK	32/45, 11/15, 7/9	
		32APSK-L	2/3	
		64APSK	11/15, 7/9, 4/5, 5/6	
		64APSK-L	32/45	
		128APSK	3/4, 7/9	
		256APSK	32/45, 3/4	
		256APSK-L	29/45, 2/3, 31/45, 11/15	
		Short FEC frame	QPSK	11/45, 4/15, 14/45, 7/15, 8/15, 32/45
			8PSK	7/15, 8/15, 26/45, 32/45
16APSK	7/15, 8/15, 26/45, 3/5, 32/45			
32APSK	2/3, 32/45			
VL-SNR ModCods		QPSK	2/9 (normal)	
		BPSK	1/5, 4/15, 1/3 (short) 1/5, 11/45, 1/3 (medium)	
		BPSK-S Spreading Factor 2	1/5, 11/45 (short)	
DVB-S2 (EN 302 307-1)	Normal and Short FEC frames <i>Note: rate 9/10 is not valid for short frames</i>	QPSK	1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10	
		8PSK	3/5, 2/3, 3/4, 5/6, 8/9, 9/10	

Modulation and Coding			
		16APSK	2/3, 3/4, 4/5, 5/6, 8/9, 9/10
		32APSK	3/4, 4/5, 5/6, 8/9, 9/10

SRS-47 The modem shall implement 5%, 10%, 15%, 20%, 25% and 35% roll-off filtering.

3.4.2 Data Rate

SRS-48 The minimum TX data rate implemented shall not be greater than 128 kbps.

SRS-49 The maximum TX data rate implemented shall not be less than 150 Mbps.

SRS-50 The minimum RX data rate implemented shall not be greater than 128 kbps (per demodulator).

SRS-51 The maximum RX data rate implemented shall not be less than 150 Mbps (aggregate).

SRS-52 The data rates shall be selectable in 1 bit per second (bps) increments.

3.4.3 Symbol Rate

SRS-53 The minimum TX symbol rate implemented shall not be greater than 64 ksps.

SRS-54 The maximum TX symbol rate implemented shall not be less than 50 Msps.

SRS-55 The minimum RX symbol rate implemented shall not be greater than 64 ksps (per demodulator).

SRS-56 The maximum RX symbol rate implemented shall not be less than 50 Msps (aggregate).

3.4.4 Miscellaneous

SRS-57 The modem shall include Built-in Integrated Test (BIT) functions, including the possibility to perform baseband and IF loopback, whose results shall be reported to the operator.

4 Technical Requirements

4.1 Performance Requirements

4.1.1 L-Band Output (TX)

4.1.1.1 Frequency

SRS-58 The modem shall provide a 950 to 2150 MHz L-band interface.

SRS-59 The modem shall provide an L-band output carrier configurable in 1 kHz steps or sub-multiples thereof.

4.1.1.2 Frequency Accuracy

SRS-60 When an external frequency reference is not present, the L-band output carrier frequency shall be within 10^{-7} of the selected value after a 5 minutes warm-up period.

SRS-61 When an external frequency reference is present, the L-band output carrier frequency shall correspond to the frequency accuracy performance of the external frequency reference.

4.1.1.3 Frequency Stability

SRS-62 When an external frequency reference is not present, the L-band output carrier frequency shall be stable to within 10^{-8} per day without frequency source adjustments.

SRS-63 When an external frequency reference is present, the L-band output carrier frequency stability shall meet the frequency stability performance of the external frequency reference.

4.1.1.4 Phase Noise

[17] The phase noise requirement is subdivided into continuous and discrete components.

4.1.1.4.1 Continuous component

[18] The continuous component consists of the Gaussian-based phase noise present within the modulator of interest and excludes the discrete component contributions.

SRS-64 The phase noise of the L-band output carrier shall not exceed the mask shown on Figure 1.

SRS-65 If the mask on Figure 1 is exceeded, then for all symbol rates supported by the modem, the following shall be true.

- 1) The measured SSB RMS phase noise shall be integrated over the limits of $0.0005R_s$ to $0.5R_s$ away from the carrier center frequency.
- 2) The spectral mask shown on Figure 1 shall be integrated over the same limits.

3) The integrated measured phase noise shall not exceed the integrated phase noise limit mask.

SRS-66 For all symbol rates supported by the modem, the calculated SSB continuous component RMS phase noise, integrated over the limits of $0.0005R_s$ to $0.5R_s$, shall not exceed.

- 1) 2.8° RMS for modems whose highest order modulation format is BPSK or QPSK;
- 2) 2.25° for modems whose highest order modulation format is 8-PSK;
- 3) 1.125° for modems whose highest order modulation format is 16-amplitude-phase-shift keying (APSK);
- 4) 0.75° for modems whose highest order modulation format is 32-APSK.

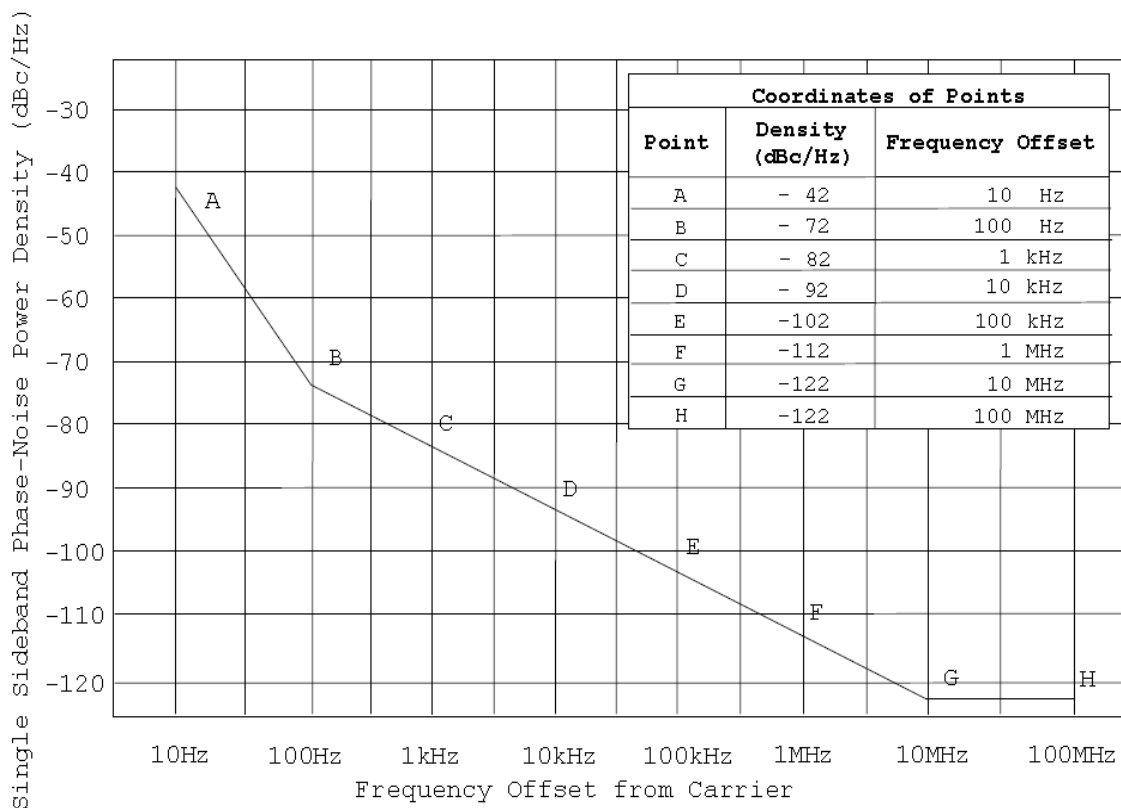


Figure 1 Phase Noise Power Spectral Density (PSD) Mask

4.1.1.4.2 Discrete Component

[19] The discrete component consists of emissions that result directly from known phenomena such as power line frequency and harmonics, switching frequencies and harmonics of switch-mode power supplies, or alternating current (AC) magnetic fields induced into the system of interest.

SRS-67 The SSB phase noise at AC line fundamental and harmonic frequencies shall not exceed -36 dBc.

SRS-68 The SSB sum (added on a power basis) of all other discrete component emissions shall not exceed -42 dBc.

4.1.1.5 Output Power

SRS-69 The output power shall be adjustable over the range from -40 to 0 dBm

SRS-70 When transmission is muted, signal present at the output, from 0 to 4 GHz, shall be no greater than -70 dBm across any 3MHz bandwidth and not greater than -80 dBm across any 30 KHz bandwidth. These limits are shown in Figure 2.

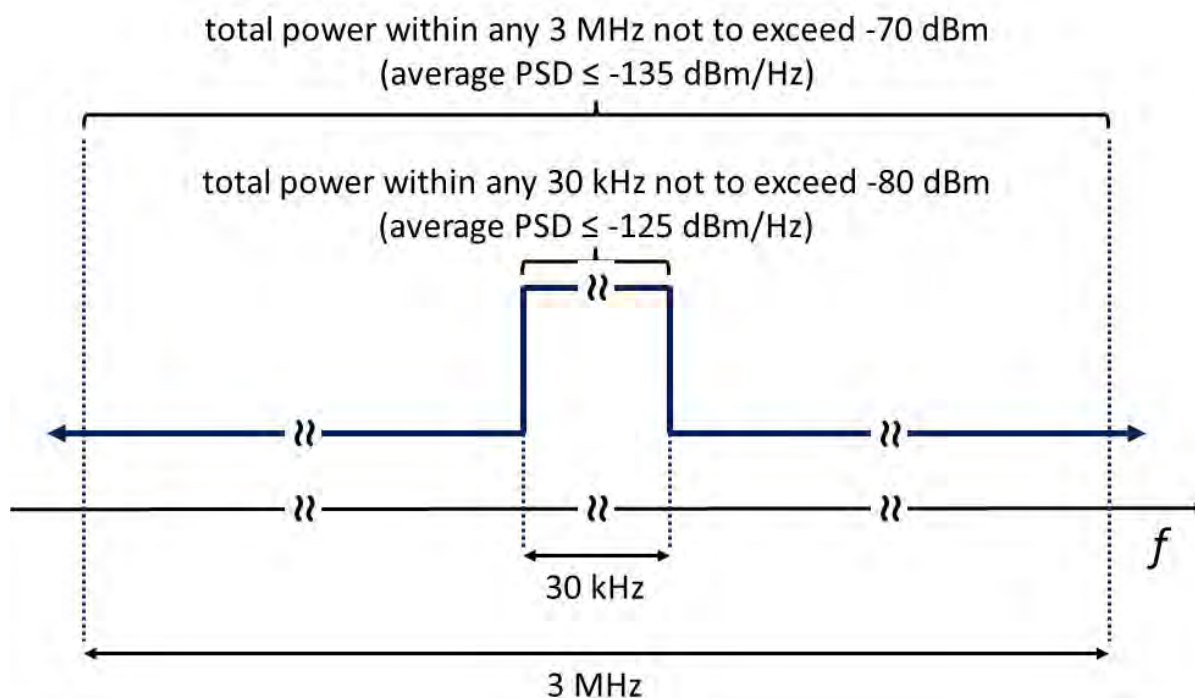


Figure 2 Carrier "OFF" Power Limits

4.1.1.6 Power Accuracy and Stability

SRS-71 The absolute accuracy of the carrier power shall be within ± 1.0 dB of the selected value.

SRS-72 The minimum step size for power adjustment shall not exceed 0.25 dB.

SRS-73 The relative accuracy associated with the smallest increment shall be within 0.1 dB

SRS-74 When a power change is initiated, the power shall transition monotonically and shall not induce burst errors into the controlled carrier's bit stream or into the adjacent carrier's bit stream (with the adjacent carrier spaced at $1.2R_s$)

SRS-75 The modem shall maintain output power stability of ± 0.5 dB at $20 \pm 2^\circ$ temperature in any 24-hour period after a proper warm-up

SRS-76 The modem shall maintain output power stability ± 1.0 dB between 0° C and 50° C.

4.1.1.7 Spectral Output

SRS-77 The IF output signal shall meet the PSD confinement mask shown in Figure 3

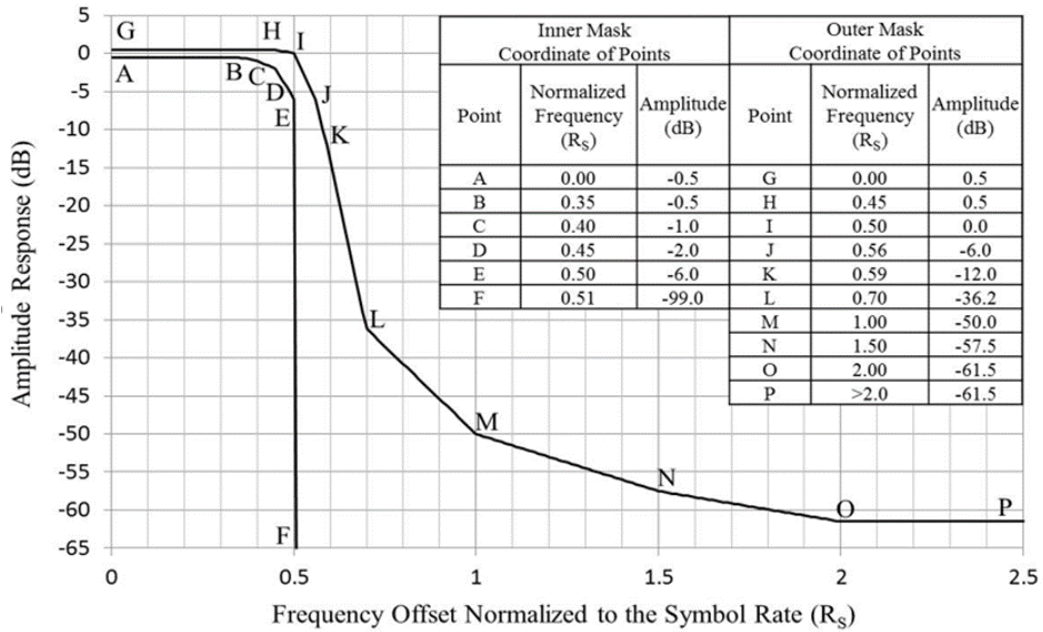


Figure 3 PSD confinement mask

SRS-78 It shall be acceptable for transmission spectra to exhibit the following:

- 1) Carrier nulls at the carrier for BPSK modulation only;
- 2) Clock nulls, offset by half the symbol rate from the carrier, for BPSK and OQPSK modulation only;
- 3) PSD not to exceed the Tx thermal noise floor threshold specified in SRS-79 when this threshold exceeds the PSD confinement mask shown on Figure 3;
- 4) Spurious emissions compliant with SRS-80;
- 5) Output harmonics compliant with SRS-81.

SRS-79 The IF output thermal noise density shall not exceed the greater of -135 dBm/Hz or -135 dBc/Hz over the full IF band.

SRS-80 Spurious emission power in any 10 kHz bandwidth, exceeding -70 dBm, shall not exceed the level relative to total modulated carrier power as follows:

$$P_{\text{spurious}} \leq -70 \text{ dBc}$$

This requirement excludes $\pm 1.0R_s$ centered on the carrier

SRS-81 The power of any transmission carrier harmonic exceeding -70 dBm shall not exceed the level relative to total modulated carrier power, as follows:

$$P_{\text{harmonic}} \leq -70 \text{ dBc}$$

4.1.2 L-band Input (RX)

SRS-82 Requirements listed in this section shall be applicable to all L-band Input (Rx) interfaces which may be present due to multi-channel demodulation capability.

4.1.2.1 Frequency

- SRS-83 The modem shall provide a 950 to 2150 MHz L-band interface.
- SRS-84 In multi-carrier reception scenario (E.g. 4 carriers), for all inbound carriers, the reception bandwidth for simultaneous reception of those 4 carriers shall not be limited to less than 50 MHz
- SRS-85 The modem shall accept an L-band input carrier configurable in 1 kHz steps or sub-multiples thereof.
- SRS-86 The modem shall be able to acquire and demodulate carriers that are within 30 kHz of the nominal expected frequency programmed in the demodulators
- SRS-87 The acquisition bandwidth of the modem shall be selectable by the operator.

4.1.2.2 Signal Level

- SRS-88 The demodulator shall operate with the specified performance with a minimum carrier level such that:

$$P_{\min} = -113 \text{ dBm/Hz} + E_s/N_0 + 10 \log R_s$$

Where:

E_s/N_0 (in dB) is the specified performance value for a BER of 10^{-8} ;

R_s is symbol rate in symbols/s.

Where E_s/N_0 performance is not specified, then:

$$E_s/N_0 = R_D/R_s \times E_b/N_0 \text{ (in linear ratios);}$$

E_b/N_0 (in dB) is the specified performance value for a BER of 10^{-8} ;

R_D is data rate in b/s.

- SRS-89 The demodulator shall operate with the specified performance with a maximum carrier level such that:

$$P_{\max} = -3 \text{ dBm/Hz} + 10 \log R_s$$

Where:

R_s is the symbol rate in mega symbols per second (Msps);

P_{\max} is capped at +0 dBm.

- SRS-90 The modem shall be able to demodulate IF input carriers in the presence of total IF input power up to +10 dBm.
- SRS-91 The modem shall not be damaged by a continuous L-band input up to +15 dBm.

4.1.2.3 Acquisition and Reacquisition

SRS-92 The modem shall achieve initial acquisition within the times shown in Table 2, with a probability of 99 percent and a confidence level of 95 percent over a frequency uncertainty of ± 30 kHz at the reference E_s/N_0 given in Table 3.

Table 2 : Acquisition and Reacquisition performance requirement

Data Rate Range (kb/s)	Maximum Initial Acquisition Time (s)	Maximum Reacquisition Time (s)
$128 \leq R_D < 1544$	15	10
$1544 \leq R_D$	1	1

SRS-93 Reacquisition as well shall be achieved in accordance with Table 2. Note: This requirement for reacquisition applies after loss of the Rx carrier for up to 15 min and upon return of the carrier to within 500 Hz of its frequency at the time of loss.

4.1.2.4 Back to back error performance

SRS-94 Back to back error performance of the modems shall be compliant with the E_s/N_0 thresholds for Additive White Gaussian Noise (AWGN) linear channel as defined in Table 3.

Table 3 : E_s/N_0 Performance at Quasi Error Free FER=10-5 (AWGN Channel)

MODCOD			E_s/N_0 [dB]
DVB-S2X Normal FEC Frame	QPSK	13/45	-2.0
	QPSK	9/20	0.3
	QPSK	11/20	1.5
	8PSK	23/36	6.2
	8PSK	25/36	7.1
	8PSK	13/18	7.5
	8APSK-L	5/9	4.8
	8APSK-L	26/45	5.2
	16APSK	26/45	7.6
	16APSK	3/5	7.9
	16APSK	28/45	8.2
	16APSK	23/36	8.4
	16APSK	25/36	9.3
	16APSK	13/18	9.8
	16APSK	7/9	10.7
	16APSK	77/90	12.0
	16APSK-L	5/9	6.9
	16APSK-L	8/15	6.6
	16APSK-L	1/2	6.0
16APSK-L	3/5	7.5	

MODCOD			E_s/N_0 [dB]
	16APSK-L	2/3	8.5
	32APSK	32/45	11.8
	32APSK	11/15	12.2
	32APSK	7/9	13.1
	32APSK-L	2/3	11.2
	64APSK	11/15	14.9
	64APSK	7/9	15.5
	64APSK	4/5	15.9
	64APSK	5/6	16.6
	64APSK-L	32/45	14.0
	128APSK	3/4	17.8
	128APSK	7/9	18.6
	256APSK	32/45	18.6
	256APSK	3/4	19.6
	256APSK-L	29/45	17
	256APSK-L	2/3	17.3
	256APSK-L	31/45	18.2
	256APSK-L	11/15	18.9
DVB-S2X Short FEC Frame	QPSK	11/45	-2.4
	QPSK	4/15	-2.2
	QPSK	14/45	-1.4
	QPSK	7/15	0.7
	QPSK	8/15	1.5
	QPSK	32/45	3.7
	8PSK	7/15	3.9
	8PSK	8/15	4.8
	8PSK	26/45	5.6
	8PSK	32/45	7.6
	16APSK	7/15	6.0
	16APSK	8/15	7.0
	16APSK	26/45	7.7
	16APSK	3/5	8.2
	16APSK	32/45	9.9
	32APSK	2/3	11.5
	32APSK	32/45	12.2
	VL-SNR	QPSK	2/9
BPSK (short)		1/5	-6
BPSK (short)		4/5	-4.8
BPSK (short)		1/3	-3.7
BPSK (medium)		1/5	-6.8
BPSK (medium)		11/45	-5.4
BPSK (medium)		1/3	-3.9

MODCOD			E_s/N_0 [dB]
	BPSK-S Spreading Factor 2	1/5	-9.8
	BPSK-S Spreading Factor 2	11/45	-8.2
DVB-S2	QPSK	1/4	-2.3
	QPSK	1/3	-1.2
	QPSK	2/5	-0.2
	QPSK	1/2	1.1
	QPSK	3/5	2.3
	QPSK	2/3	3.2
	QPSK	3/4	4.1
	QPSK	4/5	4.7
	QPSK	5/6	5.2
	QPSK	8/9	6.3
	QPSK	9/10	6.5
	8PSK	3/5	5.6
	8PSK	2/3	6.7
	8PSK	3/4	8.0
	8PSK	5/6	9.4
	8PSK	8/9	10.7
	8PSK	9/10	11.0
	16APSK	2/3	9.0
	16APSK	3/4	10.3
	16APSK	4/5	11.1
	16APSK	5/6	11.7
	16APSK	8/9	12.9
	16APSK	9/10	13.2
	32APSK	3/4	12.8
32APSK	4/5	13.7	
32APSK	5/6	14.3	
32APSK	8/9	15.7	
32APSK	9/10	16.1	

4.1.2.5 Error Performance with Adjacent Channel Interference (ACI)

4.1.2.5.1 Equal symbol-rate ACI scenarios

[20] In the equal symbol-rate scenarios, interfering carriers are located at centre frequencies above and below the carrier of interest. Interfering carriers are of symbol rate R_s equal to that of the carrier of interest. Centre-to-centre carrier spacing is either $1.2 R_s$ or $1.4 R_s$. The PSD of each interfering carrier is 13 dB higher than that of the carrier of interest. The equal symbol-rate ACI scenario is illustrated in Figure 4.

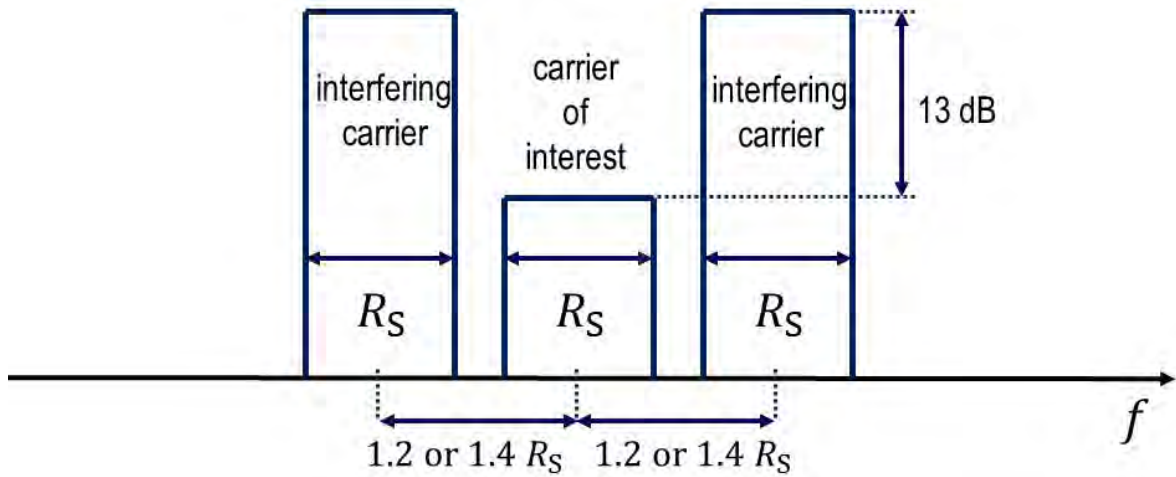


Figure 4 Equal symbol-rate ACI.

4.1.2.5.2 Double symbol-rate ACI scenarios

[21] In the double symbol-rate scenario, interfering carriers are located at center frequencies above and below the carrier of interest. Interfering carriers are of symbol rate $2 R_S$, double that of the carrier of interest. Center-to-center carrier spacing is either $1.8 R_S$ (1.2 times the average of the two symbol rates) or $2.1 R_S$ (1.4 times the average of the two symbol rates). The PSD of each interfering carrier is 13 dB higher than that of the carrier of interest. The equal symbol-rate ACI scenario is illustrated in Figure 5.

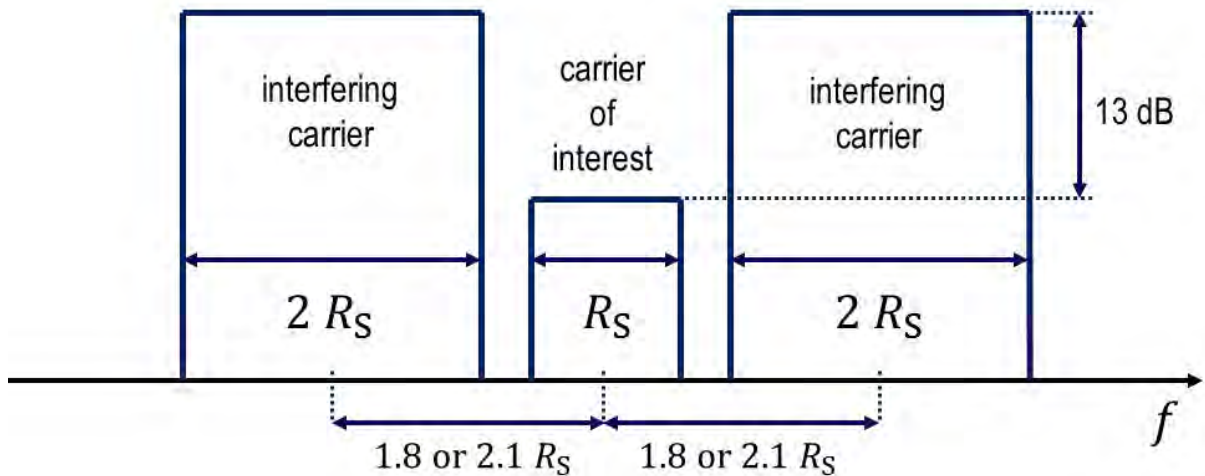


Figure 5 Double symbol-rate ACI

4.1.2.5.3 Threshold E_b/N_0 allowance for ACI

SRS-95 ES/N0 performance specified in 4.1.2.4 shall be granted an associated impairment allowance (as also shown in Figure 6) of:

$$10 \log_{10} \left(\frac{\frac{1}{E_s/N_0}}{\frac{1}{E_s/N_0} - X} \right) \text{ dB}$$

Where:

$X = 0.0059$ in the equal symbol-rate ACI scenario where center-to-center carrier spacing is $1.2R_s$;

$X = 0.0043$ in the equal symbol-rate ACI scenario where center-to-center carrier spacing is $1.4R_s$;

$X = 0.0156$ in the double symbol-rate ACI scenario where center-to-center carrier spacing is $1.8R_s$ (1.2 times the average of the two symbol rates);

$X = 0.0115$ in the double symbol-rate ACI scenario where center-to-center carrier spacing is $2.1R_s$ (1.4 times the average of the two symbol rates);

SRS-96 In cases where $\frac{1}{E_s/N_0} \leq X$, it is allowable for ACI, as defined above, to prevent reception at the BER corresponding to the relevant threshold E_b/N_0 . ACI implementation loss allowances are illustrated in Figure 6.

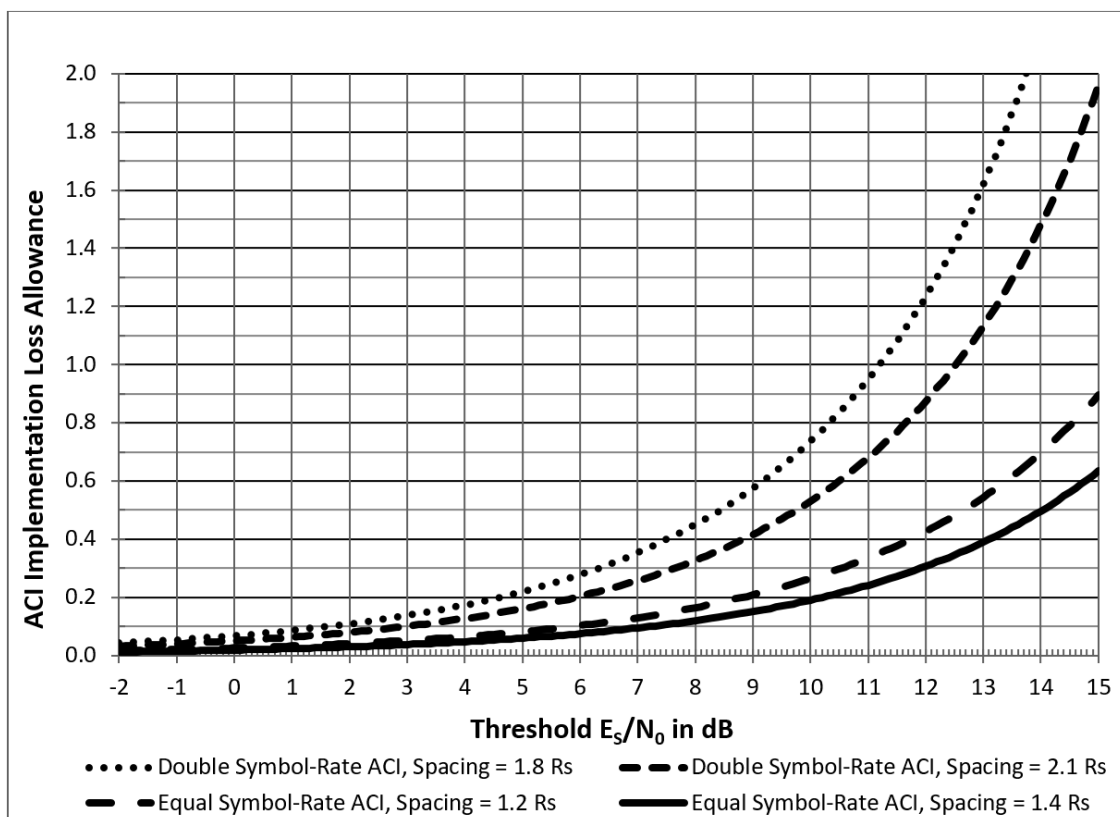


Figure 6 ACI implementation loss allowances.

4.1.2.6 Composite Power

SRS-97 The demodulator shall maintain the performance specified in 4.1.2.4 and 4.1.2.5, under the following conditions:

- 1) Total IF input power does not exceed +10 dBm;
- 2) The PSD of any carrier does not exceed -3.0 dBm/MHz;
- 3) The sum of all carriers within ± 10 MHz of the desired carrier does not exceed +30 dBc;

- 4) The sum of all carriers does not exceed +40 dBc.

4.1.2.7 Isolation of Integrated Modulators and Demodulators

SRS-98 When one or more modulators or demodulators, co-located in the same chassis, are enabled, the error performance requirements of sections 4.1.2.4 through 4.1.2.6 shall be met, to within a 0.2 dB implementation allowance, provided that:

- 1) The PSD of the carrier received by the demodulation function of interest shall be within 60 dB of the PSD of any transmitted output of any co-located modulation function;
- 2) No restrictions on co-located demodulation functions as long as they comply with the Adjacent Channel Interference requirements.

4.1.2.8 Doppler requirements

[22] The modem shall meet the functional and performance requirements under the Doppler conditions presented in Table 4.

Table 4 Doppler conditions

Doppler Shift (Hz)	11810
Doppler rate of change (Hz/s)	1046
Doppler acceleration (Hz/s ²)	1124

4.2 Interface Requirements

4.2.1 L-band Output (TX)

SRS-99 The modem shall provide a single connector of N type female interface.

SRS-100 The interface shall have a nominal impedance of 50 Ω .

SRS-101 The voltage standing-wave ratio (VSWR) shall be better than 1.5:1.

4.2.2 L-band Input (RX)

SRS-102 The modem shall provide a single connector of N type female interface.

SRS-103 The interface shall have a nominal impedance of 50 Ω .

SRS-104 The VSWR shall be better than 1.5:1.

4.2.3 External Frequency Reference Input

SRS-105 The interface shall be through a single connector of TNC or BNC type female.

SRS-106 The interface shall have a nominal impedance of 50 Ω .

SRS-107 The VSWR shall be better than 1.5:1.

SRS-108 It shall accept signal levels between -10 to 0dBm.

SRS-109 It shall accept a 10 MHz sinusoidal reference signal.

SRS-110 The modem shall be designed to operate within specification with an external frequency reference, which phase noise (SSB) characteristics comply with the following table:

Table 5 Phase noise characteristics of external frequency reference

Offset Frequency	dBc/Hz
1 Hz	-115 dBc/Hz
10 Hz	-130 dBc/Hz
100 Hz	-135 dBc/Hz
1000 Hz	-140 dBc/Hz
10000 Hz or higher	-140 dBc/Hz

4.2.4 Baseband Data interface

SRS-111 For traffic to be received or transmitted over the satellite network the modem shall provide a 10/100/1000Base-T Ethernet port compliant with IEEE 802.3i (10Base-T), IEEE 802.3u (100Base-T) and IEEE 802.3ab (1000Base-T).

SRS-112 The traffic port shall implement Auto-MDI/MDIX and Auto sensing.

SRS-113 A single traffic port shall be sufficient to transmit and receive traffic via all modulators and demodulators of the modem.

SRS-114 The connector type shall be RJ45 female.

4.2.5 Monitoring and Control Interface

SRS-115 The M&C interface shall be Ethernet 10/100Base-T (IEEE 802.3i /IEEE 802.3u) Auto-MDI/MDIX and Auto sensing.

SRS-116 The connector type shall be RJ45 female.

4.2.6 Grounding Interface

SRS-117 There shall be a grounding connection interface (grounding stud) on the chassis of the modem.

4.2.7 L-band Monitoring (TX)

SRS-118 If the modem provides an L-band monitoring interface, it shall have the following properties:

- 1) Interface shall have a nominal impedance of 50 Ω ;
- 2) Connector shall be Type N or SMA female;

- 3) No DC signal/voltage nor any frequency reference signal shall be present on monitoring port (TX).

4.3 Monitoring and Control Requirements

SRS-119 The modem shall provide a network based and physical remote access interface for monitoring and controlling modem functions and monitoring modem status.

SRS-120 The M&C physical port (as described in Section 4.2.5) shall be the only communication interface for M&C functions and there shall not be any other uncontrolled access to the M&C functions unless explicitly enabled by the operator in the modem settings.

SRS-121 Users shall be authenticated with username and password.

SRS-122 It shall be possible for the Purchaser to set role based access permissions (including read only access) to the M&C functionalities and parameters based on the password protected user profiles (e.g. Admin, Operator).

SRS-123 The modem (starting from factory default) shall be locally and remotely configurable and operable via an interactive web browser based user interface (listed in the AFPL and latest version available i.e. Mozilla Firefox, Microsoft Edge), via a non-proprietary Interface/Protocol for remote M&C (SNMPv2c or SNMPv3), and via Terminal Emulator (e.g. Putty).

SRS-124 All modem M&C functions (including TRANSEC) shown in Table 6 shall be available via:

- 1) Device front panel and display,
- 2) Web browser interface (Web GUI),
- 3) Non-proprietary network based physical interface for remote M&C system (E.g. SNMPv2c or SNMPv3).

Table 6 Monitor and Control functions

Monitor	Control
Activity of the modulator and each demodulator	Activation/deactivation of the Tx and the multiple Rx channels/demodulators
Data rate (Tx/Rx)	Data rate (Tx/Rx)
Modulation type (Tx/Rx)	Modulation type (Tx/Rx)
Frame/superframe settings	Frame/ superframe settings
Differential coding (Tx/Rx)	Differential coding (Tx/Rx)
Scrambling (Tx/Rx)	Scrambling (Tx/Rx)
FEC coding(Tx/Rx)	FEC coding(Tx/Rx)
Symbol Rate (Tx/Rx)	Symbol Rate (Tx/Rx)
IF carrier frequency (Tx/Rx)	IF carrier frequency (Tx/Rx)

Monitor	Control
Transmission IF power ON/OFF	Transmission IF power ON/OFF
Transmission IF power level	Transmission IF power level
Received E_b/N_0 , and E_s/N_0	N/A
Estimated Bit Error Rate, Symbol error rate	N/A
Acquisition / carrier lock indicator	N/A
Received signal power level, automatic gain control (AGC), or both	N/A
Bit synchronization indicator (Tx/Rx)	N/A
Status of frequency reference sources and precedence.	Frequency reference source selection and precedence
DC voltage and frequency reference multiplexing on the IF interfaces	DC voltage and frequency reference multiplexing on the IF interfaces
ACM and VCM status	ACM and VCM activation and settings
ACM return channel selection	ACM return channel selection
Logged faults , alarms, warnings and events (with date and time)	Means to clear faults, alarms, warnings and events
Fault, Alarm, Warning and event individual masking policy	Fault, Alarm, Warning and event individual masking policy
TRANSEC configuration parameters and status	TRANSEC configuration, parameters and initialisation
Applied configuration	Save/Load configuration
Management LAN parameters (IP and MAC addresses...)	Management LAN parameters
Traffic interface settings (VLANs, association to modulator and demodulators)	Traffic interface settings (VLANs, association to modulator and demodulators)
Ethernet Port (Tx and Rx, Traffic and management)) activity	N/A
Date and Time settings	Date and Time settings
Front panel display settings	Front panel display settings
SW and FW version	N/A
Product and Serial number	N/A
Built in test Results	Built in Test Request
Baseband and IF loopback status.	Baseband and IF loopbacks
CW Status	CW activation and deactivation

- SRS-125 Response time, from applying configuration to implementation, shall not exceed 0.25 second.
- SRS-126 Activation of configuration changes shall not require a reboot. Exceptions will be considered on a case per case basis for specific circumstances and be subject to Purchaser preliminary approval.
- SRS-127 Restore to default command shall not restore the network parameters configured by the operator (i.e. IP address).
- SRS-128 When using ACM, the modem shall report the actual maximum data rate for each remote destination in real time.
- SRS-129 The modem shall be capable of reporting the mean Eb/N0 (and mean Es/N0) at a minimum interval of 0.25 s. For each reporting cycle, the reported mean Eb/N0 shall be within 0.3 dB of the true mean, with a confidence level of 99.5%.
- SRS-130 The latency of the reported Eb/N0 and Es/N0 information shall not exceed one reporting cycle or one second, whichever is the smaller
- SRS-131 The modem shall be able to locally store and retrieve minimum 10 configuration files.
- SRS-132 The modem shall log locally user activity, all errors, faults, alarms and status information with date and time tagging.
- SRS-133 It shall be possible to export, clear and reset the logged data (in .txt or .csv format) via the modem web interface and the remote 3rd party M&C system.
- SRS-134 All monitoring and control functionalities available via web interface and device front panel shall also be made available for an external Monitoring and Control system.
- SRS-135 All units shall be expressed in metric system.

4.4 Power and Electrical Requirements

- SRS-136 The modem shall operate with AC mains power input 100 – 253 VAC, 50-60Hz, single phase.
- SRS-137 Maximum power consumption of the modem shall not exceed 150VA.
- SRS-138 The power inlet shall be protected against overload and short circuit with an appropriate fuse or over voltage and over current protection.
- SRS-139 In case fuses are used, they shall be non-proprietary COTS, compliant to IEC 60269 series: Low-voltage fuses, and field replaceable, within less than 5 minutes.

4.5 Physical User Interface Requirements

- SRS-140 The modem shall be configurable and operable via modem front panel (display and keypad).
- SRS-141 The display shall be an LCD that provides minimum two lines and that assists operator for local control and monitoring capability.

SRS-142 The LCD shall be readable without difficulty within the environmental conditions as described in Section 4.7.

SRS-143 The LCD shall be readable under direct sunlight exposure.

SRS-144 It shall be possible to turn on/off the display backlight, adjust the display brightness.

SRS-145 The LCD shall not allow for aggregation of dust or humidity.

SRS-146 On the front-panel, there shall be LED displays that provides basic modem status including as Rx, Tx, Fault and Alarm status.

SRS-147 There shall be a front panel keypad that includes as a minimum the below:

- 1) Alphanumeric keypad that contains both numbers and letters on the same keys;
- 2) Arrow keys for navigation;
- 3) Functional keys such as "Enter", "Back".

4.6 Supportability Requirements

SRS-148 The modem Mean Time Between Failures (MTBF) shall be greater than 100000 hours in Ground Fixed environment (ref. MIL-HDBK-338B) using failure rates data at component level.

SRS-149 The modem Fault Detection (FD) rate shall be 100% through Built-In Test (BIT) capable of on-line detection of failures modes.

SRS-150 The modem Fault Isolation (FI) rate without ambiguity shall be greater than 95% through Built-In Test (BIT) capable to isolate the detected internal function/component in failure.

SRS-151 The modem SW / FW updates, upgrades and settings shall be Software Organizational Maintenance (Level 2) SL2 or lower (please refer to Annex B - Maintenance and Support Concepts).

SRS-152 The modem internal battery shall:

- 1) be COTS available;
- 2) provide minimum 2 year shelf/storage life;
- 3) be recharged automatically, or at least not discharge when the modem is powered on;
- 4) be replaceable at Hardware Organizational Maintenance (Level 2) HL2 or lower (Please refer to Annex B - Maintenance and Support Concepts) with a COTS replacement battery within 15 minutes following the technical manuals and procedures provided by the contractor and without need of special tools (soldering iron, etc.).

4.7 Mechanical and Environmental Requirements

- SRS-153 The modem shall be rack-mountable within a standardised 19 inch (482.6 mm) rack cabinet.
- SRS-154 All physical interfaces shall be located at the back or the front of the device, not at the side panels, not at the top or the bottom panels.
- SRS-155 The modem height shall not exceed 2 RU (2 x 1.75 inches). (Note: in order to be installed in the rack without occupying the space of the adjacent equipment, the height of the unit shall be 1/32 inch or 0.794 mm less than 2 RU (or 1 RU)).
- SRS-156 The modem depth (total) shall not exceed 500mm including front and rear panel parts (e.g. connectors, fans, handles)
- SRS-157 The modem shall not pose any constraints on transporting or manoeuvrability by a single person due to its physical weight.
- SRS-158 The weight of the modem shall not exceed 9 kg.
- SRS-159 In case the contractor intends to provide the required number of modulation and demodulation capability by combining multiple modems, or as an enclosure containing several modems or modem components, then the combination of modems or the enclosure shall meet all the requirements in this SRS.
- SRS-160 Active links shall not suffer loss of bit or packet count integrity, at the Es/No required for a BER performance of 10^{-10} , over the range of operational environmental conditions specified below.
- SRS-161 The modem shall meet the performance specifications (operating temperature range) between 0 °C and +50 °C according to MIL-STD-810G w/Change 1, 2014, method 501.6 and 502.6 or AECTP 300, Edition D, version 1, 2019, Method 302 and 303, or IEC 60068-2-1:2007 and IEC 60068-2-2:2007.
- SRS-162 The modem shall withstand storage, handling and transport temperature range between -32 °C and +70 °C according to MIL-STD-810G w/Change 1, 2014, method 501.6 and 502.6 or AECTP 300, Edition D, version 1, 2019, Method 302 and 303, or IEC 60068-2-1:2007 and IEC 60068-2-2:2007.
- SRS-163 The relative humidity operating range shall be 0 to and 85% (non-condensing) according to MIL-STD-810G w/Change 1, 2014, method 507.6 or AECTP 300, Edition D, version 1, 2019, Method 317, or IEC 60068-2-38:2009.
- SRS-164 The modem shall withstand the following altitudes, according to MIL-STD-810G w/Change 1, 2014, method 500.6 or AECTP 300, Edition D, version 1, 2019, Method 301, or IEC 60068-2-13:1983:
- 1) 0 to 3000 m for operation;
 - 2) 0 to 12,000 m for transport;
 - 3) 0 to 3000 m for storage, handling, and depot.

SRS-165 The modem enclosure shall provide Ingress Protection level of IP54 from the front face, and IP32 on the other sides of the equipment as per IEC 60529:1989, AMD1:1999 and AMD2:2013.

SRS-166 The modem shall survive random vibration conditions at 5-20 Hz, 0.05 g/Hz and 20-150 Hz, -3dB/Oct vibration conditions for transport, storage, and handling according to MIL-STD-810G w/Change 1, 2014, method 514.7 or AECTP-400, Edition D, Version 1, 2019, Method 401, or IEC60068-2-64:2008 +AMD1:2019 CSV.

SRS-167 The modem shall survive mechanical shocks in each direction at 15 g / 11 ms half-sine for transport, storage, and handling according to MIL-STD-810G w/Change 1, 2014, method 516.7 or AECTP-400, Edition D Version 1, 2019, Method 403, or IEC60068-2-27:2008.

Note: AECTP 300 and AECTP 400 are part of STANAG 4370, Edition 7.

4.8 EMI/EMC Requirements

SRS-168 The EMC properties of the modem shall be compliant with EN 55032:2015+A1:2020.

SRS-169 The EMI properties of the modem shall be compliant with EN 55035:2017+A11:2020.

SRS-170 Additionally, the modems shall be compliant with Directive 2014/30/EU of the European Parliament and of the Council, of 26 February 2014, on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.

4.9 Safety Requirements

SRS-171 The modem shall have a CE marking as compliant with EU health and safety requirements and directives as applicable, including but not limited to:

- 1) Radio Equipment Directive (RED) 2014/53/EU;
- 2) Low Voltage Directive (LVD) 2014/35/EU.

SRS-172 The modem shall be compliant with IEC 62368-1:2018 Safety requirements and with IEC 60950 series: Information technology equipment – Safety.

SRS-173 The modem shall be compliant with RoHS 2 directive 2011/65/EU. For products placed on the market on or after 22 July 2019, Commission Delegated Directive (EU) 2015/863 shall be applicable.

SRS-174 Any rotating part such as fans, drive belts, etc., shall be protected to prevent accidental contact by and injury to any personnel during operation and maintenance.

SRS-175 Edges and corners shall be rounded in such way that they shall not cause any harm to the personnel during handling. Protective gloves shall not be required for handling the equipment.

SRS-176 When rounding of edges and corners is not possible, protective covers shall be applied.

- SRS-177 All cables shall have non-toxic, halogen-free, non-inflammable coating, applying IEC 60332, IEC 62821 series and IEC 60754.
- SRS-178 Wires and cables shall be placed, mounted and protected as to prevent contact with rough irregular surfaces and sharp edges and to prevent wear due to vibration.
- SRS-179 Cables shall be routed away from heat generating components and no wire or cable connection shall be in tension.
- SRS-180 All soldered connections shall be clean and smooth in appearance and shall provide excellent electrical conductivity. The insulation of soldered wires shall not show damage from the heat of the soldering operation.
- SRS-181 Dissimilar metals shall not be used in intimate contact unless suitably protected against electrolytic corrosion.
- SRS-182 All conductors and appropriate hardware shall be rated for the electrical current carrying capacity in accordance with the applicable industry standards.
- SRS-183 Safety markings and labels shall be provided identifying any potential hazards to personnel.
- SRS-184 Safety markings shall be readily visible.
- SRS-185 Appropriate notices and markings on equipment shall be provided with special reference to points where dangerous temperatures and voltages may be encountered and where precautions are to be taken against radiation hazards.
- SRS-186 Warning markings shall be as permanent as the normal life expectancy of the equipment on which they are affixed and shall be placed as close as possible to the point of danger.
- SRS-187 All matters of safety including but not limited to hot surfaces, mechanical hazards, electrical shocks and radiation hazards shall be fully and clearly addressed in the user operations and technical manuals.

APPENDIX A Applicable Documents

[ETSI EN 302 307-2 V1.2.1 (2020-08)] Digital Video broadcasting (DVB); Second generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications; Part 2: DVB-S2 Extensions (DVB-S2X)

[ETSI TS 102 606-1 V1.2.1 (2014-07)] Digital Video Broadcasting (DVB); Generic Stream Encapsulation (GSE); Part 1: Protocol

[IEEE 802.1q-2018] IEEE Standard for Local and Metropolitan Area Networks—Bridges and Bridged Networks

[IEEE 802.3i] IEEE Standard for Local and Metropolitan Area Networks - System Considerations for Multisegment 10 Mb/S Baseband Networks (Section 13) and Twisted-Pair Medium Attachment Unit (MAU) and Baseband Medium, Type 10BASE-T (Section 14)

[IEEE 802.3u] IEEE 802.3u-1995 - IEEE Standards for Local and Metropolitan Area Networks: Supplement - Media Access Control (MAC) Parameters, Physical Layer, Medium Attachment Units, and Repeater for 100Mb/s Operation, Type 100BASE-T (Clauses 21-30)

[IEEE 802.3ab] IEEE Standard for Information Technology - Telecommunications and information exchange between systems - Local and Metropolitan Area Networks - Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications - Physical Layer Parameters and Specifications for 1000 Mb/s Operation over 4 pair of Category 5 Balanced Copper Cabling, Type 1000BASE-T

[IEC 60269 series] Low-voltage fuses

[MIL-HDBK-338B] Electronic Reliability Design Handbook

[Annex B to the SoW] Maintenance and Support Concepts

[MIL-STD-810G w/Change 1] Environmental Engineering Considerations and Laboratory Tests, USA Department of Defence Interface Standard, 15 April 2014

[AECTP 300, 2019] Climatic Environmental Tests, Edition D, Version 1 (NATO Unclassified)

[IEC 60068-2-1:2007] Environmental testing - Part 2-1: Tests - Test A: Cold

[IEC 60068-2-2:2007] Environmental testing - Part 2-2: Tests - Test B: Dry heat

[IEC 60068-2-38:2009] Environmental testing - Part 2-38: Tests - Test Z/AD: Composite temperature/humidity cyclic test

[IEC 60068-2-13:1983] Basic environmental testing procedures - Part 2-13: Tests - Test M: Low air pressure

[IEC 60529:1989, AMD1:1999 and AMD2:2013] Degrees of protection provided by enclosures (IP Code)

[AECTP 400, 2019] Mechanical Environmental Tests, Edition D, Version 1 (NATO Unclassified)

[IEC 60068-2-64:2008+AMD1:2019 CSV] Consolidated version: Environmental testing - Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance

[IEC 60068-2-27:2008] Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock

[NATO STANAG 4370] Environmental Testing, Edition 7, 28 November 2019 (NATO Unclassified)

[EN 55032:2015+A1:2020] Electromagnetic compatibility of multimedia equipment. Emission requirements

[EN 55035:2017+A11:2020] Electromagnetic compatibility of multimedia equipment. Immunity requirements

[2014/30/EU] Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to electromagnetic compatibility, 26 February 2014

[RED 2014/53/EU] Directive of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC

[LVD 2014/35/EU] - Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits

[IEC 62368-1:2018] Audio/video, information and communication technology equipment - Part 1: Safety requirements

[IEC 60950 series] Information technology equipment – Safety

[2011/65/EU] RoHS-2 Directive of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment, 8 June 2011

[2015/863/EU] RoHS-2 amendment - Commission Delegated Directive of 31 March 2015 amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances

[IEC 62821 series] Electric cables - Halogen-free, low smoke, thermoplastic insulated and sheathed cables of rated voltages up to and including 450/750 V

[IEC 60754 series] Test on gases evolved during combustion of materials from cables

APPENDIX B Requirements for the Small Form Factor Modem (SFFM)

B.1 Introduction

SRS-188 The Small Form Factor Modem (SFFM) shall be fully interoperable with 'the modems' as specified in the main body of the SRS.

SRS-189 Unless otherwise explicitly stated or amended in this Appendix; the SFFM shall be fully compliant with the requirements listed in the main body of this SRS.

[23] The SFFM will be integrated into small rugged portable terminals which will be procured under a different contract. These will be multiband terminals, with very small (typically 1 meter size) antenna apertures. They will be MIL-STD-810G compliant. The integration work is not part of the scope of this SRS.

[24] The SFFM will be integrated into the Flyaway terminals which will be procured under a different contract. Flyaway terminals will be multiband terminals with small antenna apertures. They will be MIL-STD-810G compliant. It is desired that the SFFM will be fully integrated into the Flyaway terminal. If this is not possible due to limitations of the hosting terminal, then the SFFM will be integrated into environmentally and mechanically protected outdoor housing and will be collocated with the Flyaway terminal. The integration work is not part of the scope of this SoW.

SRS-190 Requirements listed in this Appendix shall be applicable to the both integration scenarios defined above.

B.2 Functional Requirements

B.2.1 Modulation and data rates

[25] The SFFM will not need to implement modulation densities strictly above 32 APSK.

SRS-191 The SFFM shall mandatory implement the VL-SNR DVB-S2X modulation waveforms.

SRS-192 The SFFM shall not be required to transmit or to receive data rates higher than 32.0 Mbps.

SRS-193 The SFFM shall not be required to transmit or to receive symbol rates higher than 40 Msps.

B.2.2 Number of Demodulators

SRS-194 The modem shall have minimum one (1) modulator and one (1) demodulator as an exception to SRS-17.

B.2.3 Time and Frequency Reference Supply

[26] Maintaining date and time synchronisation via an external reference (NTP server) is not required for SFFM.

- SRS-195 If the SFFM is not able to accept an external frequency reference, it shall provide an accurate internal reference as described below:
- SRS-196 The L-band output carrier and 10MHz reference frequencies shall be within 3×10^{-8} of their nominal values after a 5 minutes warm-up period.
- SRS-197 The L-band output carrier and 10MHz reference frequencies shall not deviate from their nominal values by more than 3×10^{-8} in 90 day period without calibration.
- SRS-198 It shall be possible to provide 10MHz reference signal independently and simultaneously to the BUC and the LNB of the hosting terminal through the centre conductor of Tx and Rx L-band ports respectively.
- SRS-199 10 MHz reference supply to BUC and LNB shall be ON and OFF switchable independently.

B.2.4 LNB DC Power Supply

- SRS-200 The SFFM shall be able to provide an internal 13 - 18 VDC and up to 500mA supply for LNB powering through the centre conductor of Rx L-band port.
- SRS-201 The Internal power supply to the LNB (or LNA/Down converter assembly) shall be ON and OFF switchable.

B.3 Technical Requirements

B.3.1 Power and Electrical Requirements

- [27] Power and Electrical Requirements described in Section 4.4 are not applicable to the SFFM.
- SRS-202 The SFFM shall accept a VDC power supply input between 5VDC and 24VDC.
- SRS-203 The Maximum power consumption of the SFFM shall not exceed 45W.

B.3.2 Physical User Interface Requirements

- [28] Requirements described in Section 4.5 are not applicable to SFFM as this modem does not require to have a front panel with display and keypad.

B.3.3 Mechanical and Environmental Requirements

- [29] The Mechanical and Environmental requirements described in Section 4.7 are not applicable to SFFM.
- SRS-204 It shall be possible to integrate the modem into a manpack and a flyaway terminal and also to use it standalone in a mechanical and environmentally protected outdoor housing.
- SRS-205 The SFFM dimensions shall not exceed 260mm x 190mm x 40mm.
- SRS-206 The weight of the modem shall not exceed 2kg.

- SRS-207 The SFFM shall meet the performance specifications (operating temperature range) between -32 °C and +50 °C according to MIL-STD-810G w/Change 1, 2014, method 501.6 and 502.6 or AECTP 300, Edition D, version 1, 2019, Method 302 and 303, or IEC 60068-2-1:2007 and IEC 60068-2-2:2007.
- SRS-208 The SFFM shall withstand temperature ranges between -32 °C and +70 °C for storage, handling and transport according to MIL-STD-810G w/Change 1, 2014, method 501.6 and 502.6 or AECTP 300, Edition D, version 1, 2019, Method 302 and 303, or IEC 60068-2-1:2007 and IEC 60068-2-2:2007.
- SRS-209 The modem shall withstand the following altitudes, according to MIL-STD-810G w/Change 1, 2014, method 500.6 or AECTP 300, Edition D, version 1, 2019, Method 301, or IEC 60068-2-13:1983:
- 1) 0 to 3000 m for operation;
 - 2) 0 to 12,000 m for transport;
 - 3) 0 to 3000 m for storage, handling, and depot.
- SRS-210 The modem shall survive random vibration conditions at 5-20 Hz, 0.05 g/Hz and 20-150 Hz, -3dB/Oct vibration conditions for transport, storage, and handling, according to MIL-STD-810G w/Change 1, 2014, method 514.7 or AECTP-400, Edition D, Version 1, 2019, Method 401, or IEC60068-2-64:2008 +AMD1:2019 CSV.
- SRS-211 The modem shall survive mechanical shocks in each direction at 15 g / 11 ms half-sine for transport, storage, and handling, according to MIL-STD-810G w/Change 1, 2014, method 516.7 or AECTP-400, Edition D Version 1, 2019, Method 403, or IEC60068-2-27:2008.

APPENDIX C ACRONYMS

Acronym	Description
ACI	Adjacent Channel Interference
ACM	Adaptive Coding and Modulation
AECTP	Allied Environmental Conditions and Test Publication
AFPL	Approved Fielded Product List
AGC	Automatic Gain Control
APSK	Amplitude Phase Shift Keying
AWGN	Additive White Gaussian Noise
BER	Bit Error Rate
BIT	Built-in Test
BPSK	Binary Phase Shift Keying
BUC	Block Upconverter
CIS	Communications and Information System
COTS	Commercial of The Shelf
CW	Continuous Wave
DIN	Deutsches Institut für Normung
DVB	Digital Video Broadcasting
EMC	Electromagnetic Compability
EMI	Electromagnetic Interference
EPM	Electronic Protective Measures
ETSI	European Telecommunications Standards Institute
EVM	Error Vector Magnitude
FDMA	Frequency division Multiple Access
FEC	Forward Error Correction
FER	Frame Error Rate
GSE	Generic Stream Encapsulation
GUI	Graphical User Interface
HDBK	Handbook
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
LAN	Local Area Network
LCD	Liquid Crystal Display

Acronym	Description
LED	Light-emitting Diode
LLD	Low Level Design
LNA	Low Noise Amplifier
LNB	Low Noise Block Downconverter
LVD	Low Voltage Directive
MAC	Media Access Control
MCPC	Multiple Carrier Per Channel
MDI	Medium-dependent interface
MDIX	medium-dependent interface crossover
SFFM	Mini Fly-Away Modem
MILSATCOM	Military Satellite Communications
MODCOD	Modulation and Coding
MTBF	Mean Time Between Failures
MTU	Maximum Transmission Unit
NATO	North Atlantic Treaty Organization
NCSA	National CIS Security Authority
NIST	National Institute of Standards and Technology
NTP	Network Time Protocol
OEM	Original Equipment Manufacturer
OQPSK	Offset Quadrature Phase-Shift Keying
PSD	Power Spectral Density
PSK	Phase-Shift Keying
QPSK	Quadrature Phase-Shift Keying
RED	Radio Equipment Directive
RFC	Request for Comments
RMS	Root Mean Square
SATCOM	Satellite Communications
SCPC	Single Carrier Per Channel
SFFM	Small Form Factor Modem
SHF	Super-High Frequency
SMA	SubMiniature version A
SNMP	Simple Network Management Protocol
SNR	Signal to Noise Ratio

Acronym	Description
SOW	Statement of Work
SRS	System Requirements Specification
SSB	Single Side Band
STANAG	Standardization Agreement
STD	Standard
TNC	Threaded Neill–Concelman
TRANSEC	Transmission Security
TSGT	Transportable Satellite Ground Terminals
VAC	Voltage Alternating Current
VCM	Variable Coding and Modulation
VDC	Voltage Direct Current
VLAN	Virtual Local Area Network
VSWR	Voltage Standing Wave Ratio



NATO Communications and Information Agency
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PROVIDE SATCOM GROUND SEGMENT BASEBAND SYSTEMS

Provision of SATCOM Convergence Routers (SCR) and Switches (WP2)

BOOK II

THE PROSPECTIVE CONTRACT

GENERAL INDEX

BOOK II - THE PROSPECTIVE CONTRACT

Signature Sheet

Part I Schedule of Supplies and Services

Part II Contract Special Provisions

Part III BOA Contract General Provisions

Part IV Statement of Work

SIGNATURE SHEET

NCI Agency PURCHASE ORDER	
1. Original Number ___ of	2. PO Number :
3. Contract Number: CO-115455-SGSBS-WP2	4. Effective date (EDC): <i>See Block 17</i>
5. Contractor: Director	6. Purchaser: The General Manager NATO Communications and Information Agency Boulevard Leopold III B-1110 Bruxelles Tel: +32(0) 6544 6103
7. CONTRACT SCOPE: This is a Firm Fixed Price contract for the provision of SATCOM Convergence Routers (SCR) and Switches - COTS routers with MPLS and IPSEC functionality in multiple configurations and including accessories, and COTS Ethernet switches with MACSEC functionality and including accessories. The Contractor shall deliver the items specified in the Schedule of Supplies and Services in the manner and at the time and location specified in the terms of this Contract and the Statement of Work.	
8. TOTAL AMOUNT OF CONTRACT : _____ Currency – Excluding VAT Firm Fixed Price	
9. PERIOD OF PERFORMANCE As stated in Schedule of Supplies and Services and Special Provisions	10. DELIVERY SITE As stated in Schedule of Supplies and Services and Special Provisions
11. CONTRACT This Contract consists of the following parts and named documents: a) Part I. Schedule of Supplies and Services b) Part II. Contract Special Provisions and Annexes c) Part IV. Statement of Work and Annexes d) NCI Agency Basic Ordering Agreement General Provisions and Appendix 1, of the Basic Ordering Agreement NCI/BOA/XXXXX XX Month 20xx, incorporated herein by reference. e) Contractor's proposal dated XX Month 2020 and subsequent clarifications. f) In the event of any conflict or inconsistencies between or among any of the documents comprising this Contract, the order of priority specified in Clause 2 of Part II shall apply.	
12. Signature of Contractor	13. Signature of Purchaser
14. Name and Title of Signer	15. Name and Title of Signer
16. Date signed by the Contractor	17. Date signed by the Purchaser



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BOOK II

PART I

SCHEDULE OF SUPPLIES AND SERVICES

CLIN	Description	Form	SOW Reference	Delivery Schedule	Delivery Location	QTY	Unit price	Total price
1 Project Management								
1.1	Project Implementation Plan (PIP) Draft	Paper, electronic	3.4.	EDC + 2 weeks	NCI Agency	1		
1.2	Project Implementation Plan (PIP) Final	Paper, electronic	3.4.	EDC + 8 weeks	NCI Agency	1		
1.3	Project Implementation Plan (PIP) Acceptance	Paper, electronic	3.4	NLT EDC + 10 weeks	as defined			
1.4	Project Review Meeting (PRM) #1 Kick -Off	n/a	3.6.	EDC + 4 weeks	NCI Agency/voice/video conference	1		
1.5	Project Review Meeting (PRM) #2 FAT Review Meeting	n/a	3.6.	in accordance with SoW	NCI Agency/voice/video conference	1		
1.6	Project Review Meeting (PRM) #3 FSA	n/a	3.6.	in accordance with SoW	NCI Agency/voice/video conference	1		
1.7	Project Review Meeting (PRM) #4 Mid Warranty	n/a	3.6.	mid warranty	NCI Agency/voice/video conference	1		
1.8	Project Status Reports (PSR)	Paper, electronic	3.6.	1 week before each PRM	NCI Agency	1		
TOTAL CLIN 1								
2 Testing, Verification and Validation								
2.1	Project Master Test Plan (PMTP)	Paper, electronic	Table 4-1 SoW	EDC + 2 weeks	NCI Agency	3		
2.2	Test Plans for individual test events	Paper, electronic	Table 4-1 SoW	2 months before test event	NCI Agency	3		
2.3	Test waivers	Paper, electronic	Table 4-1 SoW	4 weeks before test event	NCI Agency	3		
2.4	The Test Cases/Scripts/Steps	Paper, electronic	Table 4-1 SoW	4 weeks before test event	NCI Agency	3		
2.5	Test Report	Paper, electronic	Table 4-1 SoW	1 week after test event	NCI Agency	1		
2.6	Factory Acceptance Test (FAT) execution	n/a	4.2.	EDC + 3 months	Contractor premises	1		
2.7	FAT Test Procedure	Paper, electronic	4.2.	2 weeks before FAT	NCI Agency	3		
2.8	FAT Test Report	Paper, electronic	4.2.	FAT+ 1 week	NCI Agency	1		
2.9	FAT Review Meeting	n/a	4.2.	after the FAT event	NCI Agency/voice/video conference	1		
2.10	FAT Test Report Acceptance	Paper, electronic	4.2	NLT EDC + 15 weeks	as defined			
TOTAL CLIN 2								
3 Equipment (one batch delivery)								
3.1	Router G4	n/a	Annex A SRS	EDC+6 months	CSSC Brunssum	36		
3.2	Router G3	n/a	Annex A SRS	EDC+6 months	CSSC Brunssum	27		
3.3	Router DB	n/a	Annex A SRS	EDC+6 months	CSSC Brunssum	16		
3.4	Router HB	n/a	Annex A SRS	EDC+6 months	CSSC Brunssum	8		
3.5	Router SAC	n/a	Annex A SRS	EDC+6 months	CSSC Brunssum	4		
3.6	Switches	n/a	Annex A SRS	EDC+6 months	CSSC Brunssum	60		
3.7	Batch Delivery Acceptance	Paper, electronic	4.4	NLT EDC + 7 months	CSSC Brunssum			
TOTAL CLIN 3								

4 Integrated Product Support								
4.1	Product Support Data Package Draft	Electronic	Table 5-1 SoW	EDC + 8 weeks	NCI Agency	1		
4.2	Product Support Data Package Final	Electronic	Table 5-1 SoW	FAT - 2 weeks	NCI Agency	1		
4.3	Initial Provisional List (IPL) Draft	Electronic	Table 5-1 SoW	FAT - 2 weeks	NCI Agency	1		
4.4	Initial Provisional List (IPL) Final	Electronic	Table 5-1 SoW	FSA - 8 weeks	NCI Agency	1		
4.5	Warranty Report	Electronic	Table 5-1 SoW	Warranty End (FSA + 1 year)	NCI Agency	1		
4.6	User Manuals Draft	Electronic	Table 5-1 SoW	FAT - 2 weeks	NCI Agency	1		
4.7	User Manuals Final	Electronic	Table 5-1 SoW	BDA	NCI Agency	1		
4.8	Maintenance Manuals Draft	Electronic	Table 5-1 SoW	FAT - 2 weeks	NCI Agency	1		
4.9	Maintenance Manuals Final	Electronic	Table 5-1 SoW	BDA	NCI Agency	1		
4.10	Training Documentation Draft	Electronic	Table 5-1 SoW	FAT - 2 weeks	NCI Agency	1		
4.11	Training Documentation Final	Electronic	Table 5-1 SoW	BDA	NCI Agency	1		
4.12	In Service Support Plan (ISSP) Draft	Electronic	Table 5-1 SoW	FAT - 2 weeks	NCI Agency	1		
4.13	In Service Support Plan (ISSP) Final	Electronic	Table 5-1 SoW	FSA - 2 weeks	NCI Agency	1		
4.14	Initial Spares (Routers G4)	n/a		EDC+6 months	CSSC Brunssum	3		
TOTAL CLIN 4								
5 System Acceptance								
5.1	Final System Acceptance	Paper, electronic	Section 2, M. 3	NLT EDC + 9 months	As defined			
TOTAL CLIN 5								
6 Warranty								
6.1	End of Warranty	n/a	5.7	FSA+1 year	As defined	1		
TOTAL CLIN 6								
GRAND TOTAL FIRM FIXED PRICE (CLINS (1-4))								



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PROVIDE SATCOM GROUND SEGMENT BASEBAND SYSTEMS

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BOOK II

PART II

PROSPECTIVE CONTRACT SPECIAL PROVISIONS

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ARTICLE 1 SCOPE

1.1 The scope of this Contract is the procurement of COTS routers with MPLS and IPSEC functionality in multiple configurations and including accessories, and COTS Ethernet switches with MACSEC functionality and including accessories, to be installed across the fleet of NATO static, transportable and deployable ground terminals in accordance to the Statement of Work (Book II, Part IV) along with the capability and the related responsibilities, effort and services to be provided by the Contractor.

1.2 The Agreement and Acceptance of this Contract by the Parties neither implies an obligation on either part to extend the Contract beyond the specified scope or terms, nor to prohibit the Parties from mutually negotiating modifications thereto.

ARTICLE 2 ALTERATIONS, MODIFICATIONS AND DELETIONS OF THE BOA GENERAL AND SPECIAL PROVISIONS

Clause 2 – “Definitions” of BOA No. [...] Special Provisions is revised and supplemented by ARTICLE 4 – “DEFINITIONS”.

Clause 7 – “Warranty” of BOA No. [...] Special Provisions is revised and supplemented by ARTICLE 16 – “WARRANTY”.

Clause 8 – “Payments” of BOA No. [...] Special Provisions is replaced by ARTICLE 14 – “INVOICES AND PAYMENT”.

Clause 3 – “Purchaser Furnished Property” of BOA No. [...] General Provisions is revised and supplemented by ARTICLE 35 – “PURCHASER FURNISHED PROPERTY”.

Clause 5 – “Title and Risk of Loss” of BOA No. [...] General Provisions is revised and supplemented by ARTICLE 13 – “TITLE AND RISK OF LOSS”.

Clause 7 – “Inspection, Acceptance and Rejection” of BOA No. [...] General Provisions is revised and supplemented by ARTICLE 11 – “INSPECTION AND ACCEPTANCE” and ARTICLE 12 – “REVIEW AND ACCEPTANCE OF DOCUMENTATION”.

Clause 27 – “Security” of BOA No. [...] General Provisions is revised and supplemented by ARTICLE 21 – “SECURITY”.

Clause 31 – “Rights in Technical Data” of BOA No. [...] General Provisions is replaced by ARTICLE 23 – “RIGHTS IN TECHNICAL DATA AND COMPUTER SOFTWARE”.

ARTICLE 3 ORDER OF PRECEDENCE

3.1 In the event of any inconsistency in this Contract, the inconsistency shall be resolved by giving precedence in the following order:

- a. The Signature Page;
- b. Part I - The Contract Schedule of Supplies and Services (SSS);

- c. Part II - The Contract Special Provisions;
- d. Part III – The Terms of the governing Basic Ordering Agreement as specified in Block 11 on the signature page;
- e. Part IV – The Statement of Work (SOW) and the Annexes to the Statement of Work.

ARTICLE 4 DEFINITIONS

4.1 Clause 2 “Definitions” of BOA No. [...] Special Provisions is revised and supplemented by the following:

4.2 “Article” shall mean “A provision of the Special Provisions of this Contract”.

4.3 “Contract” shall mean “The agreement concluded between the Purchaser and Contractor, duly signed by both parties. The Contract includes the documents referred to in Article 3 above of these Contract Special Provisions”.

4.4 “Contracting Authority” shall mean “The General Manager of the NCI Agency, the Director of Acquisition, the Chief of Contracts of the NCI Agency or the authorized representatives of the Chief of Contracts of the NCI Agency”.

4.5 “Contractor” shall mean “The person or legal entity from a Participating Country which has signed this Contract and is a Party thereto”.

4.6 “NCI Agency (NCIA)” shall mean “The NATO Communications and Information Agency. The NCIA is part of the NCIO. The General Manager of the Agency is authorized to enter into contracts on behalf of the NCI Organization”.

4.7 “NCI Organization (NCIO)” shall mean “The NATO Communications and Information Organization. The NCI Organization constitutes an integral part of the North Atlantic Treaty Organization (NATO). The NCI Organization is a legal personality from whence flows the authority of its agent, the NCI Agency, to enter into contracts”.

4.8 “Effective Date of Contract (EDC)” shall mean “The date upon which this Contract is deemed to start. Unless otherwise specified, a Contract enters into force on the date of the last signature of the Contract by the Parties”.

4.9 “Parties” shall mean “The Contracting Parties to this Contract, i.e. the Purchaser and the Contractor”.

4.10 “Purchaser” shall mean “The NCI Organization, as represented by the General Manager, NCIA Agency. The Purchaser is the legal entity who awards and administers the Contract on behalf of NATO and stands as one of the Contracting Parties”.

ARTICLE 5 DURATION OF CONTRACT

5.1 It is the Purchaser’s intention that the present Contract covers the totality of the requirements as covered by the Schedule of Supplies and Services (SSS) and the Statement of Work (SOW) with the exception of the Options (if any), unless those options are formally exercised and funded in accordance with the prescriptions of Article 7 “Additional Contract Tasks and Options”.

5.2 The work under the Contract shall commence on effective date of Contract shown on the signature page and be completed in accordance with the Schedule of Supplies and Services and Statement of Work.

ARTICLE 6 PRICE BASIS

6.1 This is a Firm Fixed Price Contract. Firm Fixed Prices are established for the supplies and services defined in Part I - Schedule of Supplies and Services.

6.2 The Purchaser assumes no liability for costs incurred by the Contractor in excess of the stated Firm Fixed Price except as provided under other provisions of this Contract.

6.3 The Total Contract price is inclusive of all expenses related to the performance of the present Contract.

6.4 The Total Contract price in this Contract is Delivered Duty Paid (INCOTERMS 2020).

ARTICLE 7 ADDITIONAL CONTRACT TASKS AND OPTIONS

7.1 The Purchaser may increase the quantity of supplies and services as set forth in any line item of Part I - Schedule of Supplies and Services at the prices stated therein any time during the period of performance of the Contract until end of Warranty. This right can be exercised multiple times for any of the line items, by increasing the firm fixed price of the Contract via a formal Contract Amendment, or by issuing a new contractual instrument. In this case the Contractor shall honour such right at the same rates and conditions as stated in Part I – Schedule of Supplies and Services.

7.2 If this right is exercised, delivery of the added items shall be to the same destination or optional site destination as specified in the basic Contract; unless otherwise specified on the written notice. If the Contract provides for multiple destinations, the Purchaser will specify to which destination(s) the additional quantities are to be shipped. If the Purchaser specifies a destination that is not part of the basic Contract requirements, the Parties will agree to an equitable adjustment as may be required to reflect any additional costs incurred by the Contractor in making such delivery.

7.3 In addition to the above, the Purchaser reserves the right to order any foreseeable or additional Contract tasks or deliverables, listed or not, either occasionally or at a further stage in the life of the project, which it deems necessary for the successful completion of the project. The additional tasks and/or deliverables shall be priced in using the prices as stated in Part I – Schedule of Supplies and Services.

7.4 Except as otherwise provided for in this Contract, Contractor's price quotations for contract changes or modifications shall be provided at no cost to the Purchaser and shall have a minimum validity period of six (6) months from submission.

7.5 The Purchaser may, in writing, place an order for such additional tasks throughout the entire Contract period up until end of Warranty. Such an order may be placed within the framework of this Contract via the issuance of a Contract Amendment or be formulated via the issuance of a new contractual instrument.

ARTICLE 8 PARTICIPATING COUNTRIES

8.1 The Contractor may issue subcontracts to firms and purchase from qualified vendors in any contributory NATO nations in the project, namely, (in alphabetical order):

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

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

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

8.4 The Intellectual Property Rights for all software and documentation used by the Contractor in the performance of the Contract shall vest with firms from and within Participating Countries and no royalties or license fees for such software and documentation shall be paid by the Contractor to any source that does not reside within a Participating Country.

ARTICLE 9 COMPREHENSION OF CONTRACT AND SPECIFICATIONS

9.1 The Contractor warrants that it has read, understood and agreed to each and all terms, clauses, specifications and conditions specified in the Contract and that this signature of the Contract is an acceptance, without reservations, of the said Contract terms within their normal and common meaning.

9.2 The specifications set forth the performance requirements for the Contractor's proposed work as called for under this Contract. Accordingly, notwithstanding any conflict or inconsistency which hereafter may be found between achievement of the aforesaid performance requirements and adherence to the Contractor's proposed design for the work, the Contractor hereby warrants that the work to be delivered will meet or exceed the performance requirements of the said specifications.

9.3 The Contractor hereby acknowledges that it has no right to assert against the Purchaser, its officers, agents or employees, any claims or demands with respect to the aforesaid specifications as are in effect on the date of award of this Contract.

a. Based upon impossibility of performance, defective, inaccurate, impracticable, insufficient or invalid specifications, implied warranties of suitability of such specifications, or

b. Otherwise derived from the aforesaid specifications, and hereby waives any claims or demands so based or derived as might otherwise arise.

9.4 Notwithstanding the "Changes" Clause of the BOA General Provisions or any other clause of the Contract, the Contractor hereby agrees that no changes to the aforesaid specifications which may be necessary to permit achievement of the performance requirements specified herein for the Contractor's proposed work shall

entitle the Contractor either to any increase in the firm fixed price as set forth in this Contract or to any extension of the delivery times for the work beyond the period of performance in the Schedule of Supplies and Services.

ARTICLE 10 PLACE AND TERMS OF DELIVERY

10.1 Deliverables under this Contract shall be delivered DDP (Delivered Duty Paid) in accordance with the International Chamber of Commerce INCOTERMS 2020 to the destination(s) and at such times as set forth in the Schedule of Supplies and Services (SSS).

ARTICLE 11 INSPECTION AND ACCEPTANCE

11.1 Clause 7 “Inspection, Acceptance and Rejection” of BOA No. [...] General Provisions is hereby supplemented with this Article.

11.2 The supplies and services to be provided by the Contractor’s personnel under this Contract shall conform to the highest professional and industry standards and practices. Inspection of the supplies and services provided will be made by the Purchaser or another authorised designee in accordance with the specifications in Part IV - Statement of Work. Services performed by the Contractor which do not conform to the highest professional and industry standards may result in the Purchaser requesting that such work be performed again at no increase in the price of the contract. Repeated instances of work performed which fails to meet the standards and practices may result in termination of the Contract for Default.

11.3 The Purchaser reserves the right to charge to the Contractor any additional cost incurred by the Purchaser for inspection and test when Work is not ready at the time such inspection and test is requested by the Contractor or when re-inspection or retest is necessitated by prior rejection.

11.4 Under the terms of this Contract, Purchaser Acceptance shall be granted in writing from the Purchaser after delivery of documentation and equipment is complete. The date of the Purchaser acceptance shall be specified in the formal Acceptance document.

11.5 In signing the formal Acceptance document the Purchaser Certifies that the goods or services concerned are in accordance with the terms of the Contract.

11.6 Purchaser review and acceptance of documentation to be submitted by the Contractor is specified in below Article 12 of the Contract Special Provisions and Part IV, Statement of Work.

ARTICLE 12 REVIEW AND ACCEPTANCE OF DELIVERABLES

12.1 Clause 7 “Inspection, Acceptance and Rejection” of BOA No. [...] General Provisions is hereby supplemented with this Article.

12.2 Unless otherwise specified:

12.3 Upon delivery of the Draft Deliverable items, the Purchaser will review the items in accordance to the specified timeframes in the Statement of Work.

12.4 The Purchaser has the right to reject non-conforming deliverables. The Purchaser, in addition to any other rights or remedies provided by law, or under the

provisions of this Contract, shall have the right to require the Contractor at no increase in Contract price, to correct or replace non-conforming work, and in accordance with a reasonable delivery schedule as may be agreed by the Purchaser and the Contractor following the receipt of the Purchaser's notice of defects or non-conformance.

ARTICLE 13 TITLE AND RISK OF LOSS

13.1 Clause 5 “Title and Risk of Loss” of BOA No. [...] General Provision is supplemented by the following:

13.2 Title to supplies and risk of loss or damage to supplies covered by this Contract shall pass to the Purchaser upon Final System Acceptance (FSA) as defined in the SOW.

ARTICLE 14 INVOICES AND PAYMENT

14.1 This Article replaces Clause 8 – “Payments” of BOA No. [...] Special Provisions.

14.2 Following Purchaser acceptance, in writing, payment for supplies and services furnished shall be made in the currency specified in the Contract.

14.3 The term of the Contract may not be exceeded without prior approval of the Purchaser. In no case will the Purchaser make payment above the total of the corresponding CLINs.

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

- a) Contract number: **CO-115455-SGSBS-WP1**;
- b) Contract Amendment number (if any);
- c) Purchase Order number specified in the Contract or Amendment Signature Sheet (TBD at Contract Award);
- d) The identification of the performance rendered in terms of Contract Line Item Number (CLIN) as they are defined in the priced Schedule of Supplies and Services;
- e) Number of units, price per unit, currency;
- f) Bank account details for international wire transfers (SWIFT, BIC, IBAN);
- g) Payment conditions in line with the Contract (Article 14.16 below);
- h) The certificate below that shall be signed by a duly authorised company official on the designated original:

“I certify that the above invoice is true and correct, that the delivery of the above described items has been duly effected and/or that the above mentioned services have been rendered and the payment therefore has not been received.”

*Order placed for official use. Exemption from VAT Article 42, §3&3*of VAT Code for Belgium or Article 151, §1b of the Council Directive 2006/112/EC dd. 28 November 2006 on intra-community purchases and/or services.”*

- 14.5 CLINs will be paid as below based on Purchaser milestone approval in writing.
- 14.6 Evidence of the acceptance by the Purchaser shall be attached to all invoices.
- 14.7 The Contractor shall be entitled to submit invoices in accordance with the following **payment events/ milestones schedule**:

Milestone No.	Payment Milestone Description	SSS Reference (CLIN No.)	Payment Amount (Percentage of the Total contract value)	Acceptance Not Later Than
1	Acceptance of the Project Implementation Plan (PIP)	1.3	10%	EDC + 10 Weeks
2	Acceptance of the FAT Test Report	2.10	20%	EDC + 15 Weeks
3	Delivery and Acceptance of Equipment Batch	3.7	30%	EDC + 7 months
4	Purchaser Approval of Final System Acceptance (FSA)	5.1	30%	EDC + 9 months
5	End of warranty period	6.1	10%	FSA + 1 year

14.8 Invoices referencing “**CO-115455-SGSBS-WP1/ PO [...]**” shall be submitted in electronic format only to the following POCs:

- a) accountspayable@ncia.nato.int ;
- b) Contracting Authority under Article 17.7.

14.9 No payment will be made if CLIN items agreed for delivery before milestones are not complete as described in bidding sheets, SSS and SOW.

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

14.11 No payment will be made for additional items delivered that are not specified in the contractual document.

14.12 The invoice amount shall be exclusive of VAT and exclusive of all Taxes and Duties as per Clause 10 “Taxes and Duties” of the BOA No. [...] General Provisions.

14.13 Payments for services and deliverables shall be made in the currency stated by the Contractor for the relevant Contract Line Item.

14.14 The Purchaser is released from paying any interest resulting from any reason whatsoever.

14.15 Unless otherwise specified, the Contractor shall prepare and submit its invoices solely by electronic means (without paper submission). Contractor’s invoices submitted by electronic means shall be in a static, non-modifiable format (such as PDF, other). The Contractor shall ensure the accuracy, authenticity of the origin and legibility of any invoice submitted by electronic means.

14.16 NCI Agency will make payment within forty five (45) days of receipt by the NCI Agency of a properly prepared and documented invoice.

ARTICLE 15 SUPPLEMENTAL AGREEMENTS, DOCUMENTS AND PERMISSIONS

15.1 The Contractor has submitted all relevant draft supplemental agreement(s), documents and permissions prior to Contract award, the execution of which by the Purchaser is/are required by national law or regulation. If any supplemental agreements, documents and permissions are introduced after Contract award, and it is determined that the Contractor failed to disclose the requirement for the execution of such agreement from the Purchaser prior to Contract signature, the Purchaser may terminate this Contract for Default, in accordance with the Clause 19 “Termination for Default” of BOA No. [...] General Provisions.

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

Type of Agreement	National Authority of Reference	Subject

ARTICLE 16 WARRANTY

16.1 Clause 7 “Warranty” of BOA No. [...] Special Provisions is supplemented with the following:

16.2 The Contractor shall warrant that all equipment, documents, databases, technical publications, system design, production and implementation provided under this

Contract and all installation work performed under this Contract conform to the requirements and is free of any defect in material, code or workmanship. The Contractor shall provide a standard warranty for a period of **one (1) calendar year starting with the successful completion of FSA.**

16.3 Until successful FSA, the equipment/ deliverables to be provided under this Contract shall be under the Contractor's responsibility.

16.4 Notwithstanding inspection and acceptance by the Purchaser or its appointed agents of supplies furnished under the Contract or any provision of this Contract concerning the conclusiveness thereof, the Contractor warrants for the total duration of the above referred period and covering all items including:

- a) all deliverables furnished under this Contract shall be free from defect and will conform with the specifications and all other requirements of this Contract; and,
- b) the system will, under normal conditions, perform without errors which make it unusable; and
- c) the preservation, packaging, packing and marking and the preparation for and method of, shipment of such supplies will conform to the requirements of this Contract.

16.5 The Purchaser will promptly inform the Contractor in writing of any defect after its discovery and the circumstances of its discovery. The Contractor shall acknowledge to a defect notification within two working days, by engaging with the Purchaser's personnel to identify the cause of the defect and to agree a resolution approach. The resolution of defects remains the Contractor's responsibility within the warranty. Items needing service or repair at the Contractor's facility shall be repaired/replaced and dispatched back to the Purchaser as described in the SOW (5.4 Warranty and Support).

16.6 For any equipment or part of that during the warranty phase is unserviceable for a period of time longer than 15 days, the warranty for the entire equipment will be extended at no cost for the Purchaser for the same amount of time. The warranty extension will cover all delivered items in case of design defect or lot manufacturing defect; the Contractor shall demonstrate that any defect has been solved before the equipment is sent back to the Purchaser or declared as ready for operation.

16.7 The Contractor shall stipulate the address to which the Purchaser shall deliver equipment and material returned to the Contractor in accordance with the provisions of this Article. Transportation and handling charges for items returned under warranty claim to the Contractor will be in accordance to INCOTERMS® 2020 Rules DDP.

16.8 The Contractor shall, at its option, repair, adjust or replace defective equipment and restore the Purchaser equipment, functions in accordance with the requirements of the Contract.

16.9 In the event of the Contractor's failure to repair or replace failed equipment within the timeframes expressed in this Article, the Purchaser will have the right, at its discretion, and having given the Contractor due notice, to:

- a) remedy, or have remedied, the defective or non-conforming supplies, in both cases at the Contractor's expenses;
- b) equitably reduce the Contract price; and/or
- c) terminate for default that portion of the Contract relating to the defective work.

16.10 Notwithstanding the provision of above paragraph 16.2, the warranty period shall be suspended for the length of time necessary to carry out repair or replacement of the Purchaser equipment.

16.11 This right will be exercised although other contractual obligations remain in force. In the event that it is later determined that such supplies were found not to be defective or non-conforming within the provision of this Article, an equitable adjustment will be made. Failure to reach such an equitable adjustment will be considered a dispute under the Contract and subject to resolution in accordance with the Clause 17 "Disputes and arbitration" of BOA No. [...] General Provisions.

ARTICLE 17 CONTRACT ADMINISTRATION

17.1 The Purchaser is the NATO CI Agency (NCI Agency). The Purchaser is the Point of Contact for all Contractual and Technical issues. Purchaser reserves the right to re-assign this Contract to a representative(s) for administrative purposes, in whole or in part, provided that the Purchaser shall always be responsible for its obligations under the Contract and for actions or lack of actions of its assigned administrator. The Purchaser undertakes to advise the Contractor in writing whenever this right is to be exercised.

17.2 All notices and communications between the Contractor and the Purchaser shall be written and conducted in the English language. Contract modifications shall only be valid when received in writing from the General Manager, NCI Agency, and/or the NCI Agency Contracting Authority.

17.3 The Contractor shall accept Contract modifications only in writing from the Purchaser's Contracting Authority.

17.4 Formal letters and communications shall subsequently be personally delivered or sent by mail, registered mail, courier or other delivery service, to the official Points of Contact quoted in this Contract. Facsimile and e-mail may be used to provide an advance copy of a formal letter or notice which shall subsequently be delivered through the formal communication means.

17.5 Informal notices and informal communications may be exchanged by all communication means, including telephone and e-mail. All informal communication must be confirmed by a formal letter or other formal communication to be contractually binding.

17.6 All notices and communications shall be effective upon receipt.

17.7 Official Points of Contact (POC) are:

Purchaser	Contractor
NCI Agency Acquisition Boulevard Leopold III B-1110 Brussels Belgium	<i>[To be completed at award]</i>
<u>For contractual matters:</u> Attn: Title: Tel: Fax: E-mail: Attn: Title: Tel: Fax: E-mail:	<u>For contractual matters:</u> Attn: Title: Tel: Fax: E-mail:
<u>For technical/project management matters:</u> Attn: Title: Tel: E-mail:	<u>For technical/project management matters:</u> Attn: Title: Tel: E-mail:

or to such address as the Purchaser may from time to time designate in writing.

ARTICLE 18 SUB-CONTRACTORS

18.1 The Contractor shall place and be responsible for the administration and performance of all sub-contracts including terms and conditions which it deems necessary to meet the requirements of this Contract in full.

18.2 The Contractor shall not place sub-contracts outside the Participating Countries unless the prior authorization of the Purchaser has been obtained. Such authorization will not be granted when the sub-contract involves the carrying out of classified work.

ARTICLE 19 CONTRACTOR COTS RESPONSIBILITY

19.1 The Contractor shall monitor changes and/or upgrades to commercial off the shelf (COTS) software or hardware to be utilized under subject Contract.

19.2 For COTS items which are or could be impacted by obsolescence issues, as changes in technology occur, the Contractor will propose substitution of new products/items for inclusion in this Contract. The proposed items should provide at

least equivalent performance and/or lower life-cycle support costs, or enhanced performance without a price or cost increase.

19.3 The Contractor will provide evidence with respect to price and performance of the equipment being proposed as well as data proving an improvement in performance and/or a reduction in price and/or life-cycle support costs. If necessary for evaluation by the Purchaser, the Contractor shall provide a demonstration of the proposed items. Should the Purchaser decide that the proposed item(s) should be included in the Contract, an equitable price adjustment will be negotiated and the proposed item(s) shall be added to the Contract by bilateral modification under the authority of this Article.

19.4 The Contractor shall notify the Purchaser of any proposed changes in the commercial off the shelf software or hardware to be utilized. Such notification shall provide an assessment of the changes and the impact to any other items to be delivered under this Contract.

ARTICLE 20 LIQUIDATED DAMAGES

20.1 If the Contractor fails to:

- a) successfully meet the delivery schedule of the Deliverables or any specified major performance milestones or required performance dates specified in the Schedule of Supplies and Services to this Contract, or any extension thereof, or
- b) deliver and obtain acceptance of the Deliverables or to acceptably perform the services as specified in the Schedule of Supplies and Services to this Contract,

the actual damage to the Purchaser for the delay will be difficult or impossible to determine. Therefore, in lieu of actual damages the Contractor shall pay to the Purchaser, for each day of delinquency in achieving the requirements of 20.1.a) and 20.1.b), fixed and agreed liquidated damages of one per cent (1%) per week of the total payment amount for each Payment Event as scheduled in the Article 14 “Invoices and Payments” of the Contract Special Provisions.

20.2 In addition to the liquidated damages, the Purchaser may terminate this Contract in whole or in part as provided in Clause 19 “Termination for Default” of BOA No. [...] General Provisions. In the event of such a termination, the Contractor shall be liable for Liquidated Damages accruing to the date of termination, as well as the excess costs stated in the referred clause.

20.3 The Contractor shall not be charged with liquidated damages when the delay arises out of causes beyond the control and without the fault or negligence of the Contractor as defined in Clause “Termination for Default” of the BOA General Provisions. In such event, subject to the provisions of the Disputes and Arbitration Clause, the Purchaser shall ascertain the facts and extent of the delay and shall extend the time for performance of the Contract when in its judgment the findings of fact justify an extension.

20.4 Liquidated damages shall be payable to the Purchaser from the first day of delinquency in delivery and shall accrue at the rate specified in paragraphs above to

a maximum of fifteen percent (15%) of the total payment amount for each Payment Event as scheduled in Article 14. Cumulative assessed Liquidated Damages will not exceed a total of ten percent (10%) of the total value of the Contract.

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

- a) By deducting such damages from the amounts due to the Contractor against the Contractor's invoices.
- b) By proceeding against any surety or deducting from the Performance Guarantee if any.
- c) By reclaiming such damages through appropriate legal remedies.

ARTICLE 21 SECURITY

21.1 This Article supplements Clause 27 “Security” of BOA No. [...] General Provisions.

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

21.3 The security classification of this Contract is “NATO UNCLASSIFIED”.

21.4 The Contractor bears full responsibility and liability under the Contract for delays arising from the failure of the Contractor to adhere to the security requirements.

ARTICLE 22 RIGHTS IN TECHNICAL DATA AND COMPUTER SOFTWARE

22.1 Clause 31 – “Rights in Technical Data” of BOA No. [...] General Provisions is replaced by the following:

22.2 Subject to the rights of third parties, all rights in the results of work undertaken by or on behalf of the Purchaser for the purposes of this Contract, including any technical data specifications, report, drawings, computer software data, computer programs, computer databases, computer software, documentation including software documentation, design data, specifications, instructions, test procedures, training material produced or acquired in the course of such work and, in particular, all rights, including copyright therein, shall vest in and be the sole and exclusive property of the Purchaser.

ARTICLE 23 INTELLECTUAL PROPERTY RIGHT INDEMNITIES AND ROYALTIES

23.1 The Contractor shall assume all liability and indemnify the Purchaser, its officers, agents and employees against liability, including costs for the infringement of any patents or copyright in force in any countries arising out of the manufacture, services performed or delivery of supplies, or out of the use or disposal by or for the account of the Purchaser of such supplies. The Contractor shall be responsible for obtaining any patent or copyright licenses necessary for the performance of this Contract and for making all other arrangements required to indemnify the Purchaser from any liability for patent or copyright infringement in said countries. The Contractor shall exclude from its prices any royalty pertaining to patents which in accordance with

agreements reached between NATO countries may be utilized free of charge by member nations of NATO and by NATO organization.

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

- a) The royalties excluded from its price for patent utilised under the agreements mentioned in the previous paragraph;
- b) The amount of royalties paid or to be paid by the Contractor directly to others in performance of this Contract.

ARTICLE 24 INDEMNITY

24.1 The Contractor will indemnify and hold harmless NATO, its servants or agents, against any liability, loss or damage arising out of or in connection of the Deliverables and Services under this Contract, including the provisions set out in Article 23 "Intellectual Property Right Indemnities and Royalties" of the Contract Special Provisions.

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

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

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

ARTICLE 25 INDEPENDENT CONTRACTOR

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

ARTICLE 26 APPLICABLE REGULATIONS

26.1 The Contractor shall be responsible for obtaining permits or licenses to comply with national codes, laws and regulations or local rules and practices in the country of performance under this Contract.

26.2 The Contractor shall take any necessary measure to protect the life and health of persons working or visiting the work area occupied by him. These measures include compliance with the country of performance's safety provisions.

26.3 In the performance of all work under this Contract, it shall be the Contractor's responsibility to ascertain and comply with all applicable NATO security regulations as implemented by the local Headquarters' Security Officer.

ARTICLE 27 AUDITING AND ACCOUNTING

27.1 The Contractor's accounting and auditing procedures under this Contract shall be in compliance with the applicable Contractor National standards governing national defense contracts.

27.2 The invoicing and payment procedures for the amount payable to the Contractor shall be in accordance with the prescription of Article 14 "Invoices and Payment" of the Contract Special Provisions.

27.3 In the event of this Contract being terminated in accordance with Clause 20 "Termination for Convenience of the Purchaser" of BOA No. [...] General Provisions, the Contractor shall provide within ninety (90) days of the formal date of termination a detailed statement of all costs incurred since the initiation of the programme, together with the statement of all outstanding commitments for which the Contractor is legally liable.

ARTICLE 28 PERFORMANCE GUARANTEE

28.1 As a guarantee of performance under the Contract, the Contractor shall deposit with the Purchaser within ten (10) calendar days from the Effective Date of Contract, a bank guarantee to the value of **ten per cent (10%) of the total Contract Price**.

28.2 Such guarantee – the validity of this shall not elapse before the expiration of the warranty period as specified in Article 16.2 – shall be made payable to the Purchaser and may be delivered in the form of:

- a) A certified cheque;
- b) An irrevocable letter of credit; or
- c) A bank guarantee such as a performance bond or promissory note.

28.3 The terms of the guarantee shall allow for payment to be made to the Purchaser without question and upon first demand by the Purchaser against a Certificate from the Purchaser's Contracting Authority that the Contractor has not fulfilled its obligations under the Contract. The Contractor shall have no right to enjoin or delay such payment.

28.4 Certified cheques issued to fulfil the requirements of the guarantee will be cashed by the Purchaser upon receipt and held in the Purchaser's account until the term of the performance guarantee has expired.

28.5 The irrevocable letter of credit or the bank guarantee such as a performance bond or promissory note, shall be issued by a financial institution listed in Annex C either on its own behalf or as a confirmation of the irrevocable Letter of Credit or the Bank Guarantee issued by a different bank not listed in Annex C to pay all or part of a stated amount of money, until the expiration date of the letter, upon presentation by the Purchaser of a written demand therefore. Neither the financial institution nor the Contractor can revoke or condition the Standby Letter of Credit or the Bank Guarantee.

28.6 The Contractor shall request in writing relief from the performance guarantee upon expiration of the warranty period specified at Article 14.1 or such other period as may be specified in the Contract and, where appropriate, such relief will be granted by the Purchaser.

28.7 The Contractor shall be responsible, as a result of duly authorized adjustment in the total Contract price and/or period of performance by the Purchaser, for obtaining a commensurate extension and increase of the performance guarantee, the value of which shall not be less than ten per cent (10%) of the Contract Price (including all amendments), and for depositing such guarantee with the Purchaser within ten (10) calendar days from the effective date of the aforesaid duly authorized adjustment.

28.8 The failure of the Contractor to deposit such performance guarantee with the purchaser within the specified time frame, or any extension thereto granted by the Purchaser's Contracting Authority will constitute material breach of the Contract and shall be subject to Clause 19 "Termination for Default" of BOA No. [...] General Provisions.

28.9 The rights and remedies provided to the Purchaser under this Article are in addition to any other rights and remedies provided by law or under this Contract. The certificate described in this Article at 28.3 above shall not be regarded as a Termination for Default and this Clause is in addition to and separate from Clause 19 "Termination for Default" of BOA No. [...] General Provisions.

ARTICLE 29 TRANSPORTATION OF EQUIPMENT

29.1 All supplies covered under this Contract shall be transported to final destination at the responsibility of the Contractor. The Purchaser shall not be liable for any storage, damage, accessorial or any other charges involved in such transporting of supplies.

29.2 Items shipped under Warranty for repair or otherwise from Brunsumm (NL) or the NCI Agency to the Contractor shall be the responsibility of the Purchaser.

29.3 Transportation of repaired/replaced items shall be the responsibility of the Contractor. These items shall be delivered and installed at final destination.

ARTICLE 30 ASSIGNMENT

30.1 The Purchaser reserves the right to assign this Contract, in whole or in part, to another NATO body, agency or representative within NATO or NATO Nations. In such a case, the Purchaser shall notify the Contractor accordingly in writing.

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

ARTICLE 31 RIGHT OF ACCESS, EXAMINATION OF RECORDS

31.1 Notice of Authorized Disclosure of Information for Mandated NATO Third Party Audits by Resource Committees

31.2 Definitions. As used in this clause

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

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

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

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

31.3 The Purchaser may disclose to a mandated third party auditor, for the sole purpose of audit support activities, any information, including sensitive information, received –

31.3.1 Within or in connection with a bid, quotation or offer; or

31.3.2 In the performance of or in connection with a contract.

31.4 **Flowdown.** Include the substance of this clause, including this paragraph (25.4), in all subcontracts, including subcontracts for commercial items.

ARTICLE 32 FORCE MAJEURE

32.1 **“Force Majeure”** means the occurrence of an event or circumstance that prevents a Party (the “Affected Party”) from performing one or more of its contractual obligations under the Contract, provided that:

(i) it renders performance impossible;

(ii) it is beyond the Affected Party’s reasonable control and without the Affected Party’s cause, fault or negligence;

(iii) by its nature it could not have been reasonably foreseen at the time of conclusion of the Contract; and

(iv) the effects of it could not reasonably have been avoided or overcome by the Affected Party.

31.5 Examples of Force Majeure, provided conditions (i)-(iv) of paragraph [32.1] are all fulfilled, include:

31.5.1 war (whether declared or not), hostilities, invasion, act of foreign enemies, extensive military mobilisation;

31.5.2 civil war, riot, rebellion and revolution, usurped power, insurrection, act of terrorism, sabotage or piracy;

31.5.3 currency and trade restriction, embargo, sanction;

31.5.4 act of authority whether lawful or unlawful, compliance with any law or governmental order, expropriation, seizure of works, requisition, nationalisation;

31.5.5 plague, epidemic, natural disaster or extreme natural event;

31.5.6 explosion, fire, destruction of equipment, prolonged break-down of transport, telecommunication, information system or energy; and

31.5.7 general labour disturbance such as boycott, strike and lock-out, go-slow, occupation of factories and premises.

31.6 The Affected Party must give the other party to the Contract (the “**Other Party**”) written notice without delay detailing the occurrence and its expected duration. The Other Party shall within a reasonable time respond, stating whether it accepts or rejects the occurrence as Force Majeure.

31.7 If the Other Party accepts the occurrence as Force Majeure, the Contract shall remain in force but the Parties will be relieved from performance of their obligations (including payment) under Contract, from the date at which the Other Party received written notice, for so long as the effects of Force Majeure continue or for ninety (90) days, whichever is the shorter, provided that:

31.7.1 the Affected Party makes all reasonable efforts to limit the effects of Force Majeure upon performance and to avoid or overcome the effects of Force Majeure;

31.7.2 the suspension of performance is of no greater scope than is necessitated by Force Majeure;

31.7.3 the Affected Party continues to furnish weekly updates by email while the effects of Force Majeure continue detailing reasonable efforts made in accordance with [32.4.1], and notifies the Other Party immediately when the effects of Force

Majeure are avoided or overcome, or cease, and resumes performance immediately thereafter.

31.8 Neither Party shall be in breach of the Contract nor liable for delay in performing, or for failing to perform, its obligations under the Contract, due to Force Majeure.

31.9 Unless otherwise agreed by the Parties, if Force Majeure continues for more than ninety (90) days, the Parties may agree: (a) to a revised delivery schedule at no cost; (b) to a reduction of scope terminating part of the contract at no cost; or (c) to terminate the whole of the Contract at no cost.

ANNEX A

NCI AGENCY NON-DISCLOSURE DECLARATION

We, the undersigned.....(Company) duly represented by (hereinafter “Contractor”) do hereby certify that we shall ensure that the following conditions be accepted and observed by all (Contractor) employees working under **RFQ-CO-115455-SGSBS**

_Date	Full name (in block capitals)	Signature
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TO BE SIGNED BY THE CONTRACTOR’S EMPLOYEES WORKING IN THE NATO’S PREMISES UPON COMMENCEMENT OF THEIR WORK.

I UNDERSTAND:

That I must preserve the security of all classified /commercial-in-confidence Information which comes to my knowledge as a result of this contract with NATO and that I undertake to comply with all relevant security regulations.

That I must not divulge to any unauthorised person, any classified/commercial-in confidence information gained by me as a result of my contract with NATO, unless prior permission for such disclosure has been granted by the General Manager of the NCI Agency or by his designated representative.

That I must not, without the approval of the General Manager of the NCI Agency, publish (in any document, article, book, CD, video, film, play, or other form) any classified /commercial-in-confidence information which I have acquired in the course of my work under **CO-115455-SGSBS**.

That, at the end of contract and after performance of all required tasks, I must surrender any official document or material made or acquired by me in the course of my work **CO-115455-SGSBS** save such as I have been duly authorised to retain.

That the provisions of the above Declaration apply not only during the period of work under **CO-115455-SGSBS**, but also after my contract has ceased and that I am liable to prosecution if either by intent or negligence I allow classified/commercial-in-confidence information to pass into unauthorised hands.

That I commit to fulfil my obligations for the period of performance mentioned in the Schedule of Supplies and Services (including the optional periods) unless major events beyond my reasonable control happen.

That shall I decide for personal interest to leave the position, I will do my best effort to fulfil my obligations until the Company that is currently employing me has provided NATO with an acceptable suitable substitute in accordance with Special Provision.

That I solemnly undertake to exercise in all loyalty, discretion and conscience the functions entrusted to me and to discharge these functions with the interests of NATO and the Host Nation only in view. I undertake not to seek or accept instructions in regard to the performance

of my duties from any government, company or from any authority other than that of NCI Agency or the Host Nation.

That within the next two weeks I shall acquaint myself with Host Nation security regulations and security operating instructions.

Date

Full name (in block capitals)

Signature

ANNEX B

PERFORMANCE GUARANTEE STANDBY LETTER OF CREDIT

Standby Letter of Credit Number: _____

Issue Date: _____

Initial Expiry Date: _____

Final Expiry Date: _____

Beneficiary: NATO Communications and Information Agency
 (NCI Agency) or its legal successor,
 Financial Management Unit
 Boulevard Leopold III, B-1110, Brussels Belgium

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

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

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

4. This Letter of Credit is effective the date hereof and shall expire at our office located at _____ (Bank Address) on _____. All demands for payment must be made prior to the expiry date.
5. It is a condition of this letter of credit that the expiry date will be automatically extended without amendment for a period of one (1) year from the current or any successive expiry

date unless at least 90 (ninety) calendar days prior to the then current expiry date we notify you by registered mail and notify (NAME OF CONTRACTOR) that we elect not to extend this letter of credit for such additional period. However, under no circumstances will the expiry date extend beyond _____ (“Final Expiry Date”) without amendment.

6. We may terminate this letter of credit at any time upon 90 (ninety) calendar days’ notice furnished to both (NAME OF CONTRACTOR) and the NCI Agency by registered mail.
7. In the event we (the issuing bank) notify you that we elect not to extend the expiry date in accordance with paragraph 6 above, or, at any time, to terminate the letter of credit, funds under this credit will be available to you without question or delay against presentation of a certificate signed by the NCI Agency Contracting Officer which states:

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

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

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

ANNEX C**LIST OF ACCEPTABLE BANKS TO ISSUE
PERFORMANCE GUARANTEES**

#	*Bank
1	KBC Group
2	Bank of Montreal (BMO)
3	Royal Bank of Canada
4	Scotiabank
5	Danske Bank
6	Citibank Europe
7	BNP Paribas
8	Credit Agricole Group
9	Societe Generale
10	Commerzbank AG
11	Deutsche Bank
12	Intesa
13	UniCredit S.p.A.
14	ING Group
15	Rabobank Group
16	Banco Santander
17	BBVA
18	Barclays PLC
19	HSBC Holdings
20	Standard Chartered Plc
21	Bank of America
22	Wells Fargo

**These Banks are in NATO-member countries.*



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

RFQ-CO-115455-SGSBS

PROVIDE SATCOM GROUND SEGMENT BASEBAND SYSTEMS

Provision of SATCOM Convergence Routers (SCR) and Switches (WP2)

BOOK II

PART III

BOA GENERAL PROVISIONS

*Please view your firms BOA Agreement with NCIA for the BOA GENERAL PROVISIONS



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

RFQ-CO-115455-SGSBS

PROVIDE SATCOM GROUND SEGMENT BASEBAND SYSTEMS

Provision of SATCOM Convergence Routers (SCR) and Switches (WP2)

BOOK II

PART IV

STATEMENT OF WORK (SOW)

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SECTION 1. INTRODUCTION

1.1. Purpose

- [1] This procurement concerns the provision of SATCOM Convergence Routers (SCRs) and switches.
- [2] This Statement of Work (SoW) describes the requirements for the SCRs and switches, to be provided to the NATO Communications and Information Agency (NCI Agency) as the Purchaser under this Contract.

1.2. Scope

- [3] This Contract covers the provision and delivery of all hardware, Operating System and associated licences as detailed in this SoW and associated System Requirements Specifications (SRS) in Annex A, Maintenance and Support Concepts in Annex B and in quantities and delivery schedule as specified in the Schedule of Supply and Services (SSS) (Book II, Part I) and all in accordance with the terms and conditions of the Contract (Book I).

1.3. Conventions

- [4] Requirements in the SoW that indicate tasks for the Contractor are preceded by a unique heading number, consisting of a prefix, followed by a number. Prefixes are as follows:
 - IN (Section 1: Introduction);
 - SW (Section 2: Scope of Work);
 - PM (Section 3: Project Management);
 - TVV (Section 4: Testing, Verification and Validation);
 - IPS (Section 5: Integrated Product Support);
 - CM (Section 6: Configuration Management);
 - QA (Section 7: Quality Assurance and Quality Control);
 - Appendix A: Applicable and Reference Documentation;
 - Appendix B: Content and Structure for Integrated Product Support (IPS) Deliveries;
 - Appendix C: List of Acronyms.
 - Annex A: System Requirements Specification (SRS);
 - Annex B: Maintenance and Support Concepts.
- [5] Informational or context information not conveying any requirement on the Contractor is preceded by a number heading in brackets, [xx], without prefix letters.
- [6] Whenever requirements are stated herein to “include” a group of items, parameters, or other considerations, “include” means “include but not limited to”.
- [7] Whenever reference is made to a section or paragraph, the reference includes all subordinate and referenced paragraphs and any bullet or numbered list, if present.

- [8] Whenever reference is made to the SoW, the reference includes the detailed System Requirements Specification (SRS) of Annex A.
- [9] 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 is expected to cover for each of the areas above, and under each of the defined processes.
- [10] 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).
- [11] 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.

SECTION 2. SCOPE OF WORK

- [12] This section provides a notional view of the project logical schedule, as well as the list of key project milestones and criteria to be met by the Contractor.
- [13] Key project milestones are defined as:
- **Milestone 0:** Effective Date of Contract (EDC);
- SW-1 The Project Kick-Off meeting (KOM) shall be conducted four (4) weeks after the effective date of contract.
- SW-2 The draft PIP and the activities for the FAT (Factory Acceptance Testing) events shall be reviewed during the KOM.
- **Milestone 1:** Factory Acceptance Testing (FAT);
- SW-3 The Contractor shall conduct the FAT following the test regime detailed in Section 4 of this SoW.
- SW-4 Through FAT, the Contractor shall demonstrate that the equipment provided through this Contract fulfills the requirements specified in Annex A (System Requirements Specification) of this SoW.
- SW-5 The results of the FAT Test Report shall be discussed during the FAT Review Meeting.
- **Milestone 2:** Batch Delivery Acceptance;
- SW-6 Upon approval of the FAT Test Report by the Purchaser, the Contractor shall ship the equipment to the Purchaser's CSSC (Brunssum), in accordance with the Packaging, Handling, Storage and Transportation requirements detailed in Section 5.10. and in accordance with the schedule/quantities stipulated in the Schedule of Supplies and Services (SSS). Each equipment shall be accompanied by the manufacturer's original Certificate of Conformity (CoC) and the Test Data Record.
- [14] Batch Delivery Acceptance (BDA) shall be granted, in accordance with the specifications under Section 4.3. of this SoW.
- SW-7 The Contractor shall deliver the corresponding IPS Deliveries as specified in Section 5, Table 5-1 of this SoW.
- **Milestone 3:** Final System Acceptance (FSA);
- [15] Final System Acceptance (FSA) is the act by which the Purchaser has evaluated and determined that the equipment meet the requirements of the Contract, and that the Contractor has fully delivered all requirements.
- SW-8 To achieve FSA, the Contractor shall demonstrate the following:
1. All previous milestone requirements to be implemented under this Contract have been achieved;
 2. The equipment has been delivered in accordance with the schedule/quantities stipulated in the Schedule of Supplies and Services (SSS), together with the corresponding Certificates of Conformity (CoC) and the Test Data Records;
 3. All the identified deficiencies are either fixed or waived by the Purchaser;

4. All IPS documentation has been delivered as described in Section 5, Table 5-1 of this SoW;
5. The Contractor has delivered all deliverables and conducted all activities, as specified under this Contract;

SW-9 At such time as the Contractor has completed the prerequisites defined above, he shall notify the Purchaser in writing that the prerequisites for FSA are fulfilled.

[16] Within 2 weeks of receipt of the FSA notification, the Purchaser will schedule a FSA Review Meeting.

SW-10 The Contractor shall demonstrate at the FSA Review Meeting that:

- All the conditions for FSA have been met;
- The Purchaser has received all Contract deliverables.

SW-11 The Contractor shall prepare a written record of the FSA Review Meeting in the form of meeting minutes that shall be completed and signed by the representatives of the Contractor and Purchaser respectively. The FSA Minutes shall be the log, if required, of any unresolved deficiency carried over from previous milestones. These shall be listed, if any, together with a statement on the proposed resolution and resolution timeline (for discrepancies), prior to declaring FSA.

SW-12 The FSA Minutes shall be forwarded to the Purchaser's Contracting Authority who will formalise the decisions of the FSA Meeting in writing and officially notify the Contractor of such decisions within fourteen days of receipt of the FSA Minutes.

- **Milestone 4: Warranty**

SW-13 Warranty provisions shall be conducted in accordance with the requirements described in Section 5.7 of this SoW.

SECTION 3. PROJECT MANAGEMENT

3.1. The NCI Agency Project Management Team (PMT)

- [17] The NCI Agency as the Purchaser will be represented by the NCI Agency Project Management Team (PMT) that will be responsible for reviewing and guiding this project in line with the requirements of this SoW.
- [18] The PMT will be chaired by the NCI Agency Project Manager who will be the primary interface between the Contractor and the NCI Agency for technical matters. The PMT will also include the Contracting Officer who will act as the Purchaser's representative and will be the primary interface between the Contractor and Purchaser from the Effective Date of Contract (EDC).
- [19] All changes to the Contract will be made through the Purchaser's Contracting Officer only.
- [20] The PMT Project Manager, or any of the specialist support staff, may not make changes to the terms and conditions of the Contract or SoW but may only provide the NCI Agency's interpretation of technical matters.
- [21] The PMT PM will be supported by specialists in certain areas who may, from time to time, be delegated to act on the PM's behalf in their area of expertise.
- [22] The PMT will be responsible for reviewing and acceptance of the deliverables from the Contractor.

3.2. Contractor Responsibilities

- PM-1 The Contractor shall designate a Project Manager (PM), who shall direct and coordinate the activities of the Contractor's project team and shall be the primary contact for the Purchaser's Project Manager.
- PM-2 The Contractor's project team shall include as a minimum the Project Manager and a Technical Lead.
- PM-3 The Contractor shall provide a comprehensive Curriculum Vitae (CV) for both, Project Manager and Technical Lead proposed for this project, to confirm that the individuals have the qualifications and experience required for this project.
- PM-4 The Contractor's Project Manager shall be prepared at all times to present and discuss the status of Contract activities with the Purchaser's Project Manager, Contracting Officer, or Technical Lead.
- PM-5 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.
- PM-6 The Contractor's Project Manager shall have experience managing projects similar to this project in technical and financial scope.
- PM-7 The Contractor shall consult regularly with the Purchaser to ensure that project management practices are compatible, meet their joint requirements and are tailored to meet the requirements of the project.

PM-8 All documentation produced under this Contract shall following the document convention and format as detailed in Section 1.3. of this SoW.

3.3. Project Implementation Plan (PIP)

PM-9 The Project Implementation Plan (PIP) serves as project implementation documentation, including all technical aspects. The PIP evolves over time starting as a plan to the definitive as-is documentation.

PM-10 The Project Implementation Plan (PIP) shall describe how the Contractor shall implement project/contract administration.

PM-11 The PIP shall consider all project implementation aspects, which include management provisions, facilities, schedules, personnel assignments, external relationships and project control.

PM-12 The PIP shall provide sufficient detail to allow the Purchaser to assess the Contractor's plans and capabilities in implementing the entire project in conformance with the requirements specified.

PM-13 The Contractor shall ensure that the PIP accurately reflects Contractor's plans for the full duration of the period of performance of the Contract.

PM-14 After approval by the Purchaser, the final version of the PIP shall be the official document against which the Contractor is expected to conduct the performance of the Contract. The approved PIP shall however not supersede the Contract, and the Schedule of Supplies and Services (SSS) in particular.

[23] The content of the plans in PIP is described in detail in the related sections of this SoW.

PM-15 The draft PIP shall be provided to the Purchaser for review and acceptance within two (2) weeks after EDC.

PM-16 The Purchaser will review the draft PIP for a period of up to ten (10) days after its submission and will provide written confirmation that he accepts the PIP as offered or provide comments on the draft PIP at the end of this period.

PM-17 The Contractor shall update the draft PIP and shall incorporate all Purchaser comments concerning deviations from and omissions of contract requirements and shall deliver the updated document within eight (8) weeks after EDC.

PM-18 When the Purchaser is satisfied that all comments have been satisfactorily incorporated he will approve its issue. The approval of the PIP by the Purchaser signifies only that the Purchaser agrees to the Contractor's approach in meeting the requirements. This approval in no way relieves the Contractor from its responsibilities to meet the requirements stated in this SoW.

PM-19 The final PIP Document reflecting Purchaser's comments shall be provided to the Purchaser within eight (8) weeks after EDC.

PM-20 The PIP is a living document during the whole lifecycle of the project, therefore shall be kept up to date throughout the project, and shall be subject of review at each Project Review Meeting (PRM), until and including Final System Acceptance (FSA).

PM-21 The PIP shall include the sections listed and described below:

- (1) Project Overview, which shall provide an executive summary of the offered equipment and services;

- (2) Project Management Plan (PMP), provided as a Gantt chart with supported text;
- (3) The Project Master Test Plan (PMTTP) as described in Section 4;
- (4) Integrated Product Support Plan (IPSP) as described in the Section 5;
- (5) In Service Support Plan (ISSP) as described in the Section 5;
- (6) Configuration Management Plan (CMP) as described in the Section 6;
- (7) Quality Assurance Plan (QAP) as described in the Section 7;
- (8) The Project Master Schedule (PMS) that shall contain all contract events and milestones for the Project.
 - The PMS shall show all contractual deliverables, their delivery dates, and the tasks associated with them.
 - The PMS shall for each task identify the start and finish dates, duration, predecessors, constraints, and resources.
 - The PMS shall provide network, milestone, and Gantt views, and identify the critical path for the overall project.
 - The PMS shall be provided in Microsoft Project format.
- (9) Project Personnel, which shall include the Curriculum Vitae and security clearance information for for the Contractor’s project team as specified in Section 3.2 of this SoW.

3.4. Project Review Meetings and Reports

- PM-1 Except where otherwise stated in the Contract, the following provisions shall apply to all meetings to be held under the Contract.
- PM-2 The Contractor shall take meeting minutes, submit them within three working days of the meeting in draft version to the Purchaser for approval.
- PM-3 The participants shall not regard these minutes as a mechanism to change the terms, conditions or specifications of the Contract, or as a vehicle to alter the design or configuration of equipment or systems. Any such changes shall only be made by agreement, amendment or by authorised mechanisms as set forth in the Contract.
- PM-4 Any documentation, even in draft format, that may be useful to the Purchaser in preparing for meetings and ensuring efficient discussions during the meetings shall be provided to the Purchaser no later than 5 working days before the meeting.
- PM-5 The Contractor shall coordinate and hold the following Project Review Meetings (PRM) with the Purchaser:
- (1) PRM 1 includes Project Kick-Off Meeting (KOM);
 - (2) PRM 2 includes the FAT Review Meeting;
 - (3) PRM 3 includes Final System Acceptance (FSA) Meeting;
 - (4) PRM 4 includes Mid Warranty Review Meeting.

- PM-6 One week before each PRM, the Contractor shall provide a Project Status Report (PSR), with the status of all on-going tasks, the status of the Contract deliverables and identifying any changes to the Risk Log and Issue Log.
- PM-7 Problems shall be identified and discussed with the Purchaser Project Manager promptly, and shall not be held over until the next PRM. Problems should not remain undisclosed in between meetings.
- PM-8 The location of the PRMs shall be at the Purchasers premises in Brussels (BEL), Braine l'Alleud (BEL) or Mons (BEL) and when possible, it shall be scheduled with other project meetings. When deemed necessary by the Purchaser, the PRMs shall be held in an alternate location at no additional cost. If mutually agreed, the PRMs shall also be conducted through a voice or video conferencing method.

3.5. Other Meetings

- PM-9 The Purchaser shall host all other meetings unless there is a specifically agreed need to review material, witness technical demonstrations or testing, or perform any other activity outside of the Purchaser's premises, as part of the meeting.
- PM-10 Upon approval by the Purchaser's PM, the Contractor shall schedule, organise, and conduct such meetings.

SECTION 4. VERIFICATION AND VALIDATION. TESTING REQUIREMENTS

4.1. Introduction

- [24] This section defines the generic requirements to be applied by the Contractor to the Testing, Verification and Validation (TVV) process, which is required for verification and validation of the requirements set forth under this Contract by the Purchaser.
- [25] Each requirement below contains an Independent Verification and Validation (IVV) reference number (in brackets at the end of the statement), which refers to the Purchaser’s internal processes. This process will be explained during the Project Kick-Off Meeting.
- [26] The Contract requires a set of TVV activities to verify its compliance with the Contractual requirements set forth in this SoW, the System Requirements Specification (SRS, Annex A to this SoW) and the Maintenance and Support Concepts (Annex B to this SoW).

- TVV-1 All deliverables supplied by the Contractor under this contract shall be verified and validated to meet the requirements of this Contract, in particular:
- TVV-2 The Contractor shall perform the verification activities within each Build Process;
- TVV-3 The Contractor shall perform verification to confirm that each element properly reflects the specified requirements, design, code, integration and documentation;
- TVV-4 The Contractor shall support Purchaser led Validation Activities to confirm that the solution is fit for purpose.
- TVV-5 The Contractor shall demonstrate to the Purchaser that there is a testing process in place for the project, with quality assurance oversight.
- TVV-6 The Contractor shall have the overall responsibility for test execution. This includes the development of all test documentation required under this Contract, the conduct of all testing during FAT, the evaluation and documentation of the test results.
- TVV-7 The Contractor shall provide an overall project Test Manager, who will work closely with the Purchaser’s assigned IVV lead.
- TVV-8 The Contractor shall assign and provide a Test Director and Test Operators for the entire duration of the testing phase/s.
- TVV-9 The Contractor shall provide a Test Documentation Package comprised of the following documents:

Work Product Name	Sent to Review/Approve
The Project Master Test Plan (PMTP)	<i>2 weeks after EDC (Effective Date of Contract)</i>

Work Product Name	Sent to Review/Approve
Test Plans for individual test events including test design specifications	<i>2 months before test event</i>
Any submitted test Waivers together with supporting material	<i>4 weeks before test event</i>
The Test Procedures/Scripts/Steps	<i>4 weeks before test event</i>
Status Reports	<i>Periodically (to be set in PMTP)</i>
The Test Reports	<i>1 week after test event</i>
The Requirements Traceability Matrix (RTM) updated with test-related information	<i>First with PMTP and update per test event</i>
Verification Cross Reference Matrix (VCRM)	<i>First with PMTP and update per test event</i>

Table 4-1 Test Documentation

- TVV-10 The Contractor shall produce a Project Master Test Plan (PMTP) to address the plans for each V&V activities listed in this SoW.
- TVV-11 The Contractor shall describe how the Quality Based Testing is addressed and implemented in the PMTP.
- TVV-12 The Contractor shall describe all formal tests, verification and validation activities in the PMTP with a testing methodology and strategy that fit the design and development methodology chosen by the project.
- TVV-13 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.
- TVV-14 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;
 - b. Correspondent test phase(s) for each requirement;
 - c. Coverage Status.
- TVV-15 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.

[27] The testing locations are as defined in the Schedule of Supplies and Services (SSS).

- TVV-16 The PMTP shall define and describe the following test phases:
- a. Factory Acceptance Test (FAT);
 - b. Batch Delivery Acceptance (BDA);
 - c. Final System Acceptance (FSA).
- TVV-17 For each test phases the Contractor shall follow TVV process defined in PMTP and shall prove full compliance with the requirements of Annex-A to this SoW through any combination of the following as agreed by the Purchaser:
- Testing;
 - Demonstration and documentation;
 - Provision of Certificates of Conformity (CoC) and/ or equipment specifications;
 - Inspection;
 - Analysis.
- TVV-18 All testing during FAT shall be the responsibility of the Contractor, who shall provide the personnel, documentation, equipment, and facilities, as required for the installation, commissioning and execution of the test.
- TVV-19 The Contractor shall be responsible for the coordination and performance of tests, and shall ensure that an adequate number of the Contractor's engineers and technicians are present to ensure the timely completion of all tests.
- TVV-20 The Contractor shall provide the necessary duly calibrated test equipment, tools and any other items required for the satisfactory completion of all tests, and the recording of their results.
- TVV-21 The test equipment shall remain the property of the Contractor, with the exception of those test items provided by the Purchaser on loan to support some of the tests.
- TVV-22 The Contractor shall be responsible for the shipment (transport costs) of any test equipment provided on loan, from the Purchaser's premises (in Europe) to the Contractor's premises.
- TVV-23 The Contractor shall grant access to the Contractor's facilities for the Purchaser and/or his Designated Representative to attend FAT.
- TVV-24 The Contractor shall make available to the Purchaser, all required Contractor facilities, information and assistance necessary to permit a valid interpretation of the test results.
- TVV-25 The Test Environment at the Contractor's facility shall be under the configuration control of the Contractor during the testing period. Prior to the commencement of the tests, the Contractor's Test Environment shall be baselined and no changes to

hardware, software, firmware and/or configuration shall be introduced by the Contractor, unless explicitly authorised in writing by the Purchaser. Failure to do so will be identified by the Test Readiness Review.

- TVV-26 The Contractor shall conduct a Test Readiness Review (TRR) prior to the start of any of the tests phases. The TRR shall identify if all systems and or sub-systems to be tested are ready according to the acceptance criteria as identified in the PMTP.
- TVV-27 At all Test Phases, the Contractor shall prove that proposed equipment meets the SRS requirements stated in the Annex-A of this SoW.
- TVV-28 During each TRR the following documents shall be available for review : Test Plan, Test Cases/Scripts, Test Data, Test Environment Baseline, Existing defects, Dry Run results, Dry run Test Report.
- TVV-29 The Contractor shall only proceed to the next formal test activity, after agreement and approval by the Purchaser.

4.2. Factory Acceptance Test (FAT)

- [28] Factory Acceptance Test (FAT) is the operational test performed on new hardware and software to verify that their individual functionality will support the functional level specification. COTS hardware level verification will reuse to the possible extent results from manufacturer test sheets and/or Certificates of Conformity (CoC).
- [29] The Subject Matter Expert (SME) designated by the Purchaser will witness FAT. The SME is to countersign respective FAT Test Report.
- TVV-30 During the FAT the Contractor shall prove by testing that proposed equipment meets the SRS requirements stated in the Annex-A of this SoW.
- TVV-31 The Contractor shall conduct FAT at their premises.
- TVV-32 Upon completion of the FAT Testing, The Contractor shall document the results in a FAT Test Report;
- TVV-33 The Contractor shall document all the discovered deficiencies in the The FAT Test Report.
- TVV-34 The FAT Test Report cover sheet shall clearly show whether the testing passed, failed, or was not run, and for what reasons.
- TVV-35 The FAT Test Report shall be part of the project's deliverables.
- TVV-36 The results of the FAT Test Report shall be discussed during the FAT Review Meeting which will be held at the Contractor's facilities. If mutually agreed, the meeting can also be conducted through a voice or video conferencing method.

- TVV-37 The FAT Test Report shall be issued to the Purchaser within 1 week of FAT completion for review and approval.
- TVV-38 The Purchaser will review the FAT Test Report for a period of up to ten (10) days after its submission and will provide written confirmation that he accepts the Report as offered or provide comments at the end of this period.
- TVV-39 The Contractor shall be responsible for all costs related to the rectification of deficiencies or failures and subsequent re-testing caused by the design or production of the deliverables identified during the verification and/or testing cycles.
- TVV-40 The Contractor shall be responsible for any travel, subsistence and other incidental expenses incurred by the Purchaser because of the requirement for the re-performance of tests necessitated by test failures.
- TVV-41 After remedial action has been taken by the Contractor, the test may be resumed at the step during which the deficiency or failure was identified, however, the Purchaser shall have the right to require that re-testing includes all of the tests related to the verification of that particular specification requirement.
- TVV-42 The Contractor shall seek the Purchaser's agreement of a mutually suitable time when testing shall be resumed, subsequent to the Purchaser having accepted the contents of a formal submission by the Contractor providing full details describing the cause of the failure and the recommended remedial actions to be taken.
- TVV-43 The approval of the FAT Test Report shall be a pre-condition for the shipment of the batch to CSSC Brunssum, and in accordance with the schedule/quantities stipulated in the Schedule of Supply and Services (SSS).

4.3. Batch Delivery Acceptance (BDA)

[30] Upon delivery of the equipment, the Purchaser will visually inspect all deliveries for transportation damage and verification against packing and inventory lists.

TVV-44 The Contractor shall take back and replace any damaged items, and correct any discrepancies with the packing and inventory lists, at no additional cost to the Purchaser, and without delay to the project.

[31] Also, during the delivery inspection the Purchaser will verify the following, but not limited to:

- all deliverables associated to the relevant batch (as per the SSS and SoW) are delivered;
- the requirements have been fulfilled by provisioning a Certificate of Conformity (CoC) for delivered equipment;
- Test Data Records are provided for every piece of equipment.

- [32] Following the replacement of any damaged items, and correction of any discrepancies with the packing and inventory lists, the Purchaser will grant BDA.

4.4 Final System Acceptance

- [33] To declare Final System Acceptance (FSA), the Purchaser shall verify that all the test reports have been approved and all equipment and services detailed in the Schedule of Supplies and Services have been delivered and all deficiencies noted have been cleared by the Contractor to the satisfaction of the Purchaser.

SECTION 5. INTEGRATED PRODUCT SUPPORT

[34] This section addresses the Integrated Product Support (IPS) requirements of the project. The purpose of this section is to ensure that the Contractor uses sound best practices to plan, implement, integrate, continuously measure and fine tune the IPS activities, as well as to ensure timely and correct delivery of the project.

- IPS-1 The Contractor’s internal Life Cycle Management (LCM) process and system shall comply with STANAG 4728 “System Life Cycle Management (SLCM)”.
- IPS-2 The Contractor shall establish an IPS Programme to manage the IPS activities within this Contract by: providing evidence that the designed solution is at least for a service life of five (5) years starting from the successful completion of FSA (i.e.: end of warranty period) assuring and managing the supportability of the solution (i.e.: availability for supply of spare parts and/or the relevant repair services and obsolescence strategy);
- IPS-3 The Contractor shall provide the following IPS deliveries as per the requirements in the present Statement of Work and in accordance to the Appendix B (Content and structure for Integrated Product Support deliveries) part of the present SoW:

Title	Iss	Due date	References
Integrated Product Support Plan (IPSP)	Draft	EDC + 2w	Section 5.1 and Appendix B
	Final	EDC + 8w	
Product Support Data Package	Draft	EDC + 8w	Section 5.2 and Appendix B
	Final	FAT – 2w	
Initial Provisioning List (IPL)	Draft	FAT – 2w	Section 5.3.
	Final	FSA – 8w	
Warranty Report	Final	Warranty End	Section 5.7.
User Manuals	Draft	FAT – 2w	Section 5.5.
	Final	BDAFSA – 2w	
Maintenance Manuals	Draft	FAT – 2w	Section 5.5.
	Final	BDAFSA – 2w	
Training documentation	Draft	FAT – 2w	Section 5.6.
	Final	BDAFSA – 2w	
In Service Support Plan (ISSP)	Draft	FAT – 2w	Section 5.7 and Appendix B.
	Final	FSA – 2w	

Table 5-1 IPS Deliveries

- IPS-4 The Contractor shall provide the draft issue of required IPS deliveries in the PIP, describing for each paragraph the detailed content that shall be issued during the contract execution so to show the concept, understanding and commitment of each activity.
- IPS-5 All Contractor and Purchaser activities and milestones related to IPS shall be identified and included in the Project Master Schedule (PMS) of the PMP in the PIP.

5.1. Integrated Product Support Plan

- IPS-6 The Contractor shall provide the **Integrated Product Support Plan (ILSP)** that shall describe the Contractor's approach and plans for each logistic element:
- Reliability Availability Maintainability and Testability (RAMT) and Failure Mode Effect Analysis (FMEA),
 - Logistics Support Analysis (LSA) including Product Support Data and Database and Supply Support,
 - Packaging Handling Storage and Transportation (PHST),
 - Parts Obsolescence Management,
 - Technical Publications,
 - Training.
- IPS-7 The IPSP shall include a schedule and a detailed description of the interaction of the IPS activities with the other activities performed. The IPSP shall be updated and resubmitted if required to trace updates in the programme execution.

5.2. Product Logistics Support Data Package

- IPS-8 The Contractor shall provide a **Product Support Data Package** that shall include Reliability, Availability, Maintainability and Testability data, Failure Mode Effects Analysis (FMEA), Maintenance Tasks data, Product Support Database, Level of Repair data and the Repair Price List.
- IPS-9 The Contractor shall provide the relevant Reliability, Availability, Maintainability and Testability data by providing:
- data sheets and references, clearly indicating reliability and maintainability characteristics used as data input to any of the RAMT activities;
 - all draft and final calculations (ref MIL-HDBK-338B) or by actual data collected from already fielded systems for:
 - reliability (MTBF and MTBCF),
 - maintainability (MTTR and MTTRS),
 - testability: Fault Detection (FD) percentage and Fault Isolation (FI) percentage with and without ambiguity
 - artifacts.
- IPS-10 The Contractor shall provide the relevant Failure Mode Effect Analysis (FMEA) down to the hardware LRU and firmware/software CSCI level in accordance with IEC 60812:2018 or MIL-STD-1629A.
- IPS-11 The Contractor shall provide a functional FMEA considering the effects of failure of hardware LRU and firmware/software CSCI level directly to the function(s) that can/will be lost or degraded.

- IPS-12 The Contractor shall provide the relevant Maintenance Tasks data down to the hardware LRU and firmware/software CSCI level, detailing for each maintenance task: duration, maintenance level (as per appendix C), spares and consumables, tools and test equipment, facilities.
- IPS-13 The Contractor shall provide the relevant Product Support Database down to the hardware LRU and firmware/software CSCI level to collect all data provided in the Product Support Data Package and to be coherent with the relevant information contained in the Technical Publications and Training materials.
- IPS-14 The Contractor shall provide the relevant Level Of Repair data down to the hardware LRU and firmware/software CSCI level to recommend the most cost efficient solution for the level at which each maintenance task should be performed and the decision to repair or discard unserviceable LRUs:
- IPS-15 The Contractor shall provide the relevant Repair Price List (RPL) associated to all items and relevant Level Of Repair.

5.3. Supply Support and Provisioning

- IPS-16 The Contractor shall provide **Initial Provisioning List (IPL)** to include a fully detailed and priced:
 - 1) Recommended Spare Parts List (RSPL) that shall detail all spares in a hierarchical breakdown including as a minimum the information of the table below for MDS.
 - 2) Recommended Consumable Items List (RCIL) that shall detail all consumables including as a minimum the information of the table below for MDS.
 - 3) Recommended Tools and Test Equipment List (RTTL), that shall detail all standard and special-to-type tools (both HW and SW/FW), test equipment and test fixtures, cables, connectors, support equipment (e.g.: cranes, lifting platforms, etc.) to perform hardware and software maintenance tasks including as a minimum the information of the table below for MDS.
- IPS-17 The Contractor shall provide the full and complete Inventory/**Material Data Sheet (MDS)** of all items and documents to be delivered under this contract at least ten (10) working days before shipment. It shall contain the following information:

Field	Description
CLIN	Contract Line Item Number (number-10 digits maximum). Sequence number assigned to a particular line item in a given contract. The combination CLIN-Contract No. shall always be unique.
Nomenclature	Short Item Description (text- 35 digits). Should always start with the main item name followed if possible by a technical specification, followed by the next higher assembly names in hierarchical order, separated by commas. E.g. for a coax connector of a television cable the nomenclature should read: CONNECTOR, COAX, CABLE, TELEVISION.
EQRE (XB/ND)	Code (text-2 digits). Defines whether an item is repairable (ND) or not (XB) from a technical point of view.
True Manufacturer Part Number	True Manufacturer P/N (text-32 digits). Part Number given to this item by the original manufacturer.

Field	Description
True Manufacturer Code (or complete name and address)	True Manufacturer Code (text-5 digits). Code of the Company that has manufactured this item. This is an internationally recognized 5-digit code which is unique to that company. It corresponds to the "cage code" in the USA. Manufacturer Codes and Cage Codes are obtainable from the national governmental authorities or, if it already exists, from the "NATO Master Cross-Reference List" (NMCRL) obtainable from NSPA. In case the code cannot be obtained, it will be sufficient to enter the complete name and address information of the true manufacturer.
Vendor/Contractor Code (or complete name and address)	Vendor (Contractor) (text-5 digits). Company which sells the item or the complete system to which this item belongs. The vendor is the company with which the contract is placed but is not necessarily the true manufacturer of the item. If the vendor company has also designed and integrated the complete system it is also known as Original Equipment Manufacturer (OEM). The company code is an internationally recognized 5-digit code which is unique to that company. It corresponds to the "cage code" in the USA. Manufacturer Codes and Cage Codes are obtainable from the national governmental authorities or, if it already exists, from the "NATO Master Cross-Reference List" (NMCRL) obtainable from NSPA. In case the code cannot be obtained, it will be sufficient to enter the complete name and address information.
Vendor/Contractor Part Number	Vendor (Contractor) P/N (text-32 digits). Part Number given to this item by the company which sells the item or the complete system to which this item belongs. The vendor is the company with which the contract is placed but is not necessarily the true manufacturer of the item.
QTY ordered	Item Quantity (number-5 digits). Shows the quantity of this item ordered as individual item in this contract, i.e. if it is not delivered built-in in another unit. In case the item is not ordered as individual item or as spare unit but is built-in in another assembly, enter "0" (zero) in this field and complete fields: "Part Number of next higher assembly" and "qty in next higher assembly". Serialized items shall only have a quantity of 1.
Order Unit	Order Unit (text-2 digits). Unit under which the item is sold, e.g. each, set, meter, etc.
Serialized Item Tag	Serialized Items Tag (text-1 digit). Add a "Y" if the item carries a serial number independently whether serial numbers is already known or not. If known, complete column "Serial Number".
Serial Number	Serial Number. If Serialized Item Tag is "Y" (yes) then add serial number here. (1 serial number per line). If system is already installed, then the Contractor shall indicate here the serial numbers installed at user site. For items to be delivered to depots the Contractor may not know the serial number in advance, in that case it will be completed by the receiving site.
Serial Number Software Revision Level	Software Revision Level (text- 30 digits but can be expanded as necessary) If item carries a serial number and field "serial number" is completed, add SW revision level / version here if appropriate.
Serial Number Hardware Revision Level	Hardware Revision Level (text- 30 digits but can be expanded as necessary) If item carries a serial number and field "serial number" is completed, add HW revision level / version here if appropriate.
Other Serial Number attributes	Other Serial Number Attributes (text-to be defined). This field will be used and defined on a case by case basis to be decided by NCIA System Manager, NCIA and the Contractor for other attributes which might be required for a particular system.
Subject to Property Accounting	NDSS-MRCS (text-1 digit). NCIA will decide whether or not item is subject to property accounting and is to appear on the customer balance lists. This field will be completed Y or N by NCIA.
Currency	Currency (text-3 digits). International 3-digit code (ISO) representing the currency in which the item purchase price (or the estimated value) is expressed.
Price	Item Price (number-11 digits). Unit price with 2 decimals.
Warranty Expiration Date	Warranty Expiration Date (date: DD/MM/YY). Shows the date on which the warranty of this item expires, which is usually N days after delivery of the item. If delivery is scheduled for a certain date, warranty expiration date = delivery date + warranty period in days.
Receiving / Inspection Depot	Receiving / Inspection Depot (TXT-2 digits). Information will be provided to Contractor by the Purchaser's IPS Officer. This is the depot to where the vendor ships the material. Normally this depot will receive, inspect and put the material in stock against Dues-In to be created in accordance with Qty in column "Qty Ordered". In case of a deviation from this rule, the Purchaser will inform the Contractor of the correct final Depot and through which depot the items shall have to transit.
Issue to customer	Customer Code (text-4 digits - to be completed by NCIA). Code representing the customer to which the item(s) shall be shipped by the receiving/ inspecting depot.

Field	Description
Extended Line Item Description	Extended Line Item Description (text-no limit). Any additional information concerning this item shall be entered here, e.g. technical specifications, configuration, reference to technical drawings or manuals etc....
Part Number of next higher assembly	Part-Number of Next Higher Assembly (text-32 digits) If item is built-in another assembly, indicate part number of that assembly here.
Qty in next higher assembly	Quantity in Next Higher Assembly (number-3 digits max). This field shows the built-in quantity of the item in the next higher assembly. This information shall be provided for configuration control purposes.
Qty installed at Operating Unit (Customer Site)	Quantity installed. This field is only applicable when the delivery is direct to an operating unit (customer site). However in that case it is mandatory. For non-serialized items it shows total quantity installed. For serialized items quantity shall only be one per serial number. Use a new line for each serial number.

Table 5-2 Inventory/Material Data Sheet Information

5.4. Packaging, Handling, Storage and Transportation

5.4.1. Packing, Coding and Labelling (Packaging)

- IPS-18 The Contractor shall define the best method for the Packaging, fulfilling as a minimum the requirements of STANAG 4280 "NATO Levels of Packaging", NATO packaging level 4.
- IPS-19 The Contractor shall design the packaging for each item and deliver each item fully packaged and protected in individually reusable containers.
- IPS-20 The contractor shall be fully responsible for the decision and the selection of the proper packaging, marking and transportation means (air, sea, land), making proper considerations about and including (but not limited to) vibrations, shocks, management of Electrostatic Discharge (ESD) sensitive devices, altitude/pressure, temperature and humidity limits not to be exceeded during the PHST activities.
- IPS-21 The Contractor shall provide any Special To Type (non-commercial) packaging materials required for the shipment of items, if needed/required, at no extra cost to the Purchaser.
- IPS-22 The Contractor shall label each item and the relevant package with, at least:
- OEM Part Number and Cage code and Serial Number (if any) item part name
 - Vendor Part Number and Cage Code, Serial Number (if any), item part name (if different from OEM item part name)
- IPS-23 The Contractor shall package, crate or otherwise prepare items in accordance with best commercial practices considering the destination and the mode of transportation. Any Special To Type (non-commercial) packaging will be retained by the Purchaser for return of the items under Warranty if necessary.
- IPS-24 The Contractor shall mark the packages, pallets and/or containers in which supplies are transported shall, in addition to normal mercantile marking, showing on

a separate nameplate the name of this project, contract number and shipping address and clearly marked with the text “NATO PROPERTY”.

IPS-25 The Contractor shall provide Packing Lists for each consignment to allow for easy identification of the content of each package:

- One Packing List shall be affixed to the exterior of the consignment in a sealed, weatherproof envelope on the outside of each box, palette and/ or container
- A second copy shall be put inside each container/box.
- A third copy should be emailed to the Purchaser PoC upon departure of the goods.

The Packing List shall contain the following information:

Serial	Requirement
1	The shipping Address
2	Package number of number of packages
3	Contract Number
4	CLIN Number as per Schedule of Supply and Services
5	Item Description
6	Part Number
7	Serial Number
8	Quantity
9	Weight and Volume details
10	Box number and number of boxes in the consignment
11	Name and address of the Contractor, Purchaser PoC and Consignor

5.4.2. Delivery and Shipment (Handling and Storage)

[35] The Purchaser Point of Contact (PoC) for issues related to shipment by default is:

XXXXXX (Project Manager)
 NATO Communication and Information Agency,
 NSII Service Line, SATCOM
 XXXXXXXXX, Belgium
 Tel : + 32 XXXXX
 XXX.XXXXX@ncia.nato.int

IPS-26 The shipping address where all items, including goods exchanged or repaired under warranty, shall be delivered by default to:

NATO Communications and Information Agency
 CIS Sustainment Support Centre
 JFC Headquarters, Building 204
 Rimbürgerweg 30, 6445 PA Brunssum, The Netherlands

- IPS-27 All equipment under this project shall be delivered and shipped in close co-ordination with the NCI Agency POC at final destination.
- IPS-28 The Contractor shall deliver equipment pre-configured and adequately packaged on Euro pallets.
- IPS-29 The Contractor shall ensure secure fixation of pallets, cases and equipment during transportation.
- IPS-30 The Contractor shall notify all deliveries through issuing of a Notice of Shipment to the Purchaser’s PoC, at least 10 working days in advance of each shipment with the following information:

Serial	Requirement
1	Purchaser Contract Number
2	Contract line Item Number (CLIN), designation and quantities
3	Destination
4	Number and gross weight
5	Consignor’s and Consignee’s name and address
6	Method of shipment, e.g., road, air sea, etc.
7	Date of shipment
8	Number of the Custom Form 302 used

- IPS-31 The Notice of Shipment shall be accompanied by the relevant Packing List and the request for a Custom Form 302.
- [36] At final destination, the Purchaser PoC will visually inspect all deliveries for transportation damage and verification against packing and inventory lists.
- IPS-32 The Contractor shall take back and replace any damaged items, and correct any discrepancies with the packing and inventory lists, at no additional cost to the Purchaser, and without delay to the project.
- IPS-33 The Contractor shall be responsible for the availability of proper storage space and availability of Material handling equipment that may be required for the equipment shipped to the destination/location. The Purchaser cannot be held responsible for any delays in implementation in the case of unavailability of facilities or materials, and the Contractor shall be solely responsible to acquire alternative facilities/material to assure proper storage, handling etc.
- [37] The Purchaser's POC will inspect all packages, boxes and containers at final destination to ensure that no damage has occurred during transport and that all packages, boxes and containers detailed in the Packing List have been accounted for. The Purchaser will not open any packages, boxes or containers.
- IPS-34 The Contractor shall ensure that all required forms and certificates are provided and that all necessary procedures are followed for dangerous goods and goods requiring export licenses.
- IPS-35 The Contractor shall be responsible for customs clearance of all shipments into the 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 Custom Forms 302.

- IPS-36 The Contractor shall ensure that any requirements related to delivery and shipment of the equipment are obtained from NCI Agency in advance of shipments.
- IPS-37 The Contractor shall be responsible for the timely request of Custom Forms 302 at least 10 working days in advance of each shipment, required for duty free import/export of supplies between certain countries.
- IPS-38 The written request for a Custom Form 302 shall contain the following information:

Serial	Requirement
1	Purchaser Contract Number
2	Contract line Item Number (CLIN), designation and quantities
3	Destination
4	Number and gross weight
5	Consignor's and Consignee's name and address
6	Method of shipment, e.g., road, air sea, etc.
7	Name and address of the freight forwarder

- IPS-39 The request for a Custom Form 302 shall be addressed to:

XXXXXXXXXXXXXXXXX
 NATO Communication and Information Agency,
 Acquisition / Integrated Product Support
 XXXXXXXXXXX, Belgium
 Tel: XXXXXXXXXXX
 XXXXX.XXXXXX@ncia.nato.int

- IPS-40 Following receipt of the request by the Purchaser, normally a maximum of three working days are required for the issue of the form. The Custom Forms 302 shall be original, shall be delivered by mail/express courier and shall accompany the shipment and therefore no fax or electronic copy will be used, nor provided to the Contractor. If an express courier has to be used by the Purchaser, to ensure that the form is available on time before shipment, all associated costs shall be reimbursed by the Contractor.
- IPS-41 The Contractor shall be responsible to add the Custom Form 302 to the shipping documentation affixed to the to the exterior of the consignment in a sealed, weatherproof envelope on the outside of the shipment.
- IPS-42 The Contractor shall ensure that forwarding agents are informed of the availability of the Custom Form 302 and how this form is utilised to avoid the payment of Customs Duties and that the carrier shall be fully conversant with the application and use of Custom Form 302.