Acquisition
IFBCO115415DSGT@ncia.nato.int

NCIA/ACQ/2022/07177
23 September 2022

To: **Distribution List**

Subject: **AMENDMENT No.2 to Invitation for Bid: IFB-CO-115415-DSGT "PROVIDE MULTI-BAND DEPLOYABLE SATELLITE GROUND TERMINALS (DSGT) POOL"**

Project Serial: 2016/0CM03114

Reference:
A. AC/4(PP)D/28060-ADD1 dated 10 January 2022
B. AC/4-DS(2022)0001 dated 14 March 2022, NATO IC Decision Sheet
C. NCI Agency Notification of Intent to Invite Bids with reference NCIA/ACQ/2022/06771 dated 29 April 2022
D. NCI Agency Invitation For Bid: IFB-CO-115415-DSGT with reference NCIA/ACQ/2022/06959 dated 30 June 2022
E. NCI Agency Amendment No.1 to Invitation For Bid: IFB-CO-115415-DSGT with reference NCIA/ACQ/2022/07097 dated 30 August 2022

Dear Sir/Madam,

1. At Reference D your firm was invited to participate in an International Competitive Bidding for the provision of sixteen (16) x new multi-band (X- & military Ka-band) Deployable Satellite Ground Terminals (DSGT), including one for training and another one for a reference system.

2. The purpose of this Amendment 2 is to:
   a) Publish Purchaser's answers to the Clarification Requests (CRs) – batch 2, received to date from the potential Bidders for the subject IFB. The Purchaser is providing response to the CRs received by the potential Bidders in Annex A to this letter;
   b) Issue revised IFB documents (Book II), as follows:
      - IFB-CO-115415-DSGT-AMD2 - Book II, Part IV, SOW,) - as a consequence of the responses to some CRs and an amendment to a reference for a specification (see T.90);
      - IFB-CO-115415-DSGT-AMD2 - Book II, Part IV, SOW, Annex A (SRS), as a consequence of the responses to some CRs.

3. The IFB bid closing date **has not changed.** The closing time for the submission of bids in response to this IFB remains 17:00 Hours (Brussels time) on **31 OCTOBER 2022**.

4. Some answers to Bidders questions have necessitated changes to the IFB bidding documents. Revised bidding documents as indicated in Paragraph 2 above is attached to this IFB Amendment 2 and replaces the original versions in its entirety (the changes are marked in red). Potential Bidders are strongly advised to carefully review revised bidding documents

5. With the exception of the revisions mentioned above, all other IFB documents remain unchanged from their original version as issued on 30 June 2022 or as already amended.

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

7. The reference for the IFB is: **IFB-CO-115415-DSGT** and all correspondence concerning this IFB should reference this number.

8. The Purchaser point of contact for all information concerning this Invitation for Bid is:
   NATO Communications and Information Agency
   Boulevard Leopold III, B-1110 Brussels, Belgium
   Attn: Irina Barabancea, Contracting Officer
   Email: IFBCO115415DSGT@ncia.nato.int

FOR THE CHIEF OF ACQUISITION:

Tiziana Pezzi

Digitally signed by Tiziana Pezzi
Date: 2022.09.23 16:03:37 +02'00'

Tiziana Pezzi
Principal Contracting Officer

Enclosures:

1) Annex A - Purchaser's answers to the Clarification Requests
2) Revised Bidding Documents:
   - IFB-CO-115415-DSGT-AMD2 - Book II, Part IV, SOW;
   - IFB-CO-115415-DSGT-AMD2 - Book II, Part IV, SOW, Annex A (SRS).

NCIA/ACQ/2022/07177

ACKNOWLEDGEMENT OF RECEIPT OF AMENDMENT No.2
To IFB-CO-115415-DSGT

Please complete and return within 7 days by email to the POC

We hereby advise that we have received Amendment 2 to the Invitation for Bid **IFB-CO-115415-DSGT** on ....., together with all enclosures listed in the Table of Contents.

CHECK ONE

[ ] As of this date and without commitment on our part, we **do intend** to submit a quotation.

[ ] We **do not intend** to submit a quotation.

[ ] We are reviewing the requirements of the IFB and will notify you of our decision as soon as possible.

Signature .....

Company .....

Address .....

POC .....

Tel. .....

Fax .....

E-mail .....

DISTRIBUTION LIST FOR Amendment No.2 to INVITATION FOR BID

IFB-CO-115415-DSGT

Potential Bidders (sent separately in electronic version)

NATO Delegations (Attn: Investment Adviser):

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

Belgian Ministry of Economic Affairs 1

Embassies in Brussels (Attn: Commercial Attaché):

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

All Nominated Prospective Bidders

Country	Company
Canada	Advantech Wireless Technologies Inc.
	Calian, Advanced Technologies
	Comtech SNT Corp
	C-COM Satellite Systems Inc.
	ROCK Networks Inc.
	General Dynamics Mission Systems
	SpaceBridge Inc.
	Terranova Defense Solutions Incorporated
	Ultra Electronics TCS Inc. (Operating as “Ultra Communications”)
	Network Innovations Inc.
France	ACTIA Telecom
	Airbus Defence and Space SAS
	Kratos Communications
Germany	Airbus Defence and Space GmbH
	ND SatCom GmbH
	NSSL Global GmbH
Italy	ESYEN Sri
	General Dynamics Mission Systems Italy S.r.l.
	IES Sri
	LEONARDO S.p.A.
	MILANO TELEPORT Sri
	SUPPORT LOGISTIC SERVICES Sri
	Telespazio S.p.a.

Norway	Airbus Defence and Space AS
Poland	GISS Sp. z o.o.
Portugal	ALPHA C2 – Comércio e Indústria de Sistemas Eletrónicos de Comunicações e de Tecnologias Militares, Unipessoal, Lda.
Spain	AICOX Soluciones SA DEIMOS SPACE, S.L.U. Inster Tecnologia y Comunicaciones,SAU. Indra Sistemas s.a. Telefonica de España, Defensa y Seguridad
The Netherlands	Network Innovations B.V.
The United Kingdom	Global Radiodata Communications Ltd. Milexia UK Teledyne Limited Ultra Electronics Enterprises
The United States of America	Bushtex, Inc. CPI Satcom & Antenna Technologies Inc. Globecomm Systems, Inc. L3 Technologies, Inc. OneVUE Consulting LLC Secure Federal Operations LLC STS Global, Inc. UltiSat, Inc.

Date: 23 September 2022

ADMINISTRATION or CONTRACTING					
Serial Nr	**IFB Book**	**IFB Section Ref.**	**QUESTION**	**ANSWER**	**IFB amended**
A.1	Book I - Bidding Instructions Book II, Part I, Schedule of Services and Supplies (SSS)	Book I - Paragraph 4.1.3 Book II - Section 4 Integrated Product Support, IPS-2	Given the 20-year service life of the system solution and the evaluation criteria of lowest price, technically compliant, this procurement will be limited to systems that are current COTS solutions and as such, already technologically outdated. There appears to be no consideration for current or future advances in satellite communications technologies or the ability to ensure an intentional upgrade path to those technologies, thereby 'future proofing' the procurement and ensuring that NATO and NCIA receive a system solution that will truly afford it the best capabilities over the next 20 years. Recommend NCIA consider updating the evaluation criteria to 'best value' thereby affording it the ability to thoroughly evaluate system solution proposals that offer more robust and technologically forward-looking system solutions.	NATO Committee authorized the project as ICB Lowest-Cost Technically Compliant. The core purpose of this procurement is to introduce a dual-band (Mil-X/Ka) solution. The Purchaser has in place future opportunities during the mid-life of this future product to further introduce technology enhancements. This ICB Lowest-Cost Technically Compliant procurement has been carefully considered by the Purchaser to procure a product that meets the customer requirements and associated technical specifications at the lowest technically compliant cost to the contributing Nations. No change in procurement approach is foreseen at this time.	No amendment to IFB required

A.2	Book I - Bidding Instructions	Paragraph 2.15.1	Since we are integrators and not manufacturers, is it acceptable to be ISO compliant (not certified)?	This is not acceptable, as per Book I – par. 2.15.1 the Bidders shall possess an ISO certification (or equivalent). *2.15.1 Bidders are requested to note that, in accordance with the Certificate at Annex B-10 hereto, Bidders shall provide documentary evidence that the Bidder possesses a current certification that is compliant with the requirements of Allied Quality Assurance Publication (AQAP) 2110, ISO 9001, or an equivalent QA/QC regime.*	No amendment to IFB required
A.3	Book I - Bidding Instructions	Paragraph 2.15.1	If ISO certification is required, is it acceptable to be in the process of becoming certified?	This is not acceptable, as per Book I – par. 2.15.1 the Bidders shall possess an ISO certification (or equivalent).	No amendment to IFB required
A.4	Book II, Part IV, SOW Book II, Part II, Contract Special Provisions	Part IV - 2.2.5, 2.5.5, 6.2 TVVA Activities Part II – Article 7.4	All four of these reference locations have the following error message: Error! Reference sourced not found. Please provide the missing information.	Book II, Part IV, SOW • 2.2.5 – SOW92 - reference should read *"detailed in Section 4.8."* • 2.5.5 – SOW 168 - reference should read "*in accordance with section 4.7 and 4.8"* • 6.2 TVVA Activities (reference error in Table 6-1 "List of TVVA Phases" in column TVVA Phase "TVVA Assessment Phase" should read "*…of quality criteria defined in Figure 1...*". The Figure 1 - Product Quality Criteria is found under 6.4 TVV-23. Book II, Part II, SP • Article 7.4 has been amended through IFB Amendment 1 and should read *"…specified under Article 7.3"*	Please see IFB Amendment 2, Book II, Part IV

PRICE					
Serial Nr	**IFB Book**	**IFB Section Ref.**	**QUESTION**	**ANSWER**	**IFB amended**
P.1	Notification of Intent (NOI)	N/A	On April 29, 2022, the reported Estimated Value of IFB-CO-115415-DSGT was € 7,833,684. Do you have a more recent estimated value?	NATO Committee authorized the funding for this project at an estimated value of € 7,833,684 and no changes were made since then.	No amendment to IFB required

TECHNICAL					
Serial Nr	**IFB Book**	**IFB Section Ref.**	**QUESTION**	**ANSWER**	**IFB amended**
T.1	Book II, Part IV (SOW) – Annex A (SRS)	SRS -14	Does any modem include modems in TSGT? Can NATO provide a list of potential modem types?	The baseband will be through another project which is under bidding evaluation phase. In addition, EBEM modems which are already in NATO inventory will be used.	No amendment to IFB required
T.2	Book II, Part IV (SOW) – Annex A (SRS)	SRS -70	Can NATO provide an ICD for the DBAC to ensure compatibility?	The interfaces needed for MB-DSGT provider are already given under Sections 3.4.1 and 3.4.2 in detail. Also see Figure 2-1 for a general overview.	No amendment to IFB required
T.3	Book II, Part IV (SOW) – Annex A (SRS)	SRS -80	Will NATO accept Analysis as the Verification Method for this?	A CoC (Certificate of Compliance) based on analysis (provided that analysis report attached to CoC) is acceptable for the requirement.	No amendment to IFB required
T.4	Book II, Part IV (SOW) – Annex A (SRS)	SRS -81	Will NATO accept Analysis as the Verification Method for this?	A CoC (Certificate of Compliance) based on analysis (provided that analysis report attached to CoC) is acceptable for the requirement.	No amendment to IFB required
T.5	Book II, Part IV (SOW) – Annex A (SRS)	SRS -96	Would NATO consider changing this requirement to match MIL-STD-188-164C with "no greater than 2dB" to achieve lower cost?	The requirement can not be changed due to the possible usage with dual-polarization satellites. NATO has already a range of terminals that have axial ratio better than 1.0 dB.	No amendment to IFB required
T.6	Book II, Part IV (SOW) – Annex A (SRS)	SRS -97	Would NATO consider changing this requirement to match MIL-STD-188-164C with "no greater than 2dB" to achieve lower cost?	The requirement can not be changed due to the possible usage with dual-polarization satellites. NATO has already a range of terminals that have axial ratio better than 1.0 dB.	No amendment to IFB required

T.7	Book II, Part IV (SOW) – Annex A (SRS)	SRS -99	Would NATO consider changing this requirement to match MIL-STD-188-164C with "no greater than 1.5dB" to achieve lower cost?	The requirement can not be changed due to the possible usage with dual-polarization satellites.	No amendment to IFB required
T.8	Book II, Part IV (SOW) – Annex A (SRS)	SRS -101	Would NATO consider removing the gain requirements as in MIL-STD-188-164C and relying on the ESD mask instead?	The requirement is to be able to see if there is any excess over the mask at antenna level. NATO follows STANAGs as well as MIL-STDs depending on interoperability and operational needs. The requirement is in-line with STANAG 5648 and ITU.	No amendment to IFB required
T.9	Book II, Part IV (SOW) – Annex A (SRS)	SRS -107	Would NATO consider changing this requirement to 3.5dB peak to peak to match the MIL-STD-188-165C requirement to reduce design and test time?	We believe, MIL-STD-188-164C is referred. The requirement is already referring to 2.5 dB p-p and already provided with current inventory.	No amendment to IFB required
T.10	Book II, Part IV (SOW) – Annex A (SRS)	SRS -109	Would NATO consider changing this requirement to +/-0.2 radians over 2 MHz and some other value over 10 MHz, if needed? This would match the MIL-STD-188-164C requirement.	The requirement written by taking into account operational bandwidths.	No amendment to IFB required
T.11	Book II, Part IV (SOW) – Annex A (SRS)	SRS -110	Would NATO consider changing +/- 1.5 dB over full band to MIL-STD-188-164C +/- 2.0 dB over full band to decrease cost of system components and test?	The requirement will be updated as follows: *SRS-110 Amplitude variations of the transmit (uplink) function when operating at maximum linear power shall not exceed the following:* *1) ±0.5 dB over any 10-MHz segment across the instantaneous bandwidth.* *2) ±1.5 dB over any 120-MHz segment, or any smaller segment, across the instantaneous bandwidth (10 MHz < segment < 120 MHz).* *3) ±2.0 dB for each output frequency band in X (7.9-8.4 GHz) and mil-Ka (30-31 GHz) band.*	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)

T.12	Book II, Part IV (SOW) – Annex A (SRS)	SRS -118	Would NATO consider updating this specification to MIL-STD-188-165C 4.2.16 and 4.3.3.1?	We believe, MIL-STD-188-164C is referred. The requirement is in-accordance with STANAG 5648 and will be kept due to the interoperability requirement with different constellations.	No amendment to IFB required
T.13	Book II, Part IV (SOW) – Annex A (SRS)	SRS -120	Would NATO consider changing this 1.5:1 VSWR across the full band to the MIL-STD_188-165C spec of 1.5:1 under 1GHz and <2.0:1 over 1GHz to reduce cost and test time?	We believe, MIL-STD-188-164C is referred. Considering IF, only 50 MHz portion remain under 1 GHz. Switching from 1.5:1 to 2.0:1 for VSWR results in 7.1% more loss on the reflected power. The test time should not be affected from the value.	No amendment to IFB required
T.14	Book II, Part IV (SOW) – Annex A (SRS)	SRS -127	Would NATO consider changing this requirement to +/-0.2 radians over 2 MHz and some other value over 10 MHz, if needed? This would match the MIL-STD-188-164C requirement.	The requirement written by taking into account operational bandwidths.	No amendment to IFB required
T.15	Book II, Part IV (SOW) – Annex A (SRS)	SRS -134	Would NATO consider changing this requirement to match the MIL-STD-188-165C requirement of +/- 2 dB to decrease design and test time?	We believe, MIL-STD-188-164C is referred. The requirement will be updated as follows: *SRS-134 For any setting of the receive gain and for a constant PSD level, the reception function output level shall not vary more than ±2.0 dB in any 24-h period.*	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)
T.16	Book II, Part IV (SOW) – Annex A (SRS)	SRS -125	Would NATO consider changing this 1.5:1 VSWR across the full band to the MIL-STD_188-165C spec of 1.5:1 under 1GHz and <2.0:1 over 1GHz to reduce cost and test time?	We believe, MIL-STD-188-164C is referred. Considering IF, only 50 MHz portion remain under 1 GHz. Switching from 1.5:1 to 2.0:1 for VSWR results in 7.1% more loss on the reflected power. The test time should not be affected from the value.	No amendment to IFB required
T.17	Book II, Part IV (SOW) – Annex A (SRS)	SRS -128	Would NATO consider changing +/- 1.5 dB over full band to MIL-STD-188-164C +/- 2.0 dB over full band to decrease cost of system components and test?	The requirement will be updated as follows: *SRS-128 Amplitude variations as measured at the system IF output (demodulator input) shall not exceed the following:*	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)

				1) ±0.5 dB over any 10-MHz segment across the instantaneous bandwidth *2) ±1.5 dB over any 120-MHz segment or smaller segment across the instantaneous bandwidth (10 MHz < segment < 120 MHz)* *3) ±2.0 dB for each frequency band in X (7.25-7.75 GHz) and mil-Ka (20.2-21.2 GHz) band.*	
T.18	Book II, Part IV (SOW) – Annex A (SRS)	SRS -131	Would NATO consider updating this specification to MIL-STD-188-165C 4.3.9.3? a. Transmitting a single CW carrier at maximum-linear power. b. Receiving one CW carrier at any frequency over the receive band, with a level equivalent to the antenna receiving the aggregate maximum power flux density given in 4.3.2.	We believe MIL-STD-188-164C is referred. The MB-DSGT is a multi-carrier system where making measurement with a single carrier has no reflection on the real operational scenario.	No amendment to IFB required
T.19	Book II, Part IV (SOW) – Annex A (SRS)	SRS -132	Can NATO provide a signal power range for normal operations? Is there a non-damage signal level that the terminal should support?	For the baseband part, the modem provided as PFE, will be able to demodulate IF input carriers in the presence of total IF input power up to +10 dBm. The modem, provided as PFE, will not be damaged by a continuous L-band input up to +15 dBm.	No amendment to IFB required
T.20	Book II, Part IV (SOW) – Annex A (SRS)	SRS -139	Can this requirement be met with Inspection of TFRS equipment data sheets? Or does this need to be a Test?	The verification method shall be "test".	No amendment to IFB required
T.21	Book II, Part IV (SOW) – Annex A (SRS)	SRS -141	Does NATO plan to use any RF cable IFL's? For instance, to connect to legacy TSGT's or legacy modem cases? Does DSGT need to provide RF to FO converters for legacy equipment?	Please refer to Figure 2-1 for the interface with legacy TSGTs/modem cases. The conversion from FO to RF/Ethernet should be already done in IFoFL remote part.	No amendment to IFB required

T.22	Book II, Part IV (SOW) – Annex A (SRS)	SRS -145	Will NATO reconsider this requirement? Multi-carrier X-Band amplifiers are heavier when packaged for transportation.	50.8 kg is the maximum limit for a two-man lift from the floor and place it on a surface not greater than 152 cm (5.0 ft) above the floor in 1472G (two -person lift is much smaller) 10% excess tolerance could be applied by exception subject to Purchaser approval. The requirement will be updated as follows: *SRS-145 When the system is packed for transportation, the gross weight of each case shall not exceed 50.8 kg. 10% excess tolerance could be applied by exception subject to Purchaser approval.*	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)
T.23	Book II, Part IV (SOW) – Annex A (SRS)	SRS -151	How does NATO recommend verifying this requirement? Test , Inspection, Analysis, or Demonstration?	Recommended verification by test or demonstration. The requirement will be updated as follows: *SRS-151 Pressure release valves shall avoid soaking water into the case. This can occur for example (but not only) due to the negative pressure when a case is rapidly cooled down during rain after being exposed long to the sun. Verification of the requirement shall be performed either by a test or a demonstration.*	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)
T.24	Book II, Part IV (SOW) – Annex A (SRS)	SRS -187	Will NATO consider some allowance for RF degradation based on the coatings the net is required to have? If no, do the environmental tests need to include the net?	As per SRS-187 the "…system shall continue to meet all requirements specified throughout this SRS (including RF and system performance)…" which includes fulfilling the specified EIRP and G/T values with camouflage nets. Product data sheet / Certificate of Compliance would suffice for the environmental requirements of the camouflage nets.	No amendment to IFB required
T.25	Book II, Part IV (SOW) – Annex	SRS -144	Will NATO consider a higher case maximum to assist with the 2-person lift	The requirement will be updated as follows:	Please see IFB Amendment 2,

	A (SRS)		requirement? There may be more cases, but each case is lighter.	*SRS-144 The system, including all auxiliary equipment such as lashing material, wind tie-downs, grounding and lightning protection system etc., shall be able to be packed into no more than 12 cases and be palletable (TFRS can be included in a case on top of 12 cases).*	Book II, Part IV (SOW) – Annex A (SRS)
T.26	Book II, Part IV (SOW) – Annex A (SRS)	SRS -182	Will Netting need to undergo separate environmental testing?	Not specifically required. Product data sheet/ Certificate of Compliance issued by the manufacturer confirming meeting the requirements shall be sufficient. The requirement will be updated as follows: *SRS-182 Camouflage net shall remain pliable in the extreme environmental conditions the associated MB-DSGT is to be compliant with. Verification of the requirement shall be performed by reviewing a product data sheet/ Certificate of Compliance issued by the manufacturer.*	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)
T.27	Book II, Part IV (SOW) – Annex A (SRS)	SRS -193	Does NATO have documentation to share regarding these remote software M&C applications to ensure interoperability?	DBAC and ASNMC equipment haven't been acquired yet, however from MB-DSGT Contractor perspective the interfaces needed are already defined (both optical and IF ones) throughout the SRS, see Sections 3.4.1 and 3.4.2.	No amendment to IFB required
T.28	Book II, Part IV (SOW) – Annex A (SRS)	SRS -194	Does this include rain, hail, snow or thermal/humidity/altitude characteristics only?	It also includes rain, hailstone and snow. However, procedures for teardown packing shall include instructions for maintenance before long term storage (for example cleaning and drying of equipment and camouflage nets etc.). The requirement will be updated as follows: *SRS-194 The system shall be capable of being*	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)

				deployed and packed in environmental conditions for which performance is guaranteed.The environmental conditions include rain, hail, snow and thermal/ humidity/altitude characteristics. *The procedures for teardown packing shall include instructions for maintenance before long-term storage (for example cleaning and drying of equipment and camouflage nets etc.)*	
T.29	Book II, Part IV (SOW) – Annex A (SRS)	SRS -196	Does this include rain, hail, snow or thermal/humidity/altitude characteristics only?	It also includes rain, hailstone and snow. The requirement will be updated as follows: *SRS-196 The equipment shall be capable of being deployed and packed during winter conditions by operators wearing gloves. The winter conditions include rain, hail, snow and thermal/humidity/altitude characteristics.*	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)
T.30	Book II, Part IV (SOW) – Annex A (SRS)	SRS -147	Does this include laptop battery? Can batteries be flagged for special treatment?	This requirement applies to all batteries used in the system (UPS and laptops included). The contractor shall provide evidence that batteries are transportable by air in safe manner and according to ICAO and IATA requirements. The batteries shall be provided with Material Safety Data Sheet (MSDS) as required by International Civil Aviation Organization (ICAO), and International Air Transportation Association (IATA) for air transportation of dangerous goods. The battery MSDS shall confirm the batteries testing and certification according to United Nations publication: 'Manual of Tests and Criteria for Transportation of Dangerous Goods', part III, subsection 38.3, transport class 9. The requirement will be updated as follows (the rest	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)

				of given clarification already defined under SRS-254 and SRS-255): *SRS-147 The system shall be capable of being transported by air (fixed-wing airplane or helicopter) in un-pressurized compartments, without sustaining damage or prejudicing safety, including restrictions and requirements for transportation of dangerous goods.The requirement applies to all batteries used in the system (UPS and laptops included)*	
T.31	Book II, Part IV (SOW) – Annex A (SRS)	SRS -207	Can NATO provide the interface control documents for DBAC, legacy DSGT, and both varieties of TSGT? This will be necessary to understand the interoperability needs of the DSGT.	The interfaces needed for MB-DSGT provider are already given under Sections 3.4.1 and 3.4.2 in detail. Also see Figure 2-1 for a general overview.	No amendment to IFB required
T.32	Book II, Part IV (SOW) – Annex A (SRS)	SRS -208	Can NATO provide the interface control document for the SAC's NATO will need to be interoperable with?	Note that the requirement is "over the air". The interfaces needed for MB-DSGT provider are already given under Sections 3.4.1 and 3.4.2 in detail. Also see Figure 2-1 for a general overview.	No amendment to IFB required
T.33	Book II, Part IV (SOW) – Annex A (SRS)	SRS -239	What generator does NATO usually use? Type of interfaces, number of interfaces, capacity etc.	Please refer to Figure 2-1 for the power inputs provided to the MB-DSGT. For the generators, the nominal voltage range will be 230 VAC +10%, -15% and nominal frequency range will be 50 Hz ± 3 Hz.	No amendment to IFB required
T.34	Book II, Part IV (SOW) – Annex A (SRS)	SRS -286	Can NATO provide a preferred test method to achieve instantaneous temperature variation? Would the definition provided in MIL-STD-810H of temperature change of 10 degrees per minute be acceptable as instantaneous? Is the variation in the positive or negative direction or both? What is the Lifecycle	The definition in MIL-STD-810G w/Change 1 defined as 'an air temperature change greater than 10°C within one minute' is acceptable as the minimum. The specimens shall be tested both in the positive and negative direction (low-to-high and high-to-low temperature). The project calls for deployable system that shall be transportable via air, land and see to various	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)

			Event associated with this requirement?	geographical locations characterized by different climatic conditions. Hence the system will be exposed to aircraft flight exposure, air delivery – desert, ground transfer - ambient to or from either cold regions or desert. The requirement will be updated as follows: *SRS-286 The equipment, in their storage/transport packaging if applicable, shall withstand an instantaneous temperature variation of 63 ºC of the ambient temperature.The equipment shall be tested against the temperature variation both in the positive and negative direction (low-to-high and high-to-low temperature).The definition in MIL-STD-810G w/Change1 defined as 'an air temperature change greater than 10°C within one minute' is applicable as the instantaneous temperature variation.*	
T.35	Book II, Part IV (SOW) – Annex A (SRS)	SRS -287	100% humidity is not easily achievable with test equipment. Would NATO consider changing this to 95%?	For the test chamber control purpose 100% humidity implies as close as possible to 100% but at the minimum 95%. Hence, 95% as the minimum is acceptable. The requirement will be updated as follows: *SRS-287 The system shall withstand humidity levels ranging from 5% to 100 % (saturation) for storage, transport, and handling, with the applicable change of temperature. For the test chamber control purpose, 100% humidity implies as close as possible to 100% but at the minimum 95%.*	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)
T.36	Book II, Part IV (SOW) – Annex A (SRS)	SRS -288	What is meant by applicable change of temperature? Would NATO consider changing this to 95%?	For the test chamber control purpose 100% humidity implies as close as possible to 100% but at the minimum 95%. Hence, 95% as the minimum is	Please see IFB Amendment 2, Book II, Part IV

				acceptable. Since for the test purposes the humidity will vary from 5% to ~ 100%, the temperature will change as well. Example of applicable varying temperature is specified in MIL-STD-810H, Method 507.6 Humidity. The requirement will be updated as follows: *SRS-288 The system (excluding TFRS, indoor part of IFoFL and M&C Laptop) shall withstand humidity levels ranging from 5% to 100 % (saturation) for operation, with the applicable change of temperature. For the test chamber control purpose, 100% humidity implies as close as possible to 100% but at the minimum 95%.*	(SOW) – Annex A (SRS)
T.37	Book II, Part IV (SOW) – Annex A (SRS)	SRS -291	Can NATO recommend a verification method? Does this condition consider the netting or not?	The form of verification is analysis. The analysis is not required specifically for the camouflage nets themselves. However, when indicating specific procedures, to be followed in order to avoid damage to outdoor equipment immediately before and during hailstorms, camouflage nets can be taken into consideration as part of mitigation measures. The requirement will be updated as follows: *SRS-291 The outdoor equipment shall survive hailstones of up to 25 mm diameter and 0.9 g/cm³ density and 58 m/s terminal velocity during operation, transport, storage, handling. The Contractor shall indicate in his design documentation the consequences of such hailstorms and identify the parts and components which may be damaged during such severe hailstorms. The Contractor shall also indicate the specific procedures to be followed in*	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)

				order to avoid such damage immediately before and during such hailstorms, and list the expected necessary spares and tools aimed to repair the equipment. Verification of the requirement shall be performed by analysis. *The analysis is not required specifically for the camouflage nets themselves.* *When indicating specific procedures, to be followed in order to avoid damage to outdoor equipment immediately before and during hailstorms, camouflage nets can be taken into consideration as part of mitigation measures.*	
T.38	Book II, Part IV (SOW) – Annex A (SRS)	SRS -292	Will NATO consider breaking down specific test cases that need to be met for each condition: operational, transport, storage, and handling?	The form of verification is analysis. The analysis shall be performed for: - Outdoor equipment: operation, transport, storage, and handling - Other equipment: transport, storage, and handling The requirement will be updated as follows: *SRS-292 The system shall withstand snow loads of 50 kg/m² for small devices, and of 100 kg/m² for large devices during operation (outdoor equipment only), transport, storage, and handling. Verification of the requirement shall be performed by analysis. The analysis is not required specifically for the camouflage nets themselves.*	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)
T.39	Book II, Part IV (SOW) – Annex A (SRS)	SRS -294	Does this condition apply to operational, transport, storage, and handling?	For outdoor equipment it applies to operation, transport, storage, and handling. For other equipment it applies to transport, storage, and handling.	No amendment to IFB required
T.40	Book II, Part IV (SOW) – Annex A (SRS)	SRS -325	Can the government define what combinations are expected in item 10?	Combined stress testing already excluded from the requirement with Amendment 1.	No amendment to IFB required

T.41	Book II, Part IV (SOW) – Annex A (SRS)	SRS -326	What does NATO consider to be a "certified" lab?	The certified laboratory is the laboratory that is accredited according to: ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. Alternatively, it can be a laboratory that is accredited according to a national equivalent standard on the condition that such equivalent standard is recognized, applicable and in force in given NATO nation. The requirements will be updated as follows: *SRS-326 The mechanical tests shall include series of tests conducted in NATO country certified laboratory/testing plant*. Those tests shall include as a minimum:* *1) Shock* *2) Vibration* *3) Acceleration* *4) Drop and topple* *5) Free fall* **A certified laboratory is the laboratory that is accredited according to: ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. Alternatively, it can be a laboratory that is accredited according to a national equivalent standard on the condition that such equivalent standard is recognized, applicable and in force in given NATO nation.*	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)
T.42	Book II, Part IV (SOW) – Annex A (SRS)	SRS -333	Does NATO have representative examples of EMI emanating from "other equipment"?	MB-DSGT has the operational scenario to be deployed with other systems, which are already given under SRS. The aim of the requirement is to reduce harmonic content and noise so that eliminating the disturbance with the comms.	No amendment to IFB required

T.43	Book II, Part IV (SOW) – Annex A (SRS)	SRS -334	Does NATO have representative examples of "other equipment" that may need protecting from EMI?	MB-DSGT has the operational scenario to be deployed with other systems, which are already given under SRS. The aim of the requirement is to reduce harmonic content and noise so that eliminating the disturbance with the comms.	No amendment to IFB required
T.44	Book II, Part IV (SOW) – Annex A (SRS)	SRS -359	How would NATO propose to verify this, especially with COTS components and cables?	Verification shall be based on visual inspection (sample check) that can be executed by the system operators and maintainers (level I and II as the minimum). The requirements will be updated as follows: *SRS-359 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. Verification of the requirement shall be performed by visual inspection (sample check) that can be executed by the system operators and maintainers (level I and II as the minimum).*	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)
T.45	Book II, Part IV (SOW) – Annex A (SRS)	SRS -367	Can NATO provide a list of hazardous materials?	Glass fibre materials shall not be used as the outer surface or covering on cables, wire or other items where they may cause skin irritation to operating personnel. No asbestos is acceptable. Additionally, Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 (or its national equivalent) shall be applied to all individual components of the hardware. For products placed on the market on or after 22 July 2019 Commission Delegated Directive (EU) 2015/863 of 31 March 2015 (or its national equivalent) amending Annex II to Directive 2011/65/EU of the	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)

				European Parliament and of the Council applies. Exceptions can be accepted if the Contractor demonstrates that there is no feasible alternative possible, basing on following statement from Directive 2011/65/EU: 'Article 2 – Scope, 4. This Directive does not apply to: (a) equipment which is necessary for the protection of the essential interests of the security of Member States, including arms, munitions and war material intended for specifically military purposes' . The requirement will be updated as follows: (Directive 2011/65/EU and Directive (EU) 2015/863 already addressed in SRS-338): *SRS-367 No hazardous materials (of any kind) shall be used in the construction of the equipment.* *Glass fibre materials shall not be used as the outer surface or covering on cables, wire or other items where they may cause skin irritation to operating personnel.*	
T.46	Book II, Part IV (SOW) – Annex A (SRS)	SRS -379	Can NATO provide a timeline or steps that must be followed to meet SAA approval for adequate schedule estimations? Is it similar to NSA accreditation?	It may be similar, however we cannot fully confirm. Please use as reference what it is already published in AFPL. As a note, it is already mentioned in the provided SRS that: *Already approved Operating systems and applications can be found on the NATO Approved Field Product List (AFPL).* It is important that the system is not legacy and during its lifecycle it can be configured in line with NATO's security requirements (e.g.: see Directive D0048 requirements for updates and patches (SW5-1), protection against malicious code (PSW3-1), or specific hardening controls (PSW4-3).	No amendment to IFB required

T.47	Book II, Part IV (SOW) – Annex A (SRS)	SRS -378	What data input/output is considered in need of sanitization?	The system shall only accept the designed data and it shall only operate in line with the requirements. Besides basic input filtering, data processing and output controls, according to Directive D-0048, input sanitisation controls shall also include controls to prevent Cross Site Scripting (XSS), SQL injection, or buffer overflows.	No amendment to IFB required
T.48	Book II, Part IV (SOW) – Annex A (SRS)	SRS -396	Does NATO currently have a repository to accept log files from DSGT?	Logging records shall be stored in MB- DSGT M&C laptop. The requirement shall be updated as follows: *SRS-396 Logging records shall be kept either online or offline for 3 years. Logging records shall be stored in MB-DSGT M&C Laptop.*	Please see IFB Amendment 2, Book II, Part IV (SOW) - Annex A (SRS)
T.49	Book II, Part IV (SOW) – Annex A (SRS)	SRS -377	If additional fields are needed to be added to SW in accordance with this specification, does that make the SW bespoke and needing to be sent to NATO for approval?	The question is not necessarily related to the mentioned requirement. The requirement applies to the lifecycle of systems or system components mostly or completely developed in house. As mentioned above, it is important that the system is not legacy and during its lifecycle it can be configured in line with NATO's security requirements (e.g.: see Directive D0048 requirements for updates and patches (SW5-1), protection against malicious code (PSW3-1), or specific hardening controls (PSW4-3).	No amendment to IFB required
T.50	Book II, Part IV (SOW) – Annex A (SRS)	SRS -382	Can the government supply us a copy of the configuration guide?	Configuration guides are OS and application specific so depends on the OS and applications provided by the Contractor. The requirement will be updated as follows: *SRS-382 Up to date hardening guidance to Operating System (OS) and configurable applications shall be*	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)

<table>
<tr><td></td><td></td><td></td><td></td><td>applied. NATO approved security configuration guides are available upon request after Contract Award.</td><td></td></tr>
<tr><td>T.51</td><td>Book II, Part IV (SOW) – Annex A (SRS)</td><td>SRS -384</td><td>What data related to the terminal does NATO deem necessary to be protected? Or is the data only related to the modem traffic?</td><td>All data on M&C laptop shall be protected.</td><td>No amendment to IFB required</td></tr>
<tr><td>T.52</td><td>Book II, Part IV (SOW) – Annex A (SRS)</td><td>SRS-139</td><td>We have not been able to identify a COTS product that meets the phase noise specifications in SRS-139 including the supplier for the previous generation DSGT terminal.

Will NCIA consider relaxing the specification as follows, all units are in dBc/Hz:
1 Hz - not specified, or 100
10 Hz -125</td><td>The requirement shall be updated as follows:

SRS-139 TFRS Single Side Band (SSB) phase noise characteristics shall comply with below specifications:
Table 1-TFRS Phase Noise
<table><tr><td>Frequency Offset</td><td>SSB Phase Noise Power Density (dBc/Hz)</td></tr><tr><td>1 Hz</td><td>-100</td></tr><tr><td>10 Hz</td><td>-125</td></tr><tr><td>100 Hz</td><td>-135</td></tr><tr><td>1 Khz</td><td>-140</td></tr><tr><td>10 Khz and above</td><td>-140</td></tr></table></td><td>Please see Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)</td></tr>
<tr><td>T.53</td><td>Book II, Part IV (SOW) – Annex A (SRS)</td><td>SRS-139</td><td>We have not been able to identify a COTS product that meets the phase noise specifications in SRS-139 including the supplier for the previous generation DSGT terminal.

Will NCIA consider making the TFRS a Customer Furnished Equipment (CFE) that is supplied to the bidder?</td><td>SRS-139 updated.

It is not possible to make TFRS CFE.</td><td>Please see Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)</td></tr>
</table>

T.54	Book II, Part IV (SOW) – Annex A (SRS)	SRS-135, SRS-71	From the notional block diagram Figure 2-1 the TFRS and IFoFL are shown as being co-located with "BaseBand Components". Is there a space allocation in an existing transit case for the TFRS and IFoFL or is the expectation that a transit case will be supplied with the TFRS and IFoFL units?	The initial location of TFRS and indoor part of IFoFL shall be the cases supplied by MB-DSGT Contractor. When the DBAC (mainly the cases that will hold the baseband and network components) part of MB-DSGT arrives, TFRS and indoor part of IFoFL shall be integrated into DBAC.	No amendment to IFB required
T.55	Book II, Part IV (SOW) – Annex A (SRS)	SRS-144	From the notional block diagram Figure 2-1 the TFRS and IFoFL are shown as being co-located with "BaseBand Components". Are the TFRS and IFoFL units to be included in the allowance of 12 cases?	Indoor part of IFoFL shall be included in the allowance of 12 cases. TFRS can be included in a case on top of 12 cases. The requirement will be updated as follow: *SRS-144 The system, including all auxiliary equipment such as lashing material, wind tie-downs, grounding and lightning protection system etc., shall be able to be packed into no more than 12 cases and be palletable (TFRS can be included in a case on top of 12 cases).*	Please see Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)
T.56	Book II, Part IV (SOW) – Annex A (SRS)	SRS-144	The combination of the individual case weight limitation of 50.8 kg and the limit of no more than 12 cases is a significant challenge to address. Will NCIA consider changing the case quantity to be no more than 14 cases?	NCI Agency is surprised to see the physical footprint is a challenge to address since there were considerable number of replies to the market survey (done years ago) referring to much smaller footprint than the requested one. 50.8 kg is the maximum limit for a two-man lift from the floor and place it on a surface not greater than 152 cm (5.0 ft) above the floor in 1472G (two-person limit is much lower). 10% excess tolerance could be applied by exception subject to Purchaser approval. SRS-145 will be updated as follow:	Please see Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)

				SRS-145 When the system is packed for transportation, the gross weight of each case shall not exceed 50.8 kg. 10% excess tolerance could be applied by exception subject to Purchaser approval. SRS-144 will be updated as in the reply to the previous question.	
T.57	Book II, Part IV (SOW) – Annex A (SRS)	SRS-216	Lead times for "Stratos Lightwave HMA or compatible, 4-channel, straight (i.e. non angled) polish, Jam Nut style bulkhead connectors" are being quoted at 26 – 32 weeks from all sources of supply. Will NCIA consider allowing other types of connectors such as TFOCA II?	The requirement is already referring to Stratos Lightwave HMA or compatible; *SRS-216 Any optical interfaces presented on the external interface panels and all external fibre optic reels shall be implemented using Stratos Lightwave HMA or compatible, 4-channel, straight (i.e. non angled) polish, Jam Nut style bulkhead connectors.*	No amendment to IFB required
T.58	Book II, Part IV (SOW) – Annex A (SRS)	SRS-214	Can the indoor portion of the IFoFL be excluded from this requirement?	Indoor part of the IFoFL is excluded from this requirement.	No amendment to IFB required
T.59	Book II, Part IV (SOW)	N/A - General question	Is it acceptable for the Contractor to install an additional network switch for monitor & control purposes?	It is up to the Contractor's design, as long as the requirements in SRS are met.	No amendment to IFB required
T.60	Book II, Part IV (SOW)	N/A - General question	Will a networking device for the TFRS and M&C laptop located with Purchaser's baseband equipment need to be provided by Contractor or is a networking device part of the Purchaser's equipment?	Please refer to Figure 2-1. M&C laptop does not have to be always located with the baseband equipment. When M&C laptop is located with baseband equipment and TFRS, there will be switch inside the baseband case that will be provided (PFP).	No amendment to IFB required
T.61	Book II, Part IV (SOW) – Annex A (SRS)	3.4, SRS-199	Are we able to use N-Type adaptors to meet the requirements for the need of N-Type connectors?	The question is not very clear whether it is referring to mating connectors. As referred in the requirement *"SRS-199 All connectors, cables, and waveguides shall have a mating connector supplied, exceptions such as N-type and BNC-type connectors shall be subject to Purchaser approval."* it shall be evaluated	No amendment to IFB required

				on case by case basis.	
T.62	Book II, Part IV (SOW) – Annex A (SRS)	3.1.3	What is the Purchaser looking to see for maximum output power in watts or dB of the amplifier or block up converter?	The requirement for EIRP performance specs are already given under Section 3.2	No amendment to IFB required
T.63	Book II, Part IV (SOW) – Annex A (SRS)	SRS-396 & 397	For the 3 years' worth of logs to be kept on local storage, approximately how much storage do these logs use in 1 year?	Around 1 GB	No amendment to IFB required
T.64	Book II, Part IV (SOW) – Annex A (SRS)	3.1.6 SRS-42	SecureSync2400 is able to output 4 10MHz outputs but the level is fixed to +13dBm (I 50 ohms). Is this acceptable?	The level shall be adjustable.	No amendment to IFB required
T.65		Section 1.2[11] & Appendix D[11], 4 & 7	Is it possible to know the manufacturer and model of the legacy equipment with a technical manual detailed to determine interoperability?	The connections to these systems are shown under Employment Scenarios 1.1 as well as under Section 2, which give the required information for MB-DSGT side. Please see also Section 3.4.	No amendment to IFB required
T.66	Book II, Part IV (SOW)	1.4	Please clarify if the UPS is to only power the motorised antenna, BUC, LNB and outdoor fibre optic equipment.	Please refer to SRS-238 which clearly states what will be on UPS: *SRS-238 The system shall have its own UPS which shall provide no-break power supply to the entire MB-DSGT, including the outdoor part of the IFoFL (the indoor part of the IFoFL and TFRS will have its own supply). The de-icer and antenna motors don't need to be on UPS.*	No amendment to IFB required
T.67	Book II, Part IV (SOW)	3.7.9	Is CARC paint to be applied to all equipment with exposed surfaces in transportable configuration?	The answer is yes. This means that for example all outer surfaces of cases shall be CARC coated. The requirement also applies to outdoor equipment as per SRS-321.	No amendment to IFB required
T.68	Book II, Part IV (SOW)	SRS-178	SRS-178 requests that the camouflage nets are 100% waterproof. By its very nature, a net is not 100% waterproof.	Waterproofness of the camouflage net shall be understood as no water absorption property. The camouflage net allows water pass through its	No amendment to IFB required

			Does the customer require the net to be supplied with a plastic sheet or similar below the net?	surface and it is not expected from the Contractor to provide any additional membrane such as a plastic sheet or similar underneath the net.	
T.69	Book II, Part IV (SOW) – Annex A (SRS)	3.4.2, SRS-216	Jam nut bulkhead connectors requirement for fibre - Are the fibre cable drums required to have a central hub mounted jam nut bulkhead connector for the inner end or are the reels required to be free plug to free plug enabling them to be wound off the reels?	The requirement will be updated as follows: *SRS-216 Any optical interfaces presented on the external interface panels ~~and all external fibre optic reels~~ shall be implemented using Stratos ~~Lightwave~~ HMA or compatible, 4-channel, straight (i.e. non angled) polish, Jam Nut style bulkhead connectors. Cables shall provide an HMA plug at both ends of the fiber optic cable.The bulkhead connector shall be compliant with MIL-DTL-83526/21C, the plug shall be compliant with MIL-DTL-83526/20C. The reels shall be double flange.*	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)
T.70	Book II, Part IV (SOW) – Annex A (SRS)	SRS-71	50cm max depth is stipulated. Is there an intention to house this unit in an existing flight case? Please confirm if we are required to provide a flight case for the remote end (i.e. not the antenna end) equipment ?	In the end stage, the indoor unit of fiber optic converter set (IDU) shall be integrated into deployable baseband case (DBAC) which will be provided as PFE. However until this case is provided, indoor unit of fiber optic converter set shall be hosted inside the cases (requirements of cases are already given in SRS) that shall be provided by MB-DSGT Contractor. Therefore, 50 cm is the requirement due to the final and permanent location of the indoor unit of the fiber optic converter set.	No amendment to IFB required
T.71	Book II, Part I (SSS) Book II, Part IV (SOW)	Part IV 2.3.6, SOW 129	System Acceptance Testing (SAT) SOW 129: It is mentioned that “test shall prove compliance with all applicable requirements, including Environmental requirements as detailed in Annex A”. Is environmental testing, already tested during Qualification, required to be	Test results from Qualification testing can be used to verify the environmental requirements during SAT and only if there are concerns with the results would anything need to be retested and validated during SAT.	No amendment to IFB required

			conducted again in SAT?		
T.72	Book II, Part IV (SOW)	2.3.6, SOW 144	Schedule A table specifies SAT, SIT and UAT are to be conducted on all 16 antennas, this does not agree with SOW 144/- which only species FAT. Please clarify if SAT, SIT & UAT are only required for the First Article antenna or for all 16 production deliverable systems.	Only the first FAT (on the first article) will be performed with the Purchaser witnessing. All other 15 FATs are expected to be performed by the Contractor prior to shipment and SAT. The Contractor and Purchaser, together on all 16 terminals (in batches as delivered), will perform SAT. The Purchaser and the End Users (with Contractor support as required) will perform SIT and UAT. Test results from SAT of all 16 terminals are required inputs into each PSA report.	No amendment to IFB required
T.73	Book II, Part IV (SOW) – Annex A (SRS)	SRS-382	Please provide a copy of the NATO approved security configuration guides.	Configuration guides are OS and application specific so depends on the OS and applications provided by the Contractor. The requirement will be updated as follows: *SRS-382 Up to date hardening guidance to Operating System (OS) and configurable applications shall be applied. NATO approved security configuration guides are available upon request after Contract Award.*	Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)
T.74	Book II, Part IV (SOW) – Annex A (SRS)	SRS-27 and SRS-34	IF frequency band from 1000 to 2000 MHz is most popular for MIL-Ka band. Is it acceptable to propose IF frequency range from 1000 MHz to 2000 MHz instead of 950-1950 MHz	The equipment is required to be compatible with the baseband equipment being provided as PFE. So removing 950-1000 MHz is not acceptable.	No amendment to IFB required
T.75	Book II, Part IV (SOW) – Annex A (SRS)	SRS-30	Is it acceptable to provide a sample coupler external to the block up-converter?	Tx monitoring port shall be provided.	No amendment to IFB required
T.76	Book II, Part IV (SOW) – Annex	SRS-42	Could you please detail what you want to say by “Dual atomic”?	As stated in the requirement; dual atomic refers to rubidium or equivalent.	No amendment to IFB required

	A (SRS)		COTS products propose 10 MHz output power level fixed at +13 dBm. Is it acceptable?	The level shall be adjustable between the levels given in the requirement.	
T.77	Book II, Part IV (SOW) – Annex A (SRS)	SRS-108	The requirement seems not in line with Rubidium stability performances (medium term stability: 5,10^-11/month). When TFRS is not disciplined with GNSS, It means that upconversion frequency accuracy can be maintained for: - a 120 day period without recalibration in X band - approximately 10 day period without recalibration in Ka band Can you clarify this requirement?	The concern is not clear. Considering the given example figure (5x 10^{-11}/month), at the end of 180 day period, it should be 0.3 10^{-9}. Considering the LO frequencies for both bands, it should be still within the requirement.	No amendment to IFB required
T.78	Book II, Part IV (SOW) – Annex A (SRS)	SRS-130	LNB/downconverter spurious specification being typically 60dB, it is not possible to commit on this requirement. Could you relax the requirement of 10 dB in order to be aligned with STANAG 4484 Ed3 standard?	Below is the excerpt from STANAG, which is referring to similar figure with the requirement: *The sum total of spurious signal power including phase noise measured at the IF output shall be at least 20 dB below the thermal noise power measured in the bandwidth specified in 3.1.3.2.3.4, with a maximum signal into the LNA. No one spurious signal shall be greater than an equivalent signal 10 dB below the noise level in the narrowest bandwidth of interest.*	No amendment to IFB required

<table>
<tr>
<td>T.79</td>
<td>Book II, Part IV (SOW) – Annex A (SRS)</td>
<td>SRS-139</td>
<td>Phase noise requirement at 1Hz and 10Hz are very stringent. Is it possible to remove the phase noise requirements on TFRS equipment and preserves only SRS-114 requirement?</td>
<td>The requirement shall be updated as follows:

SRS-139 TFRS Single Side Band (SSB) phase noise characteristics shall comply with below specifications:
Table 1-TFRS Phase Noise

<table>
<tr><td>Frequency Offset</td><td>SSB Phase Noise Power Density (dBc/Hz)</td></tr>
<tr><td>1 Hz</td><td>-100</td></tr>
<tr><td>10 Hz</td><td>-125</td></tr>
<tr><td>100 Hz</td><td>-135</td></tr>
<tr><td>1 Khz</td><td>-140</td></tr>
<tr><td>10 Khz and above</td><td>-140</td></tr>
</table>
</td>
<td>Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)</td>
</tr>
<tr>
<td>T.80</td>
<td>Book II, Part IV (SOW) – Annex A (SRS)</td>
<td>SRS-145</td>
<td>Flyaway Antenna packaging is challenging to comply with the case weight of 50.8 kg max. Indeed, some parts of the antenna are in one piece to have suitable stiffness for operation under wind condition. Is it possible to pack some cases for transportation by 4 persons instead of 2 persons and so increase the cases weight?</td>
<td>50.8 kg is the maximum limit for a two-man lift from the floor and place it on a surface not greater than 152 cm (5.0 ft) above the floor in 1472G (two-person limit is much lower).

10% excess tolerance could be applied by exception subject to Purchaser approval.

SRS-145 will be updated as follow:

SRS-145 When the system is packed for transportation, the gross weight of each case shall not exceed 50.8 kg. 10% excess tolerance could be applied by exception subject to Purchaser approval.</td>
<td>Please see IFB Amendment 2, Book II, Part IV (SOW) – Annex A (SRS)</td>
</tr>
<tr>
<td>T.81</td>
<td>Book II, Part IV, SOW</td>
<td>Appendix F</td>
<td>Key Personnel Requirements - Can additional years of experience make up for lack of degree or certifications?</td>
<td>No.</td>
<td>No amendment to IFB required</td>
</tr>
<tr>
<td>T.82</td>
<td>Book I - Bidding Instructions</td>
<td>Paragraph 3.5.4.3</td>
<td>What financial records are preferred? Would a P&L suffice or something similar?</td>
<td>Besides a P&L, please provide a balance sheet over the previous book year.</td>
<td>No amendment to IFB required</td>
</tr>
</table>

T.83	Book II, Part IV, SOW	Paragraph 2.3.1	For the Brunnsum and Oerias site surveys, is the Contractor required to be there physically? NOTE – also found in CLIN 2.1 & 2.2 of the Bidding Sheet Requirements.	Yes. A representative of the Contractor shall be onsite for the site surveys as per SOW106. This is a key opportunity to familiarize with the site and meet key site personnel. CLIN 2.1 is for costs to attend and perform Site Survey (SOW 2.3.1 SOW106-107). CLIN 2.2 is for administrative costs to prepare, review, update, and deliver the report (SOW 2.3.1 SOW108 & SOW 3.6 MNG130).	No amendment to IFB required.
T.84	Book I - Bidding Instructions	Annex A, Bidding, Sheets, CLIN 3.4.1 & 3.4.2	What location is considered "Purchaser's Premises" for the CDR & FDR and is the Contractor required to be there physically?	Purchaser's Premises locations are identified in Book II Part IV SOW section 3.4.2 MNG-99 and will be finalized between the Purchaser and the Contractor based on location accessibility, space availability, and/or other considerations. The SOW, MNG-99 is updated to include the "Purchaser's Premises" as follows: *MNG-99 "…These meetings will be held at Purchaser's Premises in NCI Agency The Hague, Brussels, Mons, or Braine l'Alleud…."*	Please see IFB Amendment 2, Book II, Part IV (SOW)
T.85	Book I - Bidding Instructions	Annex A, Bidding Sheets, CLIN 4.3.1	BUILD PRODUCTION UNITS: CLIN 4.3.1 Specifically states that the training unit (Batch #1) is not included on this line. However, the CLIN references 2.4.1 SOW 139 which does reference the training unit. Which CLIN should the training unit be priced under?	Training Unit is to be costed under CLIN 7.3.	No amendment to IFB required
T.86	Book I - Bidding Instructions	Annex A, Bidding Sheets, CLINs 4.1.3 to 4.7	These CLINS refer to installation and testing at the Purchaser's premises in Brunnsum for the First Article, but no mention of the other 15 systems that will	CLINS 4.1 refer to the build, shipment and installation of the 1st Article. CLIN 4.2 refers to testing of all the units being procured. In some cases (such as qualification	No amendment to IFB required

			need to be installed and tested. Are we to propose just one system for now or all 16 with the knowledge that NATO will need them installed in ensuing years for the option of installing the rest?	testing) the CLIN only applies to the 1st Article but in other cases (SAT) the testing applies to all units (see quantity applied). CLIN 4.3 apply to all 14 MB-DSGT production units (not the reference or the training MB-DSGTs). CLIN 4.4 applies to all 16 units. CLIN 4.5, 4.6, 4.7 apply to activities and not specified units.	
T.87	Book II, Part IV (SOW)	SOW 2.4.1, 2.5.5; Book I, Annex A Bidding Sheets; Schedule B, Payment Milestones	Delivery of the Training System is specified in the SOW, delivery Batches and Payment Schedule. However, there is no specific CLIN on the Bidding Sheets to capture its pricing. Please clarify where to include the pricing of the Training Terminal on the Bidding Sheets.	CLIN 7.3 on the Bidding Sheet is for the costing of the delivery of the Training MB-DSGT.	No amendment to IFB required
T.88	Book II, Part IV (SOW)	IPS-29, IPS-34, IPS-37, A.2, E.1.3	S3000L is a specification for Logistic Support Analysis written in concert with the Aerospace Industries Association for the Aerospace industry. Airbus Space & Defense, an identified bidder on the DSGT program, sits on the steering committee for the specification. This is not recognized as an industry standard for the scope of work contemplated by this bid. To eliminate the appearance of a conflict of interest or inherent bias based, we request the references to S3000L be replaced with MIL-STD 1629A specification which is applicable for a deployable SATCOM system.	MIL-STD-1629A deals with FMECA and thus does not replace ASD S3000L, so they are different. MIL-STD-1629A can be used to generate and populate the relevant classifiers associated to the FMECA data into the ASD S3000L, but ASD S3000L shall be used. ASD S3000L “International procedure specification for Logistics Support Analysis” is recognized as an industry standard. As per the ASD S3000L Chapter 1 Table 2 there are several international team of experts coming from several participating companies and organizations, that contribute to the development of the specification. The webpage for S3000L (https://www.s3000l.org/) makes it clear the specification is created with broad input, stating “The ASD/AIA S3000L is a joint transatlantic specification development, where	No amendment to IFB required

				European and American industrial, aerospace and defence manufacturers and customers participate." Further, the webpage states on the main page that anyone wishing to contribute should contact the webmaster or chairman of S3000L. Without more detail showing why the use of S3000L creates a conflict of interest, or an appearance of conflict of interest, NCIA does not see a basis for concern at this time. More detail can always be provided to NCIA. To ensure maximum competition and best practices there is a need for valid and worldwide-recognized specifications. Without specific reasons or details, simply saying an organization might have contributed to a worldwide specification at some point in time in some way does not appear to be a basis for not using a specification.	
T.89	Book II, Part IV (SOW)	IPS-29, IPS-34, IPS-37, A.2, E.1.3	ASD S3000L is specified in IPS29, 34, and 37. This aircraft industry specific requirement is not aligned with similar NCIA procurements and introduces unnecessary complexity and cost for a LPTA procurement. We recommend using GEIA-STD-0007, SAE-TA-HB-0007-1, MIL-STD-1388, and MIL-STD-1629A standards to meet the IPS requirements. The recommended standards are more applicable for smaller SATCOM terminals such as the MB-DSGT. Will NCIA revise the specification to the recommended standards stated above?	ASD S3000L "International procedure specification for Logistics Support Analysis" is recognized as an industry standard. The applicability of this standard is for any product regardless its size and complexity. Most of the cited recommendations have been cancelled or no more in use nor updated, however these can be used to generate data (business rules to be proposed by the bidder), but please bear in mind that ASD S3000L shall be used for organizing, presenting and distributing data. To this extent the Bidder shall provide [IPS-29] Maintenance Task Analysis (MTA), [IPS-37] Level Of Repair Analysis (LORA) and [IPS-34/35/36] Product Support Database (PSDB) down to the hardware LRU and firmware/software CSCI level compliant with ASD S3000L iss.2.0.	No amendment to IFB required

T.90	Book II, Part IV (SOW)	Section 4.9, IPS-96 Appendix A, A.2.1 IPS	N/A	The SOW has been amended to include the correct reference for a specification: "*S1000D Issue ~~5.0 (2019)~~*"is replaced by "*S1000D Issue 4.0.1(2009)"*	Please see IFB Amendment 2, Book II, Part IV (SOW)

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

IFB-CO-115415-DSGT

AMENDMENT 2

PROVIDE MULTI-BAND DEPLOYABLE SATELLITE GROUND TERMINALS (MB-DSGT) POOL

BOOK II

PART IV

STATEMENT OF WORK (SOW)

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1 Introduction

1.1 Background

[1] NATO requires a mix of multi band (X and military Ka) Deployable Satellite Ground Terminals (MB-DSGTs) and Transportable Satellite Ground Terminals (TSGTs) to provide a Beyond Line-Of-Sight (BLOS) transmission capability to interconnect NATO's deployed Headquarters (HQ) or to provide a reach-back capability into the static environment.

[2] The Deployable Communications and Information Systems (DCIS) Points of Presence (PoP) of the supported HQ require DSGTs to augment the transmission capabilities provided by TSGTs at the large DCIS PoPs involved in high-intensity DCIS missions. Furthermore, smaller, stand-alone DCIS PoPs (e.g. mini-PoPs) deploying in support of small teams require DSGTs to operate in support of Lower INtensity DCIS missions (LINDCIS).

[3] The DSGTs supporting the above functions today are reaching their end-of life. This fact, together with the introduction of military Ka-band in the future space segment delivered through another project, drives the need to introduce a new generation of MB-DSGT that can operate in the traditional X-band as well as in the military Ka-band.

[4] NATO currently owns and operates 21 X-Band Deployable Satellite Ground Terminals (DSGTs) to support ongoing missions and operations. These DSGTs were procured in several batches between 2006 and 2009, and many have been used and operated in harsh operating conditions.

[5] The new Capability Package (CP) 9A0130 has been prepared to provide NATO with updated SATCOM Transmissions Services, to include both Space and Ground Segment Capabilities.

[6] One element of the CP 9A0130 is contained in Project 0CM03114 (Provide Multi-band DSGT Pool). This project (internally and informaly referred to as "Project 14") is to provide the necessary deployable terminals that will support NATO's deployed operations throughout the life of the CP from 2020 until end 2034, which is the scope of this Contract.

1.2 Purpose

[7] This Project "Provide **Multi-band Deployable Satellite Ground Terminals** (MB-DSGTs) Pool" will provide 16 new multi-band capable DSGTs that will be required to support the Core mission requirements of the future Major Joint Operations (MJO) and Smaller Joint Operations (SJO) missions of the NATO Level of Ambition (LoA).

[8] The total number of new MB-DSGTs required include 14 MB-DSGTs to support the Core mission requirements, 1 MB-DSGT for use as a testing, maintenance and reference terminal, and 1 MB-DSGT as a training terminal.

[9] This Statement of Work (SOW) defines the tasks and obligations to be performed by the Contractor in order to meet NATO's requirement to deliver a fully coherent and interoperable MB-DSGT Pool in support of the purpose above.

[10] The systems to be delivered, will give NATO deployed forces access to NATO's SATCOM transmission infrastructure and contribute to the provision of secure SATCOM transmission services.

[11] This project will complement and interoperate with the current fleet of terminals (DSGTs and TSGTs) as well as existing DSGT legacy modem and baseband transit cases (until the future Deployable Baseband Augementation Component (DBAC) transit cases are provisioned under another Project.

[12] The MB-DSGT consists of the Antenna Subsystem, the X-band RF Subsystem, the Ka-band RF Subsystem, a Monitor & Control Laptop, and the necessary transit cases for transport and storage.

[13] The MB-DSGT is primarily intended to support DCIS transmission requirements, either as standalone transmission bearers or to augment the transmission capacity of collocated TSGTs.

1.3 Scope

[14] The project will provide a pool of sufficient multi-band (X/Ka) MB-DSGTs to support DCIS transmission requirements, either as standalone transmission bearers or to augment the transmission capacity of collocated TSGTs.

[15] The project will ensure that the pool of MB-DSGTs can interoperate with existing Purchaser Furnished Property (PFP) at IF level (L-band).

[16] The project will deliver the necessary documentation and training as required.

[17] The project will include an evaluated option for a five (5) year-period In Service Support (ISS) post-warranty which the Purchaser may wish to exercise.

1.4 Infrastructure

[18] Table 1-1 and Table 1-2 in the following pages outline the CIS and non-CIS infrastructure scope, with the function, purpose and quantities to be delivered under this project.

[19] The scope represented in Table 1-1 and Table 1-2 below is the summary of the detailed scope provided in the SSS.

[20] The referenced CIS systems and non-CIS elements are further described and specified in Annex A to this SOW (SRS). The requirements in the SRS build upon the requirements provided by the NATO Strategic Commands.

INT-1 The implementation of the MB-DSGT and the training and reference MB-DSGT systems shall strictly adhere to the technical requirements in the SRS.

Table 1-1 – Project scope – Infrastructure (CIS)

Product	Purpose	Quantity
Muti band Deployable Satellite Ground Terminals (MB-DSGTs)	Operation	14
	Training	1
	Reference	1

Table 1-2 – Project scope – Infrastructure (non-CIS)

Product	Non-CIS element	Purpose	Quantity
Multi band Deployable Satellite Ground Terminals (MB-DSGTs)	Uninteruptable Power Supply (UPS), Ancillaries (including cables and connectors), Operation and Maintenance tools, and Transit Cases.	Operation	14
		Training	1
		Reference	1

1.5 Requirements Structure

[21] The SOW requirements are organized in eight sections and seven Appendices, as follows:

Section 1: Introduction;

Section 2: Scope of Work;

Section 3: Project Management;

Section 4: Integrated Product Support;

Section 5: Configuration Management;

Section 6: Testing, Verification, Validation and Acceptance;

Section 7: Quality Assurance and Control;

Section 8: System Acceptance;

Appendices:

1) Appendix A Applicable and Reference Documents;
2) Appendix B Contract Documentation Requirements List;
3) Appendix C Project Meetings Calendar;
4) Appendix D Purchaser Furnished Equipment;
5) Appendix E Maintenance and Support Concepts;
6) Appendix F Key Personnel Requirements;
7) Appendix G List of Acronyms.

[22] The SOW has one Annex, as follows:

Annex A – System Requirements Specifications (SRS) contains the technical requirements for the MB-DSGT.

[23] The project will be executed in three stages spanning from the Effective Date of Contract (EDC) to 1 year following the declaration of FSA. The stages are:

1. Stage 1: Contract Award up to Provisional System Acceptance (PSA) of the First Article (FA);
2. Stage 2: PSA of First Article up to Final System Acceptance (FSA);
3. Stage 3: Warranty period begins at the PSA of the First Article until FSA + 1 year.
4. Stage 4 (option): In Service Support post warranty for five (5) years starting at the end of warranty period.

1.6 Purchaser's Responsibilities

[24] The following services and items will be provided by the Purchaser for the performance of the Contract:

1) Access to the "CIS Sustainment and Support Center" (CSSC) in Brunssum, Netherlands, to the Contractor's personnel holding the required security clearances, and subject to the local procedures in force at the time of the visit;
2) Access to selected legacy DSGT physical assets, as needed to execute the system test and validation activities.;

3) SATCOM X-band bandwidth and SATCOM ground segment infrastructure (TSGT and SGS) for System Acceptance Testing (SAT) and OpTEval;

4) Access to NATO sites following Request for Visits (RfV) issued by the Contractor. The following sites are considered:

   a. Brunssum CIS Sustainment Support Centre (CSSC), for Configuration Capturing, installation of the MB-DSGT Reference System into the Reference Environment;

   b. Brunssum CIS Sustainment and Support Centre (CSSC), for delivery of systems and configurations;

   c. Oeiras NCI Academy, for Configuration Capturing, installation of the MB-DSGT Training System into the Training Environment;

   d. NATO Signal Battalion (NSB) HQ in Wessel, Grazzanize and Bydgoszcz, for User Acceptance Testing (UAT), if required;

   e. NSB Deployable CIS Modules (DCM) and Forward Support Points (FSP) for OpTEval (scenario-based testing), if required.

5) Purchaser Furnished Property (PFP) as per Appendix D of this SOW.

[25] The Purchaser's Contracting Authority will act as the Purchaser's representative and the Purchaser's Project Manager (PM) will be the primary technical and project management interface between the Contractor and Purchaser after EDC.

[26] The Purchaser's Project Manager will be supported by specialists who may, from time to time, be delegated to act on the Project Manager's behalf in their area of expertise.

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

[28] The Purchaser will make available to the Contractor the facilities necessary, within standard working hours, to test and demonstrate MB-DSGT components compliance with required interfaces to existing NATO systems. For additional out-of-hours work special requests would be necessary.

1.7 Conventions

INT-2 The term "the Purchaser" means the NCI Agency or its authorised representatives. Where referenced standards, specifications, refer to "the Government", this shall be construed to mean "the Purchaser".

[29] The Schedule of Supplies and Services (SSS) details the dates the activities and deliverables are to be provided.

INT-3 The SOW and its Annexes shall take precedence over the Applicable Documents in Appendix A of this SOW.

[30] Where international standards exist that are not specifically referenced as being equivalent to the ones referred in this SOW, the Contractor may propose to utilise such a standard if it can demonstrate the equivalence in question. The Purchaser, however, reserves the right to deny such a request and demand performance in accordance with the documents cited in the SOW.

[31] Requirements in the SOW are formulated using the form "shall". Context information supporting the requirements definition is provided using the form "will".

[32] “Shall” statements are contractually binding; “Will” statements are informative.

[33] Mandatory requirements in the SOW are preceded by a unique heading number, consisting of a prefix, followed by a number.

[34] Informational or context information not conveying any requirement on the Contractor is preceded by a number heading in brackets, [xx], without prefix letters.

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

[36] Whenever reference is made to a section or paragraph, the reference includes all subordinate and referenced paragraphs.

INT-4 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 all of the activities the Contractor shall provide. The Contractor’s approved project implementation plans determine the timing of detailed activities of the Contractor.

[37] 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.

1.8 Options

[38] This scope of the work includes one evaluated option, which the Purchaser may wish to exercise:

1) In Service Support post warranty for five (5) years service period, that can be exercised by the Purchaser after the end of Warranty.

[39] There may be a need to procure additional terminals identified between EDC and FSA to support additional requests that may arise within NATO.

2 Scope of Work

2.1 Provide System Design

SOW 01/- The MB-DSGT design documentation shall cover the full scope of the MB-DSGT systems. This includes:

1) MB-DSGT Systems, as described in Annex A (SRS) where are the requirements that each MB-DSGT shall meet.

SOW 02/- This design documentation shall separately identify the design for the operational (production), training and reference systems.

SOW 03/- The scope of the design shall encompass all the components and elements needed to achieve the capability in accordance with the SRS, including:

1) CIS Hardware (and firmware);
2) Tooling to manage and support the MB-DSGT systems;
3) Non-CIS hardware (e.g. UPS, IFL, etc.);
4) Product Support DataBase (PSDB), Common Source Database (CSDB), Training Material, Configuration Management Database (CMDB);
5) Test, Verification and Validation;
6) Control and monitoring capabilities, functions and interfaces with the maintenance laptop and third party C&M systems;
7) Performance allocation breakdown demonstrating the design is compliant to all performance requirements specified in the SRS;
8) Transportation cases with size dimension and weight.

SOW 04/- The design shall follow the structure in which requirements are formulated in Annex A (SRS).

SOW 05/- The design shall contain Hardware (HW) and Software (SW) including Firmware (FW) that shall not be:

1) End-of-production or targeted for end-of-production within 24 months at the time of Final Design Review (FDR) closure;
2) End-of-support or targeted for end-of-support within 5 years at the end of warranty.

[40] The implementation of the MB-DSGT consists of the assembly, connection, integration and configuration of Commercial of The Shelf (COTS) components, into bespoke systems that are fit for purpose and use in support of NATO expeditionary operations.

[41] The SRS conveys a design specification, in the form of functional requirements, detailed technical requirements, and implementation constraints for the Contractor to adhere to.

[42] The SRS provides high level requirements, for the Contractor to produce a design specification. That will be the main focus of the Preliminary Design Review (PDR).

SOW 06/- The Contractor shall produce a High Level Design (HLD), encompassing all the systems that make the MB-DSGT, especially focused on translating the technical requirements into a preliminary design specification, at the same level of the rest of the systems.

SOW 07/- The Contractor shall then evolve the HLD into a Low Level Design (LLD).

SOW 08/- The review process related to System Design activities shall undergo the following sequence:

1) Review of the Configuration Capturing Plan (CCAP);
2) Review of the outcome of the CCAP sessions, at the CCAP Closure meeting;
3) Review of the requirements as provided by the SRS following the CCAP, at the **System Requirements Review (SRR)**;
4) Review of the HLD, at the Preliminary Design Review (PDR);
5) Review of the Draft LLD, at the **Critical Design Review (CDR)**;
6) Review of the Final LLD, at the **Final Design Review (FDR)**.

2.1.1 Develop System Design Plan

SOW 09/- The **System Design Plan (SDP)** shall describe the Contractor's approach to implementing the System Design activities as detailed below.

SOW 10/- The SDP shall identify all activities and deliverables and when they will be provided to the Purchaser, as the design progresses from the CCAP, SRR, and High Level Design (HLD) to the final Low Level Design (LLD).

2.1.2 Conduct Configuration Capture

[43] The CCAP sessions are intended for the Contractor to become acquainted with any Purchaser-provided Test facilities, DSGT Reference Environment and CIS Sustainment and Support Centre (CSSC) in Brunnsum.

SOW 11/- In support of the CCAP, the Contractor shall establish a team with representatives from all the disciplines related to the System Design and the System Implementation of the MB-DSGT. This team is hereafter referred to as the Configuration Capturing Team (CCT). The CCT shall at least consist of the technical experts leading the design covering the areas identified below.

SOW 12/- The CCT skillsets shall cover the following areas:

1) Infrastructure services;
2) Integrated Product Support [including Training Needs Analysis (TNA)];
3) Configuration Management;
4) Test, Verification, and Validation;
5) Quality Assurance; and
6) Non-CIS.

SOW 13/- The CCT shall be led by the Technical Lead or by the individual leading the design activities, in order to ensure that the outcome of the configuration capturing process is directly supporting the design.

SOW 14/- CCAP activities shall be conducted by the CCT, at their own initiative, at the Purchaser's premises, in preparation and in direct support of System Design activities.

SOW 15/- The Contractor shall provide a Configuration Capturing Plan. The plan shall include the following:

1) The breakdown of the exisiting DSGT, including the Identification of interfaces to external systems and clear link and references to the other plans;

2) The strategy intended to capture and process the information, including the allocation of tasks to different members of the Configuration Capturing Team.

SOW 16/- For each of the identified above items the Contractor shall identify the type and format of information expected from the Purchaser.

SOW 17/- The Contractor shall deploy the CCT immediately following the Effective Date of Contract (EDC).

SOW 18/- The CCT shall capture information about the skill sets of the current engineers and of the operators, in support of the Training Need Analysis (refer to Section 2.7.1).

SOW 19/- The CCT shall deploy to CSSC in Brunssum and the NCIA Academy as required.

[44] The Purchaser will furnish office space for the CCT, over the CCAP period, in Brunnsum and or Oeiras as required.

SOW 20/- Throughout the CCAP period and in order to minimize the risk of any incompatibilities between the design and the existing SATCOM terminal infrastructure, the Contractor shall collect and assess the differences between the configuration of current SATCOM terminal assets (as captured) and the preliminary design resulting from the interpretation of the requirement in the SRS.

[45] In support of the assessment above, the Purchaser will accommodate a 3-day workshop with the CCT and the design team, to provide clarifications and guidance on how to use the Configuration Capturing data in support of the design.

SOW 21/- The outcome of the CCAP sessions shall be documented in the Draft CCAP Report, to be issued 1 week after the sessions are completed. The report shall be briefed during the CCAP Closure Meeting, in Brunssum.

SOW 22/- The Draft CCAP Report shall describe the relevant captured configuration data and how configuration data are interpreted and contribute to the HLD.

SOW 23/- The Draft CCAP Report shall identify the interoperability aspects and risk areas of the design, for each of the topics in this SOW.

SOW 24/- Half way through the CCAP period, the Contractor shall provide an interim version of the Draft CCAP report, highlighting what has been achieved, where further information or clarifications are needed, or issues have been identified that need to be addressed.

SOW 25/- Following the CCAP Closure Meeting, the Final CCAP Report shall be issued within 1 week, in support of the System Requirements Review (SRR).

SOW 26/- The Final CCAP Report shall be provided as an Annex to the HLD.

SOW 27/- Should additional configuration capturing activities be required following CDR, in support of the last design iteration before CDR, the associated level of effort and travel expenses shall be borne by the Contractor.

2.1.3 Conduct System Requirements Review

[46] The System Requirements Review (SRR) is intended to assess the Contractor's understanding and interpretation of all the requirements contained in the SRS, following the Configuration Capturing activities.

SOW 28/- The SRS constitutes the Functional Baseline (FBL) of the MB-DSGT. Any updates resulting from the SRR become updates to the MB-DSGT FBL and shall be managed by formal change process.

SOW 29/- The SRR shall occur after the CCAP Closure meeting.

SOW 30/- The SRR shall take place at the Purchaser's premises, in the form of SRR meetings between the Contractor and the Purchaser, and should not take more than 2 weeks.

SOW 31/- The Contractor shall review the SRS and map system-level requirements to allocated/derived requirements in the HLD.

SOW 32/- The outcome of the SRR discussions shall be documented in the SRR Report. The SRR Report shall be initialized during the first day of the SRR and shall evolve during the SRR meeting.

SOW 33/- The Draft SRR Report shall contain an updated Requirements Traceability Matrix (RTM).

SOW 34/- The Draft SRR Report shall contain references to any ECP resulting from the SRR discussions.

SOW 35/- A new SRS baseline incorporating all the changes to the original SRS agreed during the SRR meeting and documented in the Final SRR Report, shall be produced by the Contractor.

SOW 36/- The Contractor shall produce the Final SRR Report and provide it as an Annex to the HLD, for review at the PDR meeting.

SOW 37/- Following the approval of the Final SRR report at PDR the Contractor shall update the FBL. At this point the FBL shall be frozen and put under configuration control, with any change to the SRS (and thus the FBL) involving the formal change process as specified in the relevant Section for Configuration Management.

SOW 38/- Following the SRR, the RTM shall become part of the HLD, as an Annex.

2.1.4 Develop Design Documentation

SOW 39/- The Contractor shall produce the High Level Design (HLD) documents that will be consolidated and approved for PDR closure.

SOW 40/- The Contractor shall produce the Low Level Design (LLD) documents that will be consolidated and approved for CDR closure.

2.1.5 High Level Design Document

SOW 41/- The High Level Design (HLD) document shall include, but shall not be limited to:

1) Overall breakdown structure down to component level, including their functions and interfaces;
2) Identification of high level CI's (can be a separate document such as a Configuration Item List (CIL));
3) Interoperability with existing SATCOM assets;
4) Implementation Constraints;
5) Project Master Test Plan (PMTP);
6) Defect Management Plan;
7) Integrated Product Support:

a. Integrated Product Support Plan (IPSP);

b. Reliability Availability Maintainability Testability (RAMT) Case Report;

c. Failure Mode Effects and Criticality Analysis (FMECA);

d. Maintenance Task Analysis (MTA) [incl. Product Support Database (PSDB)].

8) Configuration Management:

a. Configuration Management Plan (CMP);

b. Functional Baseline (FBL).

SOW 42/- The HLD shall include the following Annexes as a minimum:

1) Final CCAP Report;

2) Final SRR Report;

3) Requirement Traceability Matrix (RTM).

2.1.6 Low Level Design Documents

SOW 43/- The Draft LLD shall include, but shall not be limited to:

1) Detailed subsystem and associated design specifications;

2) Hardware and software (including firmware) functional descriptions;

3) Component, subsystem and system-level:

a. Performance calculations;

b. Availability; and

c. Capacity, where applicable.

4) The justification for functional and performance allocations to various subsystems and components, in order to achieve the overall system-level requirements, per subsystem;

5) The methodology for the identification and resolution of technical problem areas that may develop at system or subsystem level, during design, production, installation and testing;

6) Identification of internal (intra-nodal) and external interfaces throughout the system to ensure interface compatibility, with special focus on the interfaces to the (external) PFP elements;

7) Engineering drawings, including hardware physical installations, connectivity to other components, power cooling;

8) Technical reviews and reports;

9) Integrated Product Support:

a. Integrated Product Support Plan (IPSP);

b. Reliability Availability Maintainability Testability (RAMT) Case Report;

c. Failure Mode Effects and Criticality Analysis (FMECA);

d. Maintenance Task Analysis (MTA) [incl. Product Support Database (PSDB)];

e. Level of Repair Analysis (LORA) [incl. Repair Price List (RPL)];

f. Packaging, Handling, Storage and Transportation (PHST) Report;

g. Initial Provisioning List (IPL); and

h. Obsolescence Report.

10) Configuration Management:

a. Allocated Baseline (ABL).

11) Test, Verification and Validation:

a. Requirement Traceability Matrix (RTM);

b. Verification Cross Reference Matrix (VCRM); and

c. Test Plan for each Test Phase. Each Test Phase will have one or more events supporting the coverage required, as stated in RTM and VCRM.

SOW 44/- The Final LLD shall contain, as a minimum:

1) A link to the Requirements Traceability Matrix (RTM) (See Chapter 6 1.7), matching System Requirements (as per the SRS) to entries of the LLD, and to test procedures in the Project Master Test Plan (PMTP) (see Chapter 6). This update shall reflect any changes effecting the original RTM proposed by the Contractor in his Bid;

2) Definition of the Configuration Items (CIs), as applicable;

3) The Low Level Design documents of each CI;

4) Initial security design documentation (based on the system-level and functional-level Security Requirements);

5) Detailed engineering drawings;

6) List of software licensing, support and warranty agreements, if and where applicable;

7) Integrated Product Support:

a. Integrated Product Support Plan (IPSP);

b. Reliability Availability Maintainability Testability (RAMT) Case Report;

c. Failure Mode Effects and Criticality Analysis (FMECA);

d. Maintenance Task Analysis (MTA) [incl. Product Support Database (PSDB)];

e. Level of Repair Analysis (LORA) [incl. Repair Price List (RPL)];

f. Packaging, Handling, Storage and Transportation (PHST) Report;

g. Initial Provisioning List (IPL); and

h. Obsolescence Report.

8) Configuration Management:

a. Allocated Baseline (ABL).

9) Test, Verification and Validation:

a. Requirement Traceability Matrix (RTM);

b. Verification Cross Reference Matrix (VCRM); and

c. Test Plan for each Test Phase. Each Test Phase will have one or more events supporting the coverage required,a s stated in RTM and VCRM.

SOW 45/- This Final LLD shall include, for each CI:

1) Allocated functional and non-functional requirements, as derived from the overall requirements specified in the SRS;

2) CI specifications, including drawings, schematic diagrams, models, manuals and other data as appropriate.

SOW 46/- For the Transit Cases the Final LLD shall include:

1) Transit Case layout plan, covering all communications, information systems, cabling, and power supply equipment and distribution in the TC;

2) Electrical safety systems;

3) Heat load calculations;

4) Power budget calculations; and

5) Estimated weight budget.

[47] It should be noted that the Final LLD:

1) Is the product of the Contractor, and review of the draft version and delivery of the final version does not imply acceptance of the low level design by the Purchaser; and

2) Is intended to provide visibility for the Purchaser into the system development and to provide documentation against which the Purchaser may evaluate progress, foresee difficulties, provide guidance and recommendations to protect its interests, and to approve the Contractor's design.

[48] It remains the sole responsibility of the Contractor to prove the design through the regime of testing set forth in the SOW Chapter 6 and it will be the sole responsibility of the Contractor in the event that the design proves deficient in terms of the Contract functional and/or performance requirements.

SOW 47/- In the Final LLD sufficient detailed information and test data (at component and subsystem level) shall be provided to assure the Purchaser that all functional and performance requirements have been achieved, or have been modified to achievable limits, always without prejudice to contractual specifications.

[49] Annex A to this SOW (SRS) provides Functional Description and Requirements. The Functional Descriptions are at system-level, whereas the Requirements are provided down to subsystem-level. This is based on the preliminary design specification (High Level Design Description) derived from existing architectures and systems that are already in operation and that the MB-DSGT needs to adhere to and interoperate with, respectively.

SOW 48/- The requirements provided in the SRS at subsystem level include implementation constraints that the Contractor shall adhere to when preparing the Final LLD.

SOW 49/- Design activities by the Contractor shall separately cover infrastructure and services, following the structure of the SRS, as per the requirements below.

SOW 50/- The Draft LLD and Final LLD shall separately address the operations, reference and training infrastructures.

2.1.7 Conduct System Design Reviews

[50] System Design Reviews are intended to:

1) Verify and discuss the correct allocation of SRS requirements to system design specifications and to verification methodologies, as documented by the Contractor in the RTM (See Chapter 6);
2) Verify and approve the overall design proposed by the Contractor;
3) Verify and approve the overall project support and configuration management approach; and
4) Verify and approve the overall verification and validation approach proposed by the Contractor.

SOW 51/- The Contractor shall support three System Design Reviews (Preliminary, Critical and Final, PDR, CDR and FDR respectively).

SOW 52/- System Design Review meetings shall take place at the Purchaser's premises with the exception of the Preliminary Design Review which shall take place at the Contractor's premise (to allow the Purchaser to meet the Contractor's team and see the facility and base layout).

2.1.8 Preliminary Design Review

[51] The PDR starts after delivery of HLD and relevant documentation/artefacts (HLD documents submitted, commented, amended and received).

[52] The PDR ends after discussion and agreement on way ahead to close comments with relevant schedule.

SOW 53/- The PDR closure declaration shall be achieved after the acceptance of the updated HLD.

SOW 54/- The Preliminary Design Review (PDR) shall focus primarily on the review of the HLD.

SOW 55/- The HLD at PDR shall document and demonstrate a proof of concept for the infrastructure and platform orchestration capabilities sought.

SOW 56/- The HLD shall be submitted 4 weeks before the PDR event.

SOW 57/- The HLD shall be updated, based on the Purchaser's comments and the decisions reached at the PDR Meeting and a final version shall be delivered within 5 business days.

2.1.9 Critical Design Review

[53] The Critical Desgin Review (CDR) starts after deliveryof LLD and relevant documentation/artefacts (draft LLD documents submitted, commented, amended and received).

[54] The CDR ends after discussion and agreement on way ahead to close comments with relevant schedule.

SOW 58/- The CDR closure declaration shall be achieved after the delivery of the updated draft LLD.

SOW 59/- The CDR shall be devoted to reviewing and approving the Draft LLD submitted by the Contractor 2 weeks earlier.

[55] At CDR, the preliminary allocation of SRS requirements to system design specifications and to verification methodologies will be assessed and will be subject of approval by the Purchaser.

SOW 60/- At CDR, the Contractor shall propose those requirements that can be verified before FDR, either through:

1) Analysis or Inspection, based on review of the Draft LLD and supporting documents; or
2) Inspection of Certificates of Conformity (CoC).

SOW 61/- The Draft LLD at CDR shall document and demonstrate a proof of concept for the cases sought for the MB-DSGT, including BC and environmental conditions protection as specified in the SRS.

SOW 62/- The approval of the Draft LLD by the Purchaser at CDR shall in no way relieve the Contractor of his responsibilities to achieve the contractual and technical requirements of this SOW and SRS.

SOW 63/- Approval of the Draft LLD at the CDR, and for those areas that are not subject of further revisions and changes before the Final Design Review (FDR), shall trigger the Contractor to identify long-lead items required by the First Article system.

SOW 64/- The Contractor shall seek Purchaser approval before installation of equipment for analysis or inspection.

SOW 65/- Any changes to the Draft LLD agreed at CDR shall be reflected in the Final LLD.

2.1.10 Final Design Review

[56] The FDR starts after delivery of LLD and relevant documentation/artefacts (final LLD documents submitted, commented, amended and recieved).

[57] The CDR ends after discussion and agreement on way ahead to close comments with relevant schedule.

SOW 66/- The CDR closure declaration shall be achieved after the acceptance of the updated final LLD.

SOW 67/- The Final Design Review (FDR) meeting shall be devoted to reviewing and approving the Final LLD submitted by the Contractor 2 weeks earlier.

SOW 68/- At FDR the focus shall be on any deficiencies identified at CDR on the Draft LLD and their resolution in the Final LLD.

SOW 69/- Changes in the Final LLD resulting from the FDR shall be implemented by the Contractor within the two weeks following FDR.

[58] Formal acceptance of the Final LLD by the Purchaser will take place not later than two weeks following delivery of the amended Final LLD document.

SOW 70/- Approval of the Final LLD by the Purchaser shall in no way relieve the Contractor of his responsibilities to achieve the contractual and technical requirements of this SOW and SRS.

SOW 71/- At the FDR the Contractor shall create the Allocated Baseline, (as per relevant Configuration Management dedicated section).

[59] Approval of the Final LLD at the FDR will trigger the following:

1) The assembly of the First Article system;

2) The delivery by the Purchaser of any PFP required to assemble the First Article system, as well as any configuration details required to enable the preparation of the FAT.

2.2 Qualify First Article

[60] A first instance of a MB-DSGT, hereafter referred to as the First Article, needs to be qualified at the factory, prior to any system delivery efforts to the Purchaser, in support of the Independent Verification and Validation Assessment (refer to Chapter 6 Support Independent Verification and Validation Assessment).

SOW 72/- The acceptance of the First Article shall depend on the operational tests conducted on it. According to the results of the operational tests and acceptance of the First Article, the Contractor shall implement identified required changes observed during the tests to all of the remaining future articles, including the first one.

2.2.1 Build First Article

SOW 73/- First Article shall encompass a complete MB-DSGT, including non-CIS elements as per the following paragraphs.

SOW 74/- First Article shall be built as per the Final design approved at FDR.

SOW 75/- First Article shall be subject of the following test events (refer to Chapter 6):

1) Qualification Tests (QT); and
2) Factory Acceptance Test (FAT).

SOW 76/- The production of the First Article shall be preceded by Engineering Phase tests (refer to Chapter 6) to be conducted at the discretion of the Contractor. These tests refer to tests performed by the Contractor on equipment, components, sub-systems or systems prior to readiness for Factory Acceptance Testing (FAT).

SOW 77/- The Purchaser shall be entitled to witness Engineering Phase tests and/or request access to Engineering Test Reports.

SOW 78/- Shipment and receipt of any PFP components shall not be a pre-condition for the Contractor to:

1) Integrate the subsystems without those devices, and conduct the FAT;
2) Integrate the 1st article system without those devices, and conduct a limited FAT, the scope of which would be agreed with the Purchaser.

SOW 79/- Following the completion of these tests, the above listed First Article shall be repurposed to serve as the MB-DSGT Reference System and shall be shipped to CSSC Brunssum to serve as the reference system at that location.

2.2.2 Non-CIS Elements

SOW 80/- The following First Article Non-CIS elements shall be produced for the purpose of the QT and FAT

1) Uninterrupted Power Supply (UPS);
2) Ancillaries (including cables and connectors);
3) Operation and Maintenance tools; and
4) Transit Cases

SOW 81/- All the above non-CIS units shall be repurposed to support the CIS elements of Batch #1, reducing the quantity of the Non-CIS elements of Batch #1 accordingly.

2.2.3 Conduct Qualification Testing

SOW 82/- Qualification Testing shall be performed on both CIS and non-CIS elements, and shall encompass the following:

1) Electro-Magnetic Interference and Compatibility (EMI and EMC) Testing;
2) General Environmental Testing;
3) Operational Robustness Testing;
4) Mechanical Environmental Testing;
5) Biological & Chemical Testing;
6) Transportation Testing;
7) Physical Functional System Testing; and
8) Product Safety Testing.

SOW 83/- An authorized technical surveillance authority shall approve the mechanical and electrical safety of the units under test.

SOW 84/- The Contractor shall inform the Purchaser when Qualification Testing will be performed and the Purchaser reserves the right to witness the testing as needed.

SOW 85/- In case an existing design item has already been subject to first article qualification tests, the qualification tests may be replaced by proper conformance certified documentation, delivered by a recognized body, and approved by the relevant national authority. The Contractor may in this case submit for Purchaser concurrence all the necessary certified documentation in the form of test procedures, test result certificates, and associated curves and drawings to demonstrate that the equipment meets the requirement of this contract and does not have to undergo unit qualification testing as defined herein. Where applicable, a written justification that a Contractor applied or proposed a modification would not invalidate a previously granted qualification shall also be provided to the Purchaser and shall be subject to the Purchaser's concurrence.

SOW 86/- All Qualification Tests shall be performed with all components (including PFP) physically integrated.

SOW 87/- All Test Reports shall be accessible by the Purchaser.

2.2.4 Conduct Factory Acceptance Testing

SOW 88/- Factory Acceptance Testing shall be performed following the test regime detailed in Chapter 6.

SOW 89/- Through Factory Acceptance testing, the Contractor shall demonstrate that the First Article MB-DSGT system is successfully integrated at subsystem and component levels and can communicate with other modules.

SOW 90/- In particular Factory Acceptance Testing shall verify the following, with the First Article installed at the Contractor’s test environment:

1) Functionality and performance of the various subsystems integrated including:
    a) Antenna and RF Subsystem, including pointing and tracking;

b) Time and Frequency Reference Subsystem;

c) Power Subsystem; and

d) Interfacilty link.

2) Interfaces within each of the modules (between subsystems), including subsystems outside the module and third party Control and monitoring.

SOW 91/- Factory Acceptance Testing shall further verify the functionality and performance of all non-CIS elements specified within Annex A (SRS).

2.2.5 Ship First Article

SOW 92/- Upon release and acceptance of the FAT Report, the Contractor shall ship First Article system from the factory to the Purchaser's CSSC (Brunssum) location, in accordance with the Packaging, Handling, Storage and Transportation requirements detailed in section 4.8

SOW 93/- The Contractor shall set up and configure the system in the MB-DSGT Reference Environment, in preparation for the Independent Verification and Validation Assessment to be conducted (refer to section 2.4).

SOW 94/- The Contractor shall be responsible for shipping any First Article system from the Purchaser's premises back to the factory, for rectification of non-compliances or deficiencies found under the Independent Verification and Validation assessment (refer to section 2.4). This will require shipping the First Article system back to the Purchaser's location, for regression testing.

2.3 Support Independent Verification and Validation Assessment

[61] The Purchaser will provide a test environment for the Test, Verification, Validation and Assurance (TVVA) Assessment, including Security Testing, which is operationally representative of the Purchaser's implemented security policies.

[62] The TVVA Assessment will feed the Agency IT Change Management Process in order to obtain authorization to integrate and deploy the MB-DSGT on to NATO networks

[63] As part of the IT Change Management Process, the Purchaser's TVVA Assessment will start after receipt of First Article following the completion of the Factory Acceptance Tests. Chapter 6 details the TVVA Assessment activities to be supported by the Contractor, consisting of:

1) System Integration Testing (SIT);
2) User Acceptance Testing (UAT);
3) Security Testing, also referred as Main Security Testing instance; and
4) System Acceptance Testing, consisting of tests focused on ensuring compliance with the requirements outlined in this SOW.

[64] After the successful TVVA Assessment, the Purchaser will submit a Request for Change (RFC) for screening by the Change Advisory Board (CAB). The CAB may require further tests.

SOW 95/- The Contractor shall be ready to support the re-run of all, or of a selected set of TVVA tests, or the execution of new tests, in support of the CAB.

[65] Once all the final documents required for the RFC (Release Package) have been submitted and the production baseline has successfully completed the TVVA Assessment the CAB may grant the Deployment Authorisation, i.e. the approval to deploy the MB-DSGT on NATO Operational targeted networks.

[66] As part of the change process the new baseline including the MB-DSGT components will be incorporated into the relevant Approved Fielded Products List (AFPL). The AFPL process is a NATO-owned and managed via an internal process, to which the Contractor will need to provide support as described in this section.

SOW 96/- The Contractor shall support TVVA Assessment by the Purchaser.

SOW 97/- Before the TVVA Assessment, the Contractor shall perform a demonstration to verify system installation, configuration, performance and functionality. After successful demonstration, the system will be handed-over to the Purchaser's TVVA team for further evaluation.

SOW 98/- The Contractor shall provide all the necessary System Specifications and Hardware for the Purchaser to conduct the required TVVA Assessment in the Purchaser's MB-DSGT Reference Environment.

SOW 99/- The Contractor shall install and configure the system in the Purchaser's Reference System Environment.

SOW 100/- The Contractor shall perform all or selected Factory Acceptance Tests as agreed by the Purchaser in the Purchaser's MB-DSGT Reference Environment to demonstrate that the system works with its affiliate system (interoperability) and functions successfully in an Operationally Representative environment.

SOW 101/- The Contractor shall perform the Performance Assessment Test in the Purchaser's MB-DSGT Reference Environment as part of the TVVA Assessment.

SOW 102/- The Contractor shall fix incidents found during demonstration and then handover the system to TVVA Team for further test activities.

SOW 103/- After achieving Deployment Authority of the system, the Contractor shall install and configure the system in the MB-DSGT Reference Environment and execute TVVA tests.

SOW 104/- The Contractor shall support the Purchaser's TVVA installation and Test Activities, including Purchaser performed security testing.

SOW 105/- The Contractor shall provide the technical experts on the Purchaser's MB-DSGT Reference Environment site to assist all TVVA Assessment activities.

[67] The Purchaser will execute his own set of TVVA test cases and has the right to use the Contractor developed test cases during the pre-TVVA Evaluation.

[68] The Purchaser has right to repeat the TVVA Assessment process until complete RFC package is ready and mature to start CAB process or additional tests if requested by CAB.

2.3.1 Conduct Site Survey - Reference Environment

SOW 106/- The Contractor shall conduct a Site Survey at the MB-DSGT Reference Environment in Brunssum and at the Training Environment in Oeiras.

SOW 107/- The Site Surveys shall adhere to the site survey requirements in Section 3.6

SOW 108/- The Site Survey Report (SSR) shall be delivered to the Purchaser for review and acceptance following the document requirements (in the Project Management relevant section), not later than 2 weeks following the Site Survey.

2.3.2 Provide Release Package

[69] A Release Package is a planned release of a product or product edition. The content of a Release Package is defined by the features and associated Requests for Change (RFC) that it implements.

SOW 109/- The Contractor shall supply the documents and media in final form listed in Table 2-1 below, for inclusion in the Purchaser Release Package for the RFC. These shall be provided 3 weeks before planned tests.

SOW 110/- The Contractor shall submit a complete build including deployment and installation instructions prior to the start of the TVVA Assessment.

Table 2-1 – Release Package items

Serial	Item	Source
1	System Media (system installation executables)	Contractor
2	System Installation Instructions	Contractor
3	System Operation Manuals and Maintenance Manuals	Contractor
4	Version Release Description/System Release Notes	Contractor
5	System Implementation Plan	Contractor
6	End User Licence Agreement (EULA) for embedded Open Source Software (OSS)	Contractor

Serial	Item	Source
7	Unit/Component Test Report(s)	Contractor
8	First Article Test Report	Contractor
9	Requirements Traceability Matrix	Contractor

2.3.3 Install First Article

SOW 111/- The Contractor shall install and verify the First Article system in the Purchaser's MB-DSGT Reference Environment, in preparation for the TVVA Assessment.

SOW 112/- Installation activities shall be followed by the configuration of the system and provisioning of services in accordance with the Final LLD, which shall in turn be based upon the configuration captured [refer to section 2.1.2].

[70] The Purchaser will be responsible for connecting the First Article to the MB-DSGT Reference Environment.

2.3.4 Conduct System Integration Testing (SIT)

SOW 113/- System Integration Testing shall verify the following at the Purchaser's test environment:

1) Interface with the modem in the legacy modem cases
   a) Until DBAC arrives, baseband capability shall be provided with legacy modem cases
2) Interface with the existing T1+2 TSGT
   a) MB-DSGT without DBAC shall provide RF capacity augmentation of the existing T1+2 TSGT
3) Interface with the external power system
   a) The UPS system shall take single phase Mains/Generator TN-S Supply in accordance with the International Electrotechnical Commission, (IEC) 60038 standard, to power and operate the CIS and non-CIS components.

[71] Installation, integration and operation of legacy modem cases with the system delivered under this contract is the Purchaser's responsibility.

[72] Installation, integration and operation of the T1+2 TSGT with the system delivered under this contract is the Purchaser's responsibility.

[73] Installation, integration and operation of the PGS with the system delivered under this contract is the Purchaser's responsibility

2.3.5 Conduct User Acceptance Testing (UAT)

SOW 114/- UAT shall consist of Scenario based testing, focused on validating the system as per user needs.

SOW 115/- The Contractor shall develop test scenarios based on the operational phase and the type of user. The Contractor shall use the Table below as a frame work to develop the training.

Table 2-2 – Sample Scenarios for UAT

No.	Operational Scenario Phase & required CIS	Admin Users	End Users	Comment
1	Deployment Preparation and Planning			
2	Initial Deployment			
3	Mission Execution			
4	NRF Mission Handover			
5	Redeployment			

[74] Operational scenarios are detailed in Annex A.

SOW 116/- The scope of the UAT for the Admin Users shall be determined from the user functions as identified from the TNA.

SOW 117/- The End User will mainly focus on the End User Business Support Services and COI services (i.e. Core Services and COI-specific services (FAS). Noting that the provision and configuration of these is PFP. The Contractor shall undertake UAT, as detailed in Chapter 6

2.3.6 System Acceptance Testing

SOW 118/- System Acceptance Test shall assess the requirements for all quality characteristics, beyond interoperability and functionality. This will encompass requirements (e.g. Functional, Performance, Reliability, etc.) as described in Chapter 6.

[75] In particular, performance assessment during System Acceptance Testing is required to measure responsiveness, effectiveness and stability, as well as to ensure that the MB-DSGT system is behaving and generating results within specified performance criteria. Performance Testing can also serve to investigate, measure, validate or verify other quality attributes of the capability, such as scalability, reliability and resource usage.

SOW 119/- The Contractor shall run tests in order to find out the actual capability of the system, based on the individual performance benchmark of the components specified in the SRS

SOW 120/- The Contractor shall plan the functional test also for the purpose of reliability testing and consider the related reliability metrics in the planning of the test.

SOW 121/- This test shall verify that the complete system, consisting of tested Subsystems, has been produced to meet the appropriate engineering design specifications and is fault-free.

SOW 122/- It shall ensure that the requirements of the system are fulfilled.

SOW 123/- It shall be shown that the system is fully integrated and stable.

SOW 124/- It shall verify inputs and outputs including all combinations of legal and illegal values for Man Machine Interfaces and external interfaces.

SOW 125/- The test shall assess the mechanical construction, stability requirements, and ergonomic design of the overall system.

SOW 126/- The test shall verify system initialization, power down, and power loss and system re-initialization.

SOW 127/- The test shall verify intra-system interfaces between all relevant Sub-systems in the system.

SOW 128/- The test shall verify intersystem interfaces and protocols for interoperability with external systems.

SOW 129/- The test shall prove compliance with all applicable requirements, including Environmental requirements as detailed in Annex A.

[76] In addition the following objectives for the SAT apply:

1) To ensure that the requirements of the system detailed in Annex A are fulfilled with operational data loaded
2) To ensure that the requirements of the system detailed in Annex A are fulfilled when all Contractor and PFP Sub-systems are in an operational configuration.
3) To ensure that operational data is loaded successfully
4) To ensure that the operational configuration is correct and complete
5) To verify that the systems have been produced to meet the appropriate engineering design specifications and are fault-free when loaded with operational data and when configured for operations
6) To ensure that the system is ready for production.
7) To verify Man Machine Interfaces and external interfaces using operational data inputs and outputs including all combinations of legal and illegal values
8) To verify system interoperability using operational data and configuration
9) To demonstrate that the Product Baseline (PBL) complies with the Functional Baseline (FBL) concerning the integration with externally interfacing systems;
10) To demonstrate interoperability between MB-DSGT and other legacy equipment, both at the level of physical interfaces and services (communications and infrastructure);
11) To demonstrate end-to-end functionality through a series of end-point tests;

SOW 130/- SAT shall involve the following assets:

1) MB-DSGT consisting of legacy equipment provided as PFP, and provisioned with military SATCOM bandwidth;
2) SET 2 or a similar calibrated site for X Band plus a KA calibrated terminal (provided by the Contractor); and
3) TSGT3G-DSO reference terminal for compatability testing for first delivered MB-DSGT only.

[77] During SAT, the Purchaser will provide:

1) A test environment for SAT, which is operationally representative in respect to Purchaser’s security policies;
2) The required affiliated systems and the interfaces for the interoperability tests;
3) Access to the Purchaser’s Reference Environment, including MB-DSGT Reference System, will be available over terrestrial connectivity.

SOW 131/- The Purchaser will provide satellite access at mutually agreed times for System Acceptance Testing purposes. The Contractor shall request the Purchaser to provide satellite access at least 2 weeks in advance.

SOW 132/- For satellite access, specific requirements (see Appendix C in Annex A), that are needed to have access authorization to satellite shall be fulfilled by the Contractor. This shall include but not limited to providing the required data of the terminals to have authorization for access.

SOW 133/- The system acceptance test activity shall have following Entry/Exit Conditions

Table 2-3 – System Acceptance Testing Entry/Exit Conditions

Entry Conditions	Exit Conditions
All related Sub-systems shall have reached a stable and fault-free condition	All test cases and steps shall have passed successfully. This includes Environmental , EMI & EMC Testing as well
All related Sub-systems shall have passed the Sub-system integration tests successfully	Test report shall be provided by the Contractor including test case, step description and test documentation
All testing aides, tools and data shall have been prepared	Conformance Certificates from Conformance Testing Agencies and requests for exclusions from unit and Sub-system integration testing shall have been accepted by the Purchaser
All test procedures shall have been accepted by the Purchaser	Formal acceptance of the systems undergoing qualification testing has been granted
All operational data shall have been prepared and loaded	
All operational configurations shall have been documented, prepared and implemented	-
The Contractor has successfully completed a dry run of the system acceptance test	A dry-run test report has been submitted by the Contractor and been accepted by the Purchaser

[78] The Purchaser has the right to perform pre-security tests on the Contractor provided baseline during the SIT.

SOW 134/- Successful completion of the SAT shall be a trigger for planning Provisional System Acceptance (PSA).

[79] Note that the System Acceptance Test during the TVVA Assessment does not imply achievement nor acceptance of PSA or FSA.

2.3.7 Install and Validate Reference Environment

SOW 135/- Following the TVVA Assessment, including Security testing, the First Article system (excluding non-CIS) shall be re-configured as required, in order to become the MB-DSGT Reference System, within the wider DCIS Reference Environment, consisting of:

SOW 136/- Any change required on the First Article system as delivered, resulting from the outcome of the TVVA Assessment shall be implemented prior to integrating into the MB-DSGT Reference System.

[80] The MB-DSGT Reference System will be used in support of troubleshooting and issue resolution during the Site Acceptance Testing, OpTEval and beyond, throughout the lifecycle of the MB-DSGT.

SOW 137/- The Contractor shall provide the tools and procedures to ensure that the MB-DSGT Reference System is kept up to date and in line with the current MB-DSGT baseline.

2.3.8 Conduct System Acceptance Testing of Reference Environment

SOW 138/- The Contractor shall conduct System Acceptance testing on the reference system, based on the reference system capability scope and the System Acceptance testing scope as detailed in Section 2.3.6 and Section 6.

2.4 Provide Production Units

[81] This section will cover the production and delivery of all the MB-DSGTs in the scope of the Contract.

2.4.1 Build Production Units

SOW 139/- Production Units shall be delivered in four batches, as follows (refer to Table 2-4 for details):

1) Batch #1, including the Training Unit but excluding Reference Unit (repurposed First Article);
2) Batch #2, 5 MB-DSGTs.
3) Batch #3, 5 MB-DSGTs.
4) Batch #4, 4 MB-DSGTs.

[82] Batch #1 unit is intended to support the following activities:

Training (refer to section 2.7);

SOW 140/- Batch #1 shall deliver 1 complete operational MB-DSGT for training purposes. consisting of:

- 1 MB-DSGT Terminal

SOW 141/- Batch #2 shall deliver 5 complete operational MB-DSGTs for operational purposes consisting of:

- 5 MB-DSGT Terminals

SOW 142/- Batch #3 shall deliver 5 complete operational MB-DSGTs for operational purposes consisting of:

- 5 MB DSGT terminals

SOW 143/- Batch #4 shall deliver 4 complete operational MB-DSGTs for operational purposes consisting of:

- 4 MB-DSGT Terminals

SOW 144/- The Contractor shall build, qualify (through Factory Testing) and deliver the MB-DSGTs over Batch #1, Batch #2, Batch #3 and Batch #4, as per the following table.

Table 2-4 – Equipment quantities and allocation

Type	Allocation	Quantities					
		First Article	Batch #1	Batch #2	Batch #3	Batch #4	Total(SSS)
MB-DSGT	Operation			5	5	4	14
	Training		1				1
	Reference	1					1

2.4.2 Non-CIS Elements

SOW 145/- The Contract shall deliver Non-CIS elements as required by the MB-DSGTs, in the same quantities and batches described above. This is applicable to[1]:

1) Power distribution system including Uninteruptable Power Supply (UPS);
2) Ancillaries, transportation boxes, camouflage nets, operation and maintenance tools, weather station, grounding kit, lightning protection

2.4.3 Monitor and Control Laptop

SOW 146/- The Contract shall deliver Monitor and Control laptop for local operation of the MB-DSGT, maintenance purposes and man-machine interface[2].

2.4.4 Provide Licenses

SOW 147/- Software licenses shall be provided as required by the MB-DSGTs under each batch.

SOW 148/- Licenses shall encompass but shall not be limited to:

1) Firmware needed for the Monitor and Control of the MB-DSGT such as but not limited to local operation and maintenance purposes; and
2) Any software images (e.g. hypervisors, operating systems) and applications running on compute and storage components (e.g. Management Laptop).

SOW 149/- Where commercially available, perpetual licenses shall be procured and delivered under this Contract.

SOW 150/- Any software proposed by the Contractor for which NATO holds an Enterprise agreement, will be provided as PFP. For the identified software, the Contractor shall provide the list of licenses to the Purchaser, for the Purchaser to procure the licenses in the quantities required.

2.4.5 Conduct Production Factory Testing

[83] Production Factory Testing encompasses the tests to verify that all production units comply with the specifications.

[1] Refer to Annex A for details.
[2] Refer to Annex A for details

SOW 151/- Production Factory Testing is applicable for each production unit and shall consist of an accepted subset of the Factory Acceptance Testing test cases.

SOW 152/- The Batch Factory Testing Reports shall be issued to the Purchaser within 1 week of Factory Testing completion. A successful Factory Test will be a pre-condition to approve the shipment of equipment to CSSC Brunssum.

2.4.6 Provide System Documentation

SOW 153/- As part of the Batch deliverables, the Contractor shall provide the System Documentation including:

1) Operation Manuals (as per CSDB);
2) Maintenance Manuals (as per CSDB);
3) Product Baseline (PBL) (as per CMDB);
4) Material Data Sheet (as per PSDB);
5) Electronic Security Environment (ESE) Conformatnce Statement (ESECS).

2.4.7 Ship Production Units

SOW 154/- The Contractor shall ship the production units from the factory to the Purchaser's CSSC Brunssum.

SOW 155/- The Contractor shall be responsible for shipping any elements affected by deficiencies back to factory, following SAT and before PSA can be declared and OpTEval can commence.

SOW 156/- The Contractor shall be responsible for shipping any elements affected by deficiencies back to factory, following OpTEval and before PSA or FSA can be declared and the systems can be handed over to the end-users.

SOW 157/- Shipping of production units shall adhere to the requirements in Section 4.8.2.

2.5 Perform Training MB-DSGT System Installation

[84] In support of System Acceptance Testing (SAT), Training MB-DSGT System Installation activities entail integration of the MB-DSGT delivered under Batch #1 (refer to Table 2-4 for details) with legacy communications equipment.

[85] SAT is conducted to exercise the MB-DSGT coexistence and interoperability with existing legacy communications equipment, in an operational training setting, vice the setting of the MB-DSGT Reference Environment. The MB-DSGT Reference System of the MB-DSGT Reference Environment will support any troubleshooting activities during SAT.

[86] SAT assesses the MB-DSGT's use of resources in the target implementation environment to identify any undesirable effects on other systems.

SOW 158/- The Contractor shall ensure that at the end of SAT all the functional and non-functional requirements in Annex A (SRS) are either tested or demonstrated, in adherence to the processes described in Chapter 6.

[87] The SAT will involve an MB-DSGT connected to the existing legacy communications equipment. These assets will be configured onsite at the NCI Academy and use local resources. Another MB-DSGT will be configured and used to test the MB-DSGT in Ka-band.

[88] The SAT will be conducted with the minimum necessary non-CIS assets deployed.

2.5.1 Develop System Installation Plan – Training System

SOW 159/- The System Installation Plan (SIP) shall describe the Contractor's approach to implementing the System Integration activities in fulfilment of the requirements in the paragraphs below.

2.5.2 Conduct Site Survey (System Installation) – Training System

[89] System Installation activities in preparation of System Acceptance testing will be conducted at the CSSC in Brunssum (NLD) with the exception of the Training MB-DSGT (Batch #1) in which case it will be performed at the NCI Academy in Oerias (PTL).

SOW 160/- The Contractor shall conduct a Site Survey at those locations selected by the Purchaser for performing the System Installation activities..

SOW 161/- The Site Survey shall adhere to the site survey requirements in Section 3.6.

SOW 162/- The Site Survey Report (SSR) shall be delivered to the Purchaser for review and acceptance following the document requirements in the Project Management relevant section, not later than 2 weeks following the Site Survey.

2.5.3 Perform System Configuration – Training System

SOW 163/- The System Configuration Package shall include:

1) Physical connectivity and/or networking diagrams;
2) Fully documented Antenna Subsystems, RF components for each frequency band (X/Ka), IFOFL assembly, Monitor and Control laptop, Time and Frequency Reference Sytems, Power distribution systems inculding UPS, and Ancillaries to include Transporation Boxes; and
3) Fully documented Interfaces for integration purposes.

SOW 164/- For any software and scripts, developed as part of this procurement, the System Configuration Package shall include descriptions, diagrams/modelling as applicable and documented source code.

2.5.4 Conduct System Acceptance Testing –Training System

SOW 165/- The Contractor shall conduct System Acceptance testing on the training system, based on the training system capability scope and the System Acceptance testing scope as detailed in Section 2.3.6 and Section 6.

2.5.5 Deliver Training System

SOW 166/- The Training equipment shall be developed in parallel to the other MB-DSGT equipment.

SOW 167/- The Training equipment shall be tested during Factory Tests as defined in section 2.4.5.

SOW 168/- Upon completion of Factory Testing of Batch #1, the Contractor shall package, preserve, ship, transport, document and deliver the Training equipment to the NCIA Academy Oeiras (PRT) in accordance with section 4.7 and 4.8. The Contractor shall provide the necessary delivery documentation (Inventory List, Packing List, Notice of Shipment) as detailed in Section 4.7 and 4.8.

2.5.6 Training System Documentation

SOW 169/- To support the installation, configuration and maintenance of the Training equipment, the Contractor shall deliver the following documentation:

1) Hardware and software inventory as defined in Section 4.7;
2) Technical Publications as defined in Section 4.9;
3) As-Built Drawings as defined in Section 3.8.4;
4) COTS documentation as defined in Appendix B (CDRL).

SOW 170/- The Training Units Technical Publications shall be provided 4 weeks before Factory Tests.

SOW 171/- The COTS documentation and As-Built drawings shall be provided for system acceptance.

2.5.7 Training System Installation

SOW 172/- The Contractor shall unpack in the presence of the Purchaser representative all Purchaser-furnished and Contractor-furnished equipment at the installation location and dispose of packing materials as directed by the Purchaser's Site POC. The Contractor shall perform an Inventory Check with the Purchaser representatives based on the delivery documentation provided by the Contractor accordingly with Section 4.7, 4.8 and 4.9.

SOW 173/- The installation of the Training equipment shall be done with NATO NCIA Academy representatives and shall follow the procedures defined in the Training equipment Technical Manual.

SOW 174/- The Contractor shall obtain site configuration details from the Site POC.

SOW 175/- The Contractor shall configure all hardware/software settings to match the Product Baseline and site-specific requirements. The Contractor shall provide all necessary information, documents and assistance for Purchaser to perform an interim PCA on the system.

SOW 176/- The Contractor shall ensure all equipment is asset marked in accordance with the requirements of the site and the Purchaser’s Configuration Management requirements.

SOW 177/- The Training Unit shall be interconnected with the NATO NCIA Academy Training legacy DSGT equipment, and tests / training courses shall consider the tests listed under Section 2.5.4.

2.5.8 Training System Validation

SOW 178/- The Contractor shall perform a subset of the System Acceptance Tests as defined Section 2.5.4 to demonstrate that the training system is configured as an operational MB-DSGT and ready for training.

SOW 179/- System Acceptance Testing shall take place upon completion of the installation and configuration work at the training site and shall not last more than five calendar days.

SOW 180/- System Acceptance Testing shall be conducted in adherence to Chapter 6.

[90] The Purchaser will support the execution of a subset of the System Acceptance Testing along the lines described in section 2.6.

SOW 181/- As a part of the Work Package deliverables the Contractor shall present the Purchaser with:

1) Purchaser witnessed and approved test results;
2) Operation Manuals (as per CSDB);
3) Maintenance Manuals (as per CSDB);
4) Product Baseline (PBL) (as per CMDB); and
5) Material Data Sheet (as per PSDB).

SOW 182/- Upon completion of site installation work, the Contractor shall provide the Purchaser a site installation report.

2.5.9 Conduct System Acceptance Testing – Operation MB-DSGTs

SOW 183/- The Contractor shall conduct System Acceptance testing on the remaining Operational MB-DSGTs, based on the MB-DSGT capability scope and the System Acceptance testing scope as detailed in Section 2.3.6 and Section 6.

2.6 Support Operational Test and Evaluation

[91] The OpTEval will be conducted by the Purchaser with preparation of equipment in a garrison location, deployment to outdoor environment, installation of the MB-DSGT system, introduction of fault scenarios, finishing with the redeployment of the system back to the garrison location.

[92] Operational Test and Evaluation (OpTEval) occurs after the system has been granted Provisional System Acceptance (PSA).

[93] Chapter 6 provides the high level requirements for OpTEval. In the context of MB-DSGT OpTEval is intended to:

1) Demonstrate that the MB-DSGT is Fit for Use, by placing it in the hands of the Operational Users (NATO CIS Group (NCISG)) to verify that the Operational Acceptance Criteria (OAC) are fulfilled through scenario-based testing;
2) Verify that the training delivered is fit for purpose;
3) Verify that documentation has been delivered and can be effectively use to operate and support the system in the field;
4) Verify integration with additional PFP not involved in previous test instances, including interaction with the Operational Users (i.e. vehicles, generators, tents, radio masts, fibre optic reels, user appliances); and
5) Verify that the system interoperates with other NATO DCIS assets in the context of a NATO exercise.

[94] The OpTEval will consist of following steps:

1) Planning;
2) Preparation;
3) Deployment;
4) OpTEval Execution;
5) Redeployment; and
6) Finalization.

SOW 184/- During the above mentioned steps the Contractor shall:

1) Provide advice to the Purchaser on the functionality and capability of the MB-DSGT. The Contractor shall provide this expertise during the OpTEval and witness the whole process, Contractor's technical lead onsite at purchaser location and for up to 5 business days; and

2) Collect Training Feedback throughout the whole OpTEval to improve the Training deliverables.

[95] The Purchaser has the right to conduct User Tests as part of OpTEval. Prior to the OpTEval, the Users may provide scenarios to be tested, and the Purchaser will create test plans that will be shared with the Contractor.

SOW 185/- The Contractor shall support Purchaser-conducted series of User tests.

[96] The OpTEval will include testing interfaces to other NATO DCIS assets, which will be configured and operated by the Purchaser in support of the tests.

[97] During the OpTEval, the equipment will be operated by trained NATO DCIS personnel.

[98] The OpTEval will be performed replicating the operational conditions of a NATO deployed operation to the greatest extent possible.

[99] Depending on the results for the previous security testing instance(s), none or only very limited amount of security tests should be tested during additional security testing.

SOW 186/- Security Test and Verification Reports (STVR) shall be developed and released by the Contractor one week after completing the Additional Security Testing but not later not later than 4 weeks prior FSA. This is to enable issuance of (I)SA for the MB-DSGT.

SOW 187/- The Contractor shall be responsible for correcting the faults found during the test and amending, if necessary, the corresponding documentation and any other documentation (including training) affected by those changes.

SOW 188/- The Contractor shall plan the support concept for OpTEval accordingly with the Support Requirements provided in Section 4.4. The Contractor shall provide Subject Matter Experts (SME) onsite over the OpTEval period and resolve major issues outside of normal working hours, working overnight if required.

SOW 189/- The Contractor shall maintain a logbook recording any significant event for the acceptance and final testing. The logbook shall contain, as a minimum, the details of the test executed, their ratings, deficiencies noted, test duration, and important remarks.

3 Project Management

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

[101] The Project will be managed and be subject to review by the Purchaser, who will be represented by the NCI Agency Project Management Team (PMT). This team will include relevant NCI Agency personnel (Project Manager, Contracting Officer, Project Engineers, Subject Matter Experts, Independent Verification and Validation engineers).

3.1 Contractor's Project Management Office

MNG-1 The Contractor shall establish a project management organization and maintain a Project Management Office (PMO) to perform and manage all efforts necessary to meet all his responsibilities under this Contract.

MNG-2 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.

MNG-3 The Contractor shall use PRINCE2 or a similar and internationally recognized Project Management standard for the direction, governance and management activities for the entire project.

MNG-4 The personnel identified below shall be considered as Key Personnel:

Project Manager;

Technical Lead;

Test Director;

IPS Manager;

Training Manager; and

Configuration Manager.

MNG-5 The key Personnel shall meet the requirements as detailed at Appendix F.

[102] The Purchaser's Contracting Authority will act as the Purchaser's representative and the Purchaser's Project Manager (PM) will be the primary technical and project management interface between the Contractor and Purchaser after the EDC.

MNG-6 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.

MNG-7 The Contractor`s Project Manager shall have experience managing projects similar to this project in technical and financial scope.

MNG-8 Key personnel on the Contractor side shall actively liaise with Purchaser's personnel with equivalent roles, as required.

MNG-9 The Quality Assurance Manager shall report to a separate manager within the Contractor's organization at a level equivalent to or higher than the Project Manager.

MNG-10 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.

3.2 Project Management Plan

MNG-11 The Contractor shall establish and maintain a **Project Management Plan (PMP)**.

MNG-12 The PMP shall describe how the Contractor will implement the totality of the project, including details of the project control that will be applied.

MNG-13 The PMP shall describe how the Contractor shall implement project/contract administration, including details of the controls that shall be applied to supervise Sub-Contractor performance.

MNG-14 The PMP 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.

MNG-15 After approval by the Purchaser, the final version of the PMP shall be the official document against which the Contractor is expected to conduct the performance of the Contract. The approved PMP shall however not supersede the Contract, and the Schedule of Supplies and Services (SSS) in particular.

MNG-16 The PMP shall describe the contractor's organization, assignment of functions, duties, and responsibilities, management procedures and policies, and reporting requirements for the conduct of contractually-imposed tasks, projects, or programmes.

MNG-17 The PMP shall identify all major Contractor operating units and any Subcontractors involved in the development of System and a description of the portion of the overall effort or deliverable item for which they are responsible.

MNG-18 The PMP shall cover all aspects of the project implementation, including the Contractor's project management structure and project control processes, personnel assignments, and external relationships necessary to provide the System as required by this Contract.

MNG-19 The Contractor shall ensure that the PMP remains current throughout the duration of the Project to reflect the actual state of the Contractor's organization and efforts.

MNG-20 The Contractor shall maintain the baseline version of the PMP.

MNG-21 The Contractor shall brief any changes to the PMP at all Project Review Meetings (PRM).

MNG-22 The PMP shall cover at least the following areas:

1) Project organization:
    a) Internal structure, including a project organizational diagram;
    b) Roles and responsibilities of each organizational unit;
    c) Key personnel, their qualifications, and their responsibilities; and
    d) Organizational boundaries between the project organization and the parent and subcontracted organizations.
2) Project management processes:
    a) A description of the Contractor's project management methodology and approach to be used for this project;
    b) Project start-up, including staffing, basis of cost and schedule

estimates, and project infrastructure; and

c) Project control, including monitoring, reporting of work packages.

3) Communications management, including the Project Progress Reports; Project Checkpoint Reviews; and all other communications with the Purchaser and Sub-contractors;

4) Lessons Learned management, including the identification, reporting, and logging of lessons learned in a Lessons Learned Log;

5) Purchaser involvement:

a) Purchaser involvement via Joint Reviews, informal meetings, reporting, modification and change, implementation, verification, approval, acceptance and access to facilities;

b) Expected Purchaser Furnished Equipment and associated timelines; and

c) Delivery procedures for the documentation and the products. This includes control of Purchaser Property, export control process.

6) Subcontracting plan demonstrating that the Contractor can effectively manage, monitor and control the sub-contractors and that the sub-Contractors will agree to abide by the requirements of the prime Contract as pertains to flow-down provisions.

3.3 Project Implementation Plan

MNG-23 The Project Implementation Plan (PIP) shall describe how the Contractor shall implement project/contract administration.

MNG-24 The PIP shall consider all project implementation aspects, which include management provisions, facilities, schedules, personnel assignments, external relationships and project control.

MNG-25 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.

MNG-26 The Contractor shall ensure that the PIP accurately reflects Contractor’s plans for the full duration of the period of performance of the Contract.

MNG-27 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.

[103] The content of the plans in the PIP are described in detail in the related sections of this SOW.

MNG-28 All plans in the PIP above involve a sequence of activities. For each major activity, the plan shall at least provide the following information:

1) Timeline of the activity;

2) Locations where the activity will take place;

3) Methodology and processes followed to implement the activity;

4) Actors involved in the activity, covering:

a) On the Contractor's side, both prime and Sub-Contractors, with detailed information on the roles and responsibilities of each; and

b) On the Purchaser's side, required players and description of how they will engage in the activities and with the actors on the Contractor's side.

5) Information required from the Purchaser for the activity to take place;

6) Documentation tree and deliverables for the activity, where applicable; and

7) Review and acceptance process of the documentation above, where applicable.

MNG-29 In all plans of the PIP, the Contractor's proposed timelines shall be commensurate and contingent upon the nature of the risks relevant to the efforts concerned, as identified in the Risk Management Plan (Section 3.3.4).

MNG-30 All plans in the PIP shall provide:

1) Tables listing activities and dates, as tabular version of the Gantt charts; and

2) Lists of deliverables under each plan (in turn mapped to CLIN numbers).

MNG-31 All plans in the PIP shall contain a mechanism to visually track the changes in any of the artefacts above, throughout the various revisions of the PIP. Alternatively, the changes can be itemized in Release Notes or similar (in tabular form).

MNG-32 The Contractor shall produce a Draft PIP. The Draft PIP shall address all comments received at Contract Award.

MNG-33 The Draft PIP shall be reviewed during SRR.

MNG-34 The Contractor shall continue to update the draft Project Implementation Plan (PIP) produced and delivered at the time of the Contract Award. The Contractor shall incorporate any required changes to the PIP resulting from Site Surveys, Configuration Capture, System Design Reviews, and Purchaser feedback and provide a final version of the PIP at Critical Design Review (CDR) for final Purchaser review and acceptance. The final version of the PIP will continue to be a living document until FSA.

MNG-35 The Contractor shall ensure that the PIP accurately reflects Contractor's plans for the full duration of the period of performance of the Contract.

MNG-36 The PIP shall include the following products:

1) Product Breakdown Structure (PBS);

2) Project Work Breakdown Structure (PWBS);

3) Project Master Schedule (PMS);

4) Risk Management Plan, including Risk Log; and

5) Issue Management Plan, including Issue Log.

MNG-37 The Contractor shall provide the following Plans specific to specialist areas. The Contractor may want to include these in the PIP, but as a separate section:

1) System Design Plan (SDP) (Section 2.1.1);

2) System Installation Plan (SIP) (Section 2.5.1);

3) Project Master Test Plan (PMTP) (Section 6.4);

4) Documentation Plan (DP) (Section 3.8.1);

5) Integrated Product Support Plan (IPSP) (Section 4.1);

6) Training Plan (TRNP) (Section 4.10);

7) In Service Support Plan (ISSP) (Section 4.13);
8) System Safety Program Plan (SSPP) (Section 4.15.3);
9) Configuration Management Plan (CMP) (Section 5.1); and
10) Quality Assurance Plan (QAP) (Section 7.6).

[104] The approval of the PIP and of any updated plan of the PIP by the Purchaser signifies that the Purchaser considers the plan to be a logical and satisfactory approach to the management of the required activities, based upon the information provided by the Contractor.

MNG-38 The approval of the PIP shall in no way relieve the Contractor from his responsibilities to satisfy the contractual and technical requirements of this Contract. The requirements of the Contract supersede the statements of the PIP in the case of any conflict, ambiguity or omission.

MNG-39 The PIP shall be updated 2 weeks prior to every Project Review Meeting.

MNG-40 From FDR onwards, the following plans shall be updated by the Contractor as appropriate throughout the duration of the contract, beyond the time of release of the final version of the PIP:

1) Project Master Test Plan (PMTP);
2) Documentation Plan (DP);
3) Integrated Product Support Plan (IPSP);
4) Training Plan (TRNP);
5) In Service Support Plan (ISSP);
6) System Safety Program Plan (SSPP); and
7) Configuration Management Plan (CMP).

MNG-41 Each revision of the PIP shall entail a revision of each of the plans.

MNG-42 Any revisions of the PIP shall be subject to Purchaser approval.

[105] The approval of the final version of the PIP and of any updated plan of the PIP by the Purchaser signifies that the Purchaser considers the plan to be a logical and satisfactory approach to the management of the required activities, based upon the information provided by the Contractor.

MNG-43 The approval of the final version of the PIP shall in no way relieve the Contractor from his responsibilities to satisfy the contractual and technical requirements of this Contract. The requirements of the Contract supersede the statements of the PIP in the case of any conflict, ambiguity or omission.

3.3.1 Product Breakdown Structure

MNG-44 The Contractor shall establish and maintain a **Product Breakdown Structure (PBS)**.

MNG-45 The PBS shall identify the physical outcomes of the project. It shall define all the products that the project has to produce. The PBS shall show the scope broken down in a hierarchical manner and at a sufficient level to ensure a clear understanding of the product and its status. It shall identify all components of the system, hardware and software (including firmware), infrastructures, services and any documentation required by the Contract.

MNG-46 Each constituent sub-product shall be related to a precise sub-set of the System Requirements Specification (SRS) and be identifiable to the Contract (SSS).

MNG-47 The Product Description shall be sufficient to understand the purpose and function of the product and the level of quality required of the product.

MNG-48 The PBS shall include the percentage of accomplishment for each sub component. This status shall be included in the Project Progress reports.

MNG-49 The Contractor shall provide the initial baseline version of the PBS within four weeks after PDR.

MNG-50 The PBS shall be put under Configuration and Change Control.

3.3.2 Project Work Breakdown Structure

MNG-51 The Contractor shall establish and maintain a **Project Work Breakdown Structure (PWBS)**.

MNG-52 The contractor shall capture 100% of the work defined by the project scope, as well as all deliverables in terms of the work to be completed, including project management, in the PWBS.

MNG-53 The PWBS shall include:

1) The definition of all the work packages and the relationship between the work packages and the end product;
2) The description of the work packages to a level that exposes all project risk factors and allows accurate estimate of each work item's duration, resource requirements, inputs and outputs, and predecessors and successors;
3) For each work item its duration, resource requirements, inputs and outputs, predecessors and successors, assumptions, constraints, dependencies, and requirements for Purchaser support; and
4) The PWBS shall include a PWBS Dictionary that identifies for each work item its duration, resource requirements, inputs and outputs, predecessors and successors, assumptions, constraints, dependencies, and requirements for the Purchaser support.

MNG-54 The Contractor shall not change the PWBS or PWBS Dictionary without the approval of the Purchaser.

3.3.3 Project Master Schedule

MNG-55 The Contractor shall establish and maintain a **Project Master Schedule (PMS)**.

MNG-56 The PMS shall contain all Contract events and milestones, including Contract-related Purchaser activities and events (e.g., Purchaser reviews, provision of specific Purchaser-furnished items).

MNG-57 The PMS shall identify, when PFP are required throughout the Project life so that it can be implemented/integrated in a timely fashion. The identified PFP items are at Appendix D.

MNG-58 All Contractor and Purchaser activities and milestones related to Integrated Product Support (IPS), Configuration Management (CM) and Quality Assurance (QA) shall be identified and included in the PMS.

MNG-59 The PMS shall provide the duration, sequence, and resource effort to deliver tasks providing a realistic assessment of the scope of work involved.

MNG-60 The PMS shall include the delivery dates for all products identified in the SSS.

MNG-61 The PMS shall correlate with the PWBS and also be traceable to performance and delivery requirements of this SOW.

MNG-62 The PMS shall identify the start and finish dates, duration, predecessors, successors, and resource requirements for each work item.

MNG-63 The PMS shall identify the progress for each task.

MNG-64 The PMS shall include the delivery dates for all management products (e.g., project plans, Project Progress Reports), including at least the initial submission, the review cycles and the final delivery.

MNG-65 The PMS shall include activity network, activity Gantt, milestone, and critical path views of the project schedule.

MNG-66 The PMS shall be based on Microsoft Project 2010. Any changes to this version shall be approved by the Purchaser.

3.3.4 Risk Management

MNG-67 The Contractor shall establish a risk management process and perform risk management throughout the period of performance of this Contract.

MNG-68 The Contractor's Risk Management process shall enable and define identification of all types of risks, evaluation and prioritization of each risk, definition of proposed response strategy, owner and actions and suggested monitor and control mechanisms.

MNG-69 The Contractor shall establish a **Risk Management Plan (RMP)**.

MNG-70 The Contractor shall document, update and maintain status of all risks in the Risk Log, as an Annex to the RMP.

MNG-71 The Contractor shall update the Risk Log at minimum on a monthly basis in a format agreed with the Purchaser.

MNG-72 The Contractor shall brief the Risk Log at all Project Progress Meetings and Design Reviews.

MNG-73 The RMP shall be developed by establishing and maintaining a strategy for identifying, analyzing, and mitigating risks.

MNG-74 The risk management strategy shall address the specific actions and management approach used to apply and control the risk management program. This shall include identifying the sources of the risk, the scheme used to categorize risks, and the parameters used to evaluate.

MNG-75 The RMP shall be under configuration control.

MNG-76 The RMP shall include:

1) Risk Management processes and measurement methodology;
2) Key Risk Categories;
3) Risk Prioritization Matrix;
4) Risk Management organization, roles and responsibilities;
5) Requirements for communicating risks and risk status with the Purchaser; and

6) Risk Log.

MNG-77 The Risk Log shall list all the risks, and indicate for each one the following information (but not limited to):

1) Risk identifier: unique code to allow grouping of all information on this risk;
2) Description: brief description of the risk;
3) Risk category (e.g. management, technical, schedule, quality and cost risks);
4) Impact: effect on the project if this risk were to occur;
5) Probability: estimate of the likelihood of the risk occurring;
6) Risk rating (High, Medium, Low);
7) Proximity: how close in time is the risk likely to occur;
8) Response strategy: avoidance, mitigation, acceptance, transference;
9) Response plan(s): what actions have been taken/will be taken to counter this risk;
10) Owner: who has been appointed to keep an eye on this risk;
11) Author: who submitted the risk;
12) Risk Stakeholders;
13) Date identified: when was the risk first identified;
14) Date of last update: when was the status of this risk last checked; and
15) Status: e.g. closed, reducing, increasing, no change.

3.3.5 Issue Management

MNG-78 The Contractor shall establish and maintain a process for identifying, tracking, reviewing, reporting and resolving all project issues.

MNG-79 The Contractor shall propose an **Issue Management Plan (IMP)**.

MNG-80 The Contractor shall develop and maintain an Issue Log where all project issues are recorded and tracked regardless of their status, as an Annex to the IMP.

MNG-81 The Contractor shall update and maintain the Issue Log throughout the period of performance of this Work Package.

MNG-82 The Contractor shall update the Issue Log at minimum on a monthly basis in a format agreed with the Purchaser.

MNG-83 The Contractor shall brief the Issue Log at all Project Review Meetings and Design Reviews.

MNG-84 The IMP shall outline the general processes and techniques to monitor, control, report the issues affecting the project both in technical and administrative terms in all phases of the project. The IMP shall be under configuration control.

MNG-85 The IMP shall include:

1) Issue Management processes (identification, reporting, assessment, and logging of project issues); and
2) Issue Log.

[106] A Project Issue is anything that affects the Project, either detrimental or beneficial (e.g. problem, error, anomaly, risk occurring, query, change in the project environment, change request, off-specification).

[107] In accordance with PRINCE2 an issue is defined as, “a relevant event that has happened, that was not planned, and requires management action”. It can be any concern, query, and request for change, suggestion or off-specification raised during a project. Project issues can be about anything to do with the project”.

MNG-86 The Issue Log shall comprise the following information (but not limited to):

1) Project Issue Number;
2) Project Issue Type (Request for change, Off-specification, general issue such as a question or a statement of concern);
3) Author;
4) Date identified;
5) Date of last update;
6) Description;
7) Action item/Decision;
8) Responsible person (individual in charge of the action item);
9) Suspense date (Suspense date for the action item);
10) Priority; and
11) Status.

MNG-87 The Issue Log shall be maintained in a format where sorting and filtering of issues is possible.

3.4 Project Meetings

3.4.1 Kick-off Meeting

MNG-88 The Contractor shall support a Contract Kick-off Meeting (KOM).

MNG-89 For the KOM, the Contractor and any key personnel from major subcontractors shall meet with the Purchaser’s Project Manager at the Purchaser’s facility (The Hague-Netherlands, Brussels-Belgium, Mons-Belgium, or Braine l’Alleud-Belgium) within two weeks after Contract Award to review the schedule of activities and to discuss any preparations or coordination required to support the implementation effort.

[108] Attendance in person is necessary.

MNG-90 At KOM, the Contractor shall present the Project Management Plan, the Project Master Schedule, the Risk log, the Configuration Management process, the Configuration Status Accounting database and the Quality Management process.

MNG-91 At the KOM, the Contractor shall identify any pre-requisites to support the implementation of present contract.

MNG-92 At the KOM, the Contractor shall provide templates for all types of site surveys for review and approval by the Purchaser.

MNG-93 Following the KOM, the Contractor shall conduct Project Review Meetings (PRM) every 3 months, in adherence to the requirements in the following section.

3.4.2 Project Review Meetings

MNG-94 The Contractor shall arrange Project Review Meetings (PRM) with the Purchaser to occur every 3 months or at the request of the Purchaser if the situation requires.

[109] The location of the meetings will ordinarily be at the Purchaser`s premises. Other NATO locations, or at the Contractor's premises may be used if Purchaser and Contractor both consent.

MNG-95 Unless otherwise specified, at least two weeks before all meetings required under this Contract, the Contractor shall send an invitation, including:

1) Purpose;
2) Agenda;
3) List of participants; and
4) Date, hour, place, duration.

MNG-96 If meeting facilities at a Purchaser location are not available at the specified Purchaser location in the time frame required to support a meeting, the Contractor shall:

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

MNG-97 The Contractor shall provide minutes of all meetings. The Minutes shall include:

1) Date, place, and time of the meeting;
2) Purpose of the meeting;
3) Name of participants;
4) Approval of previous meeting's minutes and all resolutions;
5) Record of principle points discussed, actions taken, and decisions made; and
6) Copies of materials distributed at the meeting.

MNG-98 The minutes shall not be used as a mechanism to change the terms, conditions or specifications of the Contract nor as a vehicle to alter the design or configuration of equipment or systems. Such changes shall only be made by agreement, amendment or by authorized mechanisms as set forth in the Contract.

MNG-99 In addition to the mandatory meetings, the Contractor shall support ad-hoc meetings. These meetings will be held at Purchaser's Premises in NCI Agency The Hague, Brussels, Mons, or Braine l'Alleud. They will last 2 days maximum. These meetings will be devoted to discussing management issues, technical issues, or both. Technical issues will be discussed through Joint Technical Reviews (refer to 3.4.4).

MNG-100 Dates for the PRM shall be mutually agreed between the Purchaser and the Contractor.

MNG-101 PRM shall by default take place at the Purchaser's premises. When coinciding with System Design Reviews, the PRM shall take place at the Contractor's premises.

MNG-102 All types of communication including the meetings, phone calls, correspondences and project documentation shall be in English.

MNG-103 If the programme of a given PRM cannot be fulfilled at the intended date owing to one or more CDRL products being late and/or failure to meet the required quality criteria, the PRM shall be delayed and re-scheduled following mutual agreement between the Purchaser and the Contractor. In such circumstances the Purchaser may call one or more Ad-Hoc Meetings, in order to discuss project progress outside the nominal PRM sequence.

[110] Video-Teleconference (VTC) may be used at PRM in circumstances where it may be difficult to otherwise ensure attendance by the required personnel.

MNG-104 Should the Contractor wish to use VTC, a written request with justifications shall be submitted to the Purchaser not less than eight working days in advance of the scheduled meeting.

[111] The Purchaser's PM will chair the meetings.

MNG-105 The normal PRM agenda shall include:

1) Review of the minutes recorded and agreed at the previous PRM;
2) The Contractor's presentation of the Project Progress Report;
3) Schedule Review;
4) Risk Log Review;
5) Issue Log Review;
6) Technical Changes;
7) Discussion/resolution of problems and areas of concern;
8) If necessary, a summary of items to be discussed; and
9) Any other business.

MNG-106 During the meetings, the Contractor shall present slides covering all the points of the planned agenda. These slides shall be accessible by the Purchaser at least 5 working days before the meeting.

MNG-107 The Contractor shall attend and provide the meeting's Secretary in all meetings, including those held over VTC links.

MNG-108 During the meeting, the meeting's Secretary shall be fully devoted to capturing the minutes of the meeting.

MNG-109 Draft minutes shall be produced real time during the PRM and shall be agreed by the Contractor and the Purchaser representatives within 1 week following the PRM.

MNG-110 The approval of the final content, both recorded discussion items and agreed action items, shall be possible within 1 week of the last day of the meeting.

MNG-111 The minutes shall document the topics, problems, discussions and all decisions made and include copies of the current Action Item List (AIL), Project Schedule and Risk Analysis/Assessment, as Annexes.

MNG-112 These minutes shall not be regarded by the Parties as a mechanism to change the terms, conditions or specifications of the Contract nor as a vehicle to alter the design or configuration of equipment or systems. Any such changes shall only be made by Contract amendment or by authorized mechanisms as set forth in this Contract.

MNG-113 The minutes shall not exceed ten (10) pages, unless specifically approved by the Purchaser.

MNG-114 The Contractor shall send the final version of the draft minutes to the Purchaser not later than 5 working days after the initial draft approval, for final approval by the Purchaser.

[112] The Purchaser can send questions and comments concerning the documentation delivered between two meetings.

MNG-115 The KOM or a PRM shall not last more than 2 (two) days.

MNG-116 PRM shall host the formal revisions and approval of the CDRL products as per the CDRL table in Appendix B.

3.4.3 Ad-Hoc Meetings

[113] Ad Hoc Working Meetings (AHM) may be organized by on request of either the Purchaser or the Contractor, pending Purchaser agreement, to resolve problems, clarify project requirements and review progress in between the nominal PRM sequence.

[114] These meetings will normally be held at the Purchaser's premises.

MNG-117 Minutes of the Ad Hoc Working Meetings shall be written real time by the Contractor and sent to the Purchaser within 5 working days following the meeting. Comments received will be taken into account and incorporated. Once the Minutes are accepted by both parties' respective Project Managers, the Contractor shall provide the final version.

3.4.4 Joint Technical Reviews

MNG-118 The Contractor shall organize and conduct joint technical reviews, as defined in IEEE 12207 [IEEE 12207], to address and resolve critical technical issues in advance of major reviews such as Requirements, Design or Test Reviews.

MNG-119 The Contractor shall propose the subject and the timing of the joint technical reviews to ensure the most critical technical risks are raised and mitigated as early as possible. The joint technical reviews should be planned as early as possible but as a minimum 4 weeks in advance to provide sufficient time for the identification of appropriate operational users and arrangements for their participation.

MNG-120 The Contractor shall deliver the following information at least two weeks prior to each review: a meeting agenda and a list of issues to be reviewed, with an impact assessment, root cause of the issue (evidence) and possible solutions per issue.

MNG-121 Unless otherwise agreed by the Purchaser, all joint technical reviews shall be conducted at a Purchaser facility. The specific date and location must be agreed between the Contractor and the Purchaser's Project Manager.

MNG-122 The Contractor shall provide all relevant resources including personnel, hardware, software, and tools at each review.

MNG-123 The Contractor shall provide the following items at each review: presentation and discussion of each issue, including relevant technical material, such as requirements references, design specifications, views, use cases, operational employment scenarios, screenshots, or prototypes, or developmental baseline release.

3.5 Project Progress Reports

MNG-124 This PPR shall summarize the progress since the previous PRM or since the last PPR, any accomplishments, schedule of deliveries against progress, difficulties

encountered and resolution of any issues raised in previous PRMs. The Project Progress Reports shall include:

1) Overall project progress: the activities performed and works completed during the preceding period including major milestones achieved as applicable;
2) Description of issues/problems/risks that have occurred in the preceding period and the identified/proposed solution (Issue Log);
3) A list of Change Proposals with the current status;
4) Configuration Status Reports (CSR) for the system and all documentation (CDRL);
5) Answers to questions addressed by the Purchaser between two meetings;
6) The progress of work related to the schedule in the current PMP;
7) Status of the equipment (equipment order, in Contractor's office, packing, transfer to site, deploy and test);
8) Any foreseen or possible changes to project performance or schedule. In case of changes, the Contractor shall give the updated performance or schedule;
9) Description of any identified problems and high risk areas and the proposed solutions and corrective actions;
10) Activities planned for the next period;
11) Supplies to be delivered by the Contractor and those to be provided by the Purchaser; and
12) Update on the status of Action Items List (AIL).

[115] Upon receipt of the PPR, and in absence of a Project Review Meeting opportunity near, the Purchaser can call for an Ad-hoc meeting with the Contractor (refer to Section 3.4.3), for the purpose of reviewing or discussing the PPR contents. The meeting may either involve physical presence, or take place over a video conference session.

MNG-125 The Contractor shall maintain an archive of PPR.

MNG-126 The Contractor shall prepare and submit a Project Progress Report (PPR) to the Purchaser monthly, throughout the performance period of the contract.

3.6 Site Surveys

MNG-127 Site Surveys shall collect information on the site or sites of interest, into a Site Survey Report (SSR), covering at least the following data:

1) All the information relevant to the physical installation of the new equipment at the site;
2) Any CIS security implications at each site, including integration and interaction with already existing cybersecurity components;
3) Floor plan layouts of installation spaces and training activities (equipment rooms, corridors, offices);
4) Temporary equipment storage spaces;
5) Cabling (routing, configuration and wiring assignment);
6) Availability of electrical power and electrical power conditioning;

7) Environmental conditioning; and

8) Points of contact, including site access requirements.

3.7 Security Aspects

MNG-128 Contractor's premises shall be able to handle information up to and including NATO S*CR*T.

MNG-129 All information items used in support of the execution of the project shall be classified and handled according to their security classification.

MNG-130 The Contractor shall ensure that all Contractor and Subcontractor personnel that shall work for this Project have at a minimum, a valid NATO S*CR*T clearance as required by NATO policy.

MNG-131 The Contractor shall follow the Purchaser site access procedure to gain access to the NATO sites for the conduct of Project business. The Contractor shall allow sufficient time in their planning to achieve this.

3.8 Documentation

[116] The purpose of these requirements is to ensure that the Contractor develops and provides high quality, comprehensive documentation and as-built drawings. Unless explicitly referred, these requirements don't apply to the Technical Publications (i.e.: Operation Manuals and Maintenance Manuals).

[117] The Purchaser's default software packages for managing projects and processing documentation deliverables are:

1) Microsoft Office Professional;

2) Microsoft Project; and

3) Microsoft Visio Enterprise.

3.8.1 Documentation Plan

MNG-132 As part of the PIP, the Contractor shall submit a **Documentation Plan (DP)**. The DP shall explain in detail how the Contractor shall fulfil all documentation requirements in this Contract. The DP shall include:

1) A list of all documentation deliverables to be provided and defined in this Contract and it's annexes (including SOW, SRS), in the form of a Contract Data Requirements List (CDRL) and organized according to the Contract Line Item Number (CLIN) structure of the Schedule of Supplies and Services (SSS);

2) A schedule of release of all CDRL items, including draft versions (for review) and final versions (for the purpose of acceptance);

3) A detailed description of the file naming convention in accordance with the requirements in this section;

4) A detailed description of the document review process in accordance with the requirements in this section; and

5) A detailed description of the change control and version control processes through which the Contractor proposes to manage and control change during the life cycle of each documentation deliverable.

MNG-133 Any deviation from the CDRL shall be coordinated with and requires approval by the Purchaser.

MNG-134 Should it be found that there are documentation requirements within the SOW and Annexes, that are not identified in the CDRL, the CDRL shall be updated to reflect this.

3.8.2 Documentation Format

MNG-135 Documentation shall not contain warnings limiting the rights to use or reproduce the document. The Purchaser reserves the right to make additional copies of any documentation (including the Technical Publications) provided under this contract for his internal use.

MNG-136 The Contractor shall submit project documentation (e.g., plans, schedules, reports, etc.) and contractual documentation (e.g., invoices, change proposals, etc.) in electronic format:

1) In the native format compatible with the Purchaser's software packages above; or
2) In the Contractors toolset of choice in which case the Contractor shall provide the Purchaser with 5 licenses of each tool/application used.

MNG-137 The Contractor shall submit the documentation, intended for review by the Purchaser, with each modification identified through the change tracking feature (e.g.: track changes) or otherwise marked in the revision table.

MNG-138 The Contractor shall submit all final and accepted versions of documentation deliverables in electronic format, as PDF (OCR), accompanied with a Microsoft Office version for editing purposes.

MNG-139 All documentation produced under this contract shall adhere to the same presentation style and readability features (cover pages, approval pages, headers, footers, headings and paragraphs, font types and sizes within headings and paragraphs), irrespective of the source of the document within the Contractor's team, including any except COTS equipment documentation, subcontractor documentation.

MNG-140 Every page shall include a header and footer indicating the highest classification of content on that page using one of the following labels: NATO CONFID*NTIAL, NATO R*STRICT*D (sensitive information identifying e.g. a named location or security assessment), or NATO UNCLASSIFIED.

MNG-141 The Contractor shall submit project documentation (e.g., plans, schedules, reports, drawings, etc.), COTS documentation and contractual documentation (e.g., invoices, change proposals, etc.) in English with the following features:

1) The first page shall show the document title, project title, contract number, version number and issue date to be shown on each subsequent page.
2) The review page shall contain the following information for identification: Version of the document and version history, Contractual Due date, Delivery date, CLIN number, Status (e.g., accepted/approved/draft).
3) The first chapter shall contain a preface detailing the scope of the document, foreseen updates and content, details of related documents and information on how to navigate the document.

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

5) The convention for dates appearing in free text (e.g., quoting dates of meetings) shall be year-month-day (YYYYMMDD).

6) Where documents contain many complex specialized or strongly domain oriented terminologies these shall be defined in a glossary.

7) The filenames for all documentation deliverables in compliance with the following filename convention:[NU|NR]_[Contract number]_[Contract Line Item number]_[Name of deliverable]_[v0.x|v1.0].[filename extension] where:

   a. [NU|NR] is the classification of the document: NATO Unclassified or NATO Restricted;

   b. [Contract number] is the official Purchaser contract number;

   c. [Contract Line Item number] is the CLIN used to identify the deliverable in the Schedule of Supplies and Services (SSS);

   d. [Name of deliverable] is the Contractor proposed, Purchaser agreed designation of the deliverable.

8) [v0.x|v1.0] is the version number in the range:

   a. (v0.1 / v1.1 / v2.1…) for **first version** not eligible for acceptance;

   b. (v0.2, …, v0.9, v0.10, v0.11… / v1.2, …, v1.9, v1.10, v1.11… / v2.2, …, v2.9, v2.10, v2.11…) for **revised versions** not eligible for acceptance;

   c. (v1.0 / v2.0 / v3.0…) for the **ultimate version**.

9) [filename extension] is the standard filename extension, but ".zip" may be used to aggregate multiple files.

10) COTS documents, such as a vendor supplied operational manual, shall retain their original filenames and shall hence not be renamed according to the above filename convention.

11) Hard copy documentation for deployment of terminal shall be protected/ provided with appropriate environmental protection etc.

MNG-142 The Contractor shall remain responsible for updating the documentation that is affected by the changes in the system requirements, design, or support arrangements throughout the project.

3.8.3 Documentation Acceptance Process

[118] The Purchaser will provide comments, corrections, and suggested changes to the Contractor within two weeks of receipt, unless specified differently in the Work Package (e.g.: eight weeks for technical publications).

[119] The Purchaser reserves the right to ask for an extension to provide comments, corrections, and suggested changes to the Contractor according to the workload required.

[120] The Purchaser reserves the right to return without review a document that has significant deficiencies.

MNG-143 All documentation shall be subject to Purchaser approval.

MNG-144 All the documentation within the scope of this project shall be consistent in terms of content. Any inconsistencies that are detected between documents at any time until the end of this project shall be corrected upon Purchaser notification.

MNG-145 The Contractor shall not rely on the Purchaser review to fill in deficiencies or obtain missing Purchaser information.

MNG-146 The Contractor shall provide a **first version** (e.g.: version 0.1, version 1.1) of each deliverable for Purchaser review by the date specified in the Schedule of Supplies and Services or as agreed between the Purchaser and Contractor.

MNG-147 The first version shall be substantially complete and correct, and delivered in accordance with the delivery dates specified in the Work Package and the Schedule of Supplies and Services. To ensure the completeness and correctness, the Contractor shall complete the internal review cycle between the related functions before presenting a version to the Purchaser.

MNG-148 The Contractor shall resubmit the document as a **revised version** (e.g.: version 0.2, version 1.2) incorporating the Purchaser's comments within two weeks after receipt, unless specified differently in the Work Package.

MNG-149 The Contractor shall provide the **ultimate version** (e.g.: version 1.0, version 2.0) document within two weeks of receipt of the Purchaser's comments on the revised version, unless specified differently in the Work Package.

MNG-150 Documentation shall be distributed as follows:

1) For all documents unless otherwise instructed: an electronic copy to the Purchaser's Project Manager;
2) For contractual documents: in addition to one hard copy and an electronic copy to the Purchaser's Contracting Office; and
3) With the exception of contractual documents, an electronic copy to the Collaborative Environment.

MNG-151 "One week" and multiples thereof shall be understood as 5 working days, Monday - Friday. This mainly applies to the period of Purchaser's review of a document, from the time the document is uploaded or delivered by the Contractor and vice versa.

MNG-152 Approval of a document or other deliverable shall not be interpreted to imply any Purchaser endorsement of the content. It shall remain the sole responsibility of the Contractor to meet the full system performance requirements and to prove such performance through the regime of testing and other assurance mechanisms set forth in the Contract and it shall be the sole responsibility of the Contractor to remedy any performance shortfall in the event of any identified deficiency in terms of the contract functional and/or performance requirements. The Contractor's responsibility in this regard extends beyond FSA through warranty, responsibility for any latent defects.

MNG-153 The Contractor shall include and integrate all document review and acceptance activities in the overall Project Master Schedule (PMS) of the PMP in the PIP.

3.8.4 As Built Drawings

MNG-154 The Contractor shall provide **As-Built Drawings (ABDs)** aligned with the PBL that match with each type of delivered system and cross-referenced and consistent with each other and with any other documents provided under this Contract, such as Technical Publications and training material.

MNG-155 The ABD shall comprise of:

1) Layout Plans showing the locations of all Contractor installed assets;
2) Cabling Plans showing all Contractor installed cabling, per security classification, clearly identifying the location and labelling of each cable, together with the terminations at both ends and the use of the cable;
3) Rack Layout Plans for all Contractor installed racks; and
4) System Configuration Plan showing all installed assets with all their interfaces and interconnections, both internal and external.

MNG-156 The ABD, representing technical networking and service configuration diagrams, shall use layered views, as follows:

1) One layer shall be created for the physical view, covering hardware, ports and cable-connections (including also signal flow, electrical power and grounding);
2) One layer for the logical view, covering VLANs, virtual servers, logical links;
3) One layer for the addressing and routing information; and
4) Service view schematics.

MNG-157 The Contractor shall ensure that all as-built drawings are cross-referenced and consistent with each other and with any other documents provided under this Contract, such as the technical publications with the relevant CSDB and the training material.

4 Integrated Product Support

[121] 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.

[122] The Purchaser will review and approve (in 4 weeks) the IPS deliveries provided under this Contract and subject to review and approval by the Purchaser.

[123] The Purchaser will review and approve (in 8 weeks) Technical Publications and Training Materials provided under this Contract. Upon acceptance of the draft version, the Contractor is allowed to deliver the final version of the technical publications.

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 manage the IPS activities within this Contract by:

1) Providing evidence that the designed system solution is for a service life of at least twenty (20) years based on the operational conditions required through the development of the activities described in the Integrated Product Support Plan (IPSP) and the In Service Support Plan (ISSP), assuring and managing the supportability of the solution (i.e.: availability for supply of spare parts and/or the relevant repair services);
2) Providing evidence that for a period of at least five (5) years after successful completion of last batch's Final System Acceptance (FSA) by the Purchaser, the system's equipment shall not become obsolete and the Customer shall be able to obtain all necessary spare parts, components and technical expertise for planned routine maintenance and normal repair, following which it shall continue to meet the design performance parameters when operated under design conditions;
3) Appointing an IPS manager for the entire duration of the contract to conduct the IPS Programme that shall:
    a. Be at a level commensurate with the systems engineering and the software engineering managers;
    b. Be point of contact to interface with the Purchaser on IPS matters.
4) Providing all relevant IPS deliverables (documents, data and activities) as a result of all IPS processes.

IPS-3 The Contractor shall provide the required IPS deliveries in accordance with the following schedule that shall be included in the contractor's Project Master Schedule (PMS) of the PMP in the PIP:

Table 4-1 – IPS Deliverables

Title	Iss	Due date
Integrated Product Support Plan (IPSP)	Draft	EDC + 2w
	Final Draft	PDR - 4w
	Final	CDR - 4w
Reliability Availability Maintainability Testability (RAMT) Case Report	Draft	SRR - 4w
	Final Draft	PDR - 4w
	Final	CDR - 4w
	Demonstration	PSA

Title	Iss	Due date
Failure Mode Effects and Criticality Analysis (FMECA)	Draft	SRR - 4w
	Final Draft	PDR - 4w
	Final	CDR - 4w
Maintenance Task Analysis (MTA) [incl. Product Support Database]	Draft	PDR - 4w
	Final Draft	CDR - 4w
	Final	FDR - 4w
	Demonstration	PSA
Level of Repair Analysis (LORA) [incl. Repair Price List (RPL)]	Draft	PDR - 4w
	Final Draft	CDR - 4w
	Final	FDR - 4w
Packaging, Handling, Storage and Transportation (PHST) Report	Draft	FDR - 4w
	Final	FAT - 4w
Initial Provisioning List (IPL)	Draft	FDR - 4w
	Final	FAT - 4w
Obsolescence Report	Draft	CDR - 4w
	Final Draft	FAT - 4w
	Quarterly	First delivery at PSA + 3m
Warranty Report	Draft	first PSA – 4w
	Quarterly	First delivery at first PSA + 3m
Operation Manuals	Draft	FDR - 4w
	Final	FAT + 4w
Maintenance Manuals	Draft	FDR - 4w
	Final	FAT + 4w
Training Plan (TRNP) [incl. Training Needs Analysis (TNA)]	Draft	CDR - 4w
	Final Draft	FAT - 4w
	Final	first PSA – 4w
Training documentation	Draft	FAT - 4w
	Final	Training Start – 4w
Training execution of Testing Personnel	Execution	Immediately before tests
Training execution of Operators (including reports)	Execution	Start: NLT first PSA + 1w
	Report	Training End + 4w
Training execution of Maintainers (including reports)	Execution	Start: NLT first PSA + 1w
	Report	Training End + 4w
Training execution of Instructors (including reports)	Execution	Start: NLT first PSA + 1w
	Report	Training End + 4w
In Service Support Plan (ISSP)	Draft	FSA - 6m
	Final Draft	FSA - 4w
	Final	FSA + 6m
In Service Support (ISS) Monthly Report	Monthly	First delivery at Warranty End + 1m

4.1 Integrated Product Support Plan

[124] The Integrated Product Support Plan (IPSP) is the primary document that details the approach to IPS, tailored to meet the needs of a specific product or service. The IPSP includes detailed information for the planning, implementation and co-ordination of the IPS program, together with element plans detailing how the appropriate IPS elements are addressed. The IPSP is integrated and consistent with other program documentation. The IPSP is a living document and therefore the content will vary depending on the type and phase of any program or project.

IPS-4 The Contractor shall establish, provide, execute and maintain an effective Integrated Product Support Plan (IPSP) in accordance with ASD SX000i iss.3.0.

IPS-5 The IPSP shall:

1) Describe the Contractor's plans for the management control, interface, and integration of all elements of the Contractor's Integrated Product Support with the system engineering and design processes;
2) Establish/describe the policies, procedures, and methodologies to ensure the logistic requirements are achieved and to refine the support to the system;
3) Document the Contractor's plans, organisational structure, procedures and activities implemented, followed and performed to ensure that product support elements influence and interface with system design and other functional areas, to satisfy supportability criteria; and
4) Incorporate Purchaser-approved changes, additions and deletions.

IPS-6 The IPSP shall describe the Contractor's approach and plans for each logistic element:

1) Reliability Availability Maintainability and Testability (RAMT) and Failure Mode Effect and Criticality Analysis (FMECA);
2) Logistics Support Analysis (LSA) including Product Support Data and Database, Supply Support, Packaging Handling Storage and Transportation (PHST);
3) Parts Obsolescence Management;
4) Technical Publications;
5) Training; and
6) Support during Warranty and Post Warranty.

IPS-7 The Contractor shall provide the IPSP detailing the relevant content to cover the following structure.

Table 4-2 – IPSP 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

Structure	Content
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 Deliverable Requirements List (CDRL)
5	System Breakdown
6	Reliability, Availability, Maintainability and Testability (RAMT) Plan
6.1	Reliability
6.2	Maintainability
6.3	Testability
6.4	Availability
6.5	Failure Mode Effects and Criticality Analysis (FMECA)
7	Logistics Support Analysis (LSA) Plan
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 (PSDB)
8	Supply Support Plan
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
12.3	Sub-Contractors

4.2 Reliability Availability Maintainability Testability Case Report

IPS-8 The Contractor shall provide a Reliability Availability Maintainability Testability (RAMT) Case Report that shall include:

1) All COTS equipment data sheets and references, clearly indicating the COTS equipment's reliability and maintainability characteristics used as data input to any of the RAMT activities;

2) The complete set of Reliability Block Diagrams (RBDs), including reliability, maintainability and intrinsic availability allocations per block, per aggregated block, per sub-system, per location, and for the entire system;

3) All draft and final calculations (ref MIL-HDBK-338B) for:

   a. Reliability (MTBF and MTBCF);

   b. Maintainability (TTR, MTTR, MTTRS and MTBPM);

   c. Testability: Fault Detection (FD) percentage and Fault Isolation (FI) percentage with and without ambiguity;

   d. Intrinsic availability (Ai);

   e. Rationale and justifications for all data and formulas used in any of the calculations and models.

IPS-9 The Contractor shall develop and maintain, in accordance with IEC 61078:2016 or MIL-STD-756B, the Reliability Block Diagrams (RBDs) for the entire system and subsystems, relating all hardware and firmware/software items (i.e. hardware down to LRU level and firmware/software CSCI) based on failure dependencies, and explaining how the reliability of each item contributes to the success or failure of the entire system. Firmware shall be treated as being part of the pertinent LRU.

IPS-10 The reliability predictions shall be in accordance with one of the following:

1) Bellcore/Telcordia SR-332, Ground Fixed Uncontrolled, 30°C Case temperature;

2) HDBK-217Plus and ANSI VITA51, Ground Fixed, 30°C Case temperature;

3) Certified field data (scaling i.a.w. MIL-HDBK-338B table for Environment and Temperatures); or

4) A combination of the above.

IPS-11 The reliability predictions shall consider the System duty 100% (components de-rating and local duties may be applied).

IPS-12 The Contractor shall provide detailed and comprehensive historical evolution in versioning for each firmware/software including the technical motivation linked to each release vs the previouse one.

IPS-13 The Contractor shall plan, design and execute on-site Reliability tests in accordance with MIL-HDBK-781 to demonstrate the MTBF relevant requirement in the SRS with 90% (ninety percent) confidence (10% Consumer's risk).

IPS-14 The Contractor shall propose a test plan and procedure indicating the minimum number of testing hours based on the cumulative failures as per Chi-Squared test matching the above criteria. The test hours shall be distributed on all the systems with a minimum testing time of 1000 hours per system.

IPS-15 The Contractor shall plan, design and execute the system maintainability/testability demonstration in accordance with IEC 60706-3:2006 test method 1 Annex B or MIL-HDBK-470A Appendix B (test method 1A).

IPS-16 The Contractor shall ensure that the maintainability/testability demonstration addresses both hardware and firmware/software maintenance tasks.

IPS-17 The Contractor shall demonstrate the MTTR requirement in the SRS by providing 90% (ninety percent) confidence.

IPS-18 The Contractor shall demonstrate system diagnostic capability (fault detection and isolation) in accordance with the relevant requirements set in the SRS.

IPS-19 The Contractor shall provide the RAMT Case Report detailing the relevant content to cover the following structure.

Table 4-3 – RAMT Case Report 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 Breakdown Description
4	Design for Reliability
4.1	Reliability Prediction Formulas
4.2	Reliability Block Diagram
4.3	Reliability Prediction
5	Design For Maintainability
5.1	Maintainability Prediction Formulas
5.2	Maintainability Prediction
6	Design For Testability
6.1	Testability Prediction Formulas
6.2	Testability Prediction
7	Availability
8	Conclusions

IPS-20 The Contractor shall provide one .xls spreadsheet as annex of the RAMT Case Report in accordance with the following content and structure:

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

4.3 Failure Mode Effect and Criticality Analysis

IPS-21 The Contractor shall provide a **Failure Mode Effect and Criticality Analysis (FMECA)** down to the hardware LRU and firmware/software CSCI level in accordance with IEC 60812:2018 or MIL–STD–1629A.

IPS-22 The Contractor shall provide functional descriptions for the systems and allocated to the subsystems, covering all operational modes and mission phases.

IPS-23 The Contractor shall perform a functional FMECA considering the effects of failure of hardware LRU and firmware/software CSCI level directly to the functions that shall be lost or degraded.

IPS-24 The Contractor shall identify critical items as the items (hardware LRU and firmware/software CSCI) whose failure induce loss of critical function.

IPS-25 In case of catastrophic and/or safety critical failures have been identified through the FMECA, the Contractor shall perform a **Fault Tree Analysis (FTA)** down to the

SRU or CSC level as appropriate for development items in accordance with MIL–HDBK–338B.

IPS-26 The Contractor shall provide FMECA detailing the relevant content to cover the following structure.

Table 4-4 – FMECA 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 Breakdown Description
4	FMECA Procedures
5	Failure Mode Effects Analysis (FMEA)
6	Criticality Analysis (CA)
7	Criticality Matrix (CM)
8	Conclusions

IPS-27 The Contractor shall provide one .xls spreadsheet as annex of the FMECA in accordance with the following content and structure:

1) **Product Breakdown**: Level, Description, Cage Code, Part Number;
2) **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;
3) **Criticality Analysis (CA)**: Failure probability, Failure Effect Probability (β), Failure Mode Ratio (α), Failure Rate (λp), Operating Time (t), Failure Mode Crit Number [Cm=β α λp t], Item Crit Number [Cr=∑(Cm)], Remarks;

IPS-28 The Contractor shall also provide Criticality Matrix (CM) summary tables for:

1) Criticality vs Failure probability vs Severity classification;
2) Apportionment of criticality vs Failure end effect; and
3) Apportionment of criticality vs Manufacturer (Cage Code).

4.4 Maintenance Task Analysis

IPS-29 The Contractor shall provide a **Maintenance Task Analysis (MTA)** down to the hardware LRU and firmware/software CSCI level compliant with ASD S3000L iss.2.0.

IPS-30 The Contractor shall provide the Maintenance Task Analysis (MTA) covering hardware and software (including firmware) that summarizes the maintenance planning:

1) Analysing the results of the FMECA to identify candidate corrective maintenance tasks;
2) Identifying procedures, spares and materials, tools, support equipment, personnel skill levels, estimated and elapsed times as well as any facility issues that must be considered for a maintenance task (i.e.: for preventive/scheduled and corrective/unscheduled);

3) Identifying preventive/scheduled maintenance tasks and develop a scheduled maintenance programme at each Level of Maintenance (HL/SL 1-4) allocated to the appropriate Level of Support (LoS 1 to 4) that is consistent with the maintenance concept described for the intended use of the system. The decision logic used for task selection shall implement the following priorities:

   a. Avoidance of safety and mission critical failures;

   b. Achievement of system availability requirements;

   c. Sustainability of deployed operations in accordance with the intended use and the product support environment of the system;

   d. Minimization of Life Cycle Cost;

4) Identifying the operation support tasks required to support operational readiness of the system;

5) Considering ad hoc pre deployment and post deployment maintenance actions to allow no down time (i.e.: zero hours) due to preventive/scheduled maintenance during deployment;

6) Assessing for each maintenance task: skill levels, tools and test equipment required, facilities, spares and consumables, duration.

IPS-31 The Contractor shall provide the MTA detailing the relevant content to cover the following structure.

Table 4-5 – MTA 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 Breakdown Description
4	MTA Approach
4.1	Levels of Maintenance
4.1.1	Hardware Levels of Maintenance
4.1.1.1	HL1
4.1.1.2	HL2
4.1.1.3	HL3
4.1.1.4	HL4
4.1.2	Software Levels of Maintenance
4.1.2.1	SL1
4.1.2.2	SL2
4.1.2.3	SL3
4.1.2.4	SL4
4.2	Task Justification
4.3	Task Structure
4.3.1	Unscheduled and Corrective Maintenance Task structure
4.3.2	Scheduled and Preventive Maintenance Task structure
4.4	MTA Data Element
5	MTA Output
6	Conclusions

IPS-32 The MTA shall provide spreadsheet as an annex with the following tables:

1) **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;

2) **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;

3) **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;

4) **Material Resource Report – MRR** : shall include the following vistas:

   a. Material Resource List : the list of all the resources with associated type (e.g.: spare, consumable, common tools, special tools);

   b. Material Resource Utilization: the list of all the resources with associated maintenance where the resource is used; and

   c. Material Resource Annual Use: the list of all the resources with the calculated annual use based on the task frequency.

5) **Personnel Report – PR** : shall include the following vistas (same as MRR but for personnel): Personnel List, Personnel Utilization, Personnel Annual Use; and

6) **Facilities Report – FR** : shall include the following vistas (same as MRR but for facilities): Facilities List, Facilities Utilization, Facilities Annual Use.

IPS-33 The MTA shall also provide summary tables for:

1. Total Quantity of Maintenance Tasks as per:

Table 4-6 – Total Quantity of Maintenance Tasks

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

2. Mean Annual Downtime and Mean Annual Workload (one table for HW+SW Maintenance, one table for HW Maintenance and one table for SW Maintenance) as per:

Table 4-7 – Maintenance Downtime and Workload

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						

3. Scheduled maintenance grouped by periodicity using as many columns as periodicity defined (one table for HW+SW maintenance, one table for HW maintenance, and one table for SW maintenance) as per:

Table 4-8 – Scheduled Maintenance Record

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-34 The Contractor shall provide a **Product Support Database (PSDB)** as annex to each issue of the MTA down to the hardware LRU and firmware/software CSCI level that shall match the Product Baseline (PBL), shall be coherent with the relevant information contained in the Technical Publications and Training Materials and shall be fully compliant with ASD S3000L iss.2.0 as per the NCIA instructions.

IPS-35 The PSDB shall contain and collect all relevant information and data coming from the IPS reports and analysis coming from RAMT, FMECA, MTA, LORA and PHST.

IPS-36 The PSDB shall include information fields required for each HW and SW (including Firmware) item to be provided/updated:

1) **Indenture level**: Level of indenture starting from the system that is the first level and classified as End Item;
2) **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;
3) **Reference Designator** (in accordance with ASME Y14.44);
4) Subsystem;
5) **Breakdown Element Name**: Word or phrase by which the breakdown element is known and can be easily referenced;
6) **Part Logistic Category**; to define an item (HW or FW/SW) as designed in the context of product support:
    a. EI - End Item and SS – System Subsystem;
    b. Hardware (HW) Maintenance Significant Items (MSI):
        i. LS - Statistical Life LRUs (e.g.: Computers, Power PCs, Switches, Routers, IF modules, RF modules, Breakers, Power Supplies, Monitors, Modems, Power Amplifiers);

ii. LL – Limited Life LRUs (e.g.: Batteries, flexible waveguides, oscillators);

iii. II – Insurance Items [e.g.: docking stations, Keyboards, Mice, Cables, mechanical parts (e.g. Racks, drawers), simple E/M parts (e.g. patch panels)];

iv. C[T] – Technical Consumables (e.g.: fuse, gas discharger, surge protection devices, lamps, bulbs, led);

v. C[NT] – Non-Technical Consumables [e.g.: POL (Petrol, Oils, Lubricants), water, gas];

vi. C[G] – Generic Consumables (e.g.: printer cartridges, toners, printers' paper);

vii. AP – Attaching Parts [e.g.: washers, gaskets (not EMI), nuts, bolts, screws].

c. Software (SW):

i. SWA – Application Software [e.g.: Contractors' developed application SW, COTS application SW (e.g. MS Office, Adobe Acrobat)];

ii. SWO – Software Operating Systems (e.g.: Linux, Unix, MS Windows, LynxOS, Android, IOS);

iii. FW – Firmware;

iv. DD – Device drivers.

7) **Support equipment and tools**: CHT (Common Hand Tool), CSE (Common Support Equipment), PSE (Peculiar Support Equipment);

8) **Manufacturer item data**: Cage Code, Part Number, Part Nomenclature;

9) **Vendor/Contractor item data**: Cage Code, Part Number, Part Nomenclature;

10) **Item characteristics**: LRU (Y/N), Serialized Item (Y/N); Mean Time Between Failures (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).

11) **Quantity**: Qty per line item; Qty in Next Higher Assy; Qty in End item.

4.5 Level Of Repair Analysis

IPS-37 The Contractor shall provide a **Level Of Repair Analysis (LORA)** down to the hardware LRU and firmware/software CSCI level compliant with ASD S3000L iss.2.0.

IPS-38 The Contractor shall provide the Level Of Repair Analysis (LORA) 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:

1) Generating a LORA candidate list containing those items whose maintenance task is not clearly allocated as NATO Maintenance Task (NMT) or Industry Maintenance Task (IMT) as a consequence of the MTA and for which a repair/discard decision is not immediately evident; and

2) Determining the level (HL1-4 or SL1-4) and the location at which each maintenance task should be performed, including detail on any NMT for which specific limited support by industry personnel is recommended.

IPS-39 The Contractor shall provide the LORA detailing the relevant content to cover the following structure.

Table 4-9 – LORA 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 Breakdown Description
4	LORA Approach
4.1	LORA Candidate Item List (CIL)
4.2	Repair vs Discard Decision
4.3	Maintenance concept
4.4	Support concept
4.5	Product Support Scenario (Maintenance and support concept relations)
4.6	LORA CIL Fields
5	Conclusions

IPS-40 The Contractor shall provide **Repair Price List (RPL)** as annex to the final issue of the LORA.

4.6 Obsolescence Report

IPS-41 The Contractor shall perform the Parts Obsolescence Management during the project execution up to the end of warranty period providing **Obsolescence Report** for hardware LRU and firmware/software CSCI to keep the Purchaser informed about any potential obsolescence problems or risks providing the end of sale, end of production, end of support, risk mitigation strategies and proposed risk recovery actions.

IPS-42 The Contractor shall recommend, as part of the Obsolescence Report:

1) A replacement (if available), when the designation of a replacement item becomes necessary due to discontinuance of support;
2) Either to implement an Off-The-Shelf (OTS) solution and modify the requirement accordingly or redesign a suitable alternative, when the recommended OTS item is not fully compliant with the Contract Requirements; and
3) Items with form, fit and function features will be given first preference to avoid development costs.

IPS-43 The Contractor shall provide a Obsolescence Report jointly with an .xls file that shall include information fields required for each HW and SW (including Firmware) item to be provided/updated:

1) **Breakdown Element Name**: Word or phrase by which the breakdown element is known and can be easily referenced;
2) **Manufacturer item data**: Cage Code, Part Number, Part Nomenclature;
3) **Vendor/Contractor item data**: Cage Code, Part Number, Part Nomenclature;

4) **Quantity**: Qty in End item;
5) **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;
6) Product current status rationale/evidences:
    a. For HW [e.g.: production started in "year", last update in "year", support availability till "year" or End of life date (if any)]
    b. For SW (e.g.: release date of the item, support of this version till "year")
7) Warranty and Service:
    a. For hardware (e.g.: warranty duration granted when procured, Provisionning Lead Time, Repair cycle time)
    b. For firmware/software (e.g.: software comunity (shareware/freeware), open source, …)
8) **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;
9) **Risk - Supply chain vulnerability**: This risk category represents a key difference between electronic items and Materials and Structural, Mechanical and Electrical (MaSME) items:
    a. Electronic items: often becomes obsolete because of technology changes (e.g.: red, yellow, green);
    b. MaSME items: obsolescence is usually related to a source going out of business or changing its product line (e.g.: red, yellow, green).
10) **Risk - Time to implement a resolution**: This risk category addresses how long it will take to implement a resolution to an 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);
11) **Risk category rationale/evidences**: Narrative for each risk category rank;
12) **Risk Level**: product of the above risk ranks;
13) **Proposed mitigation**: FFF alternative (ECP type 1), Function alternative (ECP type 2), Redesign of higher level, To Be Defined, Not Applicable, Other;
14) **Proposed mitigation rationale**: Narrative for the proposed mitigation.

4.7 Supply Support and Provisioning

IPS-44 The Contractor shall ensure a minimum stock of the most critical spare parts (those failing the most, or with a higher impact on the facilities) necessary for emergency and urgent repairs tasks up to the end of warranty.

IPS-45 The Contractor shall provide, as part of the bid, the budget quotation for the spares parts (LRUs, Insurance Items), technical and non-technical consumables to be provided four (4) working weeks before the PSA in accordance with the requirements outlined below and relevant schedule.

IPS-46 The Contractor shall provide **Initial Provisioning List (IPL)** that shall detail the rationale and calculations, for determining the range and quantity of items (i.e., spares and repair parts, consumables, special tools, test equipment, and support equipment) and the associated lists required to support and maintain the system for an initial period of service as per the following:

1) **Critical Items** using MTBCF, relevant Candidate Item List, 98% confidence level (non stock-out probability) of being able to replace any mission critical Maintenance Significant Item (MSI).
    a. List #1 per relevant site: 60-day Closed-Door-Operation (CDO) in 24/7 continuous operation;
    b. List #2 per relevant site: 1-year logistic horizon in 24/7/365 continuous operation.
2) **Critical and Non-Critical Items** using MTBF,relevant Candidate Item List, 70% confidence level (non stock-out probability) of being able to replace any Maintenance Significant Item (MSI).
    a. List #3 per relevant site: 1-year logistic horizon in 24/7/365 continuous operation;
    b. List #4 cumulative (one for all sites): 1-year logistic horizon in 24/7/365 continuous operation.

IPS-47 The Contractor shall detail the technical approach and tools to be used for providing the IPL in the IPSP as per the NCIA Instructions: [AI 16.31.10] – Spare parts provisioning.

IPS-48 The Contractor shall provide a fully detailed and priced **Recommended Spare Parts List (RSPL)** as annex to each issue of the IPL that shall detail all spares in a hierarchical breakdown including as a minimum the information of the table below for MDS.

IPS-49 The Contractor shall provide a fully detailed and priced **Recommended Consumable Items List (RCIL)** as annex to each issue of the IPL that shall detail all consumables including as a minimum the information of the table below for MDS.

IPS-50 The Contractor shall provide a fully detailed and priced **Recommended Tools and Test Equipment List (RTTL)** as annex to each issue of the IPL that shall detail all standard and special-to-type tools, test equipment and test fixtures, cables, connectors, support equipment (e.g.: cranes, lifting platforms, etc.) including as a minimum the information of the table below for MDS.

IPS-51 The Contractor shall organize a dedicated meeting (**Provisioning Conference**) to analyse the results of spare parts dimentioning and to agree on the final IPL that shall constitute the list of the initial spares and items to be provided for supply support.

IPS-52 The Contractor shall provide the **Bill of Materiel (BoM)** as annex to each issue of the IPL for all the system according to the Product Baseline (PBL).

IPS-53 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:

Table 4-10 – Inventory/Material Data Sheet 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.
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". Serialised 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	Firmware/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.

Field	Description
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.
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.

IPS-54 The Contractor shall provide a detailed **Software Distribution List (SWDL)** as annex to each issue of the IPL, which shall detail comprehensively all firmware/software CSCI and associated feature/performance licenses provided under this Contract. The SWDL shall include, the following data elements:

1) CSCI identification number;
2) Nomenclature;
3) Version number;
4) License key (if applicable);
5) License renewal date (if applicable);
6) Warranty expiration date;
7) Date of distribution;
8) Distribution location (geographically);
9) Distribution target (server); and
10) Owner.

IPS-55 The Contractor shall make sure that all licenses are originally registered with the Customer as end-user.

4.8 Packaging, Handling, Storage and Transportation

IPS-56 The Contractor shall provide a Packaging, Handling, Storage and Transportation (PHST) Report down to the hardware LRU.

IPS-57 The Contractor shall provide the PHST Report that summarizes how the following relevant requirements are fulfilled, needs for special packaging, dimensions of the items and facilities required for storage.

4.8.1 Packing, Coding and Labelling (Packaging)

IPS-58 The Contractor shall provide all supplies packaged to withstand the shipping hazards applicable to the chosen mode of transportation.

IPS-59 The Contractor shall provide any Special To Type (non-commercial) packaging materials required for the shipment of items at no extra cost to the Purchaser.

IPS-60 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-61 The Contractor shall mark the packages, palettes 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-62 The Contractor shall provide a **Packing List** for each consignment to allow for easy identification of the content of each package:

1) 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;
2) A second copy shall be put inside each container/box; and
3) A third copy should be emailed to the Purchaser PoC upon departure of the goods.

IPS-63 The Packing List shall contain the following information:

Table 4-11 – Packing List

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 and Consignor
12	Values of the goods

IPS-64 The Contractor shall provide the details of the labelling approach in the CM Plan for Purchaser approval. The Contractor shall provide its labelling for the items configured and/or modified after procurement from the OEM. For these items, the Contractor shall provide for review and approval before the start of the labelling activities, the format and content of the labelling.

IPS-65 The Contractor shall deliver all the equipment labels including a machine-readable code (e.g. barcode) compliant with:

1) STANAG 4280 - NATO Levels of Packaging;
2) STANAG 2828 - Military pallets, packages and containers;
3) STANAG 4281 - NATO Standard Marking for Shipment and Storage;
4) STANAG 4329 - NATO Standard Bar Code Symbologies – AAP-44(A); and
5) AAP-44(A) - NATO Standard Bar Code Handbook.

IPS-66 The Contractor shall provide adequate identification for the Non-CIS components as well as the CIS components. This shall entail the labelling for the transit and transport cases, marking of the tents, nameplates on the containers etc.

4.8.2 Delivery and Shipment (Handling and Storage)

IPS-67 The shipping address where all items, including goods exchanged or repaired under warranty, shall be delivered by default is:

NATO Communications and Information Agency

CIS Sustainment Support Centre

JFC Headquarters, Building 204

Rimburgerweg 30, 6445 PA Brunssum, The Netherlands

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

Name Surname (Project Manager)

NATO Communication and Information Agency,

Code, City, Nation

Tel: XXX

name.surname@ncia.nato.int

[126] The Purchaser's PoC and/or PoC of the Customer 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.

[127] The system may be deployed at locations where theres are no roads or other areas which are not easily accessable. Thererfore there will be no forklift trucks or other lifting equipment to handle the transit cases. In such circumstances material handling equipment is needed to dismount the equipement from the vans and to take them to the end locations where they will be set up.

IPS-68 The request for a Custom Form 302 shall be addressed to:

Name Surname

NATO Communication and Information Agency,

Code, City, Nation

Tel: XXX

name.surname@ncia.nato.int

[128] Following receipt of the request by the Purchaser, normally a maximum of three working days are required for the issue of the form.

[129] Load planning is a critical exercise to ensure the equipment can be dis-assembled, packaged, loaded, transported and re-assembled at the end location with minimal damage and minimal effort.

IPS-69 The Contractor shall deliver all equipment under this project in close coordination with the NCI Agency PoC at final destination.

IPS-70 The Contractor shall deliver equipment pre-configured and adequately packaged on Euro pallets.

IPS-71 The Contractor shall ensure secure fixation of pallets, cases and equipment during transportation.

IPS-72 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:

Table 4-12 – Notice of Shipment

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-73 The Notice of Shipment shall be accompanied by the relevant Packing List and the request for a Custom Form 302.

IPS-74 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-75 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.

IPS-76 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-77 The Contractor shall record all deliveries of equipment in the NCI Agency ITSM (IT Service Management) ticket system (for tracking by the Operations Centre).

IPS-78 The Contractor shall make sure that all licenses are originally registered with the Purchaser as end-user.

IPS-79 The Contractor shall provide material handling equipment that shall allow the transport of the system over rough terrain. This is especially important for the heavy transit cases.

IPS-80 The Contractor shall provide a **Load Plan** as annex of the PHST Report to be then included in the Technical Publications that shall take into account:

1) The mission function (modules needed);
2) The means of transport; and
3) Location of deployment (Building of Opportunity, Field deployment, etc.).

IPS-81 The Load Plan shall identify:

1) The distribution of the load along the different loading platforms (containers, vans, etc.) and the internal distribution in each of those platforms taking into account weight distribution (for centre of gravity considerations);
2) The required order of use during deployment by providing 3D models (format such as .stp that is acceptable and usable in Purchaser 3D modelling tools) that entail a full scope detailed load plan starting from the rough models of the equipment with detailed modelling of transit cases, Non-CIS material in the packed form and palletization;
3) What needs to be loaded in terms of the number and dimensions of transit cases and other equipment, including all relevant the CIS and non-CIS;
4) The load order to optimise weight loading, space utilization, and minimal damage; and
5) The need for Load Plan Tool if standard loading tools will be not appropriate.

IPS-82 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-83 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-84 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-85 The written request for a Custom Form 302 shall contain the following information:

Table 4-13 – Information for Custom Form 302

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-86 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-87 The Contractor shall be responsible to add the Custom Form 302 to the shipping documentation to include on the outside document envelope the contract number and the Purchaser PoC to contact upon reception.

IPS-88 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.

IPS-89 If a Country refuses to accept the Custom Form 302 and requires the payment of custom duties, the Contractor shall immediately inform the Purchaser by the fastest means available and obtain from the Custom Officer a written statement establishing that its country refuses to accept the Custom Form 302. Only after having received Purchaser's approval, the Contractor shall pay these customs duties and shall claim reimbursement to the Purchaser.

4.8.3 Transportation

[130] The Purchaser will not be liable for any storage, damage or any other charges involved in such transportation of items and supplies prior to Acceptance. Any shipment loss shall be the responsibility of the Contractor.

IPS-90 The Contractor shall be responsible to transport all items and supplies covered under this Contract to and from all destination addresses at no extra cost to the Purchaser until completion of the warranty period.

IPS-91 The Contractor shall be responsible for transportation of all equipment furnished under this Contract from its site in a NATO nation to final destination.

IPS-92 The Contractor shall be responsible for any insurance covering the shipment and delivery.

IPS-93 The Contractor shall be responsible for transportation of repaired/ replacement items under warranty to the original location.

IPS-94 The equipment shall be transportable in:

1) ISO containers for aircraft cargo and trucks;
2) Transit cases on pallets for vans; and
3) HCU 463L Air Cargo Pallets (HCU-6/E) for aircraft cargo.

IPS-95 The Contractor shall provide a **Transportation Report** (template to be provided as annex of the PHST Report) within two (2) weeks after each shipment has arrived at final destination. The Transportation Report shall include:

1) A copy of the Packing List;
2) Date of arrival at final destination;
3) Date of delivery acceptance by the Purchaser's POC at final destination; and
4) Signature of delivery acceptance by the Purchaser's POC at final destination.

4.9 Technical Publications

IPS-96 The Contractor shall detail their approach and plans for Technical Publications in the IPSP, these plans are to be fully compliant with:

1) [AI 16.31.07] – Guidance Document (GD) for ASD-AIA-ATA S1000D Technical Publications, with the associated S1000D Issue 4.0.1 Business Rules Decision Points (BRDP) Index.
2) [AI 16.31.12] – Writing Style Guide (WSG) for ASD/AIA/ATA S1000D Technical publications; and
3) [AI 16.31.13] – Illustration Style Guide (ISG) for ASD/AIA/ATA S1000D Technical publications.

IPS-97 The Contractor shall provide **Operation Manuals (OM)** [including Deployment Instructions that shall include the Loading Plan results and System Administrator Guide (SAG)] and **Maintenance Manuals (MM)**. These manuals shall constitute the system technical publications in form of a Common Source Data Base (CSDB), shall compliment each other with no conflicting information and shall include relevant information and instructions for all Contractor delivered Product (HW and FW/SW including COTS, Contractor customized items, modified items and fully developed items). The modularity of the system technical publications shall allow proper allocation for PFPs in an homogeneous breakdown structure.

IPS-98 The Contractor shall provide Operation Manuals and Maintenance Manuals as per requirements of personnel operating and maintaining the equipment in accordance with the Maintenance Concept and the outcomes of Maintenance Task Analysis:

1) Operation Manuals: is for the operation of the equipment and describes operation, settings and fine tuning of the equipment to achieve maximum performance including administration instructions (e.g.: guidance on how to show, edit and save the System Configuration Files on the respective devices, together with default user or administrator passwords, as required).
2) Maintenance Manuals: is for the maintenance of the equipment and includes:
    a. Scheduled and Unscheduled Maintenance detailed instructions, Troubleshooting and fault finding techniques (including descriptions of all indicators, switches, switch positions, displays, menu's, settings etc), Installation and dismantling of the equipment (including as applicable physical, electrical, software, safety, RF aspects etc.), repair and test procedures for HL3/SL3 activities;
    b. Drawings of the mechanical, electrical and electronic assemblies and sub-assemblies that comprise the equipment in sufficient detail to allow technical staff to maintain the system at site level in accordance with the Maintenance Concept;
    c. As-built drawings (ABDs) for full details of how all of the major assemblies of the supplied equipment have been physically installed and mechanically/electrically integrated (e.g.: drawings of intra-rack and inter-rack cabling); and

d. Detailed and lower level repair and maintenance of sub-assemblies and components shall be addressed by the Original Equipment Manufacturer's (OEM) manuals unless it has been agreed that specific activities are NMT.

3) Physical, functional, performance, environmental data and descriptions (including support equipment/tools and interfaces to external systems).

IPS-99 The Contractor shall provide **Original Equipment Manufacturer (OEM) Technical Manuals** for all the items from other manufacturers/vendors used into the system, equipment and test equipment assuring that they:

1) Cover at least: Functional descriptions; Performance descriptions; Detailed specifications; Interfaces to external systems; Descriptions of all indicators, switches, switch positions, and displays; Installation instructions; Operating instructions; Corrective and preventive maintenance instructions; Fault isolation and fault finding techniques; Support equipment/tools description;

2) Provide detailed information necessary to disassemble and assemble the units down to the lowest Line Replaceable Unit (LRU) level of maintenance;

3) Provide the necessary drawings/schematics, specifications, wiring diagrams, etc., to allow the operators to troubleshoot, and fully understand, the design and operation of the particular equipment;

4) Supplement but do not substitute Operation Manuals and/or Maintenance Manuals and thus be expected to be referenced in the latter as a way of providing specific details on a particular piece of equipment; and

5) Are amended by preparation of supplemental data to make them fully acceptable for Purchaser use.

4.10 Training

[131] The Purchaser will provide an adequate training facility, as well as adequate standard classroom furniture and equipment, such as beamer, screen, white board, paper and writing utensils.

IPS-100 The Contractor shall detail the approach and plans for the design, development, execution, evaluation and feedback for Training in the IPSP. Updates shall be managed in a separate ad hoc document named **Training Plan (TRNP)** that shall include the **Training Needs Analysis (TNA)**. Training shall be through the most effective training option identified by the TNA with extensive use of modularity.

IPS-101 The Contractor shall develop the training materials and courses on the outcomes of maintenance task analysis, as well as the TNA.

IPS-102 The TNA shall commence during the Configuration Capturing sessions conducted during the System Design stage.

IPS-103 The Contractor shall organize a meeting at the Purchaser's facility (NCI Agency Academy Oeiras - Portugal) to review Training Needs requirements as collected during the Configuration Capturing sessions, with at least the following NATO Stakeholders: NCI Agency IPS Group, NCI Agency Academy, NATO CIS Group, CIS Sustainment Support Centre – CSSC Brunssum

IPS-104 The Contractor shall be fully responsible for planning, organizing, installing, operating and maintaining all that is required to perform the training. This includes any training equipment used in the classroom.

IPS-105 The Contractor shall provide the TNA detailing the relevant content to cover the following structure and the Bi-SC Directive 075-007.

Table 4-14 – TNA 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	Analysis
4.1	Target Audience[3]
4.2	Performance Gap[4]
4.3	Difficulty, Importance and Frequency (DIF)[5]
4.4	Training Options
5	Results[6]

IPS-106 The Contractor shall develop and deliver the Training Courses in accordance with Bi-SC Directive 075-003 on Course Development and the TNA

IPS-107 The Contractor shall deliver Course Control Documents (CCD) I, II, and III in accordance with Bi-SC Directive 075-007.

IPS-108 The Contractor shall provide the TRNP detailing the relevant content to cover the following structure and the Bi-SC Directive 075-007.

Table 4-15 – TRNP 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	Training Management
4.1	Training team
4.2	Training processes and procedure overview
4.3	Training RACI Matrix
4.4	Training tools

[3] Target Audience Analysis: identification of operator and maintainer categories, including support staff (to perform Levels 1, 2 or 3) and Purchaser instructor personnel (for follow-on training).

[4] Performance Gap Analysis: identification of the gap between the current skills of operators, maintainers, support staff or instructors and the tasks they will be expected to perform in the use and support; identification of the course pre-requisites for all training courses to allow Host Nation to select students and organize Host Nation pre-requisite training, in time, before execution of the Contractor's training.

[5] Difficulty, Importance and Frequency (DIF): identification of the difficulty and importance of each major task to be performed by each category of operators, maintainers, support staff or instructors and the frequency with which the task will be performed assessing the knowledge and skill required to perform the task, determining performance objectives, and recommending how training should be provided to meet these requirements.

[6] Structuring of training modules, role-based training programmes, and training material, as well as the training sequence, mode and duration.

Structure	Content
4.5	Learning Methods
4.6	Training constraints
5	Planning
5.1	TNA results
5.2	Training Material
5.3	Training Courses
5.4	Proposed time schedule
6	Organisation of courses
6.1	Course description[7]
6.2	Training objectives
6.3	Method of presentation
6.4	Method of evaluation
6.5	Training certificates
6.6	Feedback management

IPS-109 The Contractor shall assume that trainees and audience will have proficiency in the English language, knowledge of the Microsoft Windows Operating System and the audience will be tailored for a maximum twelve (12) students plus maximum four (4) auditors.

IPS-110 The Contractor shall provide Training and all related training documentation in the English language. Training shall be able to accommodate Purchaser students with an English language skill level of 2222 (STANAG 6001). Contractor trainers shall have English language skill level 3332.

IPS-111 The Contractor shall provide evidence of the trainer, or a Subject Matter Expert (SME) supporting the trainer, qualifications and in particular to have at least two years practical experience with the installation and operation of the items under training.

IPS-112 The Contractor shall provide **Training Materials** and **Training Courses Execution** for test personnel, operators, maintainers and instructors:

1) Based on the maintenance and support concept (as per PSDB);
2) Based on technical publications (as per CSDB);
3) Containing slides used during the training, and provide a hardcopy to each student; and
4) In the requested format (e.g. NATO Academy presentation / handbook formats and style guides) for review and approval.

IPS-113 The Contractor shall provide training courses for the identified categories of operators and maintainers following the TNA. At least, the following courses shall be provided:

[7] A proposed syllabus shall be included, detailing the subject matter to be covered. Any breakdown into modules shall be described, following the format of Course Control Documents (CCD) I, II, and III as of Bi-SC Directive 075-007. For each course there shall be also the following details:

1) Student prerequisites (if required);
2) Method of presentation for each element of the syllabus (show breakdown of methods, i.e., lecture, demonstration, hands-on and directed study, online etc.);
3) Course length (including time devoted to each area of the course);
4) Recommended maximum size of course;
5) Recommended location of training and type of facility required (i.e., classroom, auditorium, site, etc.);
6) List of measurable objectives (tasks) required by graduates to demonstrate successful completion of course;

1) Operator / Maintainer courses to perform HL/SL1;
2) Operator / Maintainer courses to perform HL/SL2;
3) Operator / Maintainer courses to perform HL/SL3;
4) Train The Trainer courses to support Operator / Maintainer courses HL/SL1, HL/SL2 and HL/SL3; and
5) Other courses identified during the Training Needs Analysis.

IPS-114 The Contractor shall provide each student attending Training Courses with a hard copy of:

1) The student handbook;
2) A Training Certificate, upon completion of the course; and
3) A course evaluation feedback form.

IPS-115 The Contractor shall submit to the Purchaser the **Training Course Report** within two weeks after completion of each course. This report shall contain:

1) Student attendance and performance record;
2) Consolidated student feedback from feedback forms;
3) Problems encountered (if any);
4) Actions taken or recommended; and
5) Suggested follow-up actions.

IPS-116 The Contractor shall revise the Training Materials for each course to reflect student feedback from the initial session of each course and provide the updated material no later than 20 working days after the course completion.

IPS-117 The Contractor shall provide written notification that all required training equipment and other resources are ready for the commencement of the Training Course at least 20 working days prior to the start of each course.

IPS-118 The Contractor shall execute training at a Purchaser's premises in Portugal, Belgium and The Nederlands (e.g.: the NCIA Academy in Oeiras (PRT), CSSC in Brunssum (NLD), NCIA in Mons (BEL), NCIA in Den Haag (NLD)). The Purchaser will communicate the exact location no later than 20 working days before the Training Course Execution.

4.11 In Service Support during Warranty

[132] The warranty period starts after successful completion of the PSA for each relevant batch.

[133] The Purchaser and/or Customer will operate and maintain the system after the PSA of each relevant batch.

[134] The Purchaser will be responsible (at its own expenses) for returning of failed items to the Contractor.

[135] Any support required for Purchaser Furnished Property (PFP) (which include Purchaser Furnished Equipment (PFE) and Purchaser Furnished Software (PFS)) will be provided through separate support contract provided with the PFP.

IPS-119 The Contractor shall provide the In Service Support (ISS) during Warranty starting after each successful PSA and for one (1) year after successful completion of FSA, provided that the relevant batch is free of any defect in material, code or workmanship.

IPS-120 The Contractor shall provide support to all items, ancillaries, and firmware/software provided under the Contract including the interfaces between the system and any external systems, PFP or otherwise.

IPS-121 The Contractor shall detail approach, plans, roles and responsibilities for ISS during Warranty in the IPSP providing also a specific ISS PoC.

IPS-122 The Contractor shall be responsible for the maintenance of the system (except for PFP) until successful completion of PSA for each relevant batch and therefore shall provide its own spare parts (including consumables and insurance items), personnel, tools and test equipment to maintain the system (except for PFP) to the required performance level.

IPS-123 The Contractor shall provide the following ISS during Warranty to maintain the system to the required performance level, being responsible for:

1) Hardware corrective/unscheduled and preventive/scheduled maintenance: repair and/or re-placement of all defective technical installations/equipment; and

2) Firmware/Software corrective/unscheduled and preventive/scheduled maintenance: remediation/resolution of all bugs, flaws, etc. of all firmware/software installations, provided as part of this contract (including Firmware).

IPS-124 The Contractor shall be responsible to provide indication for Hardware and Firmware/Software corrective/unscheduled and preventive/scheduled maintenance HL/SL 2 included and onwards to ensure that the response times specified can be met (e.g.: MTTR, TAT).

IPS-125 The Contractor shall provide Hardware and Firmware/Software corrective/unscheduled action within Next Business Day (NBD) after the initiation of the warranty request with the following constraints:

1) In case of a failure could not be isolated to an hardware LRU and/or firmware/software CSCI level within 3 working days even with on-call assistance from the Contractor, the Contractor shall dispatch a field engineer to provide a solution on-site; and

2) In the case of a critical failure the warranty period is suspended after 3 working days starting with the warranty request and the warranty period is reactivated after successful resolution of the crifical failure.

IPS-126 The Contractor shall repair repairable items received at the Contractor’s plant in maximum Turn Around Time (TAT) twenty (20) calendar days. This shall include in-processing, trouble shooting, repair, check-out and shipment at the expense of the Contractor until delivery to the Purchaser (i.e. to NATO CIS Sustainment Support Centre, at Brunssum) or to any NATO premises.

IPS-127 The Contractor shall be responsible for the provision of any alternative or superseding items, should the original part be no longer available, ensuring compliance with the original design (e.g.: SRS and PBL) and System provided by this Contract. However, in such cases the Contractor shall propose the alternative item for the Purchaser approval. The alternative item shall conform to all the specified quality requirements within the scope of the contract and standards.

IPS-128 The Contractor shall be responsible for supplying all COTS hardware and firmware/software upgrades and updates till the end of warranty period.

IPS-129 The Contractor shall ensure that the warranty conditions remain valid even if the equipment is moved or relocated during the warranty period.

IPS-130 The Contractor shall submit a **Warranty Report**:

1) At the end of every 3 month period during the warranty period, documenting all identified warranty cases, affected CI's, corrective actions, cost and schedule; and

2) At the end of the warranty period to summarize and analyze all identified warranty cases, affected CI's, corrective actions, cost and schedule.

IPS-131 The Contractor shall perform the Obsolescence Management during the warranty period providing the Obsolescence Report relevant information either in the Warranty Report or in an ad hoc report depending on the criticality.

4.12 In Service Support post Warranty [OPTION]

[136] If the Purchaser decides to exercise the In Service Support (ISS) post-warranty evaluated option the contractor will be obliged to maintain the systems and provide In Service Support post-warranty for the life cycle of the systems for five (5) years after expiry of the systems warranty provisions. After the initial 5-year ISS period, the Purchaser may decide to exercise fifteen (15) additional years of ISS post-warranty through subsequent five (5) increments of three (3) year periods (i.e. 3+3+3+3+3) to cover the service life.

[137] The Purchaser will decide after prior consultation with the users whether or not to exercise the In Service Support post Warranty option as early as possible but, in any case, no later than End of Warranty.

IPS-132 The Contractor shall provide the In Service Support post Warranty with the applicable constraints and requirement as per the In Service Support during Warranty and the following requirements.

IPS-133 The Contractor shall provide Hardware and Firmware/Software corrective/unscheduled action within Next Business Day (NBD) after the initiation of the ISS request with the following constraints:

1) In case of a failure could not be isolated to an hardware LRU and/or firmware/software CSCI level within 3 working days even with on-call assistance from the Contractor, the Contractor shall dispatch a field engineer to provide a solution on-site.

2) In the case of a critical failure the relevant ISS period is suspended after 3 working days starting with the warranty request and the ISS period is reactivated after successful resolution of the crifical failure.

IPS-134 The Contractor shall detail approach, plans, roles and responsibilities for ISS post Warranty in the In Service Support Plan (ISSP) providing also a specific ISS PoC.

IPS-135 The Contractor shall be responsible for maintaining all stocks of spares, test and other maintenance equipment, Automated Test Equipment (ATE) facilities, and all repair documentation including PSDB, technical publications, skills and personnel required.

IPS-136 The Contractor shall be responsible for the Firmware/Software adaptive and perfective maintenance or change/update to ensure that the response times specified can be met.

IPS-137 The Contractor shall guarantee the provision of equipment replacement/repair services throughout the stipulated period.

IPS-138 The Contractor shall maintain comprehensive repair records to enable detailed fault analysis and early detection of failures/maintenance trends. Periodically, the

Contractor shall be required to forward the results of these analyses for review by the Purchaser.

IPS-139 If at any time the Contractor wishes to withdraw these replacement/repair services, the Contractor shall transfer to the Purchaser at no additional cost, all requisite fault diagnostic and repair expertise and instructions, documentation, etc., and special-to-type software and hardware including test equipment, mock-ups, etc., to enable such repair at a Purchaser Facility. Alternatively, if agreed by both parties, and again at no additional cost, the Contractor may transfer to the Purchaser sufficient spare sub-assemblies, modules, circuit card assemblies, etc. to support a discard maintenance concept for the remaining operational life of the equipment to cover the service life.

4.13 In Service Support Plan

IPS-140 The Contractor shall establish, provide, execute and maintain an effective **In Service Support Plan (ISSP)** that describes in detail the practical instructions necessary for the Purchaser's In Service Support organisation to operate and maintain the system (hardware and firmware/software) delivered under this Contract.

IPS-141 The ISSP shall describe the ISSP strategy and the detailed process and procedure to execute the ISS. This plan shall be detailed enough to form a comprehensive understanding of how the Contractor proposes to meet the support requirements of this SOW.

IPS-142 The Contractor shall provide a description of how its proposed CM procedures shall continue to be implemented on the hardware and software/firmware during the ISS periods.

IPS-143 The ISSP shall be considered a living document and as such shall be updated as necessary by the Contractor, with the Purchaser's concurrence, throughout the contracted ISS periods.

IPS-144 The ISSP shall describe and detail the following:

1) Detailed description of the product baseline for the ISS (HW and SW);
2) Contractor's proposed ISS Management Organisation and Structure, to carry out the ISS effort proving adequate experience in the maintenance and support of major defence systems including specialised software;
3) Plan and methods for performing ISS activities (e.g.: intervention on each site, preventive maintenance, repair activities, spares replenishment) for the main three areas: Engineering Support (ES), Material Management (MM) and Field Engineering (FE) (i.e.: maintenance activities and field services) and evaluating the Contractor's performance during ISS through proposed Key Performance Indicators for each area;
4) Details for Data Reporting Analysis and Corrective Action System (DRACAS) and its link to ECP and configuration change management [included in Engineering Support Area];
5) Details for maintaining and updating the PSDB and the Technical Publications providing relevant input to training material for refreshing training courses [included in Engineering Support Area];

6) Details for spare parts procurement, replenishment and repair including PHST (e.g.: strategy for replacing hardware that can no longer be economically supported by the Contractor or sub-contractors) [included in Material Management Area];

7) Plan and methods for Configuration Management and Obsolescence Management specific for the ISS phase; and

8) Plan and methods for communication (e.g.: for site personnel to inform Contractor when spares have been used and when assistance is needed) detailing also the use of call centre and collaborative environment and how any exceptions have to be handled.

IPS-145 The Contractor shall provide a description of the proposed product support information processes. This description shall detail how the information from locations and the Contractor's maintenance facilities will be collected, stored and made available for evaluation. The term "Sites" refers to every physical location where systems or items under this contract are located when Contractor's activity is required.

IPS-146 The Contractor shall provide a description of how the QA/QC Programme of the Prime Contractor and sub-contractors providing ISS shall meet the provisions of this contract. The Contractor shall include applicable certificates (issued by National Governments or International Organisations such as ISO) that demonstrate that the sub-contractors Quality Programme conforms to the requirement of the Prospective ISS post warranty Contract. The Contractor shall also demonstrate how the provisions of the Prospective ISS post warranty Contract regarding QA/QC shall be inserted in all subcontracts and enforced by the Prime Contractor.

IPS-147 The Contractor shall provide the ISSP detailing the relevant content to cover the following structure.

Table 4-16 – ISSP 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

Structure	Content
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

4.14 In Service Support Monthly Report [OPTION]

IPS-148 The Contractor shall submit a **ISS Monthly Report** that documents all the ISSP foreseen activities. This report shall describe in detail all task performed in the preceding month under the contract covering the main three areas: Engineering Support (ES), Material Management (MM) and Field Engineering (FE) (i.e.: maintenance activities and field services) through appropriate use of DRACAS.

IPS-149 The ISS Monthly Report shall report for Engineering Support (ES) all relevant activities performed, dashboard for the KPI evaluation to provide supportability evaluation and performance analysis.

IPS-150 The ISS Monthly Report shall report for Material Management (MM) in terms of:

1) Repair:
    a. List of items sent to repair;
    b. List of items under repair; and
    c. List of items sent back.
2) Replenish:
    a. List of items replenished;
    b. List of items planned to be used in the next period; and
    c. List of items proposed for replenishment.
3) Consumables:
    a. List of consumables used;
    b. List of consumable planned to be used in the next period; and
    c. List of consumable planned to be used by the end of contract.
4) Test Equipment (TE):
    a. List of TE with location; and
    b. List of TE planned to be used in the next period.
5) Stock optimization:
    a. List of items in stock; and
    b. Optimization proposal.

IPS-151 The ISS Monthly Report shall report for Field Engineering (FE) in terms of :

1) Maintenance scheduled and executed;

2) Corrective maintenance performed;
3) Manpower involved and facilities issues;
4) List of all requests for on-site support, including:
    a. Date and time of reception of request;
    b. Name of the employee(s) sent on-site;
    c. Location;
    d. Start and end-date and time of support provided; and
    e. Date and time of closure of request.
5) List of all firmware/software maintenance requests, including:
    a. Date and time of reception of request;
    b. Repair activities performed;
    c. Time to repair;
    d. Date and time of release of workarounds, patches and maintenance releases; and
    e. Date and time of closure of request.
6) List of all requests for technical assistance, including:
    a. Date and time of reception of request;
    b. Nature of the request;
    c. Details of SME responding to the request; and
    d. Date and time of closure of request.

IPS-152 The ISS Monthly Report shall report fo Field Engineering (FE) for repair and replenishment of items in terms of:

1) Date and time of occurred failure (actual and/or estimated);
2) Date and time of reception of request;
3) Date and time of dispatch;
4) Date and time of reception;
5) Part Number equipment/item received;
6) Serial Number equipment/item received;
7) Repair activities performed and failure reporting analysis (or diagnose NFF or BER with evaluation cost, proposed solution and details on the disposal);
8) Time to repair;
9) Repair cost, including PHS&T;
10) Date and time of shipment;
11) Date and time of arrival at return location identified by Purchaser (estimated and actual); and
12) Date and time of closure of request.

IPS-153 The ISS Monthly Report shall include the update of the Obsolescence Report.

4.15 Health and Safety and Environmental Protection

4.15.1 General

IPS-154 The Contractor shall treat Health and Safety (H&S) as a continuous process which addresses all areas, including where the Contractor shall apply best practices in accordance with EU and respective national H&S legislation for all areas of design, installation, construction and build.

IPS-155 The Contractor shall identify all hazards that exist and shall, as part of this activity, ensure that all personnel (operators and maintainers etc.) are provided with suitably designed and constructed equipment and are trained and provided with any necessary additional equipment to minimize the risk of accidents or injury.

IPS-156 The equipment and installations that are subject to this SOW shall be designed and constructed in such a way that they do not run in a hazardous condition or put human safety at risk.

IPS-157 The Contractor shall conduct a hazard review, consider and evaluate the risks and put in place control measures required to produce a statement with supporting evidence that the risks are as low as reasonably practical (ALARP).

IPS-158 All equipment and installations provided by the Supplier shall be:

1) Ambient physicochemical and fluids resistant; and
2) New, of high quality and standard manufacturing (unless bespoken product is required), and OEM with proven experience and feedback of supportability performances.

IPS-159 If lifting devices, ladders, safety equipment, special tools or harnesses are required, the Contractor shall provide them.

IPS-160 The ladders shall be compliant with following standards:

1) EN 131-1:2015+A1:2019 Ladders. Terms, types, functional sizes;
2) EN 131-2:2010+A2:2017 Ladders. Part 2: Requirements, testing, marking; and
3) EN 131-3:2018 Ladders. Marking and user instructions.

IPS-161 Personnal protective equipment (PPE) shall be compliant with Regulation (EU) 2016/425 of the European Parliament and of the Council of 9 March 2016 on personal protective equipment and repealing Council Directive 89/686/EEC.

IPS-162 No special or difficult techniques that require unusual dexterity or skill in removing or installing items shall be assumed.

4.15.2 Applicable directives and standards

IPS-163 The equipment and installations provided by the Contractor shall meet requirements stipulated in following publications (including but not limited to following publications), as applicable:

1) Directive 2001/95/EC of the European Parliament and of the Council of 3 December 2001 on general product safety;
2) Directive 2001/95/EC of the European Parliament and of the Council of 3 December 2001 on general product safety;
3) Directive 2014/30/Eu of The European Parliament and of The Council of 26 February 2014 – electromagnetic compatibility;

4) Directive 2014/35/Eu of The European Parliament and of The Council of 26 February 2014 – 'low voltage directive';
5) IEC 60950 series: Information technology equipment – Safety;
6) IEC 62821 series: Electric cables - Halogen-free, low smoke, thermoplastic insulated and sheathed cables of rated voltages up to and including 450/750V;
7) IEC 61000 series – Electromagnetic compatibility (EMC);
8) IEC 60529 – Degrees of protection provided by enclosures (IP Code);
9) EN 61340-5-1:2016 Electrostatics. Protection of electronic devices from electrostatic phenomena;
10) MIL-STD-882E – Systems Safety; and
11) MIL-STD-1472G, DoD Design Criteria Standard, Human Engineering, dated 2012.

IPS-164 The above list of standards shall not relieve the Contractor from the obligation to comply with other applicable National Standards in NL or BEL.

IPS-165 The Contractor shall clearly state which standards shall apply to each of the designed and installed deliveries.

IPS-166 The Contractor shall note that additional applicable publications, which may introduce detailed H&S measures, are also listed in SRS in reference to specific deliveries.

4.15.3 System Safety Programme Plan

IPS-167 The Contractor shall apply engineering principles, criteria, and techniques to identify and eliminate safety hazards in the systems in accordance with Military Standards (MIL-STD)-882E.

IPS-168 The Contractor shall design and/or select all equipment on the basis of inherent safety features that protect not only the human operators and maintainers but also the equipment itself.

IPS-169 The Contractor shall establish a System Safety Programme in accordance with "MIL-STD-882E, Section 4", to fulfil the safety requirements of the Contract.

IPS-170 The Contractor shall provide, a **System Safety Program Plan (SSPP)** in accordance with MIL-STD- 882E.

IPS-171 The Contractor shall describe his risk assessment method in the SSPP.

IPS-172 The Contractor shall document the procedures to control design, selection, procurement and manufacture of parts and materials. Revisions to the SSPP shall incorporate Purchaser-agreed changes, additions or deletions that have evolved during the conduct of the Programme.

IPS-173 Safety verification shall be conducted at each site prior to each SAT to ensure compliance with the SSPP. The safety verification shall verify the safety requirements for all types of hazards not eliminated by design. The Contractor shall document the safety verification process in the SSPP. The Contractor's responsibilities shall be defined in the SSPP.

IPS-174 The SSPP shall also include System Safety Hazard Analysis Report (SSHAR) as mentioned in MIL-STD- 882E.

IPS-175 The SSPP shall also include Environmental Hazard Analysis (EHA) as defined in MIL-STD-882E.

IPS-176 Environmental requirements shall be implemented and verified by the Contractor in accordance with National laws and regulations (for further information please see paragraph 4.15.5).

IPS-177 The Contractor shall comply with the national legislation concerning job accidents, incident prevention and hygiene at work. The Contractor shall also make legal arrangements for protection of the life and security of all the personnel and to guarantee medical assistance whenever necessary due to job accidents. The same legal arrangements shall be applied to sub-contractor personnel under Contractor's responsibility.

IPS-178 Health and Safety Hazards: The physical presence, operation and maintenance of the system shall pose no health or safety hazards to personnel.

IPS-179 Carcinogenic and Radio-active Materials, Mercury: Materials containing known carcinogenic substances, radio-active materials or mercury shall only be used with the prior authorisation of the Purchaser with the exception of Radium that is not to be used to achieve self-luminosity.

IPS-180 Hazard Warning Labels: Equipment warning labels shall be attached wherever there is any potential heavy lifting, electrical, chemical, excessive noise, electromagnetic radiation or heat hazard or a potential hazard caused by human contact with materials, particularly when removal of covers will expose the hazard.

IPS-181 Hazard Warning Labels 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.

IPS-182 All warning instructions shall be provided in English

IPS-183 Production of Toxic or Corrosive Fumes: Materials used, under the specified environmental and service conditions or as a result of heating due to conflagration, shall not liberate:

1) Gases that combine with the atmosphere to form an acid or corrosive alkali;
2) Toxic or corrosive fumes that would be detrimental to the performance of the equipment or health of personnel; and
3) Gases that will produce an explosive atmosphere.

IPS-184 Equipment shall not contain any asbestos material.

IPS-185 Glass Fibre Materials: Glass fibre materials shall not be used as the outer surface or covering on cables, wire or other items where they may cause skin irritation to operating personnel.

IPS-186 Moving Part Protection: Any rotating or other moving part such as ventilators, blowers, drive belts etc., shall be shielded or protected adequately to prevent accidental contact by and injury to any personnel during operation and maintenance.

IPS-187 Equipment Edges: Projecting and overhanging edges of equipment items shall be kept to a minimum. Edges and corners shall be rounded.

IPS-188 Environmental Conditions Indoors, temperature, humidity: Equipment shall function without degradation under the environmental conditions as specified.

IPS-189 Noise generated by the system in operation shall not exceed the levels specified in the local regulations or Environmental Noise Directive (2002/49/EC) whichever it is more restrictive for operational, maintenance areas.

IPS-190 Any safety related warnings and cautions shall be documented in the related sections of the manuals. Adequate labelling and marking shall be provided on the equipment and systems

IPS-191 Training and other provided documentation (for example deployment manual, operational manuals, maintenance manuals etc.) shall prominently identify hazardous situations and the preparation, precautions and actions to avoid and contain them.

4.15.4 Health & Safety in Project Status Report

IPS-192 As a part of the Project Progress Reports, the Supplier shall produce and update Safety Case Report.

IPS-193 The **Safety Case Report** shall consist of at least three sections:

1) Summary;
2) Hazard log; and
3) Compliance report (Legislative and Requirements Compliance).

IPS-194 The Safety Case shall include a clear statement regarding the current status of the Safety Case for the supplied equipment and installation.

IPS-195 The Safety Case shall reference all local and nationally applicable standards and shall include, but is not limited to:

1) National legislation;
2) Safe use of equipment including lifting equipment and manual handling operations;
3) Personnel protective equipment;
4) Use of display screen equipment;
5) Working at height;
6) Radiation limits;
7) Noise;
8) Exposure to hot surfaces;
9) Exposure to chemical and toxic material;
10) Electrical safety; and
11) Fire safety.

4.15.5 Environmental protection

IPS-196 The Contractor shall take all reasonable and practical measures to protect the public and his own employees against accidents, and to safeguard the environment and apply the best practices available in the field.

IPS-197 Environmental requirements shall be implemented and verified by the Contractor, as a minimum, in accordance with European Union environmental protection regulations and the national implementation references (i.e. law, regulation) pursuant to the EU Directives.

IPS-198 The design shall consider the environmental impact of the equipment during its life cycle and disposal, and the documentation shall provide the appropriate recommendations to the user.

IPS-199 The Contractor shall maintain and make available upon request by the Purchaser:

1) A copy of his environmental management system policy; and
2) Licenses and permits issued by the relevant authorizing authorities.

4.16 Transfer of Ownership

[138] The Purchaser, during the period between SAT and PSA, will commence to use the system for evaluation purposes, testing and training (limited to the Reference System and the Training System).

[139] The Purchaser, at successful completion of each PSA, will be liable for usage induced failures of the system.

[140] The Purchaser will be responsible for a portion of the HL/SL3 maintenance tasks, with the remainder to be the Contractor's responsibility. The HL/SL3 share between the contractor (IMT) and the Purchaser (NMT) will be clarified during production of the MTA and LORA

IPS-200 The Contractor shall be liable with regard to the function and performance of the system during the entire lifecycle.

IPS-201 The Contractor shall be responsible, during the period from SAT of the first article to PSA, for overall continuity of operation, maintenance and support of the system.

IPS-202 The Contractor, during the period between PSA and FSA, shall incrementally transfer to the Purchaser's staff the ability to conduct HL/SL1 to HL/SL2 maintenance tasks and the relevant portion of HL/SL3 according to the MTA and LORA.

IPS-203 Transfer of ownership of the system from the Contractor to the Purchaser shall occur at successful completion of the PSA for each relevant batch.

5 Configuration Management

[141] This section addresses the Configuration Management (CM) requirements of the project. The purpose of these requirements is to ensure that the Contractor establishes and executes NATO-compliant and effective configuration management during the execution of the project until the end of warranty.

CM-1 The Contractor shall establish and maintain an effective Configuration Management (CM) organization to implement the CM program and manage the CM functions (configuration identification and documentation, configuration control, configuration status accounting, configuration audits) throughout the duration of the Contract.

CM-2 The Contractor shall establish and maintain the CM policies, processes and practices/procedures in conformance with [STANAG 4427 Ed.3] “Configuration Management in System Life Cycle Management” and underpinning ACMPs (ACMP-2000, ACMP-2009, ACMP-2100) and [ISO 10007:2017] “Quality Management System – Guidelines for Configuration Management”.

CM-3 The Contractor shall implement the CM activities for any HardWare (HW), SoftWare (SW) including FirmWare (FW) delivered, integrated, tested and/or customized and document provided, used or defined in the frame of the project and shall fully integrate the COTS elements-data in order to implement a unique CM framework.

CM-4 The Contractor shall provide the required CM deliveries in accordance with the following schedule that shall be included in the contractor’s Project Master Schedule (PMS) of the PMP in the PIP:

Table 5-1 – IPS Deliverables

Title	Iss	Due date
Configuration Management Plan (CMP)	Draft	EDC + 2w
	Final Draft	PDR - 4w
	Final	CDR + 4w
Functional Baseline (FBL)	Draft	SRR – 4w
	Final	SRR + 4w
Allocated Baseline (ABL)	Draft	PDR – 4w
	Final	CDR - 4w
Product Baseline (PBL)	Draft	CDR + 4w
	Final	FAT - 4w
Operational Baseline (OBL)	Draft	FSA – 4w
	Final	FSA + 4w
Configuration Management Database (CMDB)	Draft	Design review – 4w
	Final	Design review + 4w
FCA Report		SAT + 4w
PCA Report		FAT + 4w

5.1 Configuration Management Plan

CM-5 The Contractor shall provide, execute, and maintain an effective **Configuration Management Plan (CMP)** as a living document throughout the duration of the Contract. The Contractor shall organize review meetings for CM progress starting from the first draft of CMP.

CM-6 The CMP shall identify, document and justify the organizational structure, roles and responsibilities, tasks, milestones and procedures to be used by the Contractor to implement the CMP and fulfil the requirements of this Contract.

CM-7 The CMP shall assure the establishment and maintenance of configuration item records, configuration item life cycle records, and baselines throughout the duration of the contract and provide assurance that all changes to the baselines are performed through a formal change control process once a baseline has been established and agreed.

CM-8 The CMP shall be structured following the requirements set in the [ACMP-2009-SRD-40.1 ref. # 4.3.C] and subject to revisions and updates, as required.

CM-9 The Contractor shall provide in the CMP the rationale and criteria for the CI identification and CI numbering for the Purchaser approval, based on the criteria for selection of CIs detailed in [NATO ACMP 2009, 2017] “Guidance on Configuration Management”.

5.2 Configuration Identification

5.2.1 Item identification

CM-10 The Contractor shall identify and describe HW, SW (including FW) and documentation Configuration Items (CI’s) as defined in [NATO ACMP 2009, 2017].

CM-11 The Contractor shall also identify any PFPs provided for implementation as Configuration Items (CI’s) and integrate them within their CM and related part of the CI structure.

5.2.2 Baselines

[142] The Purchaser reserves the right to modify the CI structure prior to its baselining.

CM-12 The Contractor shall define the CI trees (Baselines), hierarchically structured, clearly defining each node/leaf as Configuration Item (CI), Hardware Configuration Item (HWCI), Computer Software Configuration item (CSCI), Hardware Parts (HWP) or Computer Software Component (CSC) in accordance with the guidelines provided in the above defined ACMPs and ISO.

CM-13 The Contractor shall provide and maintain Baselines throughout the duration of the Contract.

CM-14 The Contractor shall provide the following baselines:

1) Functional Baseline (FBL);
2) Allocated Baseline (ABL);
3) Product Baseline (PBL); and
4) Operational Baseline (OBL).

CM-15 The Contractor shall be responsible for the consistency between the baselines throughout the project. Any update or change shall be introduced formally and revision controlled.

CM-16 The Contractor shall develop, maintain and fully document all the baselines in the Contractor’s Product Lifecycle Management (PLM) tool.

CM-17 The Contractor shall export the baselines in the form of CMDBs for each Baseline and relevant modifications, in accordance with the Change Request (CR), Engineering Change Proposal (ECP) and Engineering Change Order (ECO) processes, covering as a minimum the following relationships:

1) Contract functional/non-functional requirements to Functional elements of the FBL;

2) Functional Elements of the FBL to Major CIs of the ABL;

3) Major CIs of the ABL to Full CIs (CIs, HWCIs, CSCIs, HWPs, CSCs) tree (PBL); and

4) Major CIs of the PBL to Services/Sub-Services delivered by the System (mapping of CIs vs Services and vice versa).

CM-18 The Contractor shall incorporate in the baselines, under a unique hierarchical tree, all the information relevant to the OEMs/COTS HW, SW and FW used and integrated in the System including PFPs.

Functional Baseline

[143] The Functional Baseline (FBL) is a set of documents that specifies the functional and non-functional requirements of a service or product and that is used as the approved basis for comparison.

CM-19 The Contractor shall provide the final version of the FBL for Purchaser approval following the approval of Final SRR Report. Any changes on the approved FBL shall be requested through ECP.

CM-20 The Contractor's design in the FBL shall be derived from the SRS.

CM-21 The Contractor shall use an industry recognised requirements management tool to support requirements management.

CM-22 The Contractor shall provide access to the Requirements Management tool if requested by Purchaser to have an overview of the requirements management system of the Contractor.

CM-23 The Contractor shall provide the exported requirements lists from the Requirements Management tool in FBL documentation.

CM-24 The Contractor shall propose the format of FBL in the CMP for Purchaser's approval.

Allocated Baseline

[144] The Allocated Baseline (ABL) is a set of documents that specifies the design of a service or product and is used as the approved basis for comparison. The ABL starts to be developed at the beginning of the design phase (PDR) and it is established and "frozen" at the end of the design phase (at CDR) - it is also known as "as-designed" baseline.

CM-25 The Contractor's design in the ABL shall meet the functional and non-functional requirements allocated in the FBL.

CM-26 The Contractor shall provide ABL, with incremental contents, using the NCI Agency template [AI 16.32.04] - ABL Template

Product Baseline

[145] The Product Baseline (PBL) is a set of products and/or services, including supporting documents, which is used as the approved basis for comparison. The PBL starts to be developed at the beginning of the production phase. It is established and "frozen" at the end of the production phase (at factory integration/test) - it is also known as "as-built" baseline.

CM-27 The Contractor's design in the PBL shall meet the functional and non-functional requirements allocated in the FBL and the design of the ABL.

CM-28 The Contractor shall provide PBL, with incremental contents, using the NCI Agency template [AI 16.32.05] - PBL Template

CM-29 Each element of the PBL shall include as minimum (but not be limited to) the following pieces of information (in accordance with the type of item):

1) Position in the structure (hierarchical level or indenture code);
2) Physical location (Reference Designator or similar positional code) coherent with the As-Built Drawings and manuals;
3) Type of Configuration Item (CI, HWCI, CSCI, HWP, CSC);
4) Type of MRI/MSI, coherent with the LBS/PBS;
5) Item identifiers (Part Number – P/N, Cage Code, Nomenclature, revision/issue, release etc.) coherent with the Contractor's defined CM numbering system, including OEMs/COTS data and their propagation in the CM tree;
6) Asset Data (SMR Code, Price, Price UOM, MOQ, start of warranty/licence validity etc.);
7) Inventory Data (Serial Number - S/N or Licence number if applicable etc.);
8) CI documentation:
    a. For HWCIs/HWPs: specifications, datasheet, Certificates of Conformity (CoC), Declaration of Conformity (DoC), Items Setting Documents (ISD – how to configure hardware, software and firmware) etc.;
    b. For HWCIs/CIs: interconnection diagrams, interface specifications/control documents, test procedures, test records, integration data, customization/setting procedures etc.; and
    c. For CSCIs/CSCs: software Release Notes (SRN), software test data records, software metrics (type of language, Line of Code, number of function points etc.), software Source Code (if specifically generated or modified/adapted/customised in the frame of the project), software Installation files, software Version Description Documents (VDDs), software installation/customization procedures, software settings, software operating manual etc..
9) Alternative (P/N, Cage Code, Nomenclature, revision/issue, release etc.); and
10) NATO Stock Number (NSN).

CM-30 The Contractor shall provide the CMDB to reflect the PBL with all related documentation, hardware, firmware/software, configuration files, services and any other related information or deliverable necessary to establish the PBL completely.

Operational Baseline

CM-31 The Contractor's developed Operational Baseline (OBL) shall be initially established after successful completion of the PSA and then finally established after successful completion of FSA. It reflects the "as-deployed" ("as-delivered") configuration of the system.

CM-32 The Contractor shall provide the CMDB to reflect the OBL upon completion of FSA.

5.3 Change Control

CM-33 The Contractor shall be fully responsible for the Configuration Change Control of all CI's and baselines throughout the duration of the Contract and in accordance with [NATO ACMP 2009, 2017].

CM-34 The Contractor shall be responsible for issuing in a timely manner, as required by this SOW, all approved changes and revisions to all baseline documents included in the Contract. This includes changes originated both by the Contractor and the Purchaser.

CM-35 The Contractor shall ensure that the change is properly reflected in all baseline documents affected by that change where a change affects more than one document, or affects documents previously approved and delivered.

CM-36 The Contractor shall define the Configuration Baseline Change procedures and shall submit Notice of Revision or Request for Deviation/Waiver when required and approved by the Purchaser. All proposed changes to the baselines (FBL, ABL, PBL, OBL) shall be submitted to the contractor's Configuration Control Board (CCB) prior to the submission to the Purchaser for approval. The Contractor's internal CCB process shall be defined in the CM Plan. Additionally, the Contractor shall propose an external CCB process to communicate and discuss the changes with Purchaser before officially presenting the changes for approval.

CM-37 The Contractor shall submit change requests in the form of Engineering Change Proposals (ECP) or Request for Deviation/Waiver (RFD/W), when required. All requests shall be captured and logged in a change request register to be identified in CMP. Forms based on ACMP requirements designed by the Contractor for this purpose shall be submitted for approval by the Purchaser prior to use.

CM-38 The Contractor shall use the instructions and templates provided by the purchaser to issue any ECPs and RfCs in accordance with the following:

1) [AI 16.32.02] – Preparation of ECP forms and relevant annex; and
2) [AI 16.32.03] – Preparation of RFD/W forms and relevant annex.

5.3.1 Engineering Change Proposals

CM-39 The Contractor shall assign a priority rating of Emergency, Urgent or Routine Extensions to the target times for processing when submitting ECPs. Changes to the Contractor's baselined Cis shall be processed as:

1) Class I ECPs: these shall have to be mutually agreed upon by the Contractor and Purchaser. Extensions to the target times for processing Class I ECPs shall be mutually agreed upon by the Contractor and Purchaser.
2) Class II ECPs: these shall be submitted by the Contractor to the Purchaser for review and classification concurrence prior to implementation.
3) If the Purchaser's representative does not concur in the classification, Class I ECP procedures shall be applied by the Contractor and the ECP and then formally submitted to the Purchaser for approval or rejection.

CM-40 Any ECP shall include, as a minimum, the following information:

1) Reference Number;
2) requirement affected;

3) nature of change;
4) rationale for the change;
5) impact of change / CIs affected;
6) Description of how the change will be reflected in the delivered system's cost, schedule, and/or performance. This description shall include any trade-offs that shall be considered;
7) Status; and
8) Priority.

CM-41 All design changes shall be appropriately reflected in the technical documentation by the issue of appropriate changes or revisions. Changes/revisions shall be provided for consideration and approval to the Purchaser by the Contractor in accordance with ECP procedures.

CM-42 Any ECP affecting FBL shall be submitted by the Contractor to the Purchaser for review, classification concurrence and approval. No Class I ECP affecting the FBL, including a change to a baseline document shall be implemented until it has been approved by the Purchaser.

5.3.2 Requests for Deviation/Waiver

CM-43 If required, the Contractor shall prepare, handle, and submit for Purchaser's approval, Request for Deviation/Waiver (RFD/W).

CM-44 The Contractor shall be aware that permanent departures from a baseline shall be accomplished by ECP action rather than by RFD/W.

5.3.3 Deficiency Reports

CM-45 The Contractor shall establish and maintain a process for reporting, tracking, and resolving deficiencies in the relevant Baselines. Deficiency Reports (DRs) shall document problems during the design, configuration, implementation, or operation of the system.

CM-46 DRs shall be closed when the identified problem is resolved through procedure or other action that does not affect the system baselines, or when a corresponding Change Request is opened to correct the deficiency through a change to a baseline.

CM-47 The **Deficiency Report** shall contain the following information:

1) A serial number for each deficiency;
2) Description of the deficiency;
3) Test and test case or event under which the deficiency was first observed (e.g.: FAT);
4) Date of the observation of the deficiency and expected date of its correction;
5) The personnel raising and endorsing the observation;
6) Any clearance action taken such as repair and testing, notification, receipt of a written reply from the Contractor;
7) The authorized personnel endorsing the correction, and the date of correction; and

8) The Contractor's proposed way forward, in case the deficiency remains, with target dates and description of the intended resolution strategy.

CM-48 The Deficiency Log shall be first created at the time of First Article Acceptance Testing, and shall remain updated at PSA and then until FSA.

CM-49 It shall be noted that during testing or other inspection procedures, the Purchaser may observe perceived deficiencies. These Purchaser observations shall be included in the Contractor's Deficiency Log, and appropriately documented.

CM-50 The Contractor shall include and provide its Deficiency Report data as part of the Configuration Management Database (CMDB) throughout the duration of the Contract.

5.4 Configuration Status Accounting

CM-51 The Contractor shall be fully responsible for the Configuration Status Accounting (CSA) for all baselines and CIs throughout the duration of the Contract and in accordance with [NATO ACMP 2009, 2017].

CM-52 The Contractor shall propose the format of **CSA Report** in the CMP for Purchaser's approval.

CM-53 The Contractor shall include and provide its CSA data as part of the Configuration Management Database (CMDB) throughout the duration of the Contract.

5.5 Configuration Auditing

5.5.1 Functional Configuration Audits (FCA)

[146] Functional Configuration Audit (FCA): this is a formal examination to verify that a configuration item has achieved the functional and performance characteristics specified in its product configuration information. It is the Purchaser's formal audit of the equipment performance with regard to the contract's specifications

CM-54 The Contractor shall organize and support at least one Functional Configuration Audit (FCA), to occur between FDR and the PSA.

CM-55 The FCA shall be conducted upon the delivery of the first of each configuration type to be delivered by the Contractor.

CM-56 The Contractor shall provide the Purchaser with all baseline documentation required to perform the FCA. At each audit, the Contractor shall make available the technical personnel capable of answering questions from the Purchaser's auditor.

CM-57 The Contractor shall demonstrate by means of the system design and test documentation that each of the technical requirements have been satisfied.

CM-58 The Contractor shall demonstrate, before each testing activity and after the changes based on the tests, the configuration documented is the same with the configuration installed in the physical system. This shall entail the demonstration of HW and SW/FW configuration.

CM-59 The Contractor shall undergo the FCA not later than 2 weeks after successful SAT. The outcome of the FCA shall be documented in the **FCA report**, to be delivered not later than 4 weeks after successful SAT.

5.5.2 Physical Configuration Audits (PCA)

[147] Physical Configuration Audit (PCA): this is a formal examination to verify that a configuration item has achieved the physical characteristics specified in its product configuration information.

CM-60 The Contractor shall organize and execute Physical Configuration Audits (PCA) on site at each location, to occur before PSA. The PCA shall be witnessed by the Purchaser.

CM-61 The PCA shall include:

1) A full inventory check of all equipment ,firmware/software and documentation delivered on site, including auditing of equipment and cable labelling and marking, safety marking and warnings, part numbers and serial numbers;
2) Verification of manuals and training material to assess consistency between documentation and equipment and firmware/software found on site;
3) Verification of design configuration specification against equipment and firmware/software found on site; and
4) Verification of all change requests against equipment and firmware/software found on site.

CM-62 The Contractor shall provide the Purchaser with all baseline documentation required to perform the PCA. At each audit, the Contractor shall make available the technical personnel capable of answering questions from the Purchaser's auditor.

CM-63 The Contractor shall solve any deficiencies found during a PCA within the agreed timeframe and update the baseline accordingly.

CM-64 The Contractor shall undergo the PCA not later than 2 weeks after successful FAT. The outcome of each PCA shall be documented in the PCA report, to be delivered not later than 4 weeks after successful FAT.

CM-65 The Contractor shall draft and deliver a **PCA Report** after each PCA, summarizing the results of the audit and for the Purchaser's approval not later than two weeks after the PCA.

5.6 Configuration Management Database

CM-66 The Contractor shall employ a Configuration Management System (CMS) incorporating the Configuration Management Database (CMDB).

CM-67 The Contractor shall allow the Purchaser access to its CMDB and to the status of all baselines, Configuration Items, Configuration Item Records and Change Records at all times during the execution of the contract.

CM-68 The Contractor shall deliver a fully populated CMDB to the Purchaser before each design review and before PSA and FSA. The CMDB shall be in a non-proprietary format, unless otherwise stated by the Purchaser, and free of any use restrictions to the Purchaser.

CM-69 The Contractor shall provide its entire CMDB file set for Purchaser to be able to import to its CMDB tools and databases products if requested by the Contractor.

CM-70 The Contractor shall ensure that the CMDB can manage Configuration Items that are operational and Configuration Items that are non-operational or in development (i.e.: OBL vs. PBL, respectively).

6 Testing, Verification, Validation and Assurance (TVVA)

6.1 Introduction

[148] This section details the Test, Verification, Validation and Assurance (TVVA) processes and requirements to be applied and performed under this Contract, which are required for the verification and validation of the requirements set forth under this Contract by the Purchaser.

TVV -1 All deliverables supplied by the Contractor under this contract shall be verified and validated to ensure they meet the requirements of this contract. Both fitness-for-use and fitness-for-purpose will be assessed using a quality-based approach.

[149] The verification and validation approach will not only involve delivered equipment, but also interfaces and interoperability with existing NATO and/or national equipment, here considered as Purchaser Furnished Property (PFP).

[150] The verification and validation of PFP is out of the scope of this document and the contract.

[151] The project requires a set of TVVA activities to verify its compliance with the Contractual requirements set forth in the SOW and in the SRS (Annex A to the SOW).

[152] All of these efforts will be in close coordination with the Project Manager. This will ensure that all TVVA activities conform to (using operational acceptance criteria) the customer/user specifications.

6.2 TVVA activities

[153] All information items used during the verification and validation activities are to be handled according to their security classification. Guidance is provided in this SOW, under the security section.

TVV -2 The Contractor shall have the overall responsibility for meeting the TVVA requirements and conducting all related activities. This includes the development of all TVVA documentation required under this SOW, the conduct of all independent verification, validation and assurance events, and the evaluation and documentation of the results

TVV -3 All deliverables of this SOW shall be verified and validated to meet the requirements of this contract. All document-based deliverables shall be produced in a manner compliant with the templates provided by the Purchaser. In particular:

1) The Contractor shall perform the verification activities within each Build Process;
2) The Contractor shall perform verification to confirm that each element properly reflects the specified requirements, design, code, integration and documentation; and
3) The Contractor shall support Purchaser led Validation Activities to confirm that the solution is fit for purpose.

TVV -4 The Contractor shall be responsible for the planning, execution and follow-up of all TVVA events. The Purchaser will assist in preparations by reviewing and providing feedback on all Contractor produced configuration items. The Purchaser will also provide testing and engineering Subject Matter Expertise (SME) during all TVVA events to witness and assist with these events.

TVV -5 The Contractor shall demonstrate to the Purchaser that there is a testing process in

place for the project, supported by Contractor Quality Assurance (QA).

TVV -6 Where requested by the Purchaser, the Contractor shall provide test data to support all TVVA activities

TVV -7 The Contractor shall strictly follow the TVVA processes (described in the latest version of the TV&V Process Definition and Execution Document (PDED) provided by the purchaser). Any Contractor proposed modification shall be approved by the Purchaser.

TVV -8 The Contractor shall ensure that rigorous testing, including regression testing when required, is performed at every stage of the Project lifecycle in order to identify and correct defects as early as possible and minimize impact on cost and schedule.

TVV -9 All test, verification and validation material developed and used under this contract shall be delivered to the Purchaser

TVV -10 The Contractor shall provide an overall project Test Director for the phases defined in Table 1, who will work closely with the Purchaser's assigned TVVA Manager and NATO Quality Assurance Representative (NQAR). Table 1 defines the test phases considered. If deemed necessary, the project may split the test phases defined in Table 1 into multiple events.

[154] The Purchaser will provide subject matter experts (SME) during each test event, as well as TVVA Test Engineers and an NQAR.

TVV -11 The Contractor shall use Key Performance Indicators (KPIs) to identify opportunities for quality improvement, provide solutions and update the plans, the achievement of defined objectives like coverage of risks, requirements, supported configurations, supported operational scenarios, etc.

TVV -12 The Contractor shall have the overall responsibility for meeting the TVVA requirements and conducting all related activities defined in Table 6-1. Each phase may have one or more events to complete the full scope.

Table 6-1 - List of TVVA Phases

TVVA Phases	Scope	Purchaser Involvement
Engineering Phase	Internal contractor activities executed during development phase of the system to ensure the system/software conforms to their design specifications.	Review: Test Reports for Unit, Integration and System tests
Qualification Phase	Activities executed to verify the design and manufacturing process, ensure the system meets necessary design requirements, and provide a baseline for subsequent acceptance tests. *Possible activities:* • *TEMPEST Testing* • *Electro-Magnetic Compatibility (EMC) Testing* • *General Environmental Testing* • *Water/Dust Ingress Testing* • *Operational Robustness Testing*	Review: Event Test Plan, Test Cases/Scripts, Test Report, Test Data, Test Environment Baseline, Existing defects. Participate: Test Readiness Review (TRR), Test Execution, Event Review Meeting (ERM)

TVVA Phases	Scope	Purchaser Involvement
	• *Mechanical Environmental Testing* • *Environmental Control Testing* • *Biological & Chemical Testing* • *Transportation Testing* • *Physical Functional System Testing* • *Product Safety Testing* • *User Interface Testing* • *Component Testing* • *Interface Testing* • *Security Testing* • *Integration Testing (internal to the project deliverables)*	
Factory Acceptance Phase	To verify that production units comply with the requirement/design specifications and production can start. Confirm that all required engineering-level testing activities have been completed in accordance with the SOW. Determine if project deliverables are ready for independent verification, validation and acceptance	Review: Event Test Plan, Test Cases/Scripts, Test Report, Test Data, Test Environment Baseline, Existing defects. Dry Run results Participate: Dry Run (Optional Purchaser participation), TRR, Test Execution, Event Review Meeting (ERM)
TVVA Assessment Phase	Independent assessment performed with Purchaser and led by Contractor to determine whether or not a system satisfies user needs, functionality, requirements, and user workflow processes etc. before it gets into operation. To ensure verification of quality criteria defined in Figure **Error! Reference source not found.**1, for the following tests: • System Integration Test (SIT) – Requirements based testing, focused on verifying integration of the different components together and with any external interface as defined by the SOW • User Acceptance Test (UAT) – Scenario based testing, focused on validating the system as per user needs. • Security Tests – Tests focused on ensuring the security criteria are met. • System Acceptance Test (SAT) – Tests focused on ensuring	Review: Event Test Plan, Security Test and Verification Plan (STVP), Test Cases/Scripts, Test Report, Test Data, Test Environment Baseline, Existing defects, , Reliability Availability Maintainability Testability (RAMT) Case Report, Reliability Block Diagrams (RBDs). Participate: TRR, Test Execution, Event Review Meeting (ERM). User Reviews (including internal users)

TVVA Phases	Scope	Purchaser Involvement
	compliance with the requirements outlined in the SOW. Maintainability and Testability demonstration as per IPS requirements in par. 4.2 RFC Evaluation – Review by Agency Change Managers and execution of any additional evaluation as requested by Change Managers. Under normal circumstances, all required inputs are generated from TVVA activities	
System Acceptance Phase (SAT)	To ensure that the system is installed properly per plan and the service meets the requirements stated in the SRS. System Acceptance Testing is also to ensure compatibility and integration of the product with the site environment. Migration related tests are also covered under these tests. This includes integration with PFP.	Review: Event Test Plan, Test Cases/Scripts, Test Report, Test Data, Test Environment Baseline, Existing defects Participate: TRR, Test Execution, Event Review Meeting (ERM)
Operational Test and Evaluation	To ensure that all the Operational Acceptance Criteria (OAC) such as performance and availability have been successfully implemented. Sites are successfully integrated and tested on the network level. Demonstrate that all components of the System/Application have been integrated (including other systems) to meet all OACs as well as all security requirements defined in the Security Accreditation Documentation Package. Ensure end to end delivered system works as expected and can interoperate with other Purchaser equipment. This also includes Reliability Testing as defined in para 4.2	Review: Event Test Plan, Test Cases/Scripts, Test Report, Test Data, Test Environment Baseline, Existing defects Participate: TRR, Test Execution, Event Review Meeting (ERM)

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

TVV -13 The Contractor shall only proceed to the next formal TVVA activity, after the successful completion of the previous TVVA activity and after the agreement/approval by the Purchaser.

6.3 Deliverables

TVV -14 The Contractor shall provide a System Test Documentation Package, following documentation templates provided by the Purchaser, that is comprised of the following documents listed in Table 2:

Table 6-2 - Test Documentation

Work Product Name	First Draft	Sent to Review/Approve
The Project Master Test Plan (PMTP)	*During Bid*	*4 weeks after contract award*
Defect Reporting and Management Plan	*During Bid*	*4 weeks after contract award*
Event Test Plans for individual test events (ETP)	*During Bid (example)*	*4 weeks before TVVA event*
The Security Test & Verification Plans (STVP)		*as required per the NSAB*
Security Implementation Verification Procedures (SIVP)		*4 weeks before TVVA event*
Any submitted test Waivers together with supporting material		*4 weeks before TVVA event*
The Test Cases/Scripts/Steps	*During Bid (example)*	*4 weeks before TVVA event. First draft 4 weeks after contract award*
Status Reports		*Periodically (to be defined in the PMTP)*
Test Completion Report		*1 week after TVVA event*
System under-test Documentation		*2 weeks before TVVA event*
The Requirements Traceability Matrix (RTM) updated with test-related information	*During Bid*	*First with PMTP and update per test event*

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. The Test Harnesses for PFP will be provided by the Purchaser.

TVV -16 Modification of inaccurate or inadequate TVVA deliverables and any subsequent work arising as a result shall be carried out at the Contractor's expense.

TVV -17 All TVVA materials developed and used under this contract shall be delivered to the Purchaser.

TVV -18 Templates provided by the Purchaser are to be utilized by the Contractor as structure guides and for the content the Purchaser expects to be detailed. If the Contractor would like to propose a modification of the templates, it shall be approved by the Purchaser.

TVV -19 All deliverables shall undergo as many review cycles are required, and shall be approved once all deficiencies have been corrected.

6.4 Project Master Test Plan (PMTP)

TVV -20 The Contractor shall identify and describe in the Project Master Test Plan (PMTP) which best practices and international standards will be applied and how.

TVV -21 The Contractor shall produce a Project Master Test Plan (PMTP) to address the plans for each TVVA activities listed in this document. The Purchaser will monitor and inspect the Contractor's MTP activities to ensure compliance.

TVV -22 The Contractor shall keep the PMTP always up to date.

TVV -23 The Contractor shall describe how the Quality Based Testing is addressed and implemented in the PMTP. Figure 1 is based on ISO 25010 and should be used as product quality criteria model.

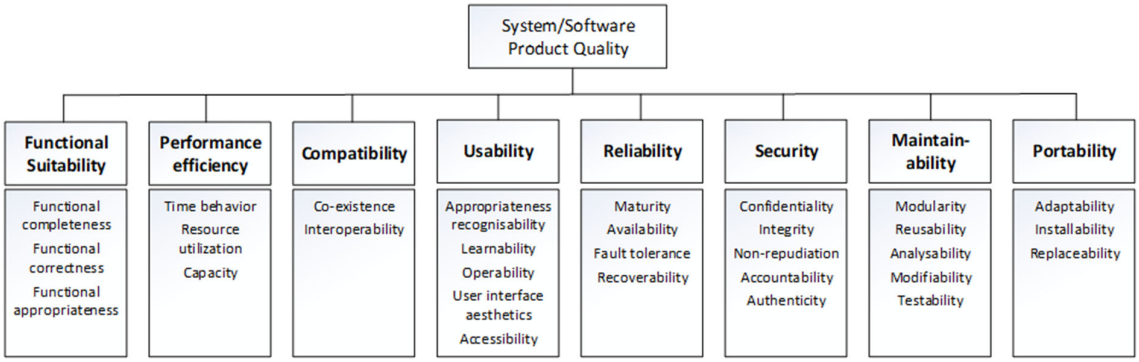

Figure 1 - Product Quality Criteria

TVV -24 The Contractor shall describe all formal TVVA activities in the PMTP with a testing methodology and strategy that fit the development methodology chosen by the project.

TVV -25 The Contractor proposed testing methodology shall describe the method of achieving all the test phases, defined in Table 6-1, successfully.

TVV -26 The Contractor shall describe in the PMTP how the following objectives will be met:

1) Compliance with the requirements of the Contract;
2) Verification that the design produces the capability required;
3) Compatibility among internal system components;
4) Compliance with the SRS requirements;
5) Compliance with external system interfaces and/or systems;
6) Confidence that system defects are detected early and tracked through to correction, including re-test and regression approach;
7) Compliance with Purchaser policy and guidance (i.e. security regulations, etc.);
8) Operational readiness and suitability; and
9) Product Quality Criteria (Figure 1).

TVV -27 The Contractor shall describe the Contractor's test organization and its relationship with the Contractor's Project Management Office and Quality Assurance (QA) functions in the PMTP.

TVV -28 The Contractor shall describe in the PMTP "Entry and "Exit" criteria for each of the formal TVVA events. The Contractor shall seek approval of all criteria related to an event not later than the TRR of the event

TVV -29 The Contractor shall provide in the PMTP the schedule, location and scope for all the events to be run, specifying to which phase they belong. When the contractor identifies that multiple events are required for a phase, this shall also be specified in the PMTP.

TVV -30 Together with the PMTP, the contractor shall provide a defect reporting and management process to be applied during the TVVA activities in Table 6-1.

TVV -31 The Contractor shall describe how defects/non-conformances encountered during TVVA events will be reported, managed and remedied

TVV -32 The PMTP shall include the Contractor's approach to Test Reviews including Test Readiness Reviews and Event Review Meetings for each TVVA event.

TVV -33 The Contractor shall provide Contractor's provisions and strategy for building/maintaining of the Reference Environment in PMTP.

6.5 Test Cases and Test Procedures

TVV -34 Any updates required from the execution of test cases during the each phase shall be incorporated into the relevant test cases by the Contractor for use during independent verification, validation and acceptance. If only certain sections are affected, then it shall be sufficient to up-date and re-issue those section plus cover sheet with amendment instructions. Should major changes in contents or page re-numbering be needed, then the complete section shall be re-issued by the Contractor. All changes shall be made with the agreement and approval of the Purchaser

TVV -35 The Contractor shall submit the draft test cases for the TVVA event to the Purchaser for approval no later than four (4) weeks prior to the execution of the tests, unless differently stated in a work package. The Purchaser shall provide comments or approval within four (4) weeks of receipt. The purchaser must have the final version of the test cases and Event Test Plan available one (1) week prior to the TRR for a specific TVVA event

TVV -36 The contractor shall develop test and use cases to verify and validate all requirements in the SOW, requirements specifications and final design. The test cases shall follow the template provided by the purchaser

6.6 Event Test Plan (ETP)

TVV -37 The contractor shall create an Event Test Plan (ETP) per each event detailing all the information required for that event. The ETP shall follow the template provided by the Purchaser.

TVV -38 The Contractor shall describe in the event test plan what training (if any) will be provided prior to formal TVVA events.

TVV -39 The Contractor shall identify, in the ETP, which environment(s) to be used at each TVVA event and the responsibilities for configuration control, operation and maintenance of the environment.

TVV -40 The ETP shall describe when an agreement shall be reached between the Contractor and the Purchaser on the defect categorization and defect priority of failures encountered, as well as a way forward (if either at the end of each day of a TVVA event or at the Event Review Meeting). If agreement is not reached, the disputed items shall be escalated to the Purchaser's and Contractors' Project Managers

6.7 Requirement Traceability Matrix (RTM)

TVV -41 The Contractor shall produce and maintain the Requirement Traceability Matrix (RTM), which includes all functional and non-functional requirements, to track the TVVA status of all requirements throughout the Contract execution (especially during the TVVA activities).The RTM shall also trace the requirements to the design. It shall also define how the requirements will be validated or verified at each of the TVVA activities:

1) The verification method: Inspection, Analysis, Test or Demonstration;
2) Correspondent TVVA phase(s) for each requirement; and
3) Coverage Status.

[156] The Purchaser will review and approve the proposed RTM.

TVV -42 The contractor SHALL maintain the RTM updated during the project lifecycle.

TVV -43 The Contractor SHALL provide the Purchaser with updates (via the tools) to the RTM daily during the execution of an event, and following the conclusion of each event defined in Table 1. A workflow for updating the RTM SHALL be proposed by the Contractor and approved by the Purchaser.

6.8 Test Tools

TVV -44 The Contractor shall generate and deliver automated test procedures/cases compatible with Purchaser test management and automation tools.

TVV -45 The Contractor shall make use of automated testing and supporting testing tools (test management, requirement coverage, defect management, etc.) to the maximum applicable extent, for all system development, implementation, internal and formal tests. The process and proposed supportive tools shall be described in the Project Master Test Plan (PMTP). In areas where the Purchaser already uses specific tools, the Contractor shall make use of the tools in use by the Purchaser

TVV -46 Tools supporting requirements coverage, defect management and test management shall be selected and hosted by the purchaser and used by the Contractor. For any internal work, the Contractor may use their own internal tools, but the tools used for the contractor's internal work shall be able to natively interface with the tools selected and hosted by the Purchaser in order to keep all TVVA related data for the project in the purchaser tools.

6.9 TVVA Events and results

TVV -47 The Contractor shall conduct testing during the Project lifecycle compliant with the following requirements:

TVV -48 The Contractor is responsible for conducting all testing during the Project lifecycle. The contractor shall provide evidence to the Purchaser of the results of these testing activities. The Contractor shall respond to any Purchaser clarification requests regarding test results or performance within two working days

TVV -49 The Contractor shall conduct all testing activities for any architectural changes.

TVV -50 The Contractor shall support post go-live activities during the Operational Acceptance phase, to evaluate the project capability performance and establish benchmarks for future enhancements, including any changes made to fulfil the requirements.

TVV -51 The Contractor shall provide status reports to the Purchaser regarding verification and validation activities during the planning/design and development phases, via the use of a dashboard report within the test management tool set and through meetings. The Contractor shall provide report(s) to the Purchaser following the completion of any TVVA event. The Purchaser will approve the report and its findings within two business days

TVV -52 Progress and result measurement shall be approved by the Purchaser and focused on KPIs.

TVV -53 Test results shall be recorded in the test management tool set. All results of all formal acceptance testing performed during a given day must be recorded in the test management tool. The Contractor shall provide these test results for any given day by the starting of the next business day (0800 AM), but as a minimum not later than 24 hours following the execution of any test

6.10 Test Readiness Review (TRR)

TVV -54 The Contractor shall conduct a Test Readiness Review (TRR) meeting at least one week prior to the events defined in Table 1 List of TVVA Phases. The TRR shall ensure that all entry criteria for the events have been met. Documentation that requires review by the Purchaser prior to a TRR, as defined in the Event Test Plan (ETP), shall be provided no less than 2 weeks prior to TRR.

[157] The Purchaser has the right to cancel the TRR and/or any formal test event if the evidence demonstrates that execution of the test event will not be effective.

TVV -55 The Contractor SHALL demonstrate that all the internal tests and dry runs are successful with test reports and results delivered to the Purchaser at least 2 weeks prior to start of any Contractual test activities.

6.11 TVVA Event Review Meeting

TVV -56 The start and/or ending of any test session shall be subject to the Purchaser approval. In the event that critical issues are encountered which impact the process of the testing or if the other functions depends on the failed test cases, the Purchaser has the right to stop the testing for Contractor's investigation. The tests can only re-start if Purchaser agrees to continue testing from the point of failure or re-start testing from the beginning.

TVV -57 The Contractor shall convene an Event Review Meeting (ERM) as defined in the ETP. The ERM shall ensure that the event results, defect categorization and a way forward to fixing the defects (if required) is agreed upon the Contractor and the Purchaser. If agreement is not reached, the disputed items shall be escalated to the Purchaser's and Contractors' Project Managers.

6.12 TVVA Event

[158] An event starts with the Test Readiness Review (TRR) and finishes off with the Event Review Meeting (ERM).

TVV -58 During formal TVVA phases, a daily progress debrief shall be scheduled. Participation to the daily progress debrief will be agreed between Purchaser and Contractor. The aim of the debrief is to get a common understanding on what tests were run, which passed, which failed, and whatever defects were reported during the day.

TVV -59 For each TVVA event, the Contractor shall provide log/record of the event, including but not limited to individual test results, defects found, requirement coverage, test execution durations, deviations during execution and sign-off for each result by both the Contractor and Purchaser.

TVV -60 At the end of the project, the Contractor shall provide the final version of all artefacts (regardless of format) created during the execution of all TVVA activities.

6.13 Reference environments

TVV -61 The Contractor shall obtain the approval of the Purchaser regarding the environments the formal events will take place on and in requesting the approval, indicate what support is required from the Purchaser to configure and prepare the environment. This includes any data from the Purchaser required for the test event. The Reference Environment Configuration shall be formally controlled using configuration management tools, and each baseline that will enter into a contractual event shall be delivered to the Purchaser for approval prior to TRR.

TVV -62 The Contractor shall ensure that all test/reference environments are under proper configuration management, especially configuration control. The Configuration Management toolset and process shall be approved by the Purchaser.

6.14 Waivers

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

TVV -63 In respect to a requested waiver, the Contractor shall certify that the test environment to be implemented is identical to that which was originally used for testing, or advise the Purchaser of design/construction changes which affect form, fit or function.

TVV -64 The Contractor shall record and log all waiver requests along with their resolution submitted for the Purchaser’s approval.

6.15 Failed events

TVV -65 In the event of failed TVVA event and the need to return to a site for re-testing; travel and per diem expenses of NATO personnel shall be borne by the Contractor

6.16 Test Defect Categorization

TVV -66 The Contractor shall use the Purchasers’ categorization nomenclature for all defects and non-compliances

TVV -67 Should a failure be identified during a TVVA event/activity, a defect shall be recorded in the Agency’s test management and defect management systems. Once the event has concluded, the defect shall be reviewed during the event review meeting to agree on the severity, priority and category. The event test report shall then report the disposition of all defects recorded during the event and the defect management system shall be updated accordingly. Classification shall follow the definitions in Table 3, Table 4 and Table 5.

Table 6-3 - Definitions for Defect Categorization

Attributes	Definition
Severity	*The severity of a defect is the degree of impact that the failure has on the development or operation of a component, a system or a user function.* *The severity shall initially be proposed by the tester but shall officially be set in agreement with all the stakeholders. When agreement cannot be reached, the Purchaser's PM will set the severity.*
Priority	*The priority of a defect defines the order in which defects shall be resolved.* *The priority of the defect shall initially be proposed by the tester but shall officially be set in agreement with all the stakeholders. When agreement cannot be reached, the Purchase's PM will set the priority.*
Category	*The type of observation identified during the execution of a test case.*

6.17 Severity

TVV -68 According to their severity, defects shall be classified as one of the following

Table 6-4 - Classification of defects based on severity

Severity	Definition
Critical	*The failure of testing of a requirement.* *The failure results in the termination of the complete system or one or more component of the system.* *The failure causes extensive corruption of data.* *The failed function is unusable and there is no acceptable alternative method to achieve the required results*
Major	*A significant failure that causes severely impaired functions but does not prevent operational processing. Applies to conditions under which the complete system or one or more component of the system are partially inoperative, but are still usable by the users. A work around may be available, but it may require manual intervention.* *Examples:* ** Absence of expected modules/ object or Unit* ** failure of business operational process that affects a large group of users* ** complete failure of a module*
Moderate	*The failure does not result in the termination and all functions are available but causes the system to produce incorrect, incomplete or inconsistent results. When resources are available and budgeted, should be resolved.*
Minor	*The failure does not result in termination and does not damage the functioning of the system. The desired results can be easily obtained by working around the failure*

Severity	Definition
Cosmetic	*The failure is related to the look and feel of the application, typos in a document or user interfaces (amongst others), and not part of the immediate usability or contractual requirements. The failure does not adversely affect the overall system operation.*

6.18 Priority

TVV -69 According to their priority, defects shall be classified as one of the following in Table 5 below:

Table 6-5 - Priority Classes for Defect Classification

Priority Class	Description
Urgent	*The defect shall be resolved as soon as possible. Required to complete independent verification and validation activities.*
Medium	*The defect shall be resolved in the normal course of development activities. It can wait until a new build or version is created.*
Low	*The defect is an irritant which should be repaired, but repair can be deferred until after more serious defects have been fixed.*

6.19 Category

TVV -70 According to their category, deficiencies shall be classified as one of the following in Table below:

Table 6-6 - Deficiency Categories

Category	Description
Defect	*An imperfection or deficiency in a work product where it does not meet its requirements or specifications. This category of defect could drive to the creation a Class II (Product Correction) Engineering Change Proposal (ECP).*
Enhancement	*This type of defect is used to record an Improvement to the product baseline. This category of defect would typically drive to the creation of a Class I (Product enhancement) ECP.*
Document	*This category is used to record deficiencies encountered in the system documentation (test cases, test procedures, RTM, test plan, manuals, design, procedures…).*
Clarification	*This category is used to record deficiencies encountered during the test execution, which must be clarified.*

Category	Description
Waiver	*This category is used to record when a waiver is required to address a specific observation or deficiency.*

7 Quality Assurance

7.1 Definitions

QA-1 Unless otherwise specified in the SoW, STANAG 4107 and underpinning AQAPs (reference A.1.3), ISO 9000:2015 (reference A.1.30), PRINCE2 and ITIL definitions shall apply.

[160] Quality Assurance (QA) is a process and set of procedures intended to ensure that a product or service, during its definition, design, development, test and deployment phases will meet specified requirements.

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

[162] Under the Contract, the terms “QA process” will also include Quality Control process.

[163] A “Project document” is a document developed and maintained to help in the management of the project. Typically the plans (amongst which, the Quality Assurance Plan (QAP)) are project documents.

QA-2 The term "NATO Quality Assurance Representative" (NQAR) shall apply to any of the Purchaser appointed Quality Assurance Representative.

QA-3 The term "Contractor Quality Assurance Representative" (CQAR) shall apply to any of the Contractor appointed Quality Assurance Representative.

7.2 Introduction

QA-4 The Contractor shall establish, execute, document and maintain an effective Quality Assurance (QA) programme throughout the Contract’s lifetime.

QA-5 The QA programme shall apply both the contractual requirements and the NATO requirements for quality identified by AQAP 2110, AQAP 2210 and AQAP 2310 and AQAP 2105 (reference A.1.3 (to the STANAG 4107)), to provide confidence in the Contractor’s ability to deliver products that conform to the Contractual requirements.

QA-6 If any inconsistency exists between the SoW requirements and the references, the SoW requirements shall prevail.

QA-7 The Contractor‘s QA effort shall apply to all services and products (both management and specialist) to be provided under the Contract. This includes all hardware, software, firmware and documentation being developed, designed, acquired, integrated, maintained, or used under the Contract (including deliverable and non-deliverable items like test and support hardware and software), without limitation.

QA-8 The Contractor‘s QA efforts shall ensure that procedures are developed, implemented and maintained to adequately control the design, development, production, purchasing, installation, inspection, testing, configuration management and customer support of all services and all products, in accordance with the requirements of this Contract.

7.3 Roles and Responsibilities

[164] During the entire Contract implementation, the NQAR(s) assures the Contractor's and Sub-Contractor's compliance with all Quality related contractual requirements. The Purchaser, through its NQAR(s), is the authority concerning all Quality related matters.

QA-9 The Contractor shall be responsible for assurance and control of quality for all deliverables and associated Contractual products, processes and services through the life-cycle of the Contract.

QA-10 The CQAR shall be accountable for the provision of the QA Plan and the compliance to the defined QA process.

QA-11 The CQAR(s) shall define the major quality checkpoints that will be implemented while executing the project and the quality process to be used at each checkpoint.

QA-12 The CQAR(s) shall be responsible for assessing that the Contractual requirements have been complied with, prior proposing the Contractual services and products.

QA-13 The CQAR shall report to a distinct manager within the Contractor's organisation at a level equivalent to or higher than the Project Manager.

QA-14 The CQAR shall be the point of contact for interface with and resolution of quality matters raised by the NCI Agency or its delegated NQAR.

QA-15 The Contractor shall support any NCI Agency or its delegated NQAR activity focused on monitoring Contractor activities at Contractor’s facilities or other sites related to the development, testing and implementation. In particular, the Contractor shall:

1) Make himself/herself available to answer questions and provide information related to the project,
2) Allow the Purchaser representatives to inspect and monitor testing activities, and management, technical and quality processes applicable to the project; and
3) Transfer to the Purchaser representatives all information deemed necessary to perform the QA activities, on his/her own initiative or on request by the Purchaser representative.

QA-16 The Contractor shall ensure that CQAR(s) have the required qualifications, knowledge, skills, ability, practical experience and training for performing their tasks.

QA-17 The CQAR(s) shall have sufficient responsibility, resources, authority and independence to review and evaluate activities, identify problems and initiate or recommend appropriate corrective actions.

QA-18 The CQAR(s) shall participate in the early planning and development stages to ensure that all quality related requirements are specified in plans, standards, specifications and documentation.

QA-19 After establishment of attributes, controls and procedures, the CQAR(s) shall ensure that all elements of the QA Process are properly executed, including inspections, tests, analysis, reviews and audits.

QA-20 The Contractor, through its CQAR(s), shall be responsible for product quality control and for submitting to Purchaser acceptance products, supplies and services which conform to contractual requirements only.

QA-21 The Contractor shall maintain and, when required, deliver objective evidence of this conformance.

QA-22 The Contractor shall give written notice to the NQAR(s) at least four weeks in advance that the services and/or products are being presented for review, testing, verification, validation and acceptance.

QA-23 Testing shall only be permitted by using test procedures and plans approved by the Purchaser.

7.4 Quality Management System (QMS)

QA-24 The Contractor shall establish, document and maintain a Quality Management System in accordance with the requirements of ISO 9001:2015 (Reference A.1.3).

QA-25 The Contractor's and Sub-Contractor's QMS relevant to performance under the Contract shall be subject to continuous review and surveillance by the cognizant NQAR(s).

QA-26 The Contractor shall include in orders placed with its Sub-Contractor(s) and Supplier(s), the QMS requirements necessary to ensure the supplies and services covered by the Sub-Contract(s) and/or Purchase Orders conform to the requirements of the prime Contract.

QA-27 The Contractor shall specify in each order placed with its Sub-Contractor(s) and Supplier(s), the Purchaser's and its NQAR(s) rights of access to all premises where contractual work is performed, in order to carry out audits, inspections, tests and other functions as may be required by the NQAR(s).

QA-28 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.

7.5 Quality Assurance process

QA-29 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-30 The requirements for these processes shall be derived from the Contract, the QMS, the applicable AQAPs and referenced best practices, in that sequence of priority.

QA-31 The Contractor shall prepare, perform and document System Requirements Review (SRR), Preliminary Design Review (PDR) and Critical Design Review (CDR) according to the contractual requirements and IEEE 15288.2:2014 (reference A.1.1).

QA-32 The Contractor shall perform verification and validation of the Contractual deliverables before proposing them for the Purchaser review and approval.

QA-33 The Contractor's QA process shall be described in the QA Plan as outlined below. The process is subject to approval by the Purchaser.

QA-34 The Contractor shall demonstrate, with the Quality Assurance process, that the processes set up for design, develop, test, produce and maintain the product will assure the product will meet all the requirements.

QA-35 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-36 On request, the Contractor shall provide the Purchaser with a copy of any Sub-Contracts or orders for products related to the Contract.

QA-37 The Contractor shall periodically review the QA process and audit it for adequacy, compliance and effectiveness, and report any changes to the Purchaser NQAR(s).

QA-38 The Contractor shall ensure that all contractual requirements, including NATO supplements, are included in internal audits.

7.6 The Quality Assurance Plan (QAP)

QA-39 The Contractor shall provide a Quality Assurance Plan (QAP) for review to the Purchaser in accordance with the requirements identified in the AQAP-2105 (Reference to the STANAG 4107) and the SoW requirements.

QA-40 The Contractor's QAP shall be compatible and consistent with all other plans, specifications, documents and schedules, which are utilised under the Contract.

QA-41 All Contractor procedures referenced in the QA Plan shall either be submitted with the plan, or described in the plan and made available for review by the Purchaser upon demand.

QA-42 The QA Plan and all related QA procedures, and all their versions/revisions, shall be subject to NQAR(s) approval based on an agreed checklist.

[165] The acceptance of the QAP by the Purchaser only means that the Purchaser agrees to the Contractor’s approach in meeting the requirements. This acceptance in no way relieves the Contractor from its responsibilities to meet the requirements stated in this Contract.

QA-43 The Contractor shall review his QA programme periodically and audit it for adequacy, compliance and effectiveness.

QA-44 The Contractor shall ensure that all contractual requirements, including NATO supplements, are included in internal audits.

QA-45 The Contractor shall inform the NQAR(s) of deficiencies identified during internal audit unless otherwise agreed between the NQAR and/or the Purchaser and the Contractor.

QA-46 The Contractor shall include a risk management section within the QAP including the risks connected to the sub-Contractors of the Contractor.

QA-47 The Contractor shall make its quality records, and those of its Sub-Contractors, available for evaluation by the NQAR(s) throughout the duration of the Contract.

QA-48 The Contractor shall update the document, as required, from the delivery date of the initial QAP through Final Operating Capability (FOC), under Configuration control. The Contractor shall provide a copy of each new version of the QAP to the Purchaser for review and approval.

7.7 Quality for Project Documents

QA-49 A formal change management process shall be applied to all project documents, including documents naming conventions as defined by the Purchaser and coordinated with the Contractor.

QA-50 Project documents shall be configuration controlled. Each version of a project document is subject to Purchaser approval (unless otherwise specified).

QA-51 The Contractor shall ensure that any change related to the project documents are controlled, with the identity, approval status, version and date of issue are clearly identified.

QA-52 Project documents file names shall not contain any variable part, like version number, reviewer initials or maturity status. Version numbers and maturity status shall be marked in the document content and/or attributes.

7.8 Risks

QA-53 The Contractor and Sub-Contractor shall provide objective evidence, that risks are considered during planning, including but not limited to Risk Identification, Risk analysis, Risk Control and Risk Mitigation.

QA-54 The Contractor shall start planning with risk identification during Contract review and updated thereafter in a timely manner. The Purchaser reserve the right to reject QPs, Risk Plans and their revisions.

7.9 Deficiencies

QA-55 The Contractor shall establish and implement a quality/product assurance Issue Tracking System (ITS) to ensure prompt tracking, documentation and correction of problems and deficiencies, during the lifecycle of the Contract.

QA-56 The ITS shall implement a lifecycle (status, responsibilities, relationship to affected Contract requirements, if applicable, and due dates) for each recorded deficiency.

QA-57 If the Contractor becomes aware at any time before acceptance by the Purchaser that a deficiency exists in any supplies, the Contractor shall log it in the ITS, coordinate with the Purchaser and promptly correct it.

QA-58 The Contractor shall demonstrate that all deficiencies are solved / closed before product acceptance.

QA-59 When the Contractor establishes that a Sub-Contractor or a Purchaser Furnished Property (PFP) product is unsuitable for its intended use, it shall immediately report to and coordinate with the Purchaser the remedial actions to be taken.

QA-60 The Contractor shall ensure that only acceptable products, intended for delivery, are released. The Purchaser reserve the right to reject non-conforming products.

7.10 Support Tools

QA-61 The Contractor shall make all support tools available for demonstration to the NQAR, upon request.

QA-62 The Contractor shall also make available to the Purchaser for review upon request, associated records and documentation, including but not limited to, control, authorization for use, calibration, validation, qualification, as applicable, per respective Contract requirement.

7.11 Certificates of Conformity

[166] A Certificate of Conformity (CoC) is a document, signed by the Supplier / Vendor of a product, stating that the product conforms to contractual requirements and regulations. A Certificate of Conformity template is available in AQAP-2070 (reference A.1.3).

[167] The CoC, provides evidence that the items produced or shipped comply with test procedures and quality specifications prescribed by the customer.

[168] The Contractor is accountable for the conformance to requirements of products provided to the Purchaser.

QA-63 The Contractor shall deliver all the CoC's for Commercial-off-the-Shelf (COTS) products (software, including firmware and hardware) released by the COTS Vendors.

QA-64 The CoCs delivered by the Contractor shall be part of the acceptance data package of the product.

QA-65 The Contractor shall provide a CoC at release of product to the Purchaser unless otherwise instructed.

8 System Acceptance

8.1 Provisional System Acceptance

[169] The concept of Provisional System Acceptance (PSA) is based upon the knowledge that complex and technically sophisticated systems may not be delivered without some deficiencies in the compliance with the totality of the Contract requirements.

SAC-1 To progress to PSA the Contractor shall have successfully completed System Acceptance Testing (see Section 2.5.4).

SAC-2 Should there be any outstanding deficiencies, they shall be handled as detailed in Section 5.3.1.

SAC-3 The Contractor shall identify, document and maintain a complete Deficiency Log, listing of all deficiencies discovered during the testing leading up to its request for PSA and those which otherwise may exist at the time that the systems are offered to the Purchaser for PSA.

SAC-4 In order to request PSA of the systems delivered under this Contract, the Contractor shall have completed the following actions:

1) All deliverables under the Contract specific to each batch of MB-DSGT's, have been supplied;
2) Approval of the SAT reports specific to each batch of MB-DSGT's by the Purchaser;
3) The training courses and delivery of all training materials;
4) The delivery of all required special tools and test equipment, all spares and consumable items;
5) The delivery of all required documentation;
6) A deliverables inventory has been provided which details all the deliverables to be supplied under the terms of the contract;
7) The design documents have been supplied with updates to accurately reflect the "As Built" configuration and verification of the accuracy of the Documentation has taken place; this includes the IDD for the control and monitoring interfaces;
8) Certificates of Conformity (CoC) have been supplied that the equipment conforms to the contractual standards and applicable manufacturing standards; and
9) A complete list of Keys and Passwords, such as Password Lists and any other Password and/or Codes necessary for the Purchaser to operate the system from day to day, has been supplied to the Purchaser.

SAC-5 At such time as the Contractor has completed the prerequisites defined above, it shall notify the Purchaser in writing that the systems are offered for PSA.

SAC-6 This notification shall be accompanied by the PSA Report for the systems being offered.

[170] The process of PSA review starts with the delivery of the PSA Report.

SAC-7 The **PSA Reports** submitted to the Purchaser for PSA (one report for each of the systems delivered under this Contract) shall include the following information:

1) Status of each individual system and sub-systems i.e. installation, integration, notification, operation;
2) Complete test reports, for all testing and acceptance events leading to PSA;
3) Reliability Maintainability and Availability (RMA) Analysis Report;
4) Status of inventory;
5) Status of documentation relevant to the acceptance e.g. as-built drawings, handbooks, quality assurance reports;
6) Status of training package; and
7) The Deficiency Log, listing all the open deficiencies, and describing the resolution strategies and target dates, as agreed with the Purchaser.

[171] Within 4 weeks of receipt of the PSA Report, the Purchaser has the option to schedule a PSA Review Meeting if required. The Purchaser has the right to grant PSA acceptance without a formal PSA Review Meeting.

[172] The PSA Meeting, if required, will be chaired by the Purchaser with the objectives of:

1) Providing a review of the status of each system, specifically reviewing and discussing the status of all observed deficiencies, as listed in the system's specific Deficiency Log;
2) Establishing a list of all observed deficiencies which have yet to be corrected by the Contractor;
3) Evaluating the list of outstanding deficiencies in relation to their combined effect on the suitability of the system for hand-over for actual operation, service delivery; and
4) Providing an initial determination as to whether PSA may be granted. If PSA is not granted, establishing the basis for such determination. If PSA is granted, establishing the final list of deficiencies which shall be corrected by the Contractor prior to Final System Acceptance and a schedule for such corrections to take place.

SAC-8 The Contractor shall prepare a written record, if a PSA Review Meeting was held, in the form of PSA Meeting minutes and submit to the Purchaser, within 1 week of the meeting.

SAC-9 The PSA Review minutes shall be completed and signed by the representatives of the Contractor and Purchaser respectively.

SAC-10 The PSA Review Minutes shall be forwarded to the Purchaser's Contracting Authority who will formalize the decisions of the PSA Meeting in writing and officially notify the Contractor of such decisions within two (2) weeks of receipt of the PSA Minutes.

[173] The Contractor should note that any Certificate of Conformity provided at the time of the PSA Report is considered to also be provisional pending correction of noted deficiencies before Final System Acceptance.

8.2 Final System Acceptance

SAC-11 The Final System Acceptance (FSA) shall be accomplished after:

1) Verifying that all components of the systems meet the contractual requirements (e.g. all PSA's are completed, reliability/maintainability requirements are met, all documentation is delivered, all trainings have taken place etc);
2) Verifying that all Deficiencies and Defects identified by reviews, inspections, tests and operation have been cleared in accordance with the observations procedure of this contract;
3) Verifying that Warranty is in place and in-progress;
4) Finalizing and implementing configuration control and product support for the system; and
5) Conducting a formal FSA meeting which records the facts that all elements of the SOW have been satisfactory completed and complied with, and all requirements of this Contract have been met.

8.2.1 Final Systems Acceptance Meeting

SAC-12 When the Purchaser considers that the deliverables are ready for Final System Acceptance (FSA), the Contractor shall conduct and support a Final System Acceptance (FSA) Meeting at the Purchaser's facilities unless otherwise agreed by both parties.

8.2.2 Final Systems Acceptance Documentation Package (FSA Report)

SAC-13 The Contractor shall prepare a Final Systems Acceptance (FSA) Documentation Package two (2) weeks prior to the Final System Acceptance (FSA) meeting stating why and how the system fulfil the contract requirements.

8.2.3 Final Systems Acceptance Meeting minutes

SAC-14 Within 2 weeks of the FSA meeting, The Contractor shall submit FSA meeting minutes to the Purchaser for review and comments before approval. The Purchaser shall have 2 weeks to review and comment the minutes before approval (FSA(s) to be completed as per SSS).

Appendix A Applicable and Reference Documents

A.1 Applicable Documents

A.1.1 Integrated Product Support

Doc Id.	Full document Name and Reference
[STANAG 4728]	System Life Cycle Management – Ed.2 (2015)
[AAP-20]	NATO Programme Management Framework (NATO Life Cycle Model) – Ed.C, Ver.1 (2015)
[AAP-48]	NATO System Life Cycle Processes – Ed.B, Ver.1 (2013)
[ALP-10]	NATO Guidance on Integrated Logistics Support for Multinational Armament Programmes – Ed.C, Ver.1 (2017)
[STANAG 4597]	Obsolescence management – Ed.2 (2010)
[STANAG 6001, Ed.5]	Language Proficiency Levels – Ed.5 (2014)
[STANAG 4280]	NATO Levels of Packaging - Ed.2 (1999)
[STANAG 4281]	NATO Standard Marking for Shipment and Storage - Ed.3 (2016)
[STANAG 4329]	NATO Standard Bar Code Symbologies – AAP-44(A) – Ed.4 (2010)
[AAP-44(A)]	NATO Standard Bar Code Handbook – (2010)

A.1.2 Configuration Management

Doc Id.	Full document Name and Reference
[STANAG 4427]	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)
[ISO 10007:2003]	Quality Management System – Guidelines for Configuration Management. Second edition, 2003.

A.1.3 Quality Management

Doc Id.	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.

Doc Id.	Full document Name and Reference
[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.4, 2019.
[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.
ISO 9000:2015	Quality management systems — Fundamentals and vocabulary
ISO 9001:2015	Ref. 001. Quality management systems — Requirements;

A.2 Reference Documents

A.2.1 Integrated Product Support

Doc Id.	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)
[IEC 61078:2016]	Reliability Block Diagrams
[IEC 60706-3:2006]	Maintainability of equipment - Part 3: Verification and collection, analysis and presentation of data
[IEC 60812:2018]	Failure modes and effects analysis (FMEA and FMECA)
[IEC 62550:2017]	Spare parts provisioning
[AIA/ASD SX000i]	International specification for Integrated Product Support (IPS) – Issue 3.0 (2021)

Doc Id.	Full document Name and Reference
[AIA/ASD S3000L]	International procedure specification for Logistics Support Analysis (LSA) – Issue 2.0 (2021)
[AIA/ASD S2000M]	International Specification for Material Management. Issue 7.0 (2021)
[AIA/ASD S1000D]	International Specification for Technical Publications. Issue 4.0.1 (2009)
[MIL-HDBK-338B]	Electronic Reliability Design Handbook
[MIL-STD-756B]	Reliability Modeling and Prediction
[MIL-HDBK-470A]	Designing and Developing Maintainable Products and Systems
[MIL–STD–1629A]	Procedures for performing a Failure Mode, Effects and Criticality Analysis
[Telcordia SR-332]	Reliability Prediction Procedure for Electronic Equipment
[HDBK-217Plus]	Reliability Prediction Models
[ANSI VITA51]	Reliability Prediction MIL-HDBK-217F2 Subsidiary Specification
[ASME Y14.44 - 2008]	Reference Designations for Electrical and Electronics Parts and Equipment
[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
[NATO C3 Taxonomy] Enclosure 1 to AC/322-D(2016)0017	“C3 Taxonomy Baseline 2.0”, 10 November 2015
[AI 16.31.10]	NCIA Agency Instruction – Spare parts provisioning
[AI 16.31.07]	NCIA Agency Instruction – Guidance Document (GD) for ASD-AIA-ATA S1000D Technical Publications, with the associated S1000D Issue 4.0.1 Business Rules Decision Points (BRDP) Index
[AI 16.31.12]	NCIA Agency Instruction – Writing Style Guide (WSG) for ASD/AIA/ATA S1000D Technical publications
[AI 16.31.13]	NCIA Agency Instruction – Illustration Style Guide (ISG) for ASD/AIA/ATA S1000D Technical publications

A.2.2 Configuration Management

Doc Id.	Full document Name and Reference
[SAE ANSI/EIA-649C]	Configuration Management Standard (2019-02-07)
[AI 16.32.04]	NCIA Agency Instruction – ABL Template
[AI 16.32.05]	NCIA Agency Instruction – PBL Template

Doc Id.	Full document Name and Reference
[AI 16.32.02]	NCIA Agency Instruction – Preparation of ECP forms and relevant annex
[AI 16.32.03]	NCIA Agency Instruction – Preparation of RfC forms and relevant annex

A.2.3 AFPL

[AFPL] Approved Fielded Product List.

A.2.4 Security

Doc Id.	Full document Name and Reference
[AC/322-D/0048-REV3 (INV)]	Technical and Implementation Directive on CIS Security

Appendix B Contract Documentation Requirements List

[1] The Contractual Data Requirements List (CDRL) contains the list of the documentation deliverables of this project. The CDRL will contribute to ensure that the project is properly administrated and the contractual, technical, and logistical requirements are met.

[2] The CDRL is provided in Table 8-2 next page.

[3] The Project Review Meeting calendar, listing the CDRL product subject of review at each PRM, is provided further below, in Appendix-C, Readiness of the CDRL products are entry conditions for the PRM to take place.

[4] All information delivered as a response to the CDRL will be identified as in Table 8-1 below.

Table 8-1 – CDRL metadata

ID	CDRL Object ID
CDRL Title	Title of part of breakdown / Description of the CDRL item.
SOW Reference	Reference section in the SOW

[5] All project documentation shall contain a version number appropriate to the major / minor concept (e.g. v1.0, v1.1, v1.2, v2.0, v3.0) where the first number represents a major release or significant change to the content while the second number represents a smaller change (e.g. spelling corrections, formatting or minor adjustments).

[6] Unless stated otherwise in this SOW, the Purchaser will provide comments in writing to the CDRL products within the two calendar weeks following their formal release, which is considered to be the point the product is uploaded to the portal.

[7] Comments will be uploaded to the portal, either in-line on the actual document, or in tabular form in a separate document. For those products released two weeks prior to a PRM (this mainly applies to the first 40 weeks of the contract, i.e. Stage 1), comments will be uploaded before the PRM, or will be briefed during the PRM itself.

[8] The delivery dates given in table are the dates that documents must be ready at the Purchaser. The Contractor shall ensure that the relevant document shall be ready latest by that date at the Purchaser.

[9] The terms “Draft” and “Final” are recurrently used in the CDRL, and are to be interpreted as follows:

1. The term “ Draft” means the deliverable of a document, with no sections or parts (partially) left empty;
2. The “Final Draft” shall be self-contained, ready for review and/or use by the Purchaser. Any further changes to the content of the “Final Draft” version, subsequently leading to a next issue of this document, shall solely be possible to be requested by the Purchaser (normally through a PRM). Prior to “Final Draft”, the Contractor is free to issue preliminary draft version(s) to the Purchaser for early feedback, although preliminary versions and feedback shall not have any legal or contractual status; and
3. The term “Final” means that the document has been extensively reviewed

through one or more intermediate releases (Draft and Final Drafts), it is complete and any changes to the document shall only take place in exceptional circumstances, upon request by the Purchaser.

Table 8-2 – MB-DSGT Project CDRL

CLIN	Description
1	**Project Management**
1.2	Project Management Plan (PMP)
1.3	Project Implementation Plan (PIP)
	Product Breakdown Structure (PBS)
	Project Work Breakdown Structure (PWBS)
	Project Master Schedule (PMS)
	Risk Management Plan (RMP)
	Issue Management Plan (IMP)
	Sytem Installation Plan (SIP)
1.4.2	Project Progress Reports
1.5.1	Documentation Plan
2	**Site Survey**
2.1.2	Site Survey Report – Reference Environment
2.2.2	Site Survey Report – Training Environment
3	**Design**
3.1.1	System Design Plan (SDP)
3.1.2	High Level Design Document (HLD)
3.1.3	Low Level Design Document (LLD)
3.2	**Conduct Configuration Capture**
3.2.1	Configuration Capture (CCAP) Plan
3.2.2	Configuration Capture (CCAP) Draft Report (incl. Interim)
3.2.4	Configuration Capture (CCAP) Final Report
3.3	**Conduct System Requirements Review (SRR)**
3.3.2	Draft System Requirements Review (SRR) Report
3.3.3	Final System Requirements Review (SRR) Report
4	**Implementation and Testing**
4.2.7	Quality Assurance Plan (QAP)
4.3.3	Provide System Documentation
4.4	Provisional System Acceptance (PSA)

CLIN	Description
	Deficiency Log
	Provision System Acceptance (PSA) Reports
	PSA Review Meeting Minutes
4.5	Operational Test and Evaluation (OpTEval)
	Maintain log book of events relevant to acceptance
4.6	Final System Acceptance (FSA)
	Final System Acceptance (FSA) Report
	Final System Acceptance (FSA) Observations Meeting Report
5	**Support Independent Verification and Validation Assessment**
5.1	**Request for Change Support**
5.1.3	Release Package for RFC
5.1.8	Security Test and Verification Report (STVR)
5.1.9	System Acceptance Testing (SAT)
7.6	Provide System Configuration Package
8.4	Training material
6	**Integrated Product Support**
6.1	Integrated Product Support Plan (IPSP)
6.2	Reliability Availability Maintainability Testability (RAMT) Case Report
6.3	Failure Mode Effects and Criticality Analysis (FMECA)
6.4	Maintenance Task Analysis (MTA)
6.5	Level of Repair Analysis (LORA) [incl. Repair Price List (RPL)]
6.6	Packaging, Handling, Storage and Transportation (PHST) Report
6.7	Initial Provisioning List (IPL)
6.8	Obsolescence Report
6.9	Warranty Report
6.10	Operation Manuals
6.11	Maintenance Manuals
6.12	Training Plan (TRNP)
7.1.1.1	Training documentation and Materials
7.1.1.2 – 7.1.1.5	Training Execution Reports

CLIN	Description
7.2	Training Needs Analysis (TNA)
6.14	In Service Support Plan (ISSP)
	In Service Support (ISS) Monthly Report
6.15	**Configuration Management**
6.15.1	Configuration Management Plan (CMP)
6.15.2	Functional Baseline (FBL)
6.15.3	Allocated Baseline (ABL)
6.15.4	Product Baseline (PBL)
6.15.5	Operational Baseline (OBL)
6.15.6	Configuration Management Database (CMDB)
6.15.7	Functional Configuration Audit (FCA) Report
6.15.8	Physical Configuration Audit (PCA) Report
6.16	**System Safety Programme Plan (SSPP)**
	Safety Case Report

Appendix C Project Meetings Calendar

Project Meetings Calendar to be provided by the Contractor after agreement with the Purchaser.

Appendix D Purchaser Furnished Property

Introduction

[10] The design, production, testing and acceptance phases shall include the integration of, and the interaction with, Purchaser Furnished Property (PFP) equipment.

[11] PFP is the general term used throughout this document. PFP includes Purchaser Furnished:

1) Equipment;
2) Software;
3) Information;
4) DBAC (baseband and modem equipment);
5) TSGT;
6) Satellite access (to NATO systems as required);
7) Legacy Modem Cases;
8) SMEs (Access to); and
9) Facilities (Access to Purchaser facilities as needed).

[12] PFP are considered

Staged and operated by the Purchaser, in the context of FAT, TVVA Assessment, SAT and OpTEval, for integration WITH the system delivered under this contract.

Integration with PFP

[13] Integration of the systems delivered under this Contract with PFP systems configured and operated by the Purchaser is required for verification of system-level interfaces, encompassing physical connectivity and end-to-end connectivity.

[14] System-level integration and verification of end-to-end connectivity with or over the following PFP systems shall be sought with the following:

1) Transportable Satellite Ground Terminals (TSGTs)
2) Legacy Modem Cases (Used with current DSGTs)

Documentation Templates

[15] For the documentation list see Chapter 6

Appendix E Maintenance and Support Concepts

E.1 Maintenance Concept and Maintenance Levels definition

E.1.1 Definitions

In accordance with [ASD SX000i], Maintenance is an activity that retains or restores a physical item to a specified condition or level of performance.

Training is linked to the Logistic Support Analysis (LSA) discipline through the Operational Task Analysis (OTA) and Maintenance Task Analysis (MTA), the former being determined by the Concept of Operation (CONOPS) and the latter being determined by the Maintenance Concept applicable to the specific product under acquisition.

A maintenance concept is a statement of maintenance considerations, constraints, and strategy for the operational support that governs the maintenance levels and type of maintenance activities to be carried out for the product under analysis. The maintenance concept is generated in the IPS element, "Maintenance".

The Maintenance concept, in turn, is derived from the Concept of Operations (CONOPS, see paragraph 6.4) and is a major driver in product design and support.

In accordance with [IEC 60050]:

1) Level of maintenance/maintenance level: set of maintenance actions to be carried out at a specified indenture level;
2) Indenture level: level of sub-division within a system hierarchy.

Maintenance, maintenance levels and maintenance tasks are product-related (linked to the system hierarchy[8]) and are defined in accordance with the complexity of the task, the required resources and tools, independently from the maintenance organization.

Maintenance supports (sustains) operation: any action required to restore the operation of a system or to ensure operational status can be maintained over time is a maintenance task; a maintenance task becomes a support task when it is associated to an organizational element of the support organization in charge of that task at the defined level.

Further definitions follow (IEC 60050):

1) Maintenance – (191-07-01): The combination of all technical and administrative actions, including supervision actions, intended to retain an item in, or restore it to, a state in which it can perform a required function.
2) Maintenance policy – (191-07-03): A description of the interrelationship between the maintenance echelons, the indenture levels and the levels of maintenance to be applied for the maintenance of an item.
3) Indenture level – (191-07-05): Level of sub-division within a system hierarchy from the point of view of a maintenance action. E.g.: System, subsystem, assembly, and component (see also MIL-HDBK-505). [Note: from the maintenance perspective, the indenture level depends upon various factors, including the complexity of the item's construction, the accessibility of sub items, skill level of maintenance personnel, test equipment facilities, and safety considerations.]

[8] The different types of systems' hierarchies (physical, functional, hybrid) are defined in [ASD S3000L] as Product Breakdown Structures (PBS).

4) Maintenance echelon or line of maintenance – (191-07-04): A position in an organization where specified levels of maintenance are to be carried out on an item.

5) Level of maintenance or maintenance level – (191-07-06): Set of maintenance actions to be carried out at a specified indenture level

E.1.2 Maintenance Concept

A Maintenance Concept is a definition of the maintenance objectives, line of maintenance, indenture levels, maintenance levels, maintenance support and their interrelationships.

A Maintenance Concept is applied for both HardWare (HW) and SoftWare (SW) and produces maintenance tasks that will be performed on site, at civil or military maintenance facilities, at industry (Original Equipment Manufacturer, Contractor) maintenance facilities.

The Maintenance Concept identifies who-does-what-at-what-level in accordance with the maintenance levels and definitions defined below.

Maintenance levels, indenture levels, maintenance echelons (etc.) are always product-related.

E.1.3 Maintenance echelon (line of maintenance)

A Maintenance echelon is the position in an organization where specified levels of maintenance are to be carried out. The line of maintenance is characterized by the skill level of the personnel, the facilities and tools provided, the location, etc.

Four (4) maintenance echelons are generally defined to ensure the highest possible availability of the Product.

1) Level 1: implies fast and easy activities on MSIs/MRIs (see [ASD S3000L]) performed on-site for preventative or corrective actions on the acquired System/Capability;
    a. Typology: without the need to remove the item from its existing installations on the Product;
    b. Accessibility: easy (e.g.: general visual inspection for hardware, launch of common routines or macros for software);
    c. Location: operating location (e.g. on-site, deployed location, on-ship);
    d. Tools: common hand tools and/or common test equipment;
    e. Facility: nil.
2) Level 2: implies more complex activities on MSIs/MRIs performed on-site including the replacement of modules using standard and special-to-type tools, BITE, limited troubleshooting on the acquired System/Capability;
    a. Typology: it may be necessary to remove the item from its existing installation on the Product;
    b. Accessibility: may be difficult (e.g.: rear access or tight plug and unplug for hardware, backup and restore for software);
    c. Location: operating location (e.g. on-site, deployed location, on-ship);
    d. Tools: common hand tools, common support equipment, and/or peculiar support equipment;

e. Facility: nil

3) Level 3: implies the repair of subassemblies, modules and MSIs/MRIs after their replacement at maintenance Level 1 and Level 2; testing on test-benches or integration tests can be included. This maintenance level can be performed either on product (e.g. on-site) or at specific repair shops/facilities (off-site);

   a. Typology: it is necessary to remove an item from its existing installation on the Product;

   b. Accessibility: item dismounted from its existing installation on the Product and available for any kind of manipulation;

   c. Location: NATO maintenance location that may be either located or not located in proximity of the operating location;

   d. Tools: as required by the NATO maintenance location;

   e. Facility: specialized repair shop, software reference systems, etc

4) Level 4: includes repairs and overhaul activities beyond Level 1 to Level 3 capabilities (e.g.: repair of subassemblies, modules and MSIs/MRIs after their replacement at maintenance Level 1 to Level 3; major modifications to improve the design and/or operational activities will be prepared and, if necessary, embodied at this level). Level 4 is always off-site (generally at OEMs facilities).

   a. Typology: it is necessary to remove an item from its existing installation on the Product;

   b. Accessibility: item dismounted from its existing installation on the Product and available for any kind of manipulation;

   c. Location: Contractor/OEM maintenance location located at Industry premises;

   d. Tools: as required by the Contractor/OEM maintenance location;

   e. Facility: repair centre, software development laboratory, etc.

While performing the Maintenance Task Analysis (MTA), each maintenance task shall be analysed to determine the echelon at which the task shall be performed.

E.1.4 Hardware Maintenance

Hardware maintenance is generally categorised/grouped as follows

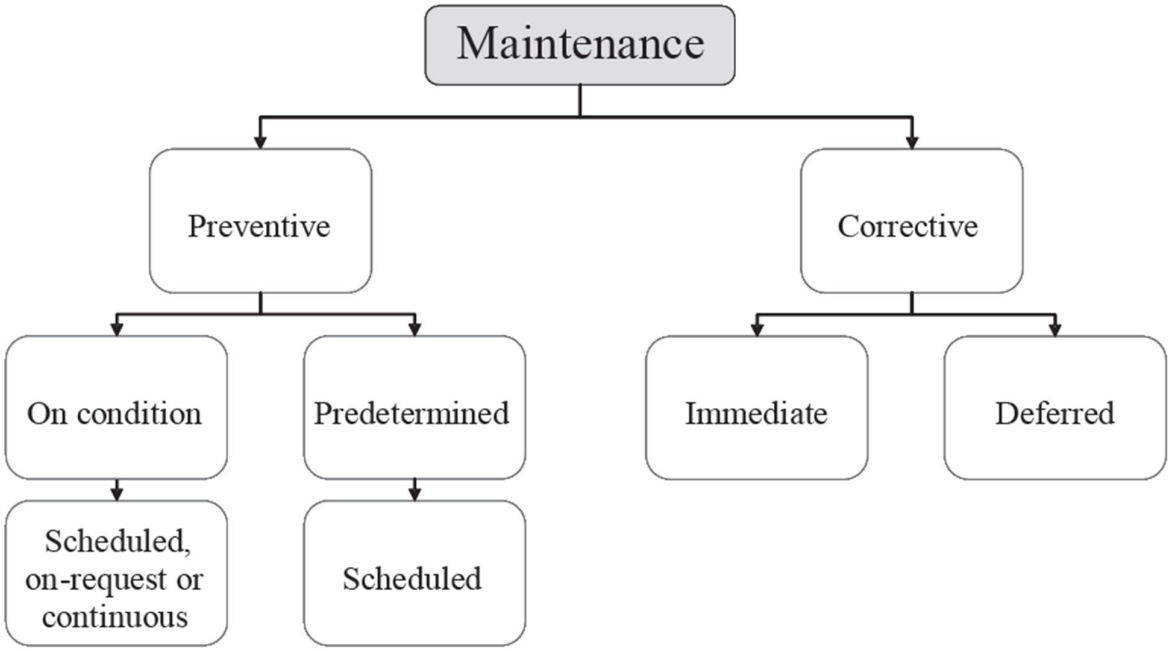

Figure E1 – Maintenance types (source: EN 13306:2001)

1) Preventative/Scheduled (HW maintenance):
    a. On-condition: maintenance carried out to mitigate degradation and reduce the probability of failure after analysis of system conditions through defined indicators assessed on a periodic basis.
    b. Scheduled (planned): maintenance carried out on a periodic basis (time-related or number-of-occurrences-related).
2) Corrective/Unscheduled (HW maintenance):
    a. Run-to-failure: maintenance carried out to perform a Remove & Replace action of a faulty item affecting system operation (critical failure). The action is done as soon as all the resources (skills, tools and spares) are available to minimise the System downtime.
    b. Deferred: maintenance carried out to perform a Remove & Replace action of a faulty item not affecting system operation. It is done in a time slot that does not further impact the Operational Availability (e.g. during a schedules maintenance downtime period) or on “live” equipment if this is possible (e.g. when active redundancy or hot stand-by are implemented).

The hardware maintenance is classified in four levels generally known as HL1, HL2 HL3 and HL4.

1) **Hardware Organizational Maintenance Level 1 (HL1)** is Hardware maintenance capable of being carried out:
    a. On-site;
    b. By relatively low technical skill level personnel performing preventive maintenance, and replacing LRUs and IIs on the basis of diagnostic outputs;

c. Using BIT systems for start-up and on-line diagnostics, by referring to main equipment TM;

d. No Special Tools and Test Equipment (TTE) are envisioned to be used;

e. Typical tasks will include visual inspection, preventative maintenance tasks, manual reconfiguration if necessary, external adjustments, removal and replacement of LRUs/IIs;

f. Includes system failure recovery by the application of simple on-line diagnostics or technician initiated restart of the system and the use of off-line diagnostics which do not require external test module support;

g. By generation of equipment failure reports, supply requisitions and other pertinent maintenance and supply records.

2) **Hardware Organizational Maintenance Level 2 (HL2)** is Hardware maintenance capable of being carried out:

a. On-site;

b. By higher technical skill level personnel performing preventive maintenance and replacing LRUs and IIs on the basis of diagnostic outputs;

c. Using BIT systems for start-up and on-line diagnostics, simple TTE (standard and special-to-type) in addition to BIT as a means for on-line and off-line diagnostics, and by referring to main equipment TMs to perform exhaustive fault isolation;

d. Simple either commercial or special-to-type TTE are envisioned to be used (e.g.: screwdrivers, multi-meters, oscilloscope, adapters, peculiar support equipment);

e. Where the fault is beyond the capabilities of HL1 technical support, HL2 activities will be performed by Support Site personnel (through on-site intervention);

f. Where remote fault management is not feasible, technicians from the host site will travel to the remote site hand carrying relevant spares to perform maintenance tasks;

g. By generation of equipment failure reports, supply requisitions and other pertinent maintenance and supply records.

3) **Hardware Intermediate Maintenance Level 3 (HL3)** is Hardware maintenance capable of being carried out:

a. At maintenance facilities and through technical support and assistance or on-site intervention/work by maintenance personnel with skills enabling tasks to be accomplished within the relevant technologies;

b. By higher technical skill level personnel performing:

i. Repairing, testing and calibrating LRU, Shop Replaceable Units (SRU) and Secondary Spare Parts (SSP);

ii. On-site investigations and major scheduled servicing/overhaul, detailed inspection, major equipment repair, major equipment modification, complicated adjustments, system/equipment testing;

iii. Failure trend analysis including reporting to relevant Purchaser authorities and Post Design Services (PDS);

iv. Repair tasks will be performed using Automatic Test Equipment (ATE), general purpose and special-to-type TTE, calibration equipment, any applicable support software, and the necessary equipment TMs and a Technical Data Package (TDP);

v. Where the fault is beyond the capabilities of HL1/2 technical support, HL3 activities will be performed by support site personnel (through on-site intervention) or by the Contractor, depending on the maintenance concept;

vi. It includes generation of equipment failure reports, supply requisitions and other pertinent maintenance and supply records.

4) **Hardware Depot Maintenance Level 4 (HL4)** is Hardware maintenance capable of being carried out:

a. At maintenance facilities (industry or military, original equipment manufacturers) and through technical support and assistance or on-site intervention/work by maintenance personnel with skills enabling tasks to be accomplished within the relevant technologies;

b. Where the fault is beyond the capabilities of HL1-3 technical support, HL4 activities will be performed by the Contractor;

c. It includes generation of equipment failure reports, supply requisitions and other pertinent maintenance and supply records.

E.1.5 Software Maintenance

The software maintenance is a task for the purposes of software fault removal, adaptation to a new environment, or improvement of performance.

The software maintenance for the purposes of software fault avoidance, identification and/or removal can be:

1) **Preventative/Scheduled (SW maintenance)**: it refers to tasks necessitated for detecting potential errors in a software product or anticipate and avoid potential failures (daily checks, DBs clean up/integrity checks, cache cleaning, rebooting/restarting etc.). The task can lead, if latent failures are discovered, to a modification of a software product after delivery to detect and correct latent faults in the software product before they become effective faults (leading to a deferred corrective action).

2) **Corrective/Unscheduled (SW maintenance)**: it refers to tasks necessitated by actual errors in a software product. If the software product does not meet its requirements, corrective maintenance is performed. It is a Reactive modification of a software product performed after a new version is made available (patch/update) to correct the discovered problem(s). This activity is linked to Configuration Management, change management (contractor initiated Engineering Change Proposals - ECP), new SW release(s) and Product baseline (PBL) change.

The software maintenance for the purposes of software adaptation to a new environment, or improvement of performance is a software change that enhances the software product. These changes are those that were not in the original design specifications or in the originally released software and are subject to purchaser initiated ECP:

1) **Adaptive maintenance**: software maintenance for the purposes of adaptation to a new environment (e.g.: a new environment could be a new type of hardware or a new operating system on which the software is to be run). Adaptive refers to a change necessary to accommodate a changing environment. Adaptive changes include changes to implement new system interface requirements, new system requirements, or new hardware requirements. This is a modification of a software product performed after delivery to keep a software product usable in a changed or changing environment.

2) **Perfective maintenance**: software maintenance performed to improve the performance, maintainability, or other attributes of a computer program (e.g.: maintenance that adds new required functions is often referred to as enhancement). Perfective refers to a change that improves the software product's performance. A perfective change might entail providing new functionality improvements for users or reverse engineering to create maintenance documentation that did not exist previously or to change existing documentation. This is a modification of a software product after delivery to improve performance or maintainability.

The software maintenance is classified in four levels generally known as SL1, SL2 SL3 and SL4.

1) Software Organizational Maintenance Level 1 (SL1) is software maintenance carried out with the same characteristics highlighted for HL1. SL1 are those functions/tasks in support of the on-site software that are within the capabilities of site maintenance personnel. This includes software failure recovery by the application of simple diagnostics, or site maintenance personnel initiated restart.

2) Software Organizational Maintenance Level 2 (SL2) is software maintenance carried out with the same characteristics highlighted for HL2. E.g.: software settings, simple software customizations (per site/instance), software reloading/installation with automated or detailed procedures reported in the TMs, execution of scripts, and management of users/profiles. SL2 are those functions/tasks in support of the on-site software that are within the capabilities of a System Administrator.

3) Software Intermediate Maintenance Level 3 (SL3) is software maintenance carried out with the same characteristics highlighted for HL3. E.g.: software/firmware fine tuning (per site/instance), software/firmware bugs recording and reporting, software/firmware troubleshooting including Operating Systems. SL3 (on-site intervention) comprises those functions/tasks in support of the on-site software that require specialist intervention (software System architects, SW programmers, experienced Systems' Administrators, Network specialists). The tasks can be performed either by software personnel visiting the site or by remote diagnostics if enabled by the product.

4) Software Depot Maintenance Level 4 (SL4) is software maintenance carried out with the same characteristics highlighted for HL4. E.g. software/firmware debugging, re-coding and testing (both in simulated and emulated environments), software/firmware patches creation and deployment. The tasks can be performed by software engineers in properly configured environments (software development and testing facilities) under strict Configuration Control.

a) HL and SL are generally combined for HW intensive systems: when HW maintenance is required and SW shall be reloaded/set on replaced MSI/MRI, the maintenance level associated to the HW (HL) is also associated to the relevant SW (SL) and the activities are combined, detailed in the TMs and associated to the same personnel in the Support organization.

E.2 Support Concept and Support Levels definition

E.2.1 Definitions

The Support Concept is linked to the Maintenance concept and operation under the constraints dictated by the support organization (e.g. how NCI Agency is organised).

Maintenance concept	Support Concept	Product Support
Product related	Maintenance organization related	Project related
Level of maintenance (HW and SW)	Level of support	Maintenance policy
HL1-4 / SL1-4	*tipically* LoS1-4	
Complexity of the maintenance task related to actions of different technical complexity	Roles and responsibilities of the different support stakeholders	Maintenance levels carried out at different positions of the maintenance organization

The support concept is organization-related operation and maintenance: support and support levels indicate the different roles, skills and tools and the escalation process in place in an organization.

The interrelationship between the support levels/activities (maintenance organization-related) and the maintenance levels/activities (product-related) to be applied for the maintenance of each item into the system is the maintenance policy.

When capabilities are procured, the Contractor is able to design, develop and deliver the relevant system and apportion the maintenance tasks in accordance with their inherent complexity and in accordance with the maintenance concept; this apportionment, driven by the NCI Agency provided maintenance concept, shall then be allocated to NCI Agency support organizational elements.

If the Support Levels are not fully mapped/linked with the Maintenance Levels (e.g. the Contractor provided Maintenance Task Analysis), then “what shall be done by whom” in NCI Agency organization will be unknown.

The allocation of maintenance tasks to the support tasks (and therefore to the support organization at different levels of responsibility) is partially done by the contractor but shall be under the NCI Agency coordination among the main stakeholders involved in the delivery of training services.

Contractors generally define, tailor (design), develop and implement/deliver capabilities based on industry standards and eventually by customising products they have already in their catalogues: the “general” maintenance and operation activities are linked to the complexity of the capability and to the main functions such capability can deliver, therefore Industry is linked to Maintenance and Operation and not to Support and Use.

Being IPS product related, all the aspects relevant to support training (support organization related) will be defined jointly with other NCI Agency organizational elements (e.g. NCI Academy, NCIA Centres) in order to correctly allocate the maintenance tasks to the right support organization teams.

Further definitions follow [IEC 60050]:

1) Support Concept – a description that provides general considerations, constraints, and plans for interim and long-term sustainment of the item under analysis. The support concept is generated in the IPS element, "Product Support Management".

2) Maintenance support performance (execution of support) – 191-02-08: the ability of a maintenance organization, under given conditions, to provide upon demand, the resources required to maintain an item, under a given maintenance policy. [Note: the given conditions are related to the item itself and to the conditions under which the item is used and maintained.]

E.2.2 Support concept

A Support Concept is a definition of the support objectives (scenarios) in relation with maintenance levels, maintenance support and their interrelationships.

The support concept has the scope to translate the product-centric complexity, constraints and limitations into a fully sustainable support organization and System/Capability.

For specific “products”, support organizations might be quite similar if defined and developed following known frameworks (e.g. ITIL) or standards (e.g. ISO 20000); however, support organizations might be quite heterogeneous if the systems/capabilities to be maintained (supported) are of different types (e.g. encompassing the full C4ISR products family).

In addition, even applying consolidated support concepts based on pre-defined support levels, what shall be done in any case is the mapping of the organizational support teams to the support levels that, in turn, shall be mapped with the maintenance levels (see Annex A).

What follows below defines the support levels in accordance with ITIL V.3 framework and ISO 20000 and applies to NCI Agency for IT-intensive (centric) products.

There are four support levels and a level zero performed by the users that normally initiate the troubleshooting for the corrective maintenance.

1) **First level support** (on-site, non-specialised):

a) It consists of simple routine administration and activities. This level is user facing and is the first line of technical support. A single point of contact inside the NCI Agency central Service Desk is provided to

customers for the implemented services. The Service Desk will log, categorise, prioritise, diagnose and resolve incidents within the boundaries of their training and permissions. The pertinent NCI Agency CIS Support Units (CSUs) carry out this level of support, in coordination with the NCI Agency Centralised Service Desk.

b) The 1st Level Support Process implements the Incident Management process in accordance with the ISO/IEC 20000 and ITIL framework or equivalent;

c) As part of the Incident Management, the Service Desk receives the issue from the user, puts it into a standard format (Trouble Ticket, TT), performs an initial assessment and distributes it to the predefined actors to solve it.

2) **Second level support** (centralised)

a) It provides escalated technical support to incident investigation and diagnosis. This level delivers advanced expertise to process services related to centralised system operations, fault isolation, system administration, management of maintenance services, system configuration, including reconfiguration of data sources and data connectivity to restore operations, assistance to first level and on-site support. This level performs end-to-end service monitoring and takes actions to resolve the incident and recover the services impacted.

b) The 2nd Level Support Process implements the Problem Management process in accordance with the ISO/IEC 20000 and ITIL framework or equivalent;

c) The Problem Management process receives the TT from the Service Desk and performs the following tasks:

d) Re-evaluation of TT category, criticality and priority,

e) Identification of the root cause of the issue (e.g. by issue replication testing),

f) Identification of workarounds,

g) Identification and initial planning of possible short, medium and long-term solutions (e.g. Workarounds, Patches, or new Baseline or CI Releases),

h) Create Problem Analysis Report and Change Request (CR) incl. schedule of implementation, and synchronisation with the Baseline Maintenance process;

i) Presentation of the Problem Analysis Report and CR to the Change Control Board (CCB) for approval,

j) Monitor and Control the approved CR during implementation,

k) Trigger 3rd Level Support and/or 3rd Level Maintenance process to implement the CR;

l) Perform the post- CR implementation review.

3) **Third level support** (centralised)

a) consists of central service management, central problem isolation and resolution, system-level maintenance, local repairs or spares provision, and management of deficiencies and warranty cases, beyond the capability of the second level support.

b) The 3rd Level Support Process implements the Deployment and Release Management process in accordance with the ISO/IEC 20000 and ITIL framework or equivalent.

c) The Deployment and Release Management process receives the approved Change Request from the 2nd Level Support and performs the following tasks:

d) Release of the solution (release unit/record)

e) Development of the solution (e.g. new CI Fix, Repair, Replacement, Patch, or Release),

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

g) Update of Baseline content and status,

h) Delivery and deployment of the solution.

4) **Fourth level support** (OEM/vendor)

b) It consists of off-site factory/vendor problem resolution and maintenance, beyond the capability of third level support.

E.3 Maintenance policy

NCIA and the contractor will contribute to the following mapping to correlate the support levels/activities (maintenance organization-related) and the maintenance levels/activities (product-related) to be applied for the maintenance of each item.

Table 8-3 – Maintenance vs support Mapping

System name:		[SystemName]	Support					Use
			Level 1 (L1S)	Level 2 (L2S)	Level 3 (L3S)	Level 4 (L4S)		
			Junior Tech	Senior tech	Sys Admin	OEM		
Operation								
Maintenance	Level 1	Hardware Level 1 (HL1M)						
		Software Level 1 (SL1M)						
	Level 2	Hardware Level 2 (HL2M)						
		Software Level 2 (SL2M)						
	Level 3	Hardware Level 3 (HL3M)						

		Software Level 3 (SL3M)						
	Level 4	Hardware Level 4 (HL4M)						
		Software Level 4 (SL4M)						

E.3.1 Operation and operators

In accordance with (IEC 60050), operation is the combination of all technical and administrative actions intended to enable an item to perform a required function, recognizing necessary adaptation to changes in external conditions.

To this extent operation is an enabling function and not a restoration function (is it not maintenance); in addition operation focuses on the (system/capability) required functions in a changing “environment” therefore it is intended to act on such functions by enabling, disabling, tuning, tweaking, optimising, changing and adapting such functions if and when required to answer, for example, to service demand changes.

So, in general, an operator (implementing the operation role) ensures that a capability is properly delivering its functions by monitoring, controlling, responding and setting the system in accordance with the required functions and current conditions.

In certain organizations (especially IT), this role is often associated to systems Administrators but generally a SysAdmin role is different and falls in the maintenance domain and not in the operation domain: a SysAdmin is able to administer the System and not (necessarily) to work on its functions.

Example: for a Surveillance Radar, the operator is the role responsible for enabling/disabling sectors, changing thresholds, changing operational modes etc. using an operator console (most of the times remoted w.r.t the Radar) where all the functions of the radar can be modified and optimised.

The system/capability operator is quite different from the system/capability user as well. The user benefits (directly or indirectly) from the functions delivered by the capability but is not an operator and might not know anything about the system functions optimization.

Being IPS product related, all the aspects relevant to operators training (system functions related) will be defined jointly with other NCI Agency organizational elements (e.g. NCI Academy, NCI Agency Centres).

E.3.2 Users and users’ needs

Although apparently linked to operators, the main document describing the users’ needs is the CONOPS (Concept of Operations).

A CONOPS "describes the proposed system in terms of the user needs it will fulfil, its relationship to existing systems or procedures, and the ways it will be used. CONOPS can be tailored for many purposes, for example, to obtain consensus among the acquirer, developers, supporters, and user agencies on the operational concept of a proposed system. Additionally, a CONOPS may focus on communicating the user's needs to the developer or the developer's ideas to the user and other interested parties” [Data Item Description DI-IPSC-81430].

CONOPS are complex documents that shall describe one or more systems composing one or more capabilities, their mission, operational scenario, interfaces, constraints, functionalities, quality elements, support organization associated to maintenance concept etc.

Not always a CONOPS is available or can be provided to contractors or is worth to be used by contractors for certain systems (or part of): in these cases, the contractual documents shall either provide an excerpt of the CONOPS or describe the essential elements required by the Contractors for building the right system (fit for use) and not only the system right (fit for purpose).

It shall be noted that there is a clear line of demarcation between operators and users: users are those elements in an organization that take benefit from the services delivered by the capability or benefit from its functions.

Example: for a Surveillance Radar, the Users are the Air Traffic Controllers (ATC) that generally have no knowledge about Radar Operation (e.g. how to set different radar modes, enable/disable functionalities etc.) or Radar maintenance or support.

Being IPS product related, all the aspects relevant to users′ training (doctrinal) will be left to other NCI Agency organizational elements (e.g. NCI Academy).

Appendix F Key Personnel Requirements

[1] Table below lists the key personnel and required certification experience to be met. In exceptional circumstances, extensive relevance experience may be considered in lue of official certificates.

No.	Key Personnel	Requirements
1	Project Manager	Responsible for project management, performance and completion of tasks and delivery orders. Establishes and monitors project plans and schedules and has full authority to allocate resources to insure that the established and agreed upon plans and schedules are met. Manages costs, technical work, project risks, quality, and corporate performance. Manages the development of designs and prototypes, test and acceptance criteria, and implementation plans. Establishes and maintains contact with Purchaser, Subcontractors, and project team members. Provides administrative oversight, handles contractual matters and serves as a liaison between the Purchaser and corporate management. Ensures that all activities conform to the terms and conditions of the Contract and Work Package procedures.
1.1	Certification	Degree in management, engineering, or business administration. Formal certification through Project Management Institute or equivalent source.
1.2	Experience	At least seven years in communication and information systems design and project management. At least two years as the project manager for an effort of similar scope, preferably including the application of a formal project management methodology such as PRINCE2.
2	Technical Lead	Performs complex engineering tasks and multiple tasks simultaneously. Assists with or plans major research and engineering tasks or programs of high complexity. Directs and co-ordinates all activities necessary to complete a major, complex engineering program or multiple smaller tasks or programs. Performs advanced engineering research, hardware or software development.
2.1	Certification	Degree in engineering
2.2	Experience	At least seven years in engineering positions associated with the review, design, development, evaluation, planning and operation of electrical or electronic components, subsystems, or systems for government or commercial use. Member of recognised professional body.

No.	Key Personnel	Requirements
3	Test Director	Directs test planning, design and tools selection. Establishes guidelines for test procedures and reports. Co-ordinates with Purchaser on test support requirements and manages Contractor test resources.
3.1	Certification	Degree in engineering.
3.2	Experience	At least seven years in the design and execution of information systems tests.
4	IPS Manager	Provides support in the development of support documentation to include as a minimum, elements such as support equipment, technical orders, supply support and computer resources support, process of evolving and establishing maintenance/support concepts. Creates and helps execute plans for the Integrated Product Support (IPS) of complex systems. Analyses adequacy and effectiveness of current and proposed logistics support provisions. Supervises the efforts of other logistics personnel in the execution of assigned tasks.
4.1	Certification	Degree.
4.2	Experience	At least seven years in supply and support of information systems. At least five years in support of distributed systems in more than one NATO nation and in international shipping
5	Training Manager	Conducts the research necessary to identify training needs based on performance objectives and existing skill sets; prepares training strategies and delivery methodology analyses; and prepares cost/benefit analyses for training facilities and deliverables. Develops training delivery plan, instructional guidelines, and performance standards and assessment mechanisms. Plans and directs the work of training material developers and coordinates activities with system development staff. Supervises the implementation and adaptation of training products to customer requirements. Conducts the research necessary to develop and revise training courses and prepares training plans. Develops instructor (course outline, background material, and training aids) and student materials (course manuals, workbooks, handouts, completion certificates, and course feedback forms). Trains personnel by conducting formal classroom courses, workshops, seminars, and/or computer based/computer-aided training. Provides daily supervision and direction to staff.
5.1	Certification	Degree.
6.2	Experience	At least three years in the design and development of training for information systems using an Instructional Systems Design approach

No.	Key Personnel	Requirements
		such as the Systems Approach to Training, Performance-Based Training, Analysis, Design, Development, Implementation, and Evaluation (ADDIE), or Criterion Referenced Instruction.
7	Configuration Manager	Establishes and maintains a process for tracking the life cycle development of system design, integration, test, training, and support efforts. Maintains continuity of products while ensuring conformity to Purchaser requirements and commercial standards. Establishes configuration control forms and database.
7.1	Certification	Degree.
7.2	Experience	At least five years experience in specifying configuration management requirements, standards, and evaluation criteria in acquisition documents, and in performing configuration identification, control, status accounting, and audits. At least three years in computer and communication systems development, including physical and functional audits and software evaluation, testing and integration.

Appendix G List of Acronyms

Acronym	Description
ACMP	Allied Configuration Management Publication
ABL	Allocated Baseline
AFPL	Approved Fielded Product List
AHM	Ad-hoc Working Meetings
Ai	Availability intrinsic
Ao	Availability operational
AIL	Action Item List
AQAP	Allied Quality Assurance Publication
BITE	Built In Test Equipment
CAB	Change Advisory Board
CAGE	a Commercial and Government Entity (CAGE) Code
CCAP	Configuration Capture
CCB	Configuration/Change Control Board
CCD	Course Control Documentation
CCT	Configuration Capture Team
CDR	Critical Design Review
CDRL	Contract Data Requirement List
CIS	Communications and Information System
CLIN	Contract Line Item
CLS	Contractor Logistics Support
CMDB	Corfiguration Management DataBase
CMP	Configuration Management Plan
CMS	Configuration Management System
COI	Community of Interest
COTS	Commercial Off The Shelf
CSA	Configuration Status Accounting
CSCI	Computer Software Configuration Items
CSR	Configuration Status Report
CSSC	CIS Sustainment Support Centre

Acronym	Description
DCIS	Deployable Communications and Information System
DCM	Deployable CIS Module
DIF	Difficulty, Importance and Frequency (DIF) analysis
DSGT	Deployable Satellite Ground Terminal
ECP	Engineering Change Procedure
ECU	Environmental Control Unit
EDC	Effective Date of Contract
EEC	European Economic Community
EMC	Electro Magnetic Compatibility
EMI	Electro Magementic Interference
ESE	Electronic Security Environment
ESECS	Electronic Security Environment (ESE) Conformatnce Statement
EULA	End User Licence Agreement
FAS	Functional Area Systems
FAT	Factory Acceptance Testing
FBL	Functional Baseline
FCA	Functional Configuration Audit
FDR	Final Design Review
FMECA	Failure Mode, Effects and Criticallity Analysis
FSA	Final System Acceptance
FSP	Forward Support Points
GQA	Government Quality Assurance
HLD	High-Level Design
IEC	International statndard from the International Electrotechnical Commission
IEEE	Institute of Electric and Electronic Engineers
ILS	Integrated Logistic Support
IPSP	Integrated Product Support Plan
IPS	Integrated Product Support
IPSP	Integrated Product Support Plan
ISO	International Organisation for Standardisation
ISS	In-Service Support

Acronym	Description
ISSP	In-Service Support Plan
ITSM	IT Service Management
KOM	Kick-Off Meeting
KPI	Key Performance Indicator
LBS	Logistics Breakdown Structure
LLD	Low Level Design
LORA	Level Of Repair Analysis
LOS	Line of Sight
LRU	Line-Replaceable Unit
LSA	Logistic Support Analysis
MIL	Military
MJO	Major joint Operation
MLPP	Muilti-Level Precedence Pre-emption
MSI	Maintenance Significant Items
MTBCF	Mean Time Between Critical Failures
MTBF	Mean Time Between Failures
MTTR	Mean Time To Restore
MTTRS	Mean Time To Restore Service
NATO	North Atlantic Treaty Organization
NBD	Next Business Day
NCI	NATO Communications Infrastructure
NCIA	NATO Communications and Information Agency
NCISG	NATO CIS Group
NQAR	NATO Quality Assurance Representative
NRF	NATO Response Force
NSB	NATO Signal Battalion
NSN	NATO Stock Number
OAC	Operational Acceptance Criteria
OBL	Operational Baseline
OCR	Optical Character Recognition
OEM	Original Equipment Manufacturer

Acronym	Description
OPE	Operational Planning Environment
OPER	Operational
OSS	Open Source Software
PBL	Product Baseline
PBS	Project Breakdown Structure
PCA	Physical Configuration Audit
PDR	Preliminary Design Review
PFE	Purchaser Furnished Equipment
PFP	Purchaser Furnished Property
PFS	Purchaser Furnished Software
PHST	Packaging, Handling, Storage, and Transportation
PIP	Project 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
POP	Point of Presence
PRM	Project Review Meeting
PRT	Portugal
PSA	Provisional Site Acceptance
PWBS	Project Work Break-down Structure
QAP	Quality Assurance Plan
QAR	Quality Assurance Representative
RAMT	Reliability, Availability, Maintainability and Testability
RBD	Reliability Block Diagram
REF	Reference
RFC	Request For Change
RFD/W	Request for Deviation/Waiver
RMA	Reliability, Maintainability and Availability

Acronym	Description
RMP	Risk Management Plan
RSPL	Recommended Spare Parts List
RTM	Requirements Traceability Matrix
SAE	Society of Automative Engineers
SAT	Site/System Acceptance Testing
SATCOM	Satellite Communications
SGS	Satellite Ground Station
SGT	Satellite Ground Terminal
SIT	System Integration Testing
SIVP	Security Implementation Verification Procedures
SJO	Small Joint Operations
SME	Subject Matter Expert
SOW	Statement of Work
SRD	Security Related Documentation
SRR	System Requirements Review
SRS	System Requirements Statement
SRU	Shop Replaceable Unit
SSHAR	System Safety Hazard Analysis Report
SSPP	System Safety Program Plan
SSR	Site Survey Report
SSS	Schedule of Supplies and Service
STANAG	Standardization Agreement
STD	Standard
STVP	Security Test and Verification Plan
STVR	Security Test and Verification Report
SWDL	Software Distribution List
TNA	Training Needs Analysis
TRR	Test Readiness Review
TSGT	Transportable Satellite Ground Terminal
TVVA	Test, Verification, Validation and Assurance
UAT	User Acceptance Testing

Acronym	Description
UPS	Uninterruptable Power Supply
USA	United States of America
VCRM	Verification Cross Reference Matrix
VLAN	Virtual Local Area Network
VTC	Video Teleconference
XLS	Microsoft Excel file format
ZIP	File compression format


NCI
AGENCY

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

IFB-CO-115415-DSGT

AMENDMENT 2

PROVIDE MULTI-BAND DEPLOYABLE SATELLITE GROUND TERMINALS (MB-DSGT) POOL

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 a multi band (X and military Ka) Deployable Satellite Ground Terminal (DSGT) further referred to as MB-DSGT.

[2] The MB-DSGT will support the provision of :

1) NATO forces Beyond Line-of-Sight transmission capability to interconnect NATO deployed Headquarters;
2) A reach-back transmission capability to the Static Headquarters.

[3] The main purpose of the MB-DSGT is, jointly with third party baseband and modem equipment referred to as Deployable Baseband Augmentation Component (DBAC) provided as Purchaser Furnished Property (PFP), to interconnect Deployable CIS (DCIS) points of presence and the NATO infrastructure networks via military satellite communications in X and Ka band.

1.1 Employment Scenarios

[4] There are 5 different scenarios and system configurations where the MB-DSGT will be deployed.

[5] Figure 1-1 shows the first configuration of MB-DSGT with DBAC (providing baseband capability, including modem and remote control & monitoring) supporting DCIS as a standalone terminal:

Figure 1-1 MB-DSGT Employment Scenario 1

[6] Figure 1-2 below shows the second configuration of MB-DSGT with DBAC for RF and baseband capacity augmentation of the TSGT:

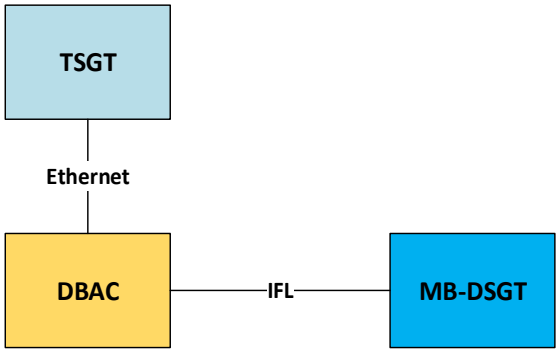


Figure 1-2 MB-DSGT Employment Scenario 2

[7] Figure 1-3 below shows the third configuration of MB-DSGT without DBAC for RF capacity augmentation of the TSGT:

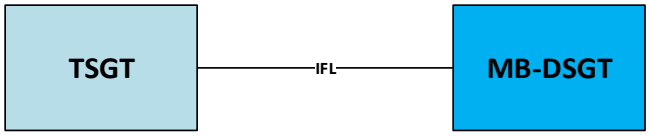


Figure 1-3 MB-DSGT Employment Scenario 3

[8] Figure 1-4 shows the fourth configuration of two MB-DSGTs without DBAC for RF capacity augmentation of the TSGT:

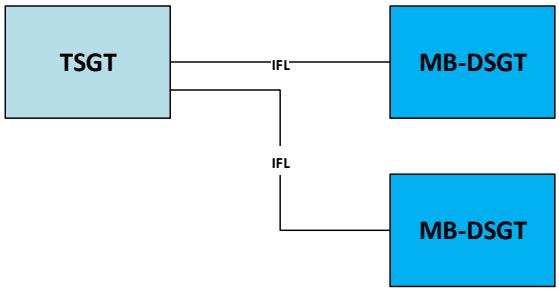


Figure 1-4 MB-DSGT Employment Scenario 4

[9] Figure 1-5 shows the fifth configuration of MB-DSGTs with the existing legacy modem cases currently in use by existing legacy DSGTs:

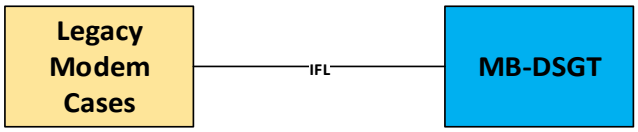


Figure 1-5 MB-DSGT Employment Scenario 5

1.2 Conventions

[10] Requirements are numbered as SRS-#. Informational text is numbered as [###].

[11] 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.

[12] Information and requirements contained under a “General” heading are applicable to all the elements covered by the corresponding section.

[13] Requirements are provided at both system-level and subsystem-level. The Contractor shall adhere to these requirements when preparing the Design specification and description.

[14] 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.

[15] The term "including" as used throughout this Annex is never meant to be limiting - the list that follows is always non-exhaustive.

[16] 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.

[17] The use of the term “notional” is to be interpreted as guidance only.

2 SYSTEM OVERVIEW

[18] The MB-DSGT has the following basic and supportive functions, to be achieved with the performance stated throughout this document:

1) Transmission function
2) Reception function
3) Monitoring and Control function
4) Antenna Control and Tracking function
5) Time and Frequency reference provision
6) Interfacility over Fiber Link (IFoFL) provision (with PFP such as DBAC, TSGT, legacy modem cases)
7) Support to maintenance and testing
8) Power Distribution
9) Environmental and climatic protection of the equipment

[19] The MB-DSGT in the scope of this project includes the following functional elements, in accordance with the Schedule of Supplies and Services (SSS) of Statement of Work (SOW):

1) Antenna subsystem
   a. Reflector and Feed including Filters, OMT(Ortho Mode Transducer)
   b. Antenna positioning (pointing and tracking)
   c. Antenna Control Unit (ACU) and Beacon Receiver
   d. Mechanics and support structure
2) RF components (1 for each frequency band)
   a. Transmit and receive chain amplifiers
   b. Up/down frequency converters (could be combined with transmit and receive amplifiers, respectively)
   c. Other RF components such as (not limited to) splitters, combiners
3) Interfacility over Fiber Link (IFoFL), including
   a. An “outdoor unit”, next to the RF part of the MB-DSGT
   b. An “indoor unit” which will be connected to the PFP housing the modem and baseband equipment and from where the MB-DSGT will be monitored and controlled
4) Monitor and Control laptop for local operation of the MB-DSGT (e.g. antenna pointing application, gain setting), maintenance purposes and man-machine interface

5) Time and Frequency Reference Subsystem (TFRS), including GPS antenna and its connection

6) Power distribution system including UPS and cables

7) Ancillaries, transportation boxes, camouflage nets, operation and maintenance tools, weather station, grounding kit, lightning protection

8) Weather station shall be rapidly field deployable, compact, capable of monitoring environmental parameters (such as but not limited to wind, air temperature, humidity, pressure, precipitation). It shall withstand the environmental conditions given throughout this document, SRS.

[20] A notional block diagram of the system is given in Figure 2-1.

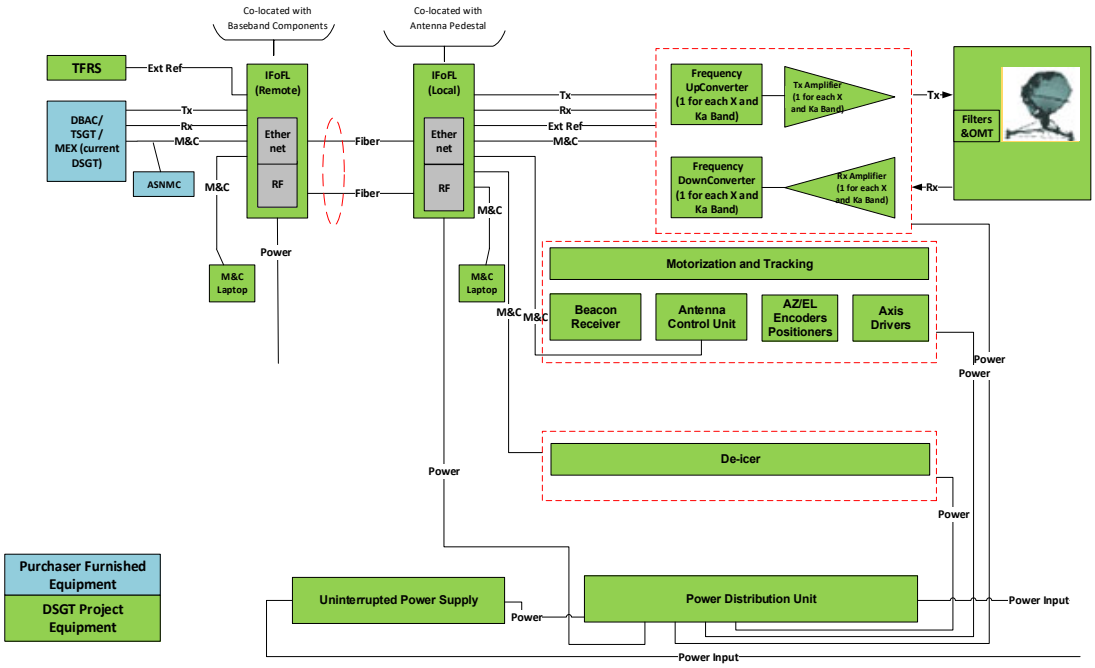


Figure 2-1 Notional Block Diagram of the System

3 REQUIREMENTS

3.1 Functional Requirements

SRS-1 On the transmit side, the MB-DSGT shall accept a modulated IF (intermediate frequency) signal provided by a third party equipment, provided as PFP, convert it to the specified military bands (X or Ka selectable), amplify it by a power amplifier, and transmit this RF signal to the satellite. The transmission function shall include all of the equipment from the IF input to the RF output.

SRS-2 On the receive side, the MB-DSGT shall receive the RF signal from the satellite in the specified military bands (X or Ka selectable), amplify it by a low-noise amplifier and convert it to IF signal and provide it to a third party equipment, provided as PFP. The reception function shall include all of the equipment from the RF input to the IF output.

SRS-3 The transmit and receive functions shall include the carry of the signals exchanged between the modem location and the RF head location through the IFoFL.

SRS-4 The MB-DSGT shall support multi-carrier operation of satellite communications (protected and non-protected), simultaneously, over different channels (frequencies).

SRS-5 The MB-DSGT shall be able to operate over X-band satellite channels and over military Ka-band satellite channels. Simultaneous X- and Ka-band operation is not a requirement.

3.1.1 Antenna

SRS-6 The MB-DSGT shall be capable of simultaneously transmitting RHCP and receiving LHCP in X-band, referred as “normal polarization”.

SRS-7 The MB-DSGT shall be capable of simultaneously transmitting LHCP and receiving RHCP in X-band, referred as “inverted polarization”.

SRS-8 It shall be possible for the Operator to switch between normal and inverted polarization in 15 minutes in X-band. Simultaneous normal and inverted polarization is not required.

SRS-9 The MB-DSGT shall be capable of simultaneously transmitting RHCP and receiving LHCP in military Ka-band, referred as “normal polarization”.

SRS-10 The MB-DSGT shall be capable of simultaneously transmitting LHCP and receiving RHCP in military Ka-band, referred as “inverted polarization”.

SRS-11 It shall be possible for the Operator to switch between normal and inverted polarization in 15 minutes in military Ka-band. Simultaneous normal and inverted polarization is not required.

3.1.2 Pointing and Tracking Capability

SRS-12 The MB-DSGT shall have automatic pointing and tracking capabilities in all frequency bands and with performance parameters referred in environmental conditions defined throughout this document.

SRS-13 The antenna mount shall support both manual and motorised motion.

SRS-14 The ACU shall be capable of tracking satellites by monitoring and maximising the level of a received signal, which can be selectable among the satellite beacon (CW or low speed modulated carrier), a similar pseudo-beacon radiated by the satellite, the wide-band signal radiated by the satellite, or the receive signal strength indicator of any modem selected by the operator.

SRS-15 The antenna pointing shall be adjustable in two-axis with the minimum following parameters:

1) Azimuth: AZ (120° range)
2) Elevation: EL (5° - 85°) above the horizon

SRS-16 The manual pointing shall be adjustable in fine increments in azimuth with minimum 40° range.

SRS-17 The manual pointing shall be adjustable in fine increments in elevation with minimum 10° range.

SRS-18 Fine increments shall be such that the pointing loss from boresight does not exceed 0.2 dB in X-band.

SRS-19 Fine increments shall be such that the pointing loss from boresight does not exceed 0.5 dB in military Ka-band.

SRS-20 The antenna auto-pointing and auto-tracking system shall allow re-pointing of the antenna in two-axis with a continuous range of motion with the following parameters:

1) Azimuth: minimum of 60°
2) Elevation: 5° to 85° above the horizon

SRS-21 The tracking sub-system shall consist, as a minimum but not limited to, the following elements:

1) Antenna Control Unit (ACU) and Beacon Receiver,
2) Axis Drive
3) Axis Control

SRS-22 The tracking sub-system shall support, as a minimum but not limited to, the following modes of operation:

1) Manual – Manually change azimuth and elevation position of the terminal by means of hand crank.

2) Semi-Auto – Manually change azimuth and elevation position of the terminal by means of a hand held remote control and external jog assembly or by a virtual interface enabling the ability to manually jog the antenna by commanding its motorised motion devices.

3) Auto – Automatically change azimuth and elevation position of the terminal based on automatically acquired position, date and/or programmed values by the operator.

SRS-23 The MB-DSGT shall provide all the necessary devices needed to ensure appropriate initial pointing, re-pointing and permanent automatic tracking of a geosynchronous satellite.

SRS-24 The antenna shall support manual positioning by a single operator in all modes of operation.

SRS-25 A compass and an inclinometer of sufficient quality and accuracy to aid or verify the initial manual antenna pointing shall be provided. Moreover, for manual pointing, azimuth angle relative to the antenna pedestal shall be able to be read with 1 degree resolution and additional marking every 5 and 10 degrees.

3.1.3 Transmit RF Chain

[21] The MB-DSGT may provide the amplifier (shall be GaN based) and upconverter as an integrated, block up-converter, which would support the overall RF performance of the system.

SRS-26 The upconversion frequency range in X-band shall be:

1) Output Frequency Range: 7900 – 8400 MHz

2) Input Frequency Range: 950 – 1450 MHz

SRS-27 The upconversion frequency range in military Ka-band shall be:

1) Output Frequency Range: 30000 – 31000 MHz

2) Input Frequency Range: 950 – 1950 MHz

SRS-28 The upconversion function shall be able to accept external 10 MHz reference input, details of which is given in 3.1.6.

SRS-29 In case of inavailability of the external frequency reference, the upconverter, amplifier or block up-converter shall be able to automatically switch to internal 10 MHz frequency reference with an accuracy better than ±30 ppb.

SRS-30 The upconverter, amplifier or block up-converter shall be equipped with a Tx output signal sampling port.

SRS-31 The upconverter, amplifier or block up-converter shall have built-in ethernet functionality. Upconverter, amplifier or block up-converter with external ethernet interconnection box shall not be acceptable.

SRS-32 The upconverter, amplifier or block up-converter IF (L-band) input interface shall be 50 Ohm N-type connector.

3.1.4 Receive RF Chain

[22] The MB-DSGT may provide the (low noise) amplifier and downconverter as an integrated, block down-converter, which would support the overall RF performance of the system.

SRS-33 The downconversion frequency range in X-band shall be:

1) Input Frequency Range: 7250 – 7750 MHz
2) Output Frequency Range: 950 – 1450 MHz

SRS-34 The downconversion frequency range in military Ka-band shall be:

1) Input Frequency Range: 20200 – 21200 MHz
2) Output Frequency Range: 950 – 1950 MHz

SRS-35 The downconversion function shall be able to accept an external 10 MHz reference input, details of which is given in 3.1.6.

SRS-36 In case of inavailability of the external frequency reference, the downconverter, amplifier or block down-converter shall be able to automatically switch to internal 10 MHz frequency reference with an accuracy better than ±30 ppb.

SRS-37 The downconverter, amplifier or block down-converter IF (L-band) output interface shall be 50 Ohm N-type connector.

SRS-38 In order to power and trouble-shoot the amplifier and downconversion functions, any necessary specific adapter (such as Bias-Tee) shall be supplied by the Contractor.

3.1.5 Waveguide Equipment

SRS-39 The MB-DSGT shall include waveguide equipment that enables rapid (less than 30 seconds) connection and disconnection without damaging the interconnecting components. No specific tools shall be required for this task.

SRS-40 The MB-DSGT shall provide waveguide protection solutions that would prevent humidity inside the waveguides of MB-DSGT.

SRS-41 Waveguides shall be sealed with RF conductive foils to prevent air ingress and ensure proper electric continuity.

3.1.6 Time and Frequency Reference Subsystem (TFRS)

SRS-42 The TFRS equipment shall provide as a minimum:

1) Dual atomic (rubidium or equivalent) frequency standards, with the capability to synchronize the long term stability on GPS signals, with

automatic switch-over. The absence of receiving GPS signal shall not affect the provision of the accurate 10 MHz to all connected equipment,

2) A frequency distribution function – The number of 10 MHz signal outputs shall be minimum 4 at a level adjustable between +6 dBm and +16 dBm,

3) A GPS receiver, with antenna and cabling (the GPS antenna shall be remote up to 15 meters from the indoor equipment and provided with an interconnecting cable), provided that GPS antenna standing at a location ensuring visibility of a sufficient number of GPS satellites.

SRS-43 TFRS shall provide 10 MHz frequency reference signal with accuracy referred in Section 3.2.4.

SRS-44 When GPS disciplined, the GPS receiver shall meet the following minimum requirements, which include the effects of Selective Availability (SA) of NAVSTAR:

1) Receiver inputs: 1575.42 MHz (L1) - C/A (Coarse-acquisition) Code

2) Timing accuracy: 300 ns UTC (USNO)

3) Acquisition time: Warm start < 5 minutes

Cold start < 20 minutes

4) Position accuracy: Spherical error up to 100 metres

SRS-45 TFRS shall provide a time reference signal compliant with IRIG-B 001, 1 pulse-per-second interface.

SRS-46 It shall be possible to select the TFRS provided time as UTC.

SRS-47 It shall be possible to show UTC on the front panel of TFRS.

SRS-48 TFRS shall provide Network Time Protocol (NTP) to synchronise time on ethernet local area network (LAN).

SRS-49 TFRS shall be able to be secured simultaneously both at the front and at the rear when integrated into a 4-post rack.

3.1.7 Monitor and Control (M&C)

SRS-50 All MB-DSGT equipment shall have Ethernet ports for monitor and control functions.

SRS-51 The Ethernet ports shall be the only communication interface for monitor and control functions.

SRS-52 The MB-DSGT shall be SNMP compatible allowing for the use of any 3rd party software applications to remotely manage the terminal.

SRS-53 The MB-DSGT shall be able to be monitored by any third party application, provided as PFP.

SRS-54 The MB-DSGT shall be able to provide raw data of the internal status to allow a third party application to fully monitor the system functionality and any performance degradation and perform fault detection and isolation down to LRU level.

SRS-55 The MB-DSGT shall be able to be configured, monitored and operated without any third party equipment or software, using the M&C laptop and its software, locally or remotely (fibre) connected to the terminal components.

SRS-56 Using the M&C laptop, the operator shall be able to fully monitor the system functionality and performance and perform fault detection and isolation down to LRU level.

SRS-57 The following parameters shall be automatically acquired by the system and displayed to the third party software and to the operator within the ACU M&C application or screens :

1) The terminal longitude,

2) The terminal latitude,

3) Date and time (refreshed every second) in UTC

SRS-58 The MB-DSGT shall support manual override or insertion of the parameters given in the requirement above by the operator (and third party software) in case the automatic acquisition becomes unavailable or there is an interference affecting the geo-location process.

SRS-59 The MB-DSGT shall be able to display the calculated azimuth and elevation to the operators prior of antenna movement to the target position.

SRS-60 The MB-DSGT shall provide an emergency stop function of the antenna motion, to freeze the antenna motion immediately, and to resume the motion of the antenna at any time. This function shall be available both with the M&C Laptop and the third party M&C software.

SRS-61 A re-initialisation of the antenna control software shall not induce any motion or repointing of the antenna.

SRS-62 Alarms shall be provided to detect irregularity in axis motion, obstruction, free-run or over-travel of the antenna motion as part of axis control.

SRS-63 An alarm shall be provided in case of excessive wind requiring operator contingency action to set the equipment in survival mode.

SRS-64 An alarm shall be provided for excessive temperature (hot and cold).

SRS-65 The travel limits of the antenna motion system shall be adjustable by the operator.

SRS-66 The system shall be equipped with physical travel limits (hardware limit) to prevent damage to the equipment.

SRS-67 The system shall support pre-limit sensing (software limit) of the electromechanical drive in each axis, in order to bring the antenna reflector assembly to a halt before it reaches the physical travel limit.

SRS-68 As a minimum, the parameters listed below shall be monitored both by the M&C laptop and the third party M&C software:

1) Antenna Subsystem, beacon level, beacon threshold alarm
2) Antenna Subsystem, auto-track status
3) TFRS high level configuration, source selection (GPS signal acquisition, number of satellites, frequency reference internal, locked on the GPS long-term standard), status (lock or unlocked) and alarms (time alarm/freq alarm)
4) UPS, charging / discharging status, AC input parameters (voltage, current, etc.) battery condition
5) Wind speed and external temperature
6) Equipment fault status (for all equipment provided throughout this Contract and specified in this SRS)
7) Equipment Temperature Alarms

SRS-69 As a minimum, the following parameters shall be monitored and controlled both by the M&C laptop and the third party M&C software:

1) Antenna pointing angles (azimuth and elevation relative to true north and relative to the pedestal)
2) Antenna subsystem, beacon frequency, emergency freeze and tracking mode
3) Total output power at antenna input and EIRP
4) Power amplifier functions and status (on, off, gain, output power, mute/transmission status)
5) Transmit gain/loss setting of each device contributing to the gain of transmit chain from IFoFL input to the antenna input
6) Receive gain setting of each device contributing to the gain of receive chain from LNA input to IFoFL output.

SRS-70 The system shall be able to be remotely monitored and controlled from the DBAC up to 750 meters through IFoFL.

3.1.8 Interfacility over Fiber Link (IFoFL)

[23] The Interfacility over Fiber Link (IFoFL) between the MB-DSGT and DBAC is comprised of a fibre cable assembly and a fiber optic converter set.

SRS-71 The fibre optic converter set shall include an out-door unit (ODU) and an in-door unit (IDU-max 1 RU high and 50 cm depth) with interface panels to host the physical interfaces of the signals.

SRS-72 The IFoFL shall provide 4-strand single mode, OS2 standards compliant, fibre optic cables: one continuous piece of 500 meters, one continuous piece of 250 meters, and one continuous piece of 50 meters.

SRS-73 Each fibre optic cable shall have connectors installed that provide interoperability with the connectors of the fibre optic converter sets as presented on the interface panel of the ODU.

SRS-74 It shall be possible to use the fibre optic cables:

1) Separately from each other,

2) By joining different lengths of cables whenever required

SRS-75 The fibre optic cables shall be mounted and delivered on cable reels.

SRS-76 The cable reels and fibre optic cables shall be military grade, designed and manufactured for tactical deployment and for outdoor operations.

SRS-77 The fibre optic cable reels shall meet following requirements (for fibre cable length greater than 100 m, manual (no spring-driven) reels shall be provided):

1) Heavy duty, ruggedized for field military applications

2) Painted with the same colour and type of painting as the transport and transit cases

3) Roll-formed channel frame for heavy-duty applications

4) Equipped with non-sparking ratchet assembly

5) Equipped with declutching arbour to prevent damage from reverse winding

6) Equipped with fold-in swivel handles

7) Lightweight aluminium structure with protecting frame

8) Easy access assured to the inner and outer cable ends

9) Equipped with fixings to secure cable ends for transport, handling and storage

10) Designed in such a way that the cables can be rolled out and rolled back by maximum of two-person team

3.1.9 De-icer

SRS-78 A de-icer capability that removes snow and ice from the antenna (reflector(s) and feed) shall be provided.

SRS-79 The de-icer shall not affect the RF performance of the antenna system.

SRS-80 The de-icer shall not have a negative impact on the life duration of the antenna.

SRS-81 The de-icer shall not cause chipping and flaking on the antenna surface.

SRS-82 The de-icer shall report its ON/OFF status to M&C system in case it is an active component.

SRS-83 The de-icer shall have its own electrical circuit path separate from the UPS.

3.2 Performance Requirements

SRS-84 The MB-DSGT shall comply with STANAG-5648 (ratification draft or latest ratified version at the closing date of IFB) or MIL-STD-188-164C, as developed throughout this SRS.

SRS-85 The system shall have minimum 69 dBW of saturated EIRP in X-band.

SRS-86 The system shall have minimum 66 dBW of linear EIRP in X-band.

SRS-87 The system shall have minimum 70 dBW of saturated EIRP in military Ka-band.

SRS-88 The system shall have minimum 67 dBW of linear EIRP in military Ka-band.

SRS-89 The single carrier maximum-linear power (or EIRP) shall equal the carrier power (or EIRP) where the first spectral regrowth side lobe (measured at 1.0 symbol rate, expressed in Hz from the carrier center frequency) of the modulated carrier is -30 dBc.

SRS-90 Two carrier maximum-linear power/EIRP shall equal the maximum combined transmit power of two equal amplitude continuous wave (CW) carriers, when any individual intermodulation product power is –25 dB relative to the combined power of the two CW carriers.

SRS-91 The system G/T in X-band shall be at least 21 dB/K at 10° elevation at an ambient temperature of 23 °C.

SRS-92 The system G/T in military Ka-band shall be at least 26 dB/K at 10° elevation at an ambient temperature of 23 °C.

[24] G/T includes the entire reception function contributions.

3.2.1 Antenna

SRS-93 The Antenna shall be able to operate in the following frequency bands by changing the antenna feed and RF-equipment.

SRS-94 X-band:

1) Tx: 7900 - 8400 MHz

2) Rx: 7250 - 7750 MHz

SRS-95 Mil Ka-band:

1) Tx: 30.000 – 31.000 GHz

2) Rx: 20.200 – 21.200 GHz

SRS-96 The transmit axial ratio for the system operating in the X-band shall be no greater than 1.0 dB.

SRS-97 The receive axial ratio for the system operating in the X-band shall be no greater than 1.0 dB.

SRS-98 The transmit axial ratio for the system operating in the military Ka-band shall be no greater than 1.0 dB.

SRS-99 The receive axial ratio for the system operating in the military Ka-band shall be no greater than 1.0 dB.

SRS-100 The radiation pattern of the antenna while both transmitting and receiving shall be in accordance with ITU-R S.580-6.

SRS-101 The gain of the antenna, G, shall be such that at least 90 percent of the sidelobe peaks do not exceed:

- $G(\theta) = 29\text{-}25 \log_{10} (\theta)$ dBi for 1° or 100 λ / D_e (whichever is larger, up to $2° \leq \theta \leq 20°$)
- $G(\theta) = -3.5$ dBi for $20° < \theta \leq 26.3°$
- $G(\theta) = 32\text{-}25 \log_{10} (\theta)$ dBi for $26.3° < \theta \leq 48°$
- $G(\theta) = -10$ dBi for $48° < \theta \leq 180°$

[25] G = gain relative to an isotropic antenna, θ = off-axis angle in the direction of the satellite referred to the main-lobe axis, D_e = equivalent antenna diameter and λ = wavelength (same units as D_e).

SRS-102 For the appreciation of SRS-101 above, the angular regions and allowed side-lobe peak excess shall be within the limits as defined below:

- 1 dB for $\theta_{min} < \theta \leq 7°$, where $\theta_{min} = 1°$ or $(100 \lambda / D_e)$ degrees, whichever is greater
- 3 dB for $7° < \theta \leq 9.2°$

- 3 dB for 9.2° < θ ≤ 48°
- 10 dB for 48° < θ ≤ 180°

SRS-103 The transmit and receive main lobe axes of the antenna radiation pattern shall be coincident within 0.1° for X band.

SRS-104 The transmit and receive main lobe axes of the antenna radiation pattern shall be coincident within 0.02° for military Ka band.

3.2.2 Transmit RF Chain

SRS-105 The power level of the upconversion function shall be adjustable in steps ≤0.5 dB, over a dynamic range of 30 dB.

SRS-106 The up-conversion function shall be such that the input signal level of -20 dBm at IFoFL input leads to maximum linear EIRP.

SRS-107 For any setting of the transmit gain and a constant IF input level, the EIRP in the direction of the satellite shall not vary more than +1.0 dB or -1.5 dB in any 24-hour period. This tolerance, added on a root-sum-square (RSS) basis, includes all system factors contributing to the EIRP variation, including output power level instability and power variations in the direction of the satellite caused by tracking errors referenced to boresight.

SRS-108 The upconversion process shall not induce a frequency error greater than 1 kHz relative to the intended value of the received carrier frequency. Up-conversion frequency accuracy shall be maintained for a 180-day period or more without recalibration.

SRS-109 Departure from phase linearity of the transmission function, when operating at any point up to the maximum linear power, shall not exceed:

1) ±0.7 radians over any 120-MHz for any L-band IF

2) ±0.2 radians over the center 10 MHz for any IF operation.

SRS-110 Amplitude variations of the transmit (uplink) function when operating at maximum linear power shall not exceed the following:

1) ±0.5 dB over any 10-MHz segment across the instantaneous bandwidth.

2) ±1.5 dB over any 120-MHz segment, or any smaller segment, across the instantaneous bandwidth (10 MHz < segment < 120 MHz).

3) ±2.0 dB for each output frequency band in X (7.9-8.4 GHz) and mil-Ka (30-31 GHz) band.

SRS-111 The sum of the fundamental and all harmonic components of the alternating current (AC) line frequency shall not exceed −30 dBc.

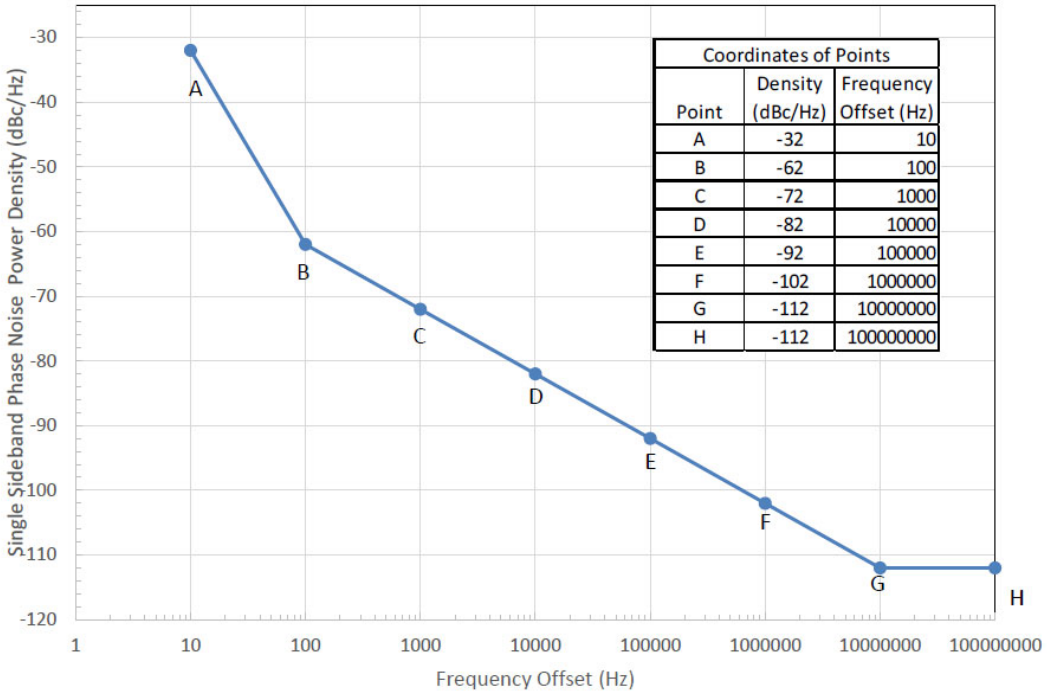
SRS-112 The single sideband sum (added on a power basis) of all other individual spurious components shall not exceed −36 dBc.

SRS-113 The single sideband power spectral density (PSD) of the continuous phase noise component shall comply with the envelope defined in Figure 3-1 below.

SRS-114 If specific points associated with the measured phase noise plot exceed the Figure 3-1 envelope, then the following two conditions shall be met:

1) The single sideband phase noise due to the continuous component, when integrated over the bandwidth from 10 Hz to 16 kHz relative to carrier center frequency, shall be less than 3.4° root mean square (RMS) (with a two-sided value of 4.8° RMS).

2) The single sideband phase noise due to the continuous component, when integrated over the bandwidth from 1 percent of the symbol rate (Rs) to Rs Hz relative to the carrier center frequency, shall be less than the value obtained when integrating the Figure 3-1 plot over the same limits. This requirement applies to all operational Rs values between 100 Ks/sec and 50 Ms/sec.



Coordinates of Points		
Point	Density (dBc/Hz)	Frequency Offset (Hz)
A	-32	10
B	-62	100
C	-72	1000
D	-82	10000
E	-92	100000
F	-102	1000000
G	-112	10000000
H	-112	100000000

Figure 3-1 Phase Noise- (reference MIL-STD-188-164C)

SRS-115 With the transmit equipment aligned and a CW signal applied to the IF input such that maximum linear power is achieved, or with the array configured to radiate maximum linear power and a CW signal applied to the IF input, extraneous emissions as measured over any 10-kHz bandwidth shall not exceed the following values:

1) Transmit band: -60 dBc when measured at the feed. This requirement excludes a 2-MHz band centered on the carrier.

2) Non-transmit band: -60 dBc, except for the band 31.0 GHz ≤ *f* ≤ 33.0 GHz, which shall not be greater than -45 dBc at 31.0 GHz and shall decrease linearly to -60 dBc by 33.0 GHz.

SRS-116 The level of the second and third harmonics of the transmit carriers shall not exceed −60 dBc when measured at maximum linear power.

SRS-117 Transmit-to-receive isolation shall be such that there is less than 0.1 dB degradation in specified receive noise density with the transmitter operating at any EIRP level, compared to the receive performance with the transmitter turned off.

SRS-118 For X-band operation, intermodulation products appearing at the low-noise amplifier (LNA) input in the receive band, due to two equal power transmit carriers transmitting up to the maximum linear EIRP specified under ‘Performance Requirements”, shall be no greater than -135 dBm.

SRS-119 No spectral inversion shall exist between any IF input and the antenna output for system operating with non-embedded modems. System with embedded modems shall be interoperable with terminals that do not have embedded modems.

SRS-120 The IF input impedance shall be nominally 50-ohms, with a VSWR not to exceed 1.5:1 over the specified bandwidth.

3.2.3 Receive RF Chain

SRS-121 The RF-to-IF gain adjustment shall be at least 20 dB in steps of 1 dB or less.

SRS-122 For X-band, all reception functions shall be met with the required performance level with the maximum power flux densities (PFDs) as follows:

1) −142 dBW/m^2 in any 4-kHz band in any single carrier;

2) −95 dBW/m^2 across the entire 500-MHz band.

SRS-123 For military Ka-band, all reception functions shall be met with the required performance level with the maximum PFDs as follows:

1) −112 dBW/m^2 in any 1-MHz band in any single carrier;

2) −90 dBW/m^2 across the entire 1-GHz band.

SRS-124 The receive chain absolute gain shall be sufficient to raise the IF interface noise power spectral density, when pointing to a cold sky away from a geosynchronous satellite at an angle of 30 degrees, to at least -95 dBm/Hz.

SRS-125 The output impedance at the terminal IF interface shall be 50 ohms, with a Voltage Standing Wave Ratio (VSWR) less than 1.5:1 over the specified bandwidth.

SRS-126 The down-conversion frequency accuracy shall be within 1 kHz of the intended value for all received RF carriers. Down-conversion frequency accuracy shall be maintained for a 180-day period or more without recalibration.

SRS-127 The RF-to-IF phase response of the reception function shall not deviate from linear by more than the following amounts:

1) ±0.7 radians over any 120-MHz for any L-band IF

2) ±0.2 radians over the center 10 MHz for any IF operation.

SRS-128 Amplitude variations as measured at the system IF output (demodulator input) shall not exceed the following:

1) ±0.5 dB over any 10-MHz segment across the instantaneous bandwidth

2) ±1.5 dB over any 120-MHz segment or smaller segment across the instantaneous bandwidth (10 MHz < segment < 120 MHz)

3) ±2.0 dB for each frequency band in X (7.25-7.75 GHz) and mil-Ka (20.2-21.2 GHz) band.

SRS-129 The sum of all spurious signal power shall be at least 10 dB below the thermal noise power within any 500 MHz bandwidth of interest, when measured across the terminal IF output interface.

SRS-130 No one spurious signal shall exceed the level of 20 dB below the thermal noise power within 100 KHz bandwidth of interest, when measured across the terminal IF output interface.

SRS-131 The receive spurious requirements of the previous two requirements shall be met under the following simultaneous conditions:

1) Transmitting multiple carriers at the maximum linear power,

2) Receiving two carriers at the maximum input signal level to the LNA.

SRS-132 Intermodulation level at the output of receive chain shall not exceed -45 dBc relative to the combined power of the two CW carriers applied at a level of -63 dBm each at LNA input.

SRS-133 No spectral inversion shall exist between any RF input and the IF output of the system.

SRS-134 For any setting of the receive gain and for a constant PSD level, the reception function output level shall not vary more than ±2.0 dB in any 24-h period.

3.2.4 Time and Frequency Reference Subsystem (TFRS)

SRS-135 TFRS dimensions shall not exceed the following dimensions:

1) Height: 1x44.45 mm- 1 Rack Unit (1U)

2) Width: Standard 19 inches (482.6 mm) rack

3) Depth: 500 mm.

SRS-136 TFRS weight shall not exceed 5 kg.

SRS-137 TFRS power consumption shall not exceed 50 Watts.

SRS-138 TFRS shall provide 10 MHz frequency reference signal with an accuracy better than ±0.1 ppb even in the absence of the GPS signal in all environmental conditions specified throughout this SRS.

SRS-139 TFRS Single Side Band (SSB) phase noise characteristics shall comply with below specifications:

Table 1-TFRS Phase Noise

Frequency Offset	SSB Phase Noise Power Density (dBc/Hz)
1 Hz	-100
10 Hz	-125
100 Hz	-135
1 Khz	-140
10 Khz and above	-140

3.2.5 Interfacility over Fiber Link (IFoFL)

SRS-140 The IFoFL weight (for 750 meter length cable - split into two, one 500 meter and other 250 meter long) shall not exceed 45 kg in total, including the cable reels, handles (foldable or removable) and connectors.

SRS-141 The IFoFL shall not generate more than 0.1 dB degradation (per direction) of the E_b/N_o of the modulated signals transiting through the IFoFL, compared to the signal present at the interface of the outdoor unit of the MB-DSGT.

SRS-142 Intermodulation level at the output of IFoFL shall not exceed -45 dBc relative to the combined power of the two CW carriers applied at a level of -63 dBm each at LNA input.

3.3 Deployability Requirements

SRS-143 The system shall be easily transportable by road, rail, sea, air and rapidly deployed, packed, or redeployed on site.

SRS-144 The system, including all auxiliary equipment such as lashing material, wind tie-downs, grounding and lightning protection system etc., shall be able to be packed into no more than 12 cases and be palletable (TFRS can be included in a case on top of 12 cases).

SRS-145 When the system is packed for transportation, the gross weight of each case shall not exceed 50.8 kg. 10% excess tolerance could be applied by exception subject to Purchaser approval.

SRS-146 The system shall be able to be loaded and secured on Standard Euro Pallets (Type EUR 1: 1,200 x 800 x 144 millimetres), not exceeding these dimensions.

SRS-147 The system shall be capable of being transported by air (fixed-wing airplane or helicopter) in un-pressurized compartments, without sustaining damage or prejudicing safety, including restrictions and requirements for transportation of dangerous goods. The requirement applies to all batteries used in the system (UPS and laptops included).

SRS-148 The system shall be able to be loaded and secured on one HCU 463L Air Cargo Pallet (HCU-6/E), that is compliant with MIL-STD-1791C w/Change 1 - 29 December 2017: Designing for Internal Aerial Delivery in Fixed Wing Aircraft (certified for these aircrafts: C-130, C-5, C-27, CH-47, KC-10, C-17, C-9).

SRS-149 When packed for transportation, the total volume of the cases and enclosures of the system shall not exceed 50% of the loading capacity (interior cargo dimensions) of the following sample vehicle:

1) Mercedes Sprinter Van, Standard Length (144WB), Low Roof

SRS-150 The cases shall be equipped with:

1) auto pressure release valves, and humidity indicators visible from outside
2) stacking corners
3) drop handles with return spring and plastic or rubber sheathing

SRS-151 Pressure release valves shall avoid soaking water into the case. This can occur for example (but not only) due to the negative pressure when a case is rapidly cooled down during rain after being exposed long to the sun. Verification of the requirement shall be performed either by a test or a demonstration.

SRS-152 Each case, with CIS and/or UPS equipment operating from within the case, shall be provided with adequate air inlets and air outlets to assure required air flow and heat dissipation.

SRS-153 The air inlets and air outlets shall be protected with removable lids for transport and storage.

SRS-154 The components in a case shall be mounted on shock absorbers and vibration dampers, or otherwise protected (e.g. custom cut foam), such that the case with mounted components as a whole meets the transport environmental requirements specified in Section 3.7.

SRS-155 The cases, when fully loaded, shall allow stacking them on top of each other with no damage to housed equipment and the cases itself.

SRS-156 Cases shall be capable of being secured to anchor points to prevent theft and movement in order to avoid damage during transportation.

SRS-157 Each case shall be lockable to prevent theft or tampering (e.g. padlock).

SRS-158 The Contractor shall provide padlocks for each case.

SRS-159 The padlocks shall have;

1) Lock body made from brass
2) Inner components made from non-corrosive materials
3) Stainless steel shackle
4) Precision pin tumbler cylinder
5) 2 keys

SRS-160 The system, including all its equipment, shall be packaged in such a way as to minimise its physical dimensions.

SRS-161 The packaging of the system shall prevent any imbalance to its transportation and lifting.

SRS-162 The complete assembly of components and case shall meet the environmental requirements specified in Section 3.7.

SRS-163 The power subsystem shall be equipped with a Connectorized Front Panel (CFP), suitable for outdoor operation.

SRS-164 The CFP shall be removable and re-installable for maintenance or for re-patching of connectors to equipment ports by the Purchaser, without assistance from the Contractor.

SRS-165 The CFP shall include signal and power interfaces presented on a front panel that is fixed to the case.

SRS-166 CFP shall be protected by a removable lid for transport and storage.

SRS-167 Each MB-DSGT shall be equipped with supplementary wind tie-downs to cater for the Environmental Requirements Conditions stipulated in Section 3.7.

SRS-168 The Contractor shall provide suitable lifting devices for manual lifting and carrying, assuring compliance with ISO 11228-1.

SRS-169 The Contractor shall ensure that all spares are delivered in reusable packaging. This packaging may also be used for storage of equipment if not used.

SRS-170 The packing cases shall be capable of being secured to the structure of the vehicle with typical lashing straps with buckle according to the European Standard for lashing EN 12195-1:2010 and EN-12195-2:2001.

SRS-171 The Contractor shall provide adequate number and type of lashing straps with buckles with torque limiter to prevent excessive lashing that could cause damages to transport cases. The lashing material shall be compliant with EN 12195-1:2010 and EN-12195-2:2001.

SRS-172 The Contractor shall provide camouflage nets for each MB-DSGT.

SRS-173 The number of camouflage nets shall be sufficient to cover the entire MB-DSGT in its operational configuration and disguise its shape.

SRS-174 The camouflage nets shall be composed of disruptive patterning for the European Theatre of Operations (woodland).

SRS-175 The camouflage nets shall resemble normal foliage in natural conditions and blend into the natural surroundings of the European Theatre of Operations (woodland).

SRS-176 The camouflage nets shall be in compliance with Allied Engineering Publication AEP-31, Edition 1, 1994: Reference Document of Colors for Disruptive Camouflage for Military Equipment In Use In NATO.

SRS-177 Camouflage net materials shall be resistant to mould growth and shall withstand limited contamination by the most relevant fungal species listed in Table 1 of AECTP 300 Edition D, version 1, test method 308 without substantial degradation. The mould growth shall manifest as no greater than ‘Trace’ when tested in accordance with method 308.

SRS-178 Camouflage net shall be 100% waterproof and shall not become clogged or heavy due to wet or damp conditions

SRS-179 Camouflage net shall be UV deterioration and infra-red treated, of a non-toxic fabric, but lightweight, strong and durable.

SRS-180 Camouflage net shall be as quiet and rustle free as possible.

SRS-181 Camouflage net shall be specially coated to reduce shine and glare. The reduction of shine and glare can be achieved whether by coating, production method or special fabrics.

SRS-182 Camouflage net shall remain pliable in the extreme environmental conditions the associated MB-DSGT is to be compliant with. Verification of the requirement shall be performed by reviewing a product data sheet/ Certificate of Compliance issued by the manufacturer.

SRS-183 Special flame retardant treatments shall have been applied to camouflage nets.

SRS-184 Camouflage nets shall be easily compressed and packed into storage bags for ease of transportation and storage. The use of lightweight modern waterproof textiles is recommended.

SRS-185 Camouflage net storage bags shall be sized to allow repacking under field conditions.

SRS-186 Camouflage net shall be provided with all the necessary associated equipment in order to set-up the nets over the MB-DSGT elements and to anchor it. This might include, but is not limited to strings, spikes, arch and bars. All shall be stored with the nets.

SRS-187 The MB-DSGT system shall continue to meet all requirements specified throughout this SRS (including RF and system performance) while the camouflage nets are fitted on any components of the MB-DSGT.

SRS-188 The MB-DSGT system shall be designed to minimise the risks of toppling or instability when deployed.

SRS-189 The set-up time and making operational of the MB-DSGT system shall be less than 1 hour (60 Minutes) by a trained two-person team.

SRS-190 The set-up time shall start from the time the cases are located on the ground next to a suitable antenna location within line of sight of the satellite and shall include the satellite modems locked at both ends of the link, considering baseband equipment is ready to operate with the connections already done.

[26] For the appreciation of set-up time requirement, this time assumes that the satellite approximate pointing angles are known, and the satellite path is not blocked by obstacles and anchoring of the antenna is not required due to adverse wind conditions.

SRS-191 The tear-down time of the system including packaging shall be less than 30 minutes by a trained two-person team.

[27] Tear-down time shall start from the moment decision is made to switch off the carriers radiated by the system.

SRS-192 It shall be possible to switch between frequency bands in less than 30 minutes.

SRS-193 The system shall be capable of unmanned operations after initial set-up, and of being controlled and monitored:

1) Locally via Contractor M&C application

2) Distantly by the personnel via DBAC and ASNMC system, which are provided as PFP through another project

3) Remotely from any other location like the NATO Network Control Centre (NNCC) using the PFP that shall be supplied through other projects.

SRS-194 The system shall be capable of being deployed and packed in environmental conditions for which performance is guaranteed. The environmental conditions include rain, hail, snow and thermal/ humidity/ altitude characteristics. The procedures for teardown packing shall include instructions for maintenance before long term storage (for example cleaning and drying of equipment and camouflage nets etc.)

SRS-195 The system shall be capable of being deployed, operated, maintained, and folded on moderately uneven ground such as paved or unpaved road or roadside, grassland, dusty/sandy earth or muddy terrain not necessarily perfectly horizontal, with a slope of up to 5 degrees in any direction.

SRS-196 The equipment shall be capable of being deployed and packed during winter conditions by operators wearing gloves. The winter conditions include rain, hail, snow and thermal/humidity/altitude characteristics.

SRS-197 The systems shall support semi-static deployments up to 1-year long.

3.4 Interface Requirements

SRS-198 The system shall include all the necessary interconnection cables to support the functional requirements detailed in Section 3.1.

SRS-199 All connectors, cables, and waveguides shall have a mating connector supplied, exceptions such as N-type and BNC-type connectors shall be subject to Purchaser approval.

SRS-200 The monitoring LEDs shall be coherent throughout all the subsystems of the system, if any.

SRS-201 MB-DSGT shall use metric system for all components and documentation.

SRS-202 Electrical equipment wiring, including color codes, shall be compliant with IEC 60445:2021.

SRS-203 European standards for wiring, including color codes, shall be fully applied throughout the system.

3.4.1 IF and M&C Interfaces

SRS-204 The MB-DSGT shall provide IF (intermediate frequency) over fibre link conversion solution for the Tx and Rx IF connection with the external IF & baseband systems mentioned in Sections 1 and 2.

SRS-205 The MB-DSGT shall provide 10 MHz over fibre link conversion solution for the equipment mentioned in Sections 1 and 2 .

SRS-206 The MB-DSGT shall provide Ethernet over fibre link conversion solution for M&C connection with the external systems mentioned in Sections 1 and 2.

SRS-207 The system shall have the required interfaces to be fully interoperable with below systems, provided as PFP :

1) DBACs,
2) The legacy DSGT modem cases,
3) The 4th generation, multiband TSGTs,
4) The existing TSGTs.

SRS-208 The system shall also be interoperable with SATCOM Anchor Components (SACs) over the air.

SRS-209 The MB-DSGT shall provide an L-band duplex interface for at least 500 MHz of instantaneous bandwidth situated in the 950-1450 MHz range for X band with the exact frequency span as required for compatibility with the selected modem.

SRS-210 The MB-DSGT shall provide an L-band duplex interface for at least 1 GHz of instantaneous bandwidth situated in the 950-1950 MHz range for military Ka band with the exact frequency span as required for compatibility with the selected modem.

SRS-211 The IFoFL shall have a 10 MHz (simplex from indoors to outdoors) interface compatible with TFRS detailed in Section 3.2.4.

SRS-212 The IFoFL interface shall provide minimum the following physical interfaces:

1) 50 ohm N-type interface for the L-band RF connections, one for each Tx and Rx,

2) Two Ethernet, 10/100Base-TX or 10/100/1000Base-T, Auto-MDIX and Auto-Negotiation, RJ45, interfaces for M&C signal. One local and one remote,

3) Interface for 10 MHz connections.

SRS-213 Any unused IF and RF connector shall be terminated by 50 Ohms impedance load.

SRS-214 Any copper interfaces presented on interface panels shall be implemented using MIL-DTL-38999 series III based connectors, equipped with dust caps in the receptacle as well as in the cable side.

SRS-215 In case of copper Ethernet interfaces, the MIL-DTL-38999 series III based connector shall have an internal RJ45 connector and a MIL-DTL-38999 series III shell.

3.4.2 Optical Interfaces

SRS-216 Any optical interfaces presented on the external interface panels ~~and all external fibre optic reels~~ shall be implemented using Stratos ~~Lightwave~~ HMA or compatible, 4-channel, straight (i.e. non angled) polish, Jam Nut style bulkhead connectors. Cables shall provide an HMA plug at both ends of the fiber optic cable.The bulkhead connector shall be compliant with MIL-DTL-83526/21C, the plug shall be compliant with MIL-DTL-83526/20C. The reels shall be double flange.

SRS-217 All connectors shall be provided with captive protection caps.

SRS-218 All fibre interfaces and fibre strands shall be single-mode fibre.

3.5 Supportability Requirements

[28] For Reliability, Maintainability, Testability and Availability definitions and methods please refer to:

1) MIL-HDBK-338B : Electronic Reliability Design; and

2) IEC 61078:2006 : Analysis techniques for dependability - Reliability block diagram and Boolean methods; and

3) MIL-STD-756B : Reliability Modelling and Prediction; and

4) SR-332 : Reliability Prediction Procedure for Electronic Equipment; and

5) HDBK-217Plus; and

6) ANSI/VITA 51.1-2013 (R2018) : Reliability Prediction MIL-HDBK-217 Subsidiary Specification ;and

7) MIL-HDBK-781 : Reliability test methods, plan and environments for engineering development, qualification and production; and

8) MIL-HDBK-470A : Design and developing of maintainable systems; and

9) IEC 60812:2018 : Failure modes and effects analysis (FMEA and FMECA); and

10) MIL–STD–1629A : Failure Mode Effect and Criticality Analysis.

[29] For Maintenance Level definitions please refer to the “Maintenance and Support Concepts” Appendix E of Statement of Work (SoW).

[30] For Human Engineering design criteria for Logistics Support please refer to MIL-STD-1472G.

3.5.1 Reliability

SRS-219 The system shall be designed such that a failure or removal of a component or item in the system does not cause a physical and/or functional failure of another component or item.

SRS-220 Mean Time Between Failures (MTBF) at system level shall be greater than 4000 hours in Ground Fixed environment (ref. MIL-HDBK-338B), 30°C ambient temperature, using failure rates data at component level for relevant predictions.

SRS-221 Mean Time Between Critical Failures (MTBCF) at system level shall be greater than 5000 hours in Ground Fixed environment (ref. MIL-HDBK-338B), 30°C ambient temperature using failure rates data at component level for relevant predictions.

3.5.2 Maintainability

SRS-222 Mean Time To Repair (MTTR) per relevant Maintenance Levels both Hardware (HLs) and Software including Firmware (SLs) shall be:

1) MTTR for HL/SL1 and HL/SL2 < 30 min

2) MTTR for HL/SL3 < 120 min

SRS-223 Mean Time To Restore Service (MTTRS) per relevant Maintenance Levels both Hardware (HLs) and Software including Firmware (SLs) shall be:

1) MTTRS for HL/SL1 and HL/SL2 < 20 min

2) MTTRS for HL/SL3 < 60 min

3.5.3 Testability

SRS-224 Fault Detection (FD) rate shall be greater than 95% through Built-In Test (BIT) capable of on-line detection of failure modes.

SRS-225 Fault Isolation (FI) rate without ambiguity shall be greater than 90% through Built-In Test (BIT) capable to isolate the detected internal function/component in failure.

SRS-226 The Built-in-Test (BIT) shall give a fault indication down to at least the level of LRU.

SRS-227 BIT fault detection and isolation resultant information shall be recorded in electronic logs.

3.5.4 Product Support

SRS-228 Maintenance Levels apportionment for hardware and software including firmware for corrective and unscheduled maintenance tasks weighted with the relevant failure rate shall be:

1) [Critical + Non-Critical] Failures for HL1-2/SL1-2 > 80%
2) Critical Failures for HL1-2/SL1-2 > 90%
3) [Critical + Non-Critical] Failures for HL3/SL3 < 15%
4) Critical Failures for HL3/SL3 < 10%
5) [Critical + Non-Critical] failures HL4/SL4 < 5%
6) Critical Failures for HL4/SL4 = 0%

SRS-229 The annual average hour's workload for preventive and scheduled maintenance (up to HL3/SL3) shall not exceed (x10) 10 times the annual average hour's workload for corrective and unscheduled maintenance (up to HL3/SL3) for critical and non-critical failures.

SRS-230 Maintenance tasks shall not involve more than 2 (two) persons for Organizational Maintenance (Level 2) HL/SL2 or lower.

SRS-231 The SW updates and applying settings shall be Software Organizational Maintenance (Level 2) SL2 or lower.

SRS-232 Replaceable items shall weigh:

1) less than 16.8 kilograms (37 pounds) for more than 95% of LRUs with direct accessibility;
2) Less than 11.3 kg for more than 99% of the LRUs that are only accessible by removing other components or parts thereof.

SRS-233 Items over 16.8 kilograms (37 pounds) shall be designed for two-person handling.

SRS-234 The combination of BIT and troubleshooting in Technical Publications shall allow for the fault isolation of 100% of detected failures.

SRS-235 The maximum down time when the equipment is deployed shall not exceed 8 hours to fix a fault (i.e.: Unscheduled/Corrective Maintenance due to one critical failure or sequence of non-critical failures that lead to a loss of critical function).

SRS-236 The maintenance plan shall include pre-deployment and post-deployment maintenance actions so that no down time (i.e.: zero hours) due to scheduled maintenance and preventive maintenance is required during deployment.

3.5.5 Parts Obsolescence

SRS-237 The system design shall permit to change a specific functional block maintaining the overall architecture unchanged.

3.6 Power Subsystem Requirements

SRS-238 The system shall have its own UPS which shall provide no-break power supply to the entire MB-DSGT, including the outdoor part of the IFoFL (the indoor part of the IFoFL and TFRS will have its own supply). The de-icer and antenna motors don't need to be on UPS.

SRS-239 The system shall be able to work with external power generator, provided as PFP.

SRS-240 There shall be an Emergency Power Off (EPO) switch to isolate the external mains/generator supply and shut down the UPS.

SRS-241 The EPO switch(es) shall be installed in easy access areas and with no obstructions.

SRS-242 The EPO shall have a Red Mushroom type push button.

SRS-243 The EPO switch shall be protected to prevent any inadvertent operation.

SRS-244 The activation of EPO shall be possible without opening any panels, flaps, doors or any other type of covers with easy access and no obstructions.

SRS-245 The EPO shall conform to the following directives and standards as applicable:

1) MD 2006/42/EC
2) LVD 2014/35/EU
3) IEC 60947-5-5:1997+AMD1:2005+AMD2:2016 CSV;
4) IEC 60947-5-1:2016
5) ISO 13850:2015
6) IEC 60204-1:2016

SRS-246 The total power consumption of all system, excluding the de-icer, shall be below 4 kVA for each frequency band.

SRS-247 The total power consumption of all system, including the de-icer, shall be below 6 kVA for each frequency band.

SRS-248 The UPS system shall be compliant with:

1) IEC 62040-1:2017/COR1:2019 Corrigendum 1 - Uninterruptible power systems (UPS) - Part 1: Safety requirements
2) IEC 62040-2:2016 Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements
3) IEC 62040-3:2011 Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements
4) IEC 62040-4:2013 Uninterruptible power systems (UPS) - Part 4: Environmental aspects - Requirements and reporting

SRS-249 The UPS autonomy shall be sufficient to assure graceful shutdown of all CIS components supported by the UPS. Unless graceful shutdown requires more than ten minutes, the minimum autonomy shall not be less than 10 (ten) minutes under all environmental conditions specified in Section 3.7.

SRS-250 The UPS system shall protect CIS components from having physical damages in case of the Prime Power and Emergency Power failures.

SRS-251 The UPS shall have 20% of spare capacity for additional power load maintaining the autonomy as stipulated in SRS-249 above.

SRS-252 The UPS system shall provide protection against data loss and CIS components damage due to power failures, voltage dips, voltage spikes, undervoltage, overvoltage, switching spikes, interference voltages, frequency changes and harmonic distortion

SRS-253 The UPS shall meet following requirements:

1) On line, double conversion type
2) Auto Select Input Voltage 120V / 230 V, Single phase
3) Nominal output voltage: 230 V ± 10%
4) Nominal output frequency: 50 Hz ± 3 Hz
5) Frequency compatibility: 50 / 60 Hz; Supports 50 to 60 Hz and 60 to 50 Hz conversion with no de-rating
6) Power factor: 0.9
7) Total harmonic distortion (THD): < 5% in accordance with IEC TS 61000-3-4
8) System efficiency: > 90% at full load
9) Soft start
10) Zero transfer time

11) Surge suppressor

12) Static bypass for overload

13) Manual bypass for maintenance

14) Battery monitoring

15) Protection against deep discharge of batteries

16) Hot swappable, recheargable (replacement of the batteries shall be possible without powering down the UPS) and user replaceable batteries

17) The sound pressure level shall not exceed 65 dB(A) at 1 meter distance in accordance with ISO 3746:2010

SRS-254 The UPS batteries shall be provided with Material Safety Data Sheet (MSDS) as required by International Civil Aviation Organization (ICAO), and International Air Transportation Association (IATA) for air transportation of dangerous goods.

SRS-255 The battery MSDS shall confirm the batteries testing and certification according to United Nations publication: 'Manual of Tests and Criteria for Transportation of Dangerous Goods', part III, subsection 38.3, transport class 9.

SRS-256 The UPS system shall include a visual alarm, an audio alarm and a contact closure loop to inform locally and remotely loss of mains power and of low battery power to ensure the timely implementation of the graceful shutdown processes and procedures.

SRS-257 As a minimum, the following commands and control operations of the UPS system shall be possible and accessible right after the removal of the UPS case lid which protects the UPS unit during transportation, storage and handling:

1) System OFF

2) System on UPS

3) System on Static Bypass

4) System on Manual Bypass

5) Alarm silence switch

6) Measurement of:

a) Input current

b) Input voltage

c) Input power

d) DC voltage

e) DC current

f) Output voltage

g) Output current

h) Output frequency

i) Output power

7) As a minimum, visual and audible alarms:

a) Battery at low level and low voltage

b) System on bypass

c) Input supply failure

d) Overload

e) High temperature

f) UPS not answering – communication lost

g) Logging of previous minimum 50 alarms shall be possible

8) Automatic battery check-up

SRS-258 The UPS system shall signal changes in status towards the management and control environment, as well as critical capacity warnings and visual and audio indications from the UPS itself.

SRS-259 The UPS battery system shall be capable of operating safely in a low ventilation environment.

SRS-260 Minimum operating life-time of the batteries shall be 5 (five) years.

SRS-261 The UPS system shall take single phase Mains/Generator TN-S Supply in accordance with the International Electrotechnical Commission, (IEC) 60038 standard, to power and operate the CIS and non-CIS components.

SRS-262 All components of the electrical system shall comply with the EMC requirements as contained in the directives as applicable:

1) Directive 2014/30/EU of the European Parliament and of the Council

2) Council Directive 92/31/EEC

3) Council Directive 93/68/EEC

4) MIL-STD-461G

SRS-263 For all electrical installations and equipment, a formally recognised EC Certificate of Conformity shall be provided.

SRS-264 The low voltage system shall be designed and assembled according to IEC 61439 series.

SRS-265 In order to protect personnel against electrocution and minimize single points of failure in electrical installation, the Contractor shall provide and install adequate number and type of Residual Current Devices (RCDs) in compliance with IEC 61140:2016 and IEC 60364-4-41:2005+AMD1:2017 CSV.

SRS-266 The Contractor shall provide the external power outlet(s) required to provide UPS power to the components. These power outlets shall be protected by Earth Leakage Current Detectors/Circuit Breakers which shall conform to IEC 60364-7-717:2009. These outlets shall be clearly labelled to identify their purpose/function.

SRS-267 The Contractor shall provide and install surge protection devices (SPDs) to protect the electrical system from atmospheric voltage surges (lightning strikes), operating voltage surges, industrial surges and static discharges. The SPDs shall be in compliance with the following standards:

1) IEC 61643-11:2011
2) IEC 62305:2022 SER
3) IEC 61643-21:2000+AMD1:2008+AMD2:2012 CSV
4) IEC 61643-22:2015

SRS-268 The equipment shall not be damaged and the CIS equipment shall continue to operate as in normal conditions when subjected to the lightning waveforms conforming to STANAG 4370 edition 6, AECTP 250 - leaflet 254 atmospheric electricity and lightning.

SRS-269 The Lightning Protection System shall be in compliance with IEC 62305:2022 series.

SRS-270 Cabling, connectors and all other outdoor electrical equipment shall be compliant with the climatic conditions of utilisation.

SRS-271 The grounding system shall be designed to comply with TN-S grounding architecture.

SRS-272 In order to improve personal and equipment safety, an adequate grounding and bonding shall be assured through all the connected equipment.

SRS-273 The grounding system shall be compliant with IEC 60364 series.

[31] For reference on grounding MIL-HDBK-419A can be consulted.

SRS-274 Each grounding system shall be supplied with adequate number of grounding rods and a ground rod insertion/extraction tool (for example an extractor with lever).

SRS-275 The Contractor shall provide a measuring device for checking the earth resistance and effectiveness of grounding system for each MB-DSGT.

SRS-276 All electrically supplied CIS and non CIS equipment shall have ground connection through the supply cable (3 poles or 5 poles) and through a dedicated ground stud.

SRS-277 A personal grounding device (i.e. a grounding wristband compliant to IEC 61340-4-6:2015) shall be available for troubleshooting and manipulation of CIS equipment. Each CIS equipment shall be provided with a ground bonding point for the personal grounding of the operator.

SRS-278 European standards for wiring, including color codes, shall be fully applied throughout the system.

3.7 Environmental Requirements

SRS-279 All outdoor equipment (including cases), under any mode (operation, transport, storage and handling) , shall be capable of withstanding environmental conditions specified in this document, without suffering mechanical damages, degradation of functionality and IP (Ingress Protection) integrity of cases.

SRS-280 All outdoor equipment (including cases), under any mode (operation, transport, storage and handling), shall not permit water accumulation in pockets, creases, fissures or depressions that could cause structural damage upon freezing.

SRS-281 The design of cases and components to be housed in them shall assure that no active heating and cooling is required for transport, storage, handling.

SRS-282 All cases, when exposed to environmental conditions as defined in this document, shall assure that equipment housed in them operates (when required to operate inside the case) within respective manufacturer defined environmental specifications.

3.7.1 Temperature/ Temperature Shock/ Solar Radiation and Humidity

SRS-283 The system shall withstand the following temperature ranges:

1) Between -32 ºC and +49 ºC for operation
2) Between -34 ºC and +71 ºC for transport
3) Between -34 ºC and +71 ºC for storage and handling

SRS-284 The system shall withstand a solar radiation ranging up to 1,120 W/m² for operation, transport, storage and handling in the temperature conditions specified in the current section.

SRS-285 The system shall withstand the following change of temperature (temperature shock):

1) 13.4 ºC/min during equipment switch-on and 0.12 ºC/min for steady operation, based on the assumption that no pre-heating is available, and the equipment reaches an operational temperature of 35°C five minutes after being switched on at the lowest possible ambient temperature.
2) 0.12 ºC/min for natural conditions during transport, storage and handling.

SRS-286 The equipment, in their storage/transport packaging if applicable, shall withstand an instantaneous temperature variation of 63 ºC of the ambient temperature. The equipment shall be tested against the temperature variation both in the positive and negative direction (low-to-high and high-to-low temperature).The definition in MIL-STD-810G w/Change1 defined as 'an air temperature change greater than 10°C within one minute' is applicable as the instantaneous temperature variation.

SRS-287 The system shall withstand humidity levels ranging from 5% to 100 % (saturation) for storage, transport, and handling, with the applicable change of temperature. For the test chamber control purpose, 100% humidity implies as close as possible to 100% but at the minimum 95%.

SRS-288 The system (excluding TFRS, indoor part of IFoFL and M&C Laptop) shall withstand humidity levels ranging from 5% to 100 % (saturation) for operation, with the applicable change of temperature. For the test chamber control purpose, 100% humidity implies as close as possible to 100% but at the minimum 95%.

3.7.2 Rain/ Hailstone/ Ice and Snow

SRS-289 The system shall withstand 2.38 mm/min of rain with peaks of 41.5 mm/min, for operation (outdoor equipment only), transport, storage and handling.

SRS-290 The system shall withstand 37 mm of ice for operation (outdoor equipment only), storage, and handling.

SRS-291 The outdoor equipment shall survive hailstones of up to 25 mm diameter and 0.9 g/cm³ density and 58 m/s terminal velocity during operation, transport, storage, handling. The Contractor shall indicate in his design documentation the consequences of such hailstorms and identify the parts and components which may be damaged during such severe hailstorms. The Contractor shall also indicate the specific procedures to be followed in order to avoid such damage immediately before and during such hailstorms, and list the expected necessary spares and tools aimed to repair the equipment. Verification of the requirement shall be performed by analysis. The analysis is not required specifically for the camouflage nets themselves. When indicating specific procedures, to be followed in order to avoid damage to outdoor equipment immediately before and during hailstorms, camouflage nets can be taken into consideration as part of mitigation measures.

SRS-292 The system shall withstand snow loads of 50 kg/m² for small devices, and of 100 kg/m² for large devices during operation (outdoor equipment only), transport, storage, and handling. Verification of the requirement shall be performed by analysis. The analysis is not required specifically for the camouflage nets themselves.

[32] For the purposes of the previous requirement, cases with their content are considered as the small devices. The antenna, when installed, is considered as the large device.

3.7.3 Water / Particles

SRS-293 The system shall meet the following IP ratings in compliance with IEC 60529:1989 and AMD1: 1999 and AMD2: 2013 CSV - Degrees of protection provided by enclosures (IP Code)

1) IP67 for operation, transport, storage and handling for outdoor cables and connectors

2) IP65 for transport, storage and handling for cases.

3) IP54 for outdoor antennas and associated electronics/mechanisms, when in operation, and IP 65 when in transport, storage and handling.

SRS-294 The system shall withstand the following size and concentration conditions for dust and sand:

1) Up to 2.0 g/m³ of 150 µm particles for operation (outdoor equipment only), transport, storage, and handling. Sedimentation rate as high as 2.0 g/m²/day for ODU.

2) Average particle hardness of 7 in the Mohs scale, occasionally reaching 9 on that scale.

SRS-295 A cover that protects each connector against mechanical or environmental damage (rain, dust, etc.) during transport or when not in use shall be fitted and permanently attached to all connectors.

3.7.4 Altitude/ Atmospheric Pressure

SRS-296 The system shall withstand the following altitudes:

1) 0 to 3000 m for operation

2) 0 to 12,000 m for transport

3) 0 to 3000 m for storage, and handling.

SRS-297 Within the context of the requirements for altitude, the system shall withstand atmospheric pressures ranging from 1,087 mbar to 503 mbar. (It is assumed that minimum atmospheric pressure on board (pressurized) transport aircraft shall be at least 503 mbar).

3.7.5 Salt Mist/Acidic Atmosphere

SRS-298 Material shall withstand:

a) salt mist environments at severity level 4 of [IEC 60068-2-52:2017] for operation (outdoor equipment only), transport, storage and handling conditions;

b) acidic atmosphere conditions for operation (outdoor equipment only), transport, storage and handling conditions:
   1) Severity

- Three 2-hour spraying periods with 22 hours storage after each (as per MIL-STD-810G w/Change 1, 2014, method 518.2).

2) Use a test solution containing 11.9mg (6 Pl) sulphuric acid (95-98 percent)/4 litres (4.23 qt) of solution, and 8.8mg (6 Pl) nitric acid (68-71 percent)/4 litres (4.23 qt) solution in distilled or deionized water.

3.7.6 Biological and Chemical (BC) Protection/ Contaminants

SRS-299 Material operating outdoor and conditioned in its cases shall withstand occasional contamination by exposure to the contaminant fluids listed in method 504.2 in MIL-STD-810G w/Change 1, 2014]. Selection of the test fluids listed in 504.2 which are representative of those commonly encountered during the life cycle shall be made. Ast the minimum following fluids shall be selected:

1) For Test Procedure 1:

- Kerosene
- Diesel
- Gasoline
- Propan-2-ol (isopropyl alcohol)
- Denatured alcohol
- De-icing & antifreeze fluids
- Runway de-icers
- Coolant dielectric fluid
- Fire extinguishants

2) For test Procedure 2:

- Turbine fuels (JP-8), kerosene types
- Fuel oil diesel (DL-2) and other Grades
- Simulated sea water or 5% NaCl
- De-icers, Anti-Icing
- NBC Decontamination Kits

SRS-300 Material operating outdoor and conditioned in its cases shall withstand without substantial degradation limited contamination by the most relevant fungal species identified and listed in Table 1 of test method 308 [AECTP 300, Edition D, version 1, 2019], and shall manifest as:

1) Trace (scattered, sparse or very restricted microbial growth) for outdoor, shape performing equipment (such as antennas), unless it can be proven that mould growth does not impair device performance.

2) Light (intermittent manifestations or loosely spread microbial colonies on substrate surface. Includes continuous filamentous growth extending over the entire surface, but underlying surfaces are still visible) for outdoor exposed enclosures, cables and other non-shape performing-equipment.

SRS-301 While packaged for storage, handling, transport, material shall withstand without substantial degradation limited contamination by the same fungal species, and shall manifest as medium (substantial amount of microbial growth, substrate may exhibit visible structural change) growth severity.

[33] The purpose of the Biological and Chemical (BC) protection system is to stop aerosols and gases from entering the cases.

SRS-302 The system shall provide B/C protection when in storage, transport and non-operating modes.

SRS-303 The system shall also be capable of operating in a contaminated area induced by combat gases and aerosols. The contaminated area conditions shall apply to outdoor units and cases.

SRS-304 Decontamination of the outdoor units and cases shall be possible.

SRS-305 Following exposure to BC contamination, the system shall be able to be packed, transported and further operated after having been decontaminated in a benign area.

SRS-306 All outer surfaces of cases, antennas, cabling and other outdoor equipment exposed to B/C contamination shall be selected for their ability to withstand the effects of both contamination and decontamination.

SRS-307 Materials and auxiliary materials used in surfaces exposed to B/C contamination shall be resistant to BC (according to STANAG 4521 Edition 2) and decontamination agents.

SRS-308 Protection and selection of material guidance given in AEP-07 Edition 5, referred to in STANAG 4521 Edition 2, shall be used as guidance.

3.7.7 Wind

SRS-309 Auto-tracking shall be possible without degradation of performance (up to 0.3 dB for X-band and up to 0.5 dB for Ka-band pointing losses from boresight) in wind conditions up to 10 km/h.

SRS-310 Auto-tracking shall be possible (up to 0.5 dB for X-band and up to 0.8 dB for Ka-band pointing losses from boresight) in wind conditions up to 50 km/h with gusts up to 72 km/h.

SRS-311 Auto-tracking shall be possible without damage, and within herein specified limits of pointing losses from boresight (up to 1.5 dB for X-band and up to 3.0 dB for Ka-band), for wind conditions up to 80 km/h with gusts up to 100 km/h.

SRS-312 The antenna and its tracking system shall survive (deployed but non-operating, transport, storage, and handling) without damage, to wind conditions up to 96 km/h with gusts up to 120 km/h.

SRS-313 The antenna system shall be capable of surviving, without damage, wind speeds of 150 km/h, gusting to 180 km/h after the operator carries out anchoring procedures to be specified by the Contractor.

3.7.8 Mechanical

SRS-314 The system equipment shall withstand 30g, 11 ms, half-sine mechanical shocks for transport, storage, and handling.

SRS-315 The system equipment shall withstand 5-20 Hz, 0.05g²/Hz and 20-150Hz -3dB/Oct (1.7g rms) random vibrations for transport, storage, and handling.

SRS-316 The system equipment when packaged as designed during transportation, whether or not on pallets or platforms, when carried in aircraft, shall be restrained to the following minimum ultimate factors:

1) Forward 3.0g;
2) Side 1.5g;
3) Aft 1.5g;
4) Vertical (up) 2.0g

Note: For reference, see STANAG 7213, Edition 1 and its associated ATP-3.3.4.1 Edition A, Version 1 (Tactics, Techniques and Procedures for NATO Air Movements).

SRS-317 The system equipment shall withstand the following accelerations:

1) ≤10 g for transport
2) ≤ 2 g for storage and handling

SRS-318 The system equipment shall withstand a 30º face and corner drop and topple, for transport, storage, and handling.

SRS-319 The system equipment shall withstand the following free-fall conditions for transport, storage, and handling:

1) 1000 mm for items < 2 kg,
2) 500 mm for items < 5 kg,
3) 250 mm for items < 10 kg,
4) 100 mm for items < 50 kg,
5) 50 mm for items < 100 kg,
6) 25 mm for items < 250 kg

SRS-320 In addition, if the equipment is made part of a mechanical setup (e.g. a case), it shall withstand vertical free-falls of the complete assembly from up to 500 mm, when the equipment is properly mounted in its intended position.

3.7.9 Colour

SRS-321 The outdoor equipment shall be Chemical Agent Resistive Coating (CARC) coated in Dark Green (#34082) colour compliant with MIL-DTL-64159B standard (camouflage coating, water dispersible aliphatic polyurethane, chemical agent resistant).

SRS-322 The cases shall be coated in Dark Green (#34082) colour.

SRS-323 The coating shall meet requirements stipulated in STANAG 4360, Edition 3 (2012) and its associated AEPs:

1) AEP-64, Edition A, Version 1 (2012)
2) AEP-65, Edition A, Version 1 (2012)

SRS-324 Additional colour options (minimum of NATO Bronze Green (RAL6031) and Olive Drab) shall be made available so that a change (per operational requirements) could be made within a timeframe prior to product delivery.

3.7.10 Test Methods

SRS-325 The climatic and environmental tests shall include series of tests conducted in NATO country certified climatic chambers. Those tests shall include as a minimum:

1) High temperature
2) Low temperature
3) Change of temperature (temperature shock)
4) Solar radiation
5) Humidity
6) Ingress protection
7) Salt mist
8) Acidic atmosphere
9) Altitude, pressure

SRS-326 The mechanical tests shall include series of tests conducted in NATO country certified laboratory/testing plant*. Those tests shall include as a minimum:

1) Shock
2) Vibration
3) Acceleration

4) Drop and topple

5) Free fall

*A certified laboratory is the laboratory that is accredited according to: ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. Alternatively, it can be a laboratory that is accredited according to a national equivalent standard on the condition that such equivalent standard is recognized, applicable and in force in given NATO nation.

SRS-327 Compliance to the above climatic and environmental requirements shall be demonstrated by the following test methods:

1) High temperature: MIL-STD-810G w/Change 1, 2014, method 501.6 or AECTP 300, Edition D, version 1, 2019, Method 302

2) Low temperature: MIL-STD-810G w/Change 1, 2014, method 502.6 or AECTP 300, Edition D, version 1, 2019, Method 303

3) Temperature shock: MIL-STD-810G w/Change 1, 2014, method 503.6 or AECTP 300, Edition D, version 1, 2019, Method 304

4) Solar radiation: MIL-STD-810G w/Change 1, 2014, method 505.6 or AECTP 300, Edition D, version 1, 2019, Method 305

5) Humidity: MIL-STD-810G w/Change 1, 2014, method 507.6 or AECTP 300, Edition D, version 1, 2019, Method 317

6) Rainfall: MIL-STD-810G w/Change 1, 2014, method 506.6 or AECTP 300, Edition D, version 1, 2019, Method 310

7) Ice:MIL-STD-810G w/Change 1, 2014, method 521.4 or AECTP 300, Edition D, version 1, 2019, Method 311

8) Sand and dust: MIL-STD-810G w/Change 1, 2014, method 510.6 or AECTP 300, Edition D, version 1, 2019, Method 313

9) Low pressure (altitude): MIL-STD-810G w/Change 1, 2014, method 500.6 or AECTP 300, Edition D, version 1, 2019, Method 301

10) Shock: MIL-STD-810G w/Change 1, 2014, method 516.7 or or AECTP 400, Edition D Version 1, 2019, Method 403 or IEC60068-2-27:2008

11) Vibration: MIL-STD-810G w/Change 1, 2014, method 514.7 or AECTP 400, Edition D, Version 1, 2019, Method 401 or IEC 60068-2-64:2008 +AMD1:2019 CSV

12) Acceleration: MIL-STD-810G w/Change 1, 2014, method 513.7 or IEC 60068-2-7:1983+AMD1:1986 CSV

13) Drop, topple and free fall:IEC 60068-2-31:2008

14) IP ratings: AECTP 300, Edition D, version 1, 2019, method 307 for immersion and IEC 60529:1989+AMD1:1999+AMD2:2013 CSV for other requirements

15) Salt mist: MIL-STD-810G w/Change 1, 2014, method 509.6, or IEC 60068-2-52:2017, or AECTP 300, Edition D, version 1, 2019, method 309

16) Acid atmosphere: MIL-STD-810G w/Change 1, 2014, method 518.2 or AECTP 300, Edition D, version 1, 2019, Method 319

17) Contamination by fluids: MIL-STD-810G w/Change 1, 2014, method 504.2 or AECTP 300, Edition D, version 1, 2019, Method 314

18) Mould growth (Fungus): AECTP 300, Edition D, version 1, 2019, Method 308.

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

SRS-328 Any piece of equipment (including cases) used to demonstrate compliancy to the above climatic and environmental tests shall not be part of the delivery.

3.8 EMI/EMC Requirements

[34] Electromagnetic Compatibility (EMC) is a measure of a device's ability to operate as intended in its shared operating environment while, at the same time, not affecting the ability of other equipment within the same environment to operate as intended.

[35] Electromagnetic interference (EMI), is a disturbance generated by an electrical device, an electronic device or natural sources that can adversely affect (by electromagnetic induction, electrostatic coupling, or conduction) the performance of other electrical or electronic device located within the same environment.

SRS-329 Individual subsystems and equipment shall meet interference control requirements (such as the conducted emissions, radiated emissions, conducted susceptibility, and radiated susceptibility requirements of MIL-STD-461G) so that the overall system complies with all applicable requirements of MIL-STD-464C. Compliance shall be verified by tests that are consistent with the individual requirement (such as testing in accordance with MIL-STD-461G).

SRS-330 Generation of interference by each item of equipment that could result in EMI and susceptibility to emanations from other units, shall be controlled by design provisions that limit undesired emissions and responses.

SRS-331 This control of emanations and susceptibility shall apply to all the frequency ranges, including generated harmonics, spurious emissions, and susceptibilities, utilised by CIS equipments, when performing their intended function in all modes of operation. These modes shall include the normal communications configurations, as well as the test and maintenance configurations that may involve removal of units from their normal physical position.

SRS-332 The materials and construction methods selected for the equipment shall provide inherent attenuation to electromagnetic emanation and susceptibility, to meet the EMI/EMC requirements of this project, without compromising other mechanical requirements imposed by other specifications.

SRS-333 The Contractor shall ensure that the terminal is designed and manufactured so that the operational integrity and the performance of the terminal shall not suffer degradation due to EMI emanating from other equipment or generated by the terminal itself.

SRS-334 The Contractor shall ensure that the terminal is designed and manufactured so that it shall not degrade or disrupt the operational integrity and performance of other equipment connected to the terminal or in proximity to the terminal due to electromagnetic emanations or electromagnetic incompatibility.

SRS-335 All modules and their electronic components shall comply with MIL-STD-461G (Ground), dated Dec 2015 as follows:

1) Methods CE102 for conducted emissions (CE)

2) Methods CS101, CS114, CS115, CS116 and CS118 for conducted susceptibility (CS)

3) Methods RE102 for radiated emission (RE) (except TFRS and M&C laptop)

4) Methods RS103 for radiated susceptibility (RS) (except TFRS and M&C laptop).

SRS-336 The equipment shall comply 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. In particular, CE marking shall be required, and the corresponding Test Report indicating the technical standards used for the verification shall be provided.

3.9 Safety Requirements

[36] The Safe Failure Fraction (SFF) is the probability of the system failing in a safe state: the dangerous (or critical) state states are identified from Failure Mode, Effects and Criticality Analysis (FMECA) of the system.

SRS-337 Functional safety shall be implemented as per IEC 61508 and compliance certification shall be presented to the Purchaser.

SRS-338 RoHS-2 Directive [2011/65/EU] shall be applied to all system, subsystems and individual components of MB-DSGT. 2015/863 RoHS 2 amendment shall be applied for products placed on the market on or after 22 July 2019.

SRS-339 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-340 Projecting and overhanging edges shall be kept to a minimum.

SRS-341 Edges and corners shall be rounded.

SRS-342 When rounding of edges and corners is not possible, protective covers shall be applied.

SRS-343 When protective covers are not possible or not reasonably practical for installation, sharp edges shall be marked with appropriate safety labels and marking.

SRS-344 When packed, the system shall not include any protruding point which could either be damaged or damage persons or property during transportation.

SRS-345 The Contractor shall design to ensure protection of the system and its operators against lightning and high potential discharge. Protection measures shall be compatible with the measures proposed for EMI/EMC as described in section 3.8.

SRS-346 Lightning Conductors for the system shall be provided with all necessary ancillary components, including but not limited to cables, bus bars, ground rods, bolts, washers and cables to enable termination and the tools to hammer the rods in the ground and extract them.

SRS-347 The grounding cable for Lightning Protection shall be minimum 10 metres long.

SRS-348 All electric and electronic components / sub-systems shall be ruggedized.

SRS-349 All connectors shall be ruggedized.

SRS-350 All power cabling and electrical installations shall comply with European safety rules, including (but not limited to) IEC 61008, IEC 61009,IEC 60950 series, and IEC 60364.

SRS-351 All cables shall have non-toxic, halogen-free, non-inflammable coating, applying IEC 60332, IEC 62821 series and IEC 60754.

SRS-352 All electronic equipment shall be protected from electrostatic phenomena in accordance with IEC 61340 series.

SRS-353 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-354 Insulating and sheathing compounds of all outdoor cables shall have minimum tensile strength of 12 N/mm^2 in compliance with IEC 60811-501:2012.

SRS-355 For the dimensioning of the bending radius of power cables the regulations of VDE 0298, part 3 or equivalent shall be followed.

SRS-356 All outdoor power and data cables shall be:

1) Water resistant,
2) Rodent resistant,
3) Trampling resistant,
4) UV resistant according to EN 50289-4-17:2015 or its IEC, ISO equivalent.

SRS-357 All outdoor data cables, as minimum, shall meet following requirements:

1) Maximum tensile load during installation 1800N,
2) Maximum tensile load during operation 600N,
3) Impact resistance 200 impacts (EIA/TIA-455-25 military req.),
4) Crush resistance 440 N/cm (EIA/TIA-455-41 military req.),

5) Minimum bend radius 90 mm for installation and 45 mm for operation.

SRS-358 Cable harnesses shall be routed away from heat generating equipment and no wire or cable connection shall be in tension.

SRS-359 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. Verification of the requirement shall be performed by visual inspection (sample check) that can be executed by the system operators and maintainers (level I and II as the minimum).

SRS-360 Dissimilar metals shall not be used in intimate contact unless suitably protected against electrolytic corrosion.

SRS-361 All conductors and appropriate hardware shall be rated for the electrical current carrying capacity in accordance with the applicable industry standards.

SRS-362 Safety markings and labels shall be provided identifying any potential hazards to personnel.

SRS-363 Safety markings shall be readily visible during peacetime operation and maintenance conditions, commensurate with the need for “camouflage” during operation or transportation during “crisis” or “wartime” conditions.

SRS-364 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-365 Appropriate notices and markings on equipment shall be provided with special reference to heavy equipment and specific handling guidance.

SRS-366 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-367 No hazardous materials (of any kind) shall be used in the construction of the equipment. Glass fibre materials shall not be used as the outer surface or covering on cables, wire or other items where they may cause skin irritation to operating personnel.

SRS-368 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.

3.10 Security Requirements

[37] The below requirements are valid for M&C Laptop.

SRS-369 Basic Input/Output System (BIOS) / Unified Extensible Firmware Interface (UEFI) shall be accessible only by authorized privileged users.

SRS-370 Security patching of BIOS/UEFI firmware shall be possible.

SRS-371 Security measures shall prevent unauthorized removable storage media being used on the M&C Laptop.

SRS-372 Protection against malicious code shall be deployed.

SRS-373 The anti-malware solution shall use more than signature based detection.

SRS-374 The content of removable storage media obtained from external CIS shall be checked for malware before it is made accessible to users or other services on M&C Laptop for the first time.

SRS-375 The authenticity and integrity of software and firmware shall be verified before installation.

SRS-376 The execution of applications shall be controlled in order to ensure authorized execution.

SRS-377 Bespoke applications handling NATO information shall be developed following a defined Secure Software Development Life Cycle process which ensures security is taken into account during the design, deployment, and operation phases of the application lifecycle.

SRS-378 Applications in scope of above requirement shall be developed to employ data input and output sanitisation controls.

SRS-379 Operating system and applications shall be approved by Security Accreditation Authority (SAA).

[38] Already approved Operating systems and applications can be found on the NATO Approved Field Product List (AFPL) (available upon request).

SRS-380 If a software not on the AFPL is foreseen to be used, the contractor shall undergo the NATO official process to have the tool added on AFPL and approved by SAA.

SRS-381 Software shall be used under following conditions:

1) Supported with security patches

2) Do not require an obsolete version of OS, libraries and dependencies to function

SRS-382 Up to date hardening guidance to Operating System (OS) and configurable applications shall be applied. NATO approved security configuration guides are available upon request after Contract Award.

SRS-383 Outside of appropriate security area or administrative zone, the M&C Laptop cryptographically shall protect the confidentiality of “data at rest”.

[39] For the appreciation of the above requirement, the Contractor will consult NATO Information Assurance Product Catalogue website.

SRS-384 Data loss prevention measures shall be undertaken to detect and prevent potential data breaches.

SRS-385 Users shall access M&C Laptop using multifactor authentication.

SRS-386 Authenticator feedback information shall be obscured from the user during the authentication process.

SRS-387 The M&C Laptop shall store only cryptographically protected passwords. Hashed passwords shall be salted with unique and unpredictable salt per password.

SRS-388 The Contractor shall harden credential stores and mechanisms (e.g. Windows 10 Enterprise use Microsoft Credential Guard).

SRS-389 Session lock shall be implemented after 15 minutes of inactivity.

SRS-390 The M&C Laptop shall enforce a limit of unsuccessful login attempts after which at least one of the following measures is implemented:

1) The account is throttled
2) The account or smartcard is locked
3) The account is blocked for a predefined time
4) The device is purged/wiped

SRS-391 The M&C Laptop automatically shall log account creation, modification, enabling and privilege elevation, disabling and removal.

SRS-392 The OS logs shall contain as a minimum:

1) Authentication events
2) File and object events
3) Export (e.g. upload) and import (e.g. download) events
4) User account events
5) Privilege user events

SRS-393 Log records shall contain as minimum:

1) Timestamp
2) Event, status and/or error codes
3) Service/command/application
4) Name/user(s) or system account(s) associated with an event
5) Device used (e.g. MAC address, source and destination IP address, web browser)

SRS-394 An authoritative time source for M&C Laptop shall be used. Only privileged user shall be able to change the system time.

SRS-395 Logs shall be protected from unauthorized access modification and deletion.

SRS-396 Logging records shall be kept either online or offline for 3 years. Logging records shall be stored in MB-DSGT M&C Laptop.

SRS-397 The M&C Laptop shall have sufficient storage capacity (online supplemented by an offline archive) to meet the above requirement without the risk of over-writing required logging records.

Appendix A Applicable Documents

1. [NATO STANAG 5648] Interoperability of SHF SATCOM Terminals Standard, Ratification Draft or Latest Ratified Version at the Closing Date of IFB (NATO Unclassified).
2. [NATO STANAG 4370] Environmental Testing, Edition 7, 28 November 2019 (NATO Unclassified).
3. [AECTP 250, 2014] Electrical and Electromagnetic Environmental Conditions, Edition C, Version 1 (2014) - leaflet 254: Atmospheric electricity and lightning (NATO Unclassified).
4. [AECTP 400, 2019] Mechanical Environmental Tests, Edition D, Version 1 (NATO Unclassified).
5. [AECTP 300, 2019] Climatic Environmental Tests, Edition D, Version 1 (NATO Unclassified).
6. [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.
7. [2015/863/EU] RoHS-2 amendment - Commission Delegated Directive (EU) 2015/863 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.
8. [IEC 61508] Functional safety of electrical/electronic/programmable electronic safety-related systems.
9. [IEC 60038, 2009] IEC Standard Voltages.
10. [IEC 60529:1989, AMD1:1999 and AMD2:2013 CSV] Degrees of protection provided by enclosures (IP Code).
11. [IEC 60364 series] Low-voltage electrical installations.
12. [IEC 60364-4-41:2005+AMD1:2017 CSV] - Low voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock
13. [IEC 60364-7-717:2009] - Low-voltage electrical installations - Part 7-717: Requirements for special installations or locations - Mobile or transportable units
14. [IEC 61008 series] Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs).
15. [IEC 61009 series] Residual current operated circuit breakers with integral overcurrent protection for household and similar uses (RCBOs).
16. [IEC 60332:2020 SER] Tests on electric and optical fibre cables under fire conditions.
17. [IEC 60754 series] Test on gases evolved during combustion of materials from cables.
18. [DIN VDE 0298] Application of cables and Cords in Power Installations.
19. [ISO 11228-1:2003] Ergonomics -- Manual handling -- Part 1: Lifting and carrying.
20. [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.
21. [93/68/EEC] Council Directive amending Directives 87/404/EEC (simple pressure vessels), 88/378/EEC (safety of toys), 89/106/EEC (construction products), 89/336/EEC (electromagnetic compatibility), 89/392/EEC (machinery), 89/686/EEC (personal protective equipment), 90/384/EEC (non-automatic weighing instruments), 90/385/EEC (active implantable medicinal devices), 90/396/EEC (appliances burning

gaseous fuels), 91/263/EEC (telecommunications terminal equipment), 92/42/EEC (new hot-water boilers fired with liquid or gaseous fuels) and 73/23/EEC (electrical equipment designed for use within certain voltage limits), 22 July 1993.
22. [MIL-STD-188-164C] Interoperability of SHF SATCOM Terminals, USA Department of Defense Interface Standard, 16 November 2018.
23. Recommendation ITU-R S.580-6, Radiation diagrams for use as design objectives for antennas of earth stations operating with geostationary satellites, 2004.
24. [MIL-STD-461G] Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment, USA Department of Defense Interface Standard, 11 December 2015.
25. [MIL-STD-464C] Electromagnetic Environmental Effects Requirements for Systems, USA Department of Defense Interface Standard, 1 December 2010.
26. [MIL-STD-810G w/Change 1] Environmental Engineering Considerations and Laboratory Tests, USA Department of Defense Interface Standard, 15 April 2014.
27. [MIL-HDBK-419A] Military Handbook, Grounding, bonding and shielding for electronic equipments and facilities, USA Department of Defense, 29 December 1987.
28. [MIL-STD-1472G] Design Criteria Standard – Human Engineering, USA Department of Defense, 11 January 2012.
29. [MIL-HDBK-338B] Electronic Reliability Design Handbook – USA Department of Defense, 1 October 1998.
30. [EN 12195-1:2010] Load restraining on road vehicles. Safety . Calculation of securing forces.
31. [EN-12195-2:2001] Load restraint assemblies on road vehicles. Safety. Web lashing made from man-made fibres.
32. [AEP-31, 1994] Allied Engineering Publication, Edition 1, 1994: Reference Document of Colors for Disruptive Camouflage for Military Equipment In Use In NATO (NATO Unclassified).
33. [IEC 60445:2021] - Basic and safety principles for man-machine interface, marking and identification - Identification of equipment terminals, conductor terminations and conductors
34. [MD 2006/42/EC] - Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC
35. [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.
36. [IEC 60947-5-5:1997+AMD1:2005+AMD2:2016 CSV] - Low-voltage switchgear and controlgear - Part 5-5: Control circuitdevices and switching elements - Electrical emergency stop device with mechanical latching function.
37. [IEC 60947-5-1:2016] - Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices.
38. [ISO 13850:2015] - Safety of machinery — Emergency stop function — Principles for design.
39. [IEC 60204-1:2016] - Safety of machinery - Electrical equipment of machines - Part 1: General requirements.
40. [IEC 62040-1:2017/COR1:2019] Corrigendum 1 - Uninterruptible power systems (UPS) - Part 1: Safety requirements.

41. [IEC 62040-2:2016] Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements.
42. [IEC 62040-3:2011] Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements.
43. [IEC 62040-4:2013] Uninterruptible power systems (UPS) - Part 4: Environmental aspects - Requirements and reporting.
44. [ISO 3746:2010] Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane.
45. [ST/SG/AC.10/11/Rev.7] Manual of Tests and Criteria for Transport of Dangerous Goods – Seventh revised edition, United Nations, New York and Geneva, 2019
46. [IEC 61439 series] Low-voltage switchgear and controlgear assemblies.
47. [IEC 61140:2016] Protection against electric shock - Common aspects for installation and equipment.
48. [IEC 61643-11:2011] Low-voltage surge protective devices - Part 11: Surge protective devices connected to low-voltage power systems - Requirements and test methods.
49. [IEC 62305:2022 SER] Protection against lightning - ALL PARTS.
50. [IEC 61643-21:2000+AMD1:2008+AMD2:2012 CSV] Low voltage surge protective devices - Part 21: Surge protective devices connected to telecommunications and signalling networks - Performance requirements and testing methods.
51. [IEC 61643-22:2015] Low-voltage surge protective devices - Part 22: Surge protective devices connected to telecommunications and signalling networks - Selection and application principles.
52. [IEC 61340-4-6:2015] Electrostatics - Part 4-6: Standard test methods for specific applications - Wrist straps.
53. [IEC 60811-501:2012] Electric and optical fibre cables - Test methods for non-metallic materials - Part 501: Mechanical tests - Tests for determining the mechanical properties of insulating and sheathing compounds
54. [EN 50289-4-17:2015] Communication cables. Specifications for test methods - Test methods for UV resistance evaluation of the sheath of electrical and optical fibre cable
55. [IEC 60794-1-2:2021] Optical fibre cables - Part 1-2: Generic specification - Basic optical cable test procedures - General guidance
56. [STANAG 4521, Edition 2] AEP-7, Edition 5 (2012): Chemical, Biological, Radiological and Nuclear (CBRN) Contamination Survivability Factors in The Design, Testing and Acceptance of Military Equipment (NATO Unclassified).
57. [MIL-DTL-64159B] - Detail Specification: Camouflage Coating, Water Dispersible Aliphatic Polyurethane, Chemical Agent Resistant, 24 January 2011.
58. [IEC60068-2-27:2008] Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock.
59. [IEC60068-2-64:2008 +AMD1:2019 CSV] Environmental testing - Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance.
60. [IEC 60068-2-7:1983+AMD1:1986 CSV] Basic environmental testing procedures - Part 2-7: Tests - Test Ga and guidance: Acceleration, steady state.
61. [IEC60068-2-31:2008] Environmental testing - Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens.

62. [IEC60068-2-52:2017] Environmental testing - Part 2-52: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution).
63. [IEC 60950 series] Information technology equipment – Safety.
64. [IEC 62821 series] Electric cables - Halogen-free, low smoke, thermoplastic insulated and sheathed cables of rated voltages up to and including 450/750 V.
65. [IEC 61340 series] Electrostatics.
66. [STANAG 4360, Edition 3, 2012] Specification for Paint Systems, Resistant to Chemical Agents and Decontaminants, for the Protection of Land Military Equipment (NATO Unclassified).
67. [AEP-64, Edition A, Version 1, 2012] Performance Requirements for Paint Systems Resistant to Chemical Agents and Decontaminants, for the Protection of Land Military Equipment (NATO Unclassified).
68. [AEP-65, Edition A, Version 1, 2012] Performance Requirements and Test Method for Paint Systems Resistant to Chemical Warfare Agents (NATO Unclassified).

Appendix B List of Acronyms

Acronym	Description
ACU	Antenna Control Unit
AECTP	Allied Environmental Conditions and Test Publication
AEP	Allied Engineering Publication
ASNMC	Advanced SATCOM Network Management and Control
CIS	Communications and Information System
COTS	Commercial Off The Shelf
DBAC	Deployable Baseband Augmentation Component
DCIS	Deployable Communications and Information System
DSGT	Deployable Satellite Ground Terminal
DTL	Detail
E_b/N_o	Energy-per-bit to Noise Power Density Ratio
EIRP	Effective Isotropic Radiated Power
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EPM	Electronic Protection Measures
GPS	Global Positioning System
HDBK	Handbook
HMA	Hybrid Multi Application
IEC	International Electrotechnical Commission
IFB	Invitation For Bid
IFoFL	Interfacility over Fiber Link
ISO	International Organization for Standardization
LNA	Low-Noise Amplifier
LNB	Low-Noise Block
LRU	Line Replaceable Unit
MTBCF	Mean Time Between Critical Failures
NATO	North Atlantic Treaty Organization
ODU	Outdoor Unit
OMT	Ortho Mode Transducer
PFP	Purchaser Furnished Property

Acronym	Description
RMS	Root Mean Square
SATCOM	Satellite Communications
SHF	Super-High Frequency
SNMP	Simple Network Management Protocol
SRS	System Requirements Specification
STANAG	Standardization Aggrement
TCP	Transmission Control Protocol
TSGT	Transportable Satellite Ground Terminal
UPS	Uninterruptible Power Supply
USNO	United States Naval Observatory
UTC	Universal Time Coordinated

Appendix C Required Data of the Terminals to Have Authorization for Satellite Access

Note that the below values shall be provided for all the operating frequency bands of the system;

Parameters	
1	Terminal Name (Manufacturer and Model):
2	Supportable Band(s) (of operation/frequency range) (GHz):
3	Description:
4	Antenna Type: (Mobile, VSAT, Parabolic, Phased array etc)
5	Antenna Diameter (m) to include Effective Elliptical Diameter for flat panel and elliptical antennas:
6	Antenna Efficiency (%):
7	Transmit Reference Frequency (MHz):
8	Reference frequency at which transmit antenna gain is determined (for X and mil-Ka band):
9	TX Antenna Gain at low (dBi):
10	TX Antenna Gain at medium (dBi):
11	TX Antenna Gain at high (dBi):
12	High Power Amplifiers (HPA) Type:
13	Is Linearizer fitted?
14	Is terminal designed to operate in linear or non- linear part of transfer characteristic?
15	High Power Amplifiers (HPA) Maximum Output Power (Watts):
16	High Power Amplifiers (HPA) Maximum Linear Output Power (Watts):
17	Output Backoff from Saturation Constraint (dB), if other than -3 dB from Saturated Power:
18	Identify if the HPA contains a power limiter that prevents operating at maximum output power:
19	Maximum Linear Effective Isotropic Radiated Power (EIRP) (dBW):
22	Transmit EIRP Spectral Density (ESD):
23	Receive Reference Frequency (MHz):

24	Reference frequency at which receive antenna gain is determined (for X and mil-Ka band):
25	RX Antenna Gain (dBi) - Low frequency
26	RX Antenna Gain (dBi) - Medium frequency
27	RX Antenna Gain (dBi) - High frequency
28	G/T (dB-K) at 10° elevation
29	G/T (dB-K) at 20° elevation
30	G/T (dB-K) at 30° elevation
31	LNA Noise Temperature (K):
32	Maximum Antenna Elevation Angle (deg):
33	Minimum Antenna Azimuth Angle (deg):
34	Tabular and graphical antenna gain pattern (Essential for all antenna with a = ≥50) data are required for both co- and cross-polarization (in decibels-isotropic (dBi)). State if the terminal will use a radome. If so, the pattern data must include radome effects.

The pattern data shall consist of the following:

- Pattern cut plots shall be provided for both transmit (uplink) and receive (downlink) frequencies

- Azimuth pattern cuts at low, mid, high frequencies from -180° to +180°

- Elevation pattern cuts at low, mid, and high frequencies from 0° to +90°

- Ka-band terminal azimuth and elevation pattern cuts shall be made for transmit and receive in both RHCP and LHCP polarizations

- X-band terminals are required to submit pattern cuts for RHCP transmit and receive LHCP receive only

- All tabular pattern cut data shall include angular step sizes no greater than 0.1°

- Tabular pattern cut data shall be presented as individual text files. These files shall be comma delimited and consist of two columns of data. The first column shall be the angular pointing in degrees with 0° equating to boresight. The second column shall be the gain of the antenna in dBi. No other information shall be contained within the file:

o XX = band (X or Ka)

o fff = frequency (low, mid, high in MHz)

o pppp = polarization (RHCP, LHCP)

o ll = Uplink or Downlink (ul, dl)

o dd = Azimuth or Elevation (az, el)

o cc = Co-polarization or Cross-polarization (co, cx)

35	TX and RX Axial Ratio Values. If the terminal will use a radome, Axial Ratio data must include radome effects:
36	Frequency stability (measured maximum frequency delta over 24 hours):
37	Terminal Transmit Polarization (Left-Hand Circular Polarization [LHCP]/Right-Hand Circular Polarization [RHCP]):
38	Terminal Transmit Cross- Polarization Isolation (dB). *Note: provide RHCP value for X-band terminals; provide both*
39	RHCP and LHCP values for Ka-band terminals:
40	Terminal Receive Polarization (LHCP/RHCP):
41	Terminal Receive Cross-Polarization Isolation Note: If the terminal uses a radome, data must include radome effects. Provide LHCP value for X-band terminals; provide both RHCP and LHCP values for Ka-band terminals (dB):
42	Isolation Loss (dB) (Terminal Specific):
43	Abnormal Atmospheric Loss (dB) (Usually none) (Terminal Specific):
44	Passive intermodulation and Intermodulation levels for multi carrier systems
45	Feed Loss (dB) (Terminal Specific):
46	HPA Stability: For any setting of the transmit gain and a constant IF input level, the EIRP in the direction of the satellite shall not vary more than +1.0 dB or -1.5 dB in any 24-hour period
47	Antenna Pointing Loss (dB) (Terminal Specific):
48	Radome Loss (dB) (Terminal Specific and if not included and identified in antenna patterns):
49	Harmonic Emissions (dBc) (Terminal Specific):
50	Transmit Spurious Emissions – In band and Out of Band (dBc) (Terminal Specific):

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