



NATO SUPPORT AND PROCUREMENT AGENCY
AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

STATEMENT OF WORK (SOW)
FOR THE
ACQUISITION OF
ANTI-AIRCRAFT ARTILLERY (AAA) SYSTEM
FOR THE PORTUGUESE ARMY

Document No: NSPA-LD-AAA-SOW

Issue No: 1.5

Issue Date: 06 December 2023

SA Number: SA-PRT-053



NATO SUPPORT AND PROCUREMENT AGENCY
AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

This Page Intentionally Left Blank.



NATO SUPPORT AND PROCUREMENT AGENCY
AGENCE OTAN DE SOUTIEN ET D'ACQUISITION



NATO SUPPORT AND PROCUREMENT AGENCY

AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

TABLE OF CONTENTS

1. FOREWORD	8
2. BACKGROUND INFORMATION	9
3. RESPONSIBILITIES	9
4. PLACE OF PERFORMANCE & DELIVERY / END USER	9
5. OVERALL SCOPE / MAIN OBJECTIVES	9
6. REFERENCES & APPLICABLE DOCUMENTS	11
7. AAA BASIC SYSTEM – PROJECT MANAGEMENT REQUIREMENTS	13
7.1. PROJECT MANAGEMENT	13
7.2. PROJECT MANAGEMENT PLANS	13
7.2.1. <i>Project Management Plan (PMP)</i>	13
7.2.2. <i>Quality Management Plan (QMP)</i>	14
7.3. PROJECT MEETINGS	14
7.3.1. <i>Overall organisation</i>	14
7.3.2. <i>Kick-Off Meeting (KoM)</i>	15
7.3.3. <i>Project Management Review (PMR) and technical meetings</i>	15
7.4. DATA EXCHANGE	15
7.5. INTEGRATION REQUIREMENTS	16
7.6. USAGE PROFILE	16
7.7. USE OF GOVERNMENT FURNISHED EQUIPMENT (GFE)	17
7.7.1. <i>Management and transfers</i>	17
7.7.2. <i>Identification</i>	17
7.8. SYSTEM ENGINEERING ACTIVITIES	18
7.9. CONFIGURATION MANAGEMENT (CM)	18
7.9.1. <i>Configuration Management Strategy & Responsibilities</i>	18
7.9.2. <i>Configuration Identification</i>	18
7.9.3. <i>Change Control</i>	19
7.9.4. <i>Configuration Audit and Verification</i>	20
7.10. QUALITY ASSURANCE	20
7.11. VERIFICATION AND ACCEPTANCE (V&A) ACTIVITIES	20
7.11.1. <i>Overview of the overall verification and acceptance test activities</i>	21
7.11.2. <i>Factory Acceptance Test (FAT)</i>	21
7.11.3. <i>Site Acceptance Test (SAT)</i>	22
7.11.4. <i>Final Acceptance (FinAc)</i>	22
7.11.5. <i>Discrepancy Reporting & Resolution for V&A activities (Failure Register)</i>	23
8. AAA BASIC SYSTEM – TECHNICAL REQUIREMENTS	24
8.1. AAA BASIC SYSTEM – GENERAL REQUIREMENTS	24
8.2. AAA BASIC SYSTEM – SYSTEM MODES	25
8.3. AAA BASIC SYSTEM – MOBILITY REQUIREMENTS	26
8.4. AAA BASIC SYSTEM – POWER REQUIREMENTS	26
8.5. AAA BASIC SYSTEM – CIS GENERIC REQUIREMENTS	27
8.6. AAA BASIC SYSTEM – CIS ABN REQUIREMENTS	27
8.7. AAA BASIC SYSTEM – ENVIRONMENTAL CONDITIONS	28
8.8. AAA BASIC SYSTEM – DESIGN AND INTEGRATION CONSTRAINTS	28



NATO SUPPORT AND PROCUREMENT AGENCY

AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

8.9.	AAA BASIC SYSTEM – SAFETY AND OPERATIONAL HEALTH REQUIREMENTS	28
8.10.	AAA BASIC SYSTEM – MOBILE C2C/3D RADAR REQUIREMENTS	29
8.10.1.	Mobile C2C/3D radar – Functional components	29
8.10.2.	Mobile C2C/3D radar – Subsystem modes	29
8.10.3.	Mobile C2C/3D radar – C2IS functional requirements	29
8.10.4.	Mobile C2C/3D radar – Radar performance requirements	31
8.11.	AAA BASIC SYSTEM – PWT FOR MANPADS REQUIREMENTS	32
8.11.1.	PWT for MANPADS – Subsystem modes	32
8.11.2.	PWT for MANPADS – C2IS functional requirements.....	32
8.12.	AAA BASIC SYSTEM – MOBILE AAA LAUNCHER REQUIREMENTS.....	32
8.12.1.	Mobile AAA launcher – Functional components	32
8.12.2.	Mobile AAA launcher – Subsystem modes	33
8.12.3.	Mobile AAA launcher – C2IS functional requirements.....	33
8.12.4.	Mobile AAA launcher – Performance requirements.....	34
8.13.	AAA BASIC SYSTEM – TACTICAL VEHICLE REQUIREMENTS.....	35
8.13.1.	Tactical vehicle – General requirements	35
8.13.2.	Tactical vehicle – Engine and transmission	35
8.13.3.	Tactical vehicle – Mobility.....	36
8.13.4.	Tactical vehicle – Ballistic/mine protection.....	36
8.13.5.	Tactical vehicle – Air conditioning/ventilation	36
8.14.	AAA BASIC SYSTEM – ILS PERFORMANCE REQUIREMENTS.....	36
8.14.1.	ILS performance – Product marking.....	36
9.	AAA BASIC SYSTEM – ILS REQUIREMENTS.....	37
9.1.	INTEGRATED LOGISTIC SUPPORT (ILS) GENERAL	37
9.1.1.	ILS Programme	37
9.1.2.	ILS Management	37
9.1.3.	ILS Planning	37
9.1.4.	ILS Reviews	37
9.1.5.	Maintenance Concept	37
9.2.	LOGISTIC SUPPORT ANALYSIS.....	38
9.3.	MAINTENANCE PLANNING	38
9.3.1.	Level of Repair Analysis	38
9.3.2.	Task Analysis	38
9.3.3.	Source Maintenance and Recoverability Codes	38
9.4.	SUPPLY SUPPORT AND SUPPORT EQUIPMENT	38
9.4.1.	Supply Concept.....	38
9.4.2.	Support Tools and Test Equipment.....	39
9.4.3.	Equipment Codification	39
9.4.4.	Obsolescence Management	39
9.5.	TECHNICAL DOCUMENTATION.....	40
9.5.1.	General.....	40
9.5.2.	Technical Manual Validation.....	40
9.5.3.	Technical Manual Delivery	40
9.6.	TRAINING	41
9.6.1.	General.....	41
9.6.2.	Training Plan	41
9.6.3.	Initial Training for Site Personnel (OLM)	41
9.6.4.	Specialist Training (ILM).....	41
9.6.5.	Training for Instructors.....	41
9.6.6.	Training Courses.....	42
9.6.7.	Training Documentation and Equipment	42



NATO SUPPORT AND PROCUREMENT AGENCY

AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

9.6.8.	Course Administration.....	42
9.7.	PACKAGING, HANDLING, STORAGE AND TRANSPORTATION.....	43
10.	AAA SYSTEM – ENHANCED CAPABILITIES.....	44
10.1.	EC ML#1 – ENHANCED MOBILE AAA LAUNCHER PERFORMANCE.....	44
10.2.	EC ML#2 – ENHANCED SELF-DEFENCE CAPABILITIES.....	44
10.3.	EC R – ENHANCED 3D RADAR PERFORMANCE.....	45
10.3.1.	EC R – Subsystem modes.....	45
10.3.2.	EC R – Radar performance requirements.....	45
10.4.	EC C2 – ENHANCED C2 PERFORMANCE.....	46
10.5.	EC V – ENHANCED VEHICLE OPERATIONAL SUITABILITY.....	47
10.5.1.	EC V – General requirements.....	47
10.5.2.	EC V – Engine and transmission.....	48
10.5.3.	EC V – Mobility.....	48
10.5.4.	EC V – Battlefield protection & monitoring.....	49
10.5.5.	EC V – All terrain driving protection.....	49
10.5.6.	EC V – Electrical system.....	49
10.5.7.	EC V – Air conditioning/ventilation.....	49
10.5.8.	EC V – Ancillaries.....	49
10.5.9.	EC V – Enhanced Ballistic/mine protection.....	50
10.6.	EC ILS – ENHANCED LOGISTIC SUPPORT.....	50
10.6.1.	ILS Performance.....	50
10.6.2.	ILS Planning.....	51
10.6.3.	Maintenance Concept.....	51
10.6.4.	Logistic Support Analysis Plan.....	51
10.6.5.	Supply Concept.....	51
10.6.6.	Support Tools and Test Equipment.....	51
10.6.7.	Obsolescence Management.....	51
10.6.8.	Technical Documentation.....	51
10.6.9.	Technical Manual Validation.....	51
10.6.10.	Packaging, Handling, Storage and Transportation.....	51
10.6.11.	Facilities.....	52
11.	AAA SYSTEM – OPTIONAL CAPABILITIES.....	53
11.1.	OC ML#1 – ADDITIONAL MOBILE AAA LAUNCHERS.....	53
11.2.	OC ML#2 – ADDITIONAL PWTs FOR MANPADS.....	53
11.3.	OC ML#3 – BATCH OF MISSILES.....	53
11.4.	OC ML#2.1 – BATCH OF AMMUNITIONS FOR SELF-DEFENCE EQUIPMENT.....	53
11.5.	OC C2C/3DR – ADDITIONAL MOBILE C2C/3D RADAR.....	53
11.6.	OC ILS#1 – FOLLOW-ON TRAINING SESSIONS AND DOCUMENTATION.....	54
11.7.	OC ILS#2 – BATCH OF SPARES.....	54
	ANNEX A: LIST OF DELIVERABLE PRODUCTS AND SERVICES.....	55
	ANNEX B: CONTRACT DATA REQUIREMENT LIST (CDRL) AND MAIN MEETINGS/REVIEWS.....	56
	AAA PROJECT CDRL.....	56
	AAA PROJECT MAIN (I.E. [ESSENTIAL]) MEETINGS/REVIEWS.....	58
	ANNEX C: GLOSSARY OF DEFINITIONS AND ACRONYMS.....	59
	DEFINITIONS.....	59
	ACRONYMS.....	59
	ANNEX D: LIVE FIRING EXERCISE SCENARIO.....	63



NATO SUPPORT AND PROCUREMENT AGENCY

AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

ANNEX E: TECHNICAL DETAILS	64
ITEMS CONSTITUTING 3 DAYS OF SUPPLY (DOS) FOR A CREW OF 3 SOLDIERS	64
VEHICLE STANDARD ACCESSORIES/ON-BOARD ASSETS	65
EXAMPLE OF GENERAL PURPOSE (I.E. STANDARD) TOOLS AND TEST EQUIPMENT NOT EXPECTED TO BE DELIVERED AS PART OF THE DELIVERED STTE	66

TABLE OF FIGURES AND TABLES

Figure 1 - AAA Basic System / EC / OC.....	9
Figure 2 – AAA basic system C2 architecture	25
Figure 3 – AAA system enhanced C2 architecture	46

Table 1 - EC/OP description.....	10
Table 2 – Applicable documents	12
Table 3 – Usage profile	17
Table 4 – AAA project verification and acceptance activities	21



NATO SUPPORT AND PROCUREMENT AGENCY

AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

1. FOREWORD

This SoW describes the responsibilities and efforts to be performed by the Contractor but also the system requirements for the acquisition of an Anti-Aircraft Artillery (AAA) system for the Portuguese (PRT) Army.

The SoW is comprised of 11 sections and 5 annexes that describe from a managerial and technical standpoint, the requirements for the Contractor's performance of the Contract.

The body of the Statement of Work is supported by the annexes as follows:

- Annex A – List of deliverables products and services incl. tentative timeline,
- Annex B – Contractual deliverables (CDRL list) and main meetings/reviews,
- Annex C – Glossary of definitions and acronyms,
- Annex D – Live Firing Exercise scenario,
- Annex E – Technical details.

Each requirement defined in this document and its annexes has a unique requirement number (MGMT.Req.X. for the management part and TECH.Req.X. for the system requirements. This supports the requirements management (i.e. traceability) through the duration of the project.

Whenever applicable, the requirements are marked as **[KSA]** (Key System Attribute) or **[KPP]** (Key Performance Parameter) indicating the most important features of the system. It highlights which attributes and performances are of prime importance for the end-user.

At the end of each requirement, the requirement type is marked in square bracket as either **[Essential]**, **[Desirable]** or **[Optional]**. The meaning is as follows:

- **[Essential] requirement** type means that the requirement is a mandatory requirement which the product to be delivered shall meet; these requirements are usually defined as a clear technical feature or target.
- **[Desirable] requirement** type means that the requirements represent features which the product to be delivered should meet. Such requirements are expected to bring higher performance, additional qualities or capabilities to the system. However, this requirement is does not fall under the Essential category (i.e. not mandatory).
- **[Optional] requirement** type means the option(s) will be executed upon Contract award or during the execution of the project subject to Purchase Order issuance.

2. BACKGROUND INFORMATION

The Ministry of Defence (MoD) of Portugal (PRT) and the Portuguese Army currently use the M48 Chaparral system for short and very short-range air defence (SHORAD/VSHORAD) capabilities. The legacy systems are ageing and there is an urgent need to replace them by a new Anti-Aircraft Artillery (AAA) system, capable of meeting the advances in term of technology while also considering new threats, and integrating the other air defence capabilities in service in the PRT Army (Man-Portable Air Defence Systems - MANPADS).

3. RESPONSIBILITIES

On behalf of PRT Army, the NATO Support and Procurement Agency (NSPA) is responsible for the management of the overall AAA system project and acts as Contracting Authority. In order to ease the readability of the Statement of Work (SoW), the Contracting Authority will be designated by the acronym NSPA. The beneficiary of this acquisition, PRT Army, will be designated as end-user. The provider of the AAA system, in the framework of this acquisition, will be designated as the Contractor.

4. PLACE OF PERFORMANCE & DELIVERY / END USER

The end-user of the AAA system will be PRT Army. The AAA system could be deployed in various locations in NATO Countries, but the place of delivery of the products, activities and services covered by this Contract will be “Unidade de Apoio Geral de Material do Exército”, Estrada do Infantado 2890-403, Benavente, Portugal.

5. OVERALL SCOPE / MAIN OBJECTIVES

The AAA system project will be organised in one single phase during which the Contractor will be requested to successfully deliver a “AAA Basic System” (i.e. [Essential] requirements), enhancements (i.e. [Desirable] requirements) and/or optional capabilities (i.e. [Optional] requirements) as follows:

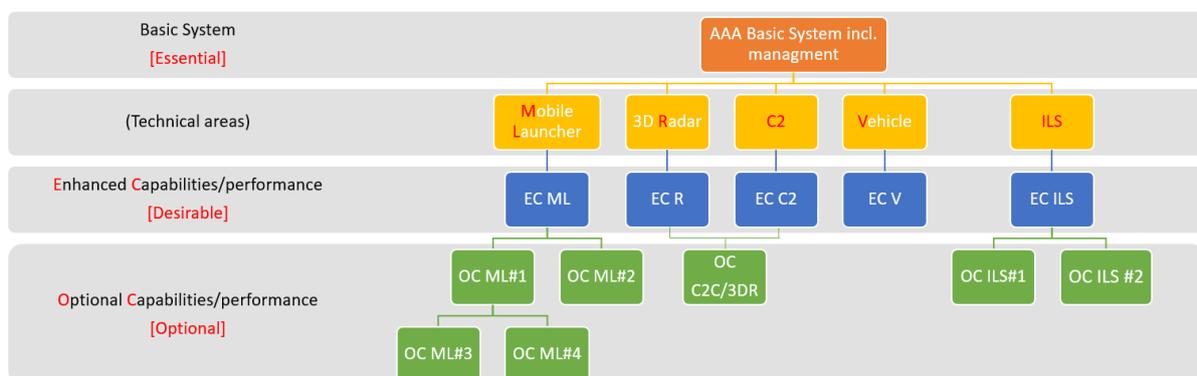


Figure 1 - AAA Basic System / EC / OC

The terminology “AAA Basic System” embeds the technical requirements but also the management, training and documentation requirements for 1 (one) Fire Unit.



NATO SUPPORT AND PROCUREMENT AGENCY

AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

As [Essential] requirement, there shall be one Fire Unit be constituted of:

- ⇒ 1 (one) C2C + 3D radar (i.e. the Mobile C2C/3D radar),
- ⇒ 3 (three) AAA launchers integrated on a vehicle (i.e. the Mobile AAA launchers) + first batch of missiles,
- ⇒ 2 (two) Portable Weapon Terminals (PWTs) for integration of existing MANPADS (i.e. PWTs for MANPADS).

The Enhanced Capability (EC) packages associated to the AAA Basic System will comprise a set of desirable requirements.

The Optional Capabilities (OC) will be constituted of single requirements related to specific services or deliverables that could be ordered throughout the duration of the Contract subject to Purchase Order issuance.

The summary table of each EC and OC is as follows:

EC/OP ID	EC/OP description
EC ML	Enhanced capabilities associated with Mobile AAA launcher performance
OC ML#1	1 ea additional Mobile AAA launchers
OC ML#2	2 ea additional PWTs for MANPADS
OC ML#3	Batch(es) of additional missiles (up to 3 x 8 ea)
OC ML#4	Batch(es) of ammunitions (up to 4 x 8/40/80 ea)
EC R	Enhanced capabilities associated with 3D radar performance
EC C2	Enhanced capabilities associated with C2 performance
OC C2C/3DR	1 ea additional Mobile C2C/3D radar
EC V	Enhanced capabilities associated with vehicle operational suitability
EC ILS	Enhanced capabilities associated with logistic support
OC ILS#1	Follow-on training sessions and documentation
OC ILS#2	Batch of spares for 1 year of support

Table 1 - EC/OP description

The main objectives of the AAA system project are the following:

1. Usage of high reliability sub-systems maximising the use of proven-mission COTS/MOTS based solutions, qualified items or Non-Developmental Items;
2. Delivery of initial and final operational capability as early as possible;
3. Reduced operation and support costs.

The requested quantities and expected delivery schedule is presented in **Annex A**.

The list of contractual deliverables as well as the timeline and the main meetings and reviews are summarized in **Annex B**.

6. REFERENCES & APPLICABLE DOCUMENTS

The following list is a list of documents which, in their most current version/revision, are considered relevant in whole or in part to the object of this SoW.

In case of a conflict between the requirements of this SoW and any of documents mentioned as reference, the SoW will prevail.

		Applicable documents
[Essential]	AQAP 2105 (Ed. C)	NATO Requirements for Deliverable Quality Plans
	RoHS Directive 2011/65/EU	Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)
	REACH Regulation EC 1907/2006	Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
	ISO 10007:2017	Quality management — Guidelines for configuration management
	EN9100	Quality management — Guidelines for configuration management
	AQAP 2110	NATO Quality Assurance Requirements for Design, Development and Production
	AQAP 2070	NATO Mutual Government Quality Assurance (GQA)
	MIL-STD-810 G or H	Environmental Engineering Considerations and Laboratory Tests
	STANAG 4370	Environmental testing
	MIL-STD-188/124A	Grounding, bonding and shielding for common long haul/tactical communication systems including ground based communications-electronics facilities and equipment
	MIL-HDBK-419A	Grounding, bonding and shielding for electronic equipment and facilities
	FED. STD. 595C	Federal Standard color referencing
	GE RAL Classic 840HR 6014	RAL colors registry
	AR 700-82	Joint Regulation Governing the Use and Application of Uniform Source Maintenance and Recoverability Codes
STANAG 4177	Codification – Uniform system of data acquisition	
[Desirable]	STANAG 5518 Ed.4/ATDLP-5.18(B)	Interoperability Standard for Joint Range Extension Application Protocol (JREAP)
	STANAG 5516 Ed.8/ATDLP-5.16(B)	Tactical Data Exchange - Link 16
	STANAG 4101 (Ed. 02)	Towing Attachments
	STANAG 4478 (Ed. 01)	Emergency towing and recovery facilities for tactical land vehicles



NATO SUPPORT AND PROCUREMENT AGENCY
AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

STANAG 2129 (Ed. 07)	Identification of Land Forces on the battlefield and in an area of operation
STANAG 4569 (Ed. 01) and AEP 55 Vol 1/2 Ed. 01	Protection levels for occupants of armoured vehicles
STANAG 2920 (Ed. 02)	Classification of personal armour
ASD S1000D	International specification for technical publications using a common source database
STANAG 4280	NATO Packaging and Preservation

Table 2 – Applicable documents



7. AAA BASIC SYSTEM – PROJECT MANAGEMENT REQUIREMENTS

7.1. Project management

MGMT_Req.1. The Contractor shall manage the project using the necessary tools and techniques to fulfil the AAA system project requirement within the timeline committed upon Contract award. **[Essential]**

MGMT_Req.2. The Contractor shall prepare and release all contractual deliverables in accordance with the tables in **Annex A** and **Annex B**. **[Essential]**

MGMT_Req.3. DELETED. **[Essential]**

MGMT_Req.4. The Contractor shall appoint a single Project Manager who will be the main Point of Contact (PoC) for NSPA for this project. The Contractor Project Manager shall be responsible for the management, the successful execution and the fulfilment of the requirements of this Contract. **[Essential]**

Note: From the Contract award date T0, the NSPA Project Manager will act as main NSPA representative and will be the primary interface with the Contractor for the good execution of this project. All contractual matters will be exclusively handled by the NSPA Procurement Officer and the NSPA Technical Lead and/or the relevant Subject Matter Expert (SME) will cover the technical part.

7.2. Project management plans

7.2.1. Project Management Plan (PMP)

MGMT_Req.5. The Contractor shall prepare and submit for approval by NSPA a **Project Management Plan (PMP)**, which shall describe in detail how the Contractor will manage the project from the Contract award date (T0) until the Contract closure. **[Essential]**

MGMT_Req.6. The PMP shall cover all aspects of project management and control, and shall explain how the Contractor plans to meet the delivery dates agreed upon Contract award. In this extent, the PMP shall address at least the following topics: **[Essential]**

- a. The management structure of the Contractor for this project, including its relationship within the company structure;
- b. The project organisation structure and the identification of the main project stakeholders, their respective roles, responsibilities and authority but also the type of information/documentation/date expected to be exchanged with them;
- c. The **Project Master Schedule (PMS)**. The PMS shall be based on a Gantt chart and used to both monitor and measure the Contract progress against the delivery requirements, in particular for the achievement of the operational capabilities acceptances. The PMS indicates the timeline of all the project activities) and shall be maintained by the Contractor. Any changes to the initially approved PMS shall require the agreement of both parties (the Contractor and NSPA);
- d. Any necessary management provisions, external relationships and project controls to both track project performance and highlight potential problem



areas;

- e. The Risk Management activities;
- f. The Configuration Management activities.

MGMT_Req.7. The Contractor shall submit the final version of the PMP (including PMS) to NSPA for review and approval. **[Essential]**

MGMT_Req.8. The Contractor shall understand the approval of the PMP by NSPA as acknowledgment of a logical and satisfactory approach for the management of the activities required in the frame of this Contract. Should any conflict, ambiguity or omission arise between the PMP and the SoW, the requirements of the Contract supersede the statements of the PMP. **[Essential]**

MGMT_Req.9. The Contractor shall consider the final version of the PMP (i.e. the version approved by NSPA) as the official document against which the execution of this Contract is conducted. Due to the duration of the project and the PMP being a living document, the Contractor shall consider a maximum of two updates in addition of the first approved version. **[Essential]**

7.2.2. Quality Management Plan (QMP)

MGMT_Req.10. The Contractor shall provide a **Quality Management Plan (QMP)** according to the requirements of **AQAP-2105** and shall ensure that all procedures referenced are accessible to NSPA AAA project representative if required. **[Essential]**

MGMT_Req.11. DELETED **[Essential]**

MGMT_Req.12. DELETED **[Essential]**

7.3. Project Meetings

7.3.1. Overall organisation

MGMT_Req.13. The Contractor shall grant NSPA the right to invite end-user representatives to any meeting, review or test/acceptance activities mentioned in this SoW. **[Essential]**

MGMT_Req.14. No later than two weeks prior to each project meeting described in this SoW (technical reviews, logistic conferences and meetings organised during the verification and acceptance activities included), the Contractor shall submit an **Agenda** covering all topics that he would like to address. When required (for instance because of bank holidays, bridging days etc.), NSPA and the Contractor shall agree a more appropriate delivery date. **[Essential]**

MGMT_Req.15. Within two weeks after each project meeting described in this SoW (technical reviews, logistic conferences when applicable and meetings organised during the verification and acceptance activities included), the Contractor shall submit a draft **Minute of Meeting (MoM)** for NSPA review. Following the necessary coordination, the Contractor shall sign and issue the final version to NSPA for countersignature. **[Essential]**

Note: The MoMs shall not be regarded as a mechanism to change the T&Cs or SoW (which can only be done by Contract amendment) but as an accurate and exhaustive record of exchanges and decisions.



7.3.2. Kick-Off Meeting (KoM)

MGMT_Req.16. The Contractor shall set up a Kick-Off Meeting within 1 (one) month after Contract award. The KoM shall preferably be held at Contractor's premises or via videoconference. **[Essential]**

7.3.3. Project Management Review (PMR) and technical meetings

MGMT_Req.17. The Contractor shall arrange one PMR per contract year between T0 (Contract award date) and the Final Acceptance (FinAc) activity and support technical meetings when deemed required (for instance in order to address comments made for a deliverable). The exact meeting dates will be mutually agreed between all parties so that they take place at the most judicious times and the Contractor shall ensure that the Contractor Project Manager and relevant technical staffs attend it. **[Essential]**

MGMT_Req.18. The PMRs and when applicable technical meetings will be chaired by NSPA and preferably be organised via videoconference. When relevant, physical meetings can also be organised either at NSPA (Capellen, LUX), end-user (PRT) or Contractor's facility. **[Essential]**

MGMT_Req.19. No later than two weeks prior each PMR, the Contractor shall submit a **Project Progress Report (PPR)** covering at least the following points: **[Essential]**

- a. The activities performed and work completed during the previous period, including major milestones achieved;
- b. The up-to-date PMS and associated progress;
- c. Performance Measurement Metrics;
- d. The up-to-date action item list;
- e. The up-to-date list of GFE under Contractor's responsibility (if applicable);
- f. Description of any identified issues and high risk areas and the proposed solutions and corrective actions;
- g. Status of open risks and issues;
- h. Any foreseen or possible changes to project performance or schedule;
- i. When applicable, summary of Engineering Change Proposals (ECP), Request for Deviation (RFD), Request for Waiver (RFW) and their status (if applicable);
- j. Expected activities during the following reporting period.

MGMT_Req.20. The Contractor shall release the PPR according to the original plan even in case of postponement of the PMR. **[Essential]**

7.4. Data exchange

MGMT_Req.21. Except if otherwise specified, the Contractor shall deliver all project deliverables (incl. documentations, presentations, reports, SW etc...) in English (UK) language and shall use the following formats: **[Essential]**

- Project Management and Baseline documents either in unlocked (i.e. allowing research) Microsoft Word format (2003 or later), Microsoft Excel format (2003 or later)



- or PDF when required. PDF being required for final/approved versions;
- (When applicable) Schematic diagrams at system, sub-system or process level either in unlocked (i.e. allowing research) Microsoft Visio format (2003 or later) or PDF when judicious;
 - Project Master Schedule (PMS) in Microsoft Project format (2003 or later);
 - Presentations in unlocked (i.e. allowing research) Microsoft PowerPoint format (2003 or later) or PDF when judicious.

Note: NSPA will advise the Contractor if or when any deviation from these standards would be accepted. It has to be noted that specific format of ILS deliverables will be directly addressed in the relevant section of this SoW.

MGMT_Req.22. The Contractor shall handle classified data in accordance with the guidance provided in the Security Aspects letter and Security Requirements Check List (SRCL) associated to the Contract Terms & Conditions (T&Cs). **[Essential]**

MGMT_Req.23. The Contractor shall name all documents/files delivered to NSPA according to the following format. NSPA will advise the Contractor if or when any deviation from this format is required. **[Essential]**

YYYYMMDD – Document title – release (e.g. draft, v.X, final...)

7.5. Integration requirements

MGMT_Req.24. The AAA system shall be developed and integrated by maximizing the use of: **[Essential]**

- a. Mission proven COTS/MOTS components and COTS/MOTS based solutions;
- b. Non-Developmental Items (NDI);
- c. Qualified items;
- d. Existing designs, documentation and processes.

MGMT_Req.25. The Contractor shall integrate, qualify and deliver a coherent solution for the AAA system while ensuring compliance with the mandatory requirements of this SoW. In the event of an inconsistency or conflict between the main body of the SoW and references and applicable documents listed in section 6, the Contractor shall provide NSPA with an assessment on the potential impacts in order to identify the technical risks and potential alternatives. **[Essential]**

MGMT_Req.26. All the equipment delivered and installed as part of this contract shall be new at current production and not refurbished. **[Essential]**

MGMT_Req.27. The AAA system shall be compliant with the **RoHS Directive 2011/65/EU** and **REACH Regulation EC 1907/2006** applicable at the Contract award date. The Contractor shall provide the associated evidences as supporting documentation of the Site Acceptance Test activity. **[Essential]**

7.6. Usage Profile

MGMT_Req.28. The Contractor shall consider that the AAA system will normally be



located at the Garrison location or deployed for exercises in Portugal or in any other NATO Nation. [Essential]

MGMT_Req.29. The Contractor shall consider the following usage profile for the AAA system: [Essential]

	Usage for Exercise	Usage at the Garrison
Recurrence	10 consecutive days, up to 6 times per year (i.e. usually every two months)	Rest of the time, 3 days per week
Operating hours per day	Up to 24 hrs per day	Up to 4 hrs
Antenna radiation time	Up to 4 hrs per day	No radiation

Table 3 – Usage profile

7.7. Use of Government Furnished Equipment (GFE)

7.7.1. Management and transfers

MGMT_Req.30. In the frame of this project, the Contractor might be required to use, access or integrate Government Furnished Equipment (GFE) provided by the end-user. Before any transfer, back and forth, a transfer protocol specifying the type of equipment, exhaustive breakdown (e.g. for kits or sets) as well as their serviceability status shall be signed by the Contractor and the end-user. The signature date will formalize the transfer of the associated responsibility/liability (the GFE shall remain property of the end-user). All GFE shall be provided in a fully operational status upon their transfers between the end-user and the Contractor, under the responsibility of the delivering party. [Essential]

MGMT_Req.31. The Contractor or any of its subcontractors shall make sure to receive the potentially required credentials/licences and use the provided GFE only for the activities related to this Contract. [Essential]

7.7.2. Identification

MGMT_Req.32. The Contractor shall trace and record all GFE provided in the frame of this Contract in the PPR (see section 7.3.3). The recorded information shall be at least the following: [Essential]

- A unique identifier for each item;
- The item name/description;
- The item P/N;
- The item S/N (if applicable);
- The quantity held;
- The physical location;
- The status of the GFE serviceability;
- The expected return date;
- A remark field.

MGMT_Req.33. The Contractor shall organise the physical labelling of each GFE in order to clearly show the associated unique identifier as well as the mention "Property of PRT



Army". [Essential]

7.8. System Engineering activities

MGMT_Req.34. DELETED [Essential]

MGMT_Req.35. The Contractor shall remain responsible for the management of the interfaces (physical or data exchanged based) between each AAA subsystem during the duration of the Contract and in order to maintain the system performances. [Essential]

MGMT_Req.36. Within the first 6 (six) months after Contract award, the Contractor shall organise a "detailed design presentation". The main purpose of this presentation is for the Contractor to present in details his system architecture/technical solution to NSPA but also the end-user representatives while allowing an open technical exchange between all stakeholders. During this detailed design presentation, the Contractor will be free to walk through appropriate engineering data, specifications, manuals, schematics, commercial videos, demonstrations and/or prototypes. [Essential]

Note: NSPA's guidance eventually provided during such detailed design presentation would be based solely upon Contractor supplied information and in no way relieves the Contractor's obligation to deliver a AAA system satisfying to the qualification and acceptance requirements of the Contract.

MGMT_Req.37. DELETED [Essential]

7.9. Configuration Management (CM)

MGMT_Req.38. A Configuration Management system shall be established, documented, applied and maintained by the Contractor in accordance with an international recognised guideline such as for instance **ISO 10007:2017** or **EN9100**. [Essential]

7.9.1. Configuration Management Strategy & Responsibilities

MGMT_Req.39. Since the AAA system is expected to be based on an existing and proprietary design of subsystems, the Contractor shall retain all responsibilities and authorities on configuration decisions. NSPA will only remain the final dispositioning authority on interface requirements that must be controlled by the end-user. [Essential]

Note: The Contractor's CM strategy for the AAA project shall deliver a coherent and supportable configuration (cf. the configuration identification and the change control requirements in the following sections).

7.9.2. Configuration Identification

MGMT_Req.40. The Contractor shall recommend a structured list of potential CI(s) to NSPA, using the selection criteria specified below or provide an existing CI(s) list: [Essential]

- a. Safety of personnel and/or equipment;
- b. Criticality, complexity, and state-of-the-art, high cost items;
- c. Critical performance or operational effectiveness;



NATO SUPPORT AND PROCUREMENT AGENCY

AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

- d. Functionality and performance;
- e. Interface with other systems, government or sub-contractor furnished items, NATO standard items and support equipment;
- f. Integrated logistic support;
- g. Applications that affect a delivered product;
- h. Reliability and maintainability;
- i. Organization, management and responsibility considerations;
- j. Second sourcing; and
- k. Susceptibility to change.

MGMT_Req.41. The Contactor shall indicate for each recommended CI and for information purpose, whether it is a new development item or an already qualified technical solution (for instance a mission proven COTS solution). **[Essential]**

MGMT_Req.42. As a minimum, for each CI, the Contractor shall develop and maintain configuration information and obtain the NATO Commercial And Government Entity (NCAGE) code and NATO Stock Number (NSN). **[Essential]**

MGMT_Req.43. The Contractor shall only use configuration information that has been formally released and has taken into account potential access limitations, e.g. and as a minimum, security classifications and proprietary license constraints. **[Essential]**

7.9.3. Change Control

MGMT_Req.44. The Contractor shall implement a Change Control Programme (CCP) in order to: **[Essential]**

- a. ensure effective control of all CIs and their approved configuration documentation,
- b. provide effective means for proposing engineering changes to CIs, requesting deviations or waivers pertaining to such items, preparing notices of revision and specification change notices, and
- c. ensure implementation of approved changes.

MGMT_Req.45. Prior the SAT, the Contractor shall provide a **Configuration Overview** of the subsystems delivered. This overview shall cover all CIs and show, at least, the following information: **[Essential]**

- a. CI description/nomenclature,
- b. CI P/N,
- c. CI NSN,
- d. HW/SW/FW revision.

MGMT_Req.46. In case of deviation in the configuration of similar subsystems, for instance (i.e. between the Mobile AAA launchers, Mobile C2/3D radar and PWT for MANPADS), the Contractor shall add the reason for change in the **Configuration Overview**. **[Essential]**

MGMT_Req.47. For changes affecting ILS deliverables (operational and maintenance manuals, tools and support equipment, spares already delivered) or the interchangeability/replaceability of LRUs, the Contractor shall prepare and send a "Class I" ECP to NSPA with a proposal of correcting action. **[Essential]**

7.9.4. Configuration Audit and Verification

MGMT_Req.48. When required, the Contractor shall be responsible for conducting Functional Configuration Audits (FCA). The associated outcomes and/or minute of audit shall be made available to NSPA upon request. [Essential]

MGMT_Req.49. When required, the Contractor shall be responsible for conducting Physical Configuration Audits (PCA). The associated outcomes and/or minute of audit shall be made available to NSPA upon request. [Essential]

7.10. Quality Assurance

MGMT_Req.50. The Contractor shall establish, document and maintain a Quality Assurance (QA) programme in compliance with the requirements in **AQAP-2110** applicable to all products and services to be delivered under this Contract. [Essential]

7.11. Verification and Acceptance (V&A) activities

MGMT_Req.51. Since the AAA system is expected to be based on an existing and proprietary design of subsystems, the Contractor shall plan and conduct a reduced verification and acceptance programme and be responsible for its thorough organisation, control and coordination while ensuring that there is a minimal redundancy of effort and data. This verification and acceptance programme will consist in: [Essential]

- a. Factory Acceptance Test (FAT) activities,
- b. One Site Acceptance Test (SAT) activity (incl. one Live Firing Exercise (LFX),
- c. Final Acceptance (FinAc).

MGMT_Req.52. The Contractor shall deliver a **Verification and Acceptance Test Plan (V&ATP)** that shall be approved by NSPA in accordance with Annex B. [Essential]

MGMT_Req.53. The V&ATP shall allow to verify that the AAA system and supporting elements meet the physical, functional, (when applicable) interface and performance requirements specified in the SoW and shall: [Essential]

- a. Describe the Contractor's organisation, overall verification method(s) and activities, processes and tools put in place in order to fulfil the verification and acceptance requirements;
- b. Identify the HW/SW to be tested when applicable the test environment, the expected test equipment, tools etc.;
- c. Specify the site requirements (when applicable);
- d. Consolidate the testplan(s), procedures and evaluation activities to be conducted in order to verify the fulfilment of all technical requirements (TECH_Req.X);

MGMT_Req.300. With the V&ATP, the Contractor shall create and deliver a **TRACeability matrix (TRAC)** allowing a clear traceability between the need expressed (each technical requirement (TECH_Req.X) of the SoW), the associated verification method, the reference of the associated V&A test as well as the activity during which the requirement is expected to be verified. For already "qualified items", the Contractor is free to simply refer to already available engineering, testing results, qualification documentation and/or certificates

in the relevant plans, procedures or activities described in the V&ATP so that there is no duplication of efforts. **[Essential]**

MGMT_Req.54. The Contractor shall ensure that all testable **[KSA]** and **[KPP]** requirements from the SoW are allocated to at least one test plan, test procedure or inspection to be performed during the SAT. **[Essential]**

MGMT_Req.55. Upon its acceptance by NSPA, the Contractor shall maintain the V&ATP up-to-date if any change on the system has an impact on the exhaustiveness and accuracy of this document. **[Essential]**

7.11.1. Overview of the overall verification and acceptance test activities

MGMT_Req.56. All formal testing shall be conducted on test items which conform to the intended production configuration baseline and shall be organised as per the Table 4 below. **[Essential]**

#	Activity	Responsibility	Applicability	Location
1	Factory Acceptance Tests (FAT)	Contractor	At least each subsystem (Mobile C2C/3D radar, each Mobile AAA Launcher, each PWT)	Contractor premises
2	Site Acceptance Tests (SAT) incl. Live Firing Exercise (LFX)	Contractor	AAA system	End-user facility
3	Final Acceptance (FinAc)	Contractor	All deliverables	N/A

Table 4 – AAA project verification and acceptance activities

7.11.2. Factory Acceptance Test (FAT)

MGMT_Req.57. Upon successful production of each the Mobile C2C/3D radar and each Mobile AAA launcher and PWT, the Contractor shall perform a FAT. The exact applicability level and extent will be proposed by the Contractor as part of the V&ATP by considering that the aim of the FAT activities shall be to verify that the equipment produced are free from manufacturing defects. **[Essential]**

MGMT_Req.58. The FAT shall be entirely under Contractor's responsibility and performed in a traceable testing environment at Contractor's facility. NSPA or a local GQA representative shall have the right to attend the FAT (completely or partially at their discretion). **[Essential]**

MGMT_Req.59. DELETED **[Essential]**

MGMT_Req.60. After successful completion of each FAT, the Contractor shall submit to NSPA the associated **FAT Report** and **Certificate(s) of Conformity (CoC)**. **[Essential]**

MGMT_Req.61. DELETED **[Essential]**

MGMT_Req.62. DELETED **[Essential]**

7.11.3. Site Acceptance Test (SAT)

MGMT_Req.63. The Contractor shall organise 1 (one) SAT with the complete AAA system. The aim of this SAT shall be to test that the equipment produced are satisfying the technical requirements (Tech_Req.X) in the end user's operational environment. [Essential]

MGMT_Req.64. The SAT shall be entirely under Contractor's responsibility and performed on a site in PRT, designated by the end-user. The Contractor shall in particular organize the packaging, transportation, delivery, assembly/installation, and integration of the HW and SW to the tests site, as well as operate the system for the tests agreed in the SAT plan. The end-user and NSPA shall monitor and witness the SAT activities. [Essential]

MGMT_Req.65. DELETED [Essential]

MGMT_Req.66. As part of the SAT activities, the Contractor shall support the organisation of a live firing exercise (LFX) in Portugal. The associated LFX scenario is described in **Annex D**. [Essential]

MGMT_Req.67. After successful completion of the SAT, the Contractor shall submit to NSPA the **Verification & Acceptance Report (V&AR)**. [Essential]

MGMT_Req.68. The V&AR shall contain at least the following information: [Essential]

- Configuration (incl. S/N when available) of the sub-systems tested;
- List of tests performed for each sub-system tested;
- Pass/Fail and evaluation criteria and thresholds used;
- Recorded test/measurements/inspection results with a note "Passed" or "Failed" in accordance with the procedures, where applicable;
- Any other supporting test, measurement, evaluation, inspection data/results, as appropriate (data recording and analysis files, printouts, pictures, records, figures, graphs, tables etc.);
- Extract of the Failure Register showing the system failures or discrepancies encountered during the V&A activities, as well as a proposal of corrective actions to be taken by the Contractor for each failed test and discrepancy if any;
- Overall Pass/Fail conclusion. A conclusion of "Pass" shall entail the Contractor's confirmation that all discrepancies/failures are resolved (or a corrective action approved) and that the end-user can use the system safely;
- Up to date **TRACeability matrix (TRAC)**.

MGMT_Req.69. Successful completion of the V&A activities requires the NSPA and end-user approval of the associated V&AR. [Essential]

7.11.4. Final Acceptance (FinAc)

MGMT_Req.301. The Contractor shall consider as Final Acceptance (FinAc), the act whereby NSPA shall definitively accept all delivered products and services as per this SOW, as complying with the contractual requirements. [Essential]

MGMT_Req.302. The FinAc will be achieved once: [Essential]

- a. SAT is completed successfully;
- b. all entries in the Failure Register are closed;
- c. initial and specialist trainings has been completed successfully;



NATO SUPPORT AND PROCUREMENT AGENCY

AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

- d. all required documentation listed in Annex B CDRL has been provided.

Once all conditions for FinAc have been achieved, NSPA shall issue to the Contractor a Final Acceptance Certificate that shall serve as starting date of the warranty period.

7.11.5. Discrepancy Reporting & Resolution for V&A activities (Failure Register)

MGMT_Req.70. From the beginning of the Verification and Acceptance activities until the successful approval of the V&AR, the Contractor shall record and analyse any Technical Events (TEs) that would occur during a V&A activity or reported by either NSPA or the end-user in this period. When applicable, the Contractor shall only implement corrective actions that have been presented to and approved by NSPA. **[Essential]**

MGMT_Req.71. The Contractor shall record and manage the Technical Events (TE) in a so-called **Failure Register** (preferably in the form of an Excel file). As a minimum, this file shall contain the following information: **[Essential]**

- a. a unique identification number assigned for each identified discrepancy/failure;
- b. a summary of the discrepancy/failure reported;
- c. the technical status (failure confirmed, rejected, cancelled);
- d. the applicability of the discrepancy/failure (one subsystem/document only or all similar sub-systems/documents);
- e. the proposed corrective action and associated timescale;
- f. the priority (urgent/routine);
- g. the management status (open/closed);
- h. the link with a potential ACSN/ECP;
- i. the potential safety issue (yes/no);
- j. a comment cell with at least the justification from the Contractor in case of failure rejection.

MGMT_Req.72. In case of safety issue, the TE shall be categorized "urgent" by the Contractor and lead to the release of a "Service Bulletin" in less than 10 Working Days. This "Service Bulletin" (based on an unlocked pdf file) shall be based on the same template as the technical documentation. The Service Bulletin shall allow the user to understand and apply the mitigating actions, along with the urgent safety measures to be applied. **[Essential]**

8. AAA BASIC SYSTEM – TECHNICAL REQUIREMENTS

The AAA system is essentially aimed at protecting military forces against air threats. However, with the evolution of the type of threats and the increasing risk of acts of terrorism, the AAA system also aims to protect sensitive points and areas during high visibility events. The system would be able to fill the gaps at low and very low altitude, constituting an essential asset in the Portuguese Army Air Defence capabilities.

8.1. AAA basic system – General requirements

TECH_Req.1. The AAA system shall ensure acquisition, identification, tracking and engagements of the following types of air threats: **[KSA] [Essential]**

- a. fixed wing aircrafts;
- b. rotary wing aircrafts (helicopters);
- c. unmanned air vehicles (UAV).

TECH_Req.2. The AAA system shall be mobile, meaning that all equipment delivered shall be either man-portable (for PWTs), mounted on a vehicle (Mobile AAA launchers) or transportable/towed by tactical vehicle (Mobile C2C/3D radar). The Command and Control Centre (C2C) and 3D radar (called further in this document as “Mobile C2C/3D radar”, designation often reduced to “Mobile C2C” when a requirement mainly addresses the command and control capabilities) shall be deployable on the field and managed as a subsystem. The AAA launcher shall be mounted on a tactical vehicle (called further in this document “Mobile AAA launcher”). **[KSA] [Essential]**

TECH_Req.3. The AAA system shall be composed of the following subsystems: **[KSA] [Essential]**

- a. **1 (one) Mobile C2C/3D radar** (+1 (one) additional Mobile C2C/3D radar as option),
- b. **3 (three) Mobile AAA launchers** (+ 1 (one) additional Mobile AAA launcher as option),
- c. **2 (two) Portable Weapon Terminals** (PWTs) for legacy MANPADS (+ 2 (two) additional PWTs as option).

TECH_Req.4. The AAA “basic system” shall ensure the required connections and information/data exchanges between the different subsystems as illustrated on the Figure 2 below. **[KSA] [Essential]**

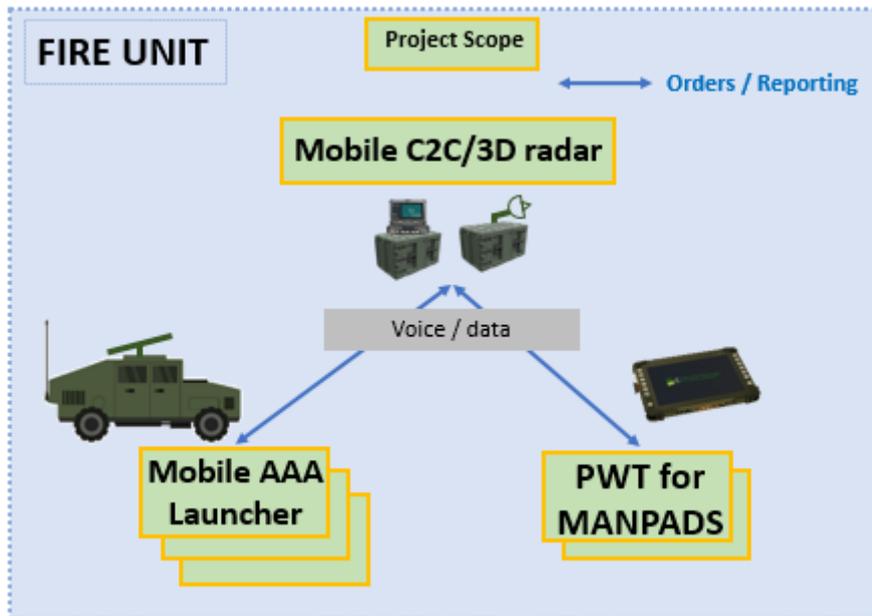


Figure 2 – AAA basic system C2 architecture

TECH_Req.5. The AAA system shall have growth possibility in order to allow each Mobile C2C/3D radar to coordinate up to a total of 4 (four) Mobile AAA launchers and up to 4 (four) PWTs for MANPADS. [KSA] [Essential]

8.2. AAA basic system – System modes

TECH_Req.6. The AAA system shall ensure the following modes of operations for the Fire Unit: [KSA] [Essential]

- a. Standalone mode, when the Mobile C2C has no communication with the FDC; in this case:
 - i. LAP, including IFF data, is produced by the 3D radar(s) and transmitted to the Mobile C2C;
 - ii. The tracks are disseminated by the Mobile C2C to the PWTs for MANPADS and to the Mobile AAA launchers respectively;
 - iii. TEWA is performed by the Mobile C2C; air defence commands are produced at Mobile C2C and sent to the PWTs for MANPADS and to the Mobile AAA Launchers respectively;
 - iv. Air defence reports are produced at the PWTs for MANPADS and the Mobile AAA launchers before being sent to the Mobile C2C.

TECH_Req.7. The Mobile AAA launchers shall be able to be operated independently by the gunner in the absence of communication (data and voice) with the Mobile C2C. [KSA] [Essential]

TECH_Req.8. The Mobile C2C/3D radars, PWTs for MANPADS and the Mobile AAA launchers shall have joint/stand-alone training and simulation modes, in order to allow training of the system operators for different mission scenarios. [KSA] [Essential]

8.3. AAA basic system – Mobility requirements

TECH_Req.9. The AAA system shall have strategic mobility by the following means: [KSA] [Essential]

- a. By road:
 - i. the Mobile C2C/3D radar and the Mobile AAA launchers shall be mobile using (when applicable) the tactical vehicles they are mounted on/in, or towed by (for the 3D radar subsystem);
 - ii. the PWTs for MANPADS shall be man-portable and transportable using common light vehicles type High Mobility Multipurpose Wheeled Vehicle (HMMWV);
- b. By air: using C130H Hercules aircrafts.
 - i. the Mobile C2C/3D radar, the Mobile AAA launchers and the PWT for MANPADS shall be transportable by air with the aircraft indicated above. It is acceptable to have a preparation for air transportation, as long as the required operations can be performed by the AAA system operators without requiring external assistance.

8.4. AAA basic system – Power requirements

TECH_Req.10. The Mobile C2C/3D radar and Mobile AAA launcher shall have the capability to be powered by all following sources: [KSA] [Essential]

- a. from its own power source: battery bank allowing the radio(s) and C2IS terminal(s) (for the Mobile C2C/3D radar, the 3D radar would be off) to continuously perform the modes of operations described in TECH_Req.6 during at least 4 hours.
- b. (when applicable) from the tactical vehicle: an integrated power generator shall allow to recharge the battery bank or maintain the required charge level in order to fully perform the operations in the modes described in TECH_Req.6.
- c. from the external European power grid (either monophasic 230V @ 50Hz with power plug F-type or tri-phasic 400V @ 50Hz).

TECH_Req.11. The power system of the Mobile C2C/3D radar and Mobile AAA launcher shall allow switching from one source to another without powering down or rebooting the system during switching. [Essential]

Note: For the switching of power source for the 3D radar, a neither rotating nor radiating radar will be accepted.

TECH_Req.12. The PWT for MANPADS shall be powered by its own exchangeable battery, and shall have the possibility to be recharged by both of the following options: [Essential]

- a. from the European standard power plug F-type (monophasic 230 V @ 50 Hz),
- b. from a 12V DC socket (i.e. automobile auxiliary power outlet).



TECH_Req.13. The C2IS PWT shall be able to perform all its functions continuously during at least 4 hours based on the electric power supplied by the integrated battery without using any external power source. **[Essential]**

8.5. AAA basic system – CIS generic requirements

TECH_Req.14. The AAA system shall operate in a so-called Air Battle Network (ABN) without any link/connection with the SDAN. **[Essential]**

TECH_Req.15. The AAA system command, control, communications and information system functions shall be performed using an integrated Command, Control and Information Systems (C2IS) software installed into and run in the related AAA subsystem C2IS terminals that are connected to the ABN. **[Essential]**

TECH_Req.16. The AAA system CIS components shall allow the transmission, receipt, exchange and display of information as implied by the system modes described in TECH_Req.6. **[Essential]**

8.6. AAA basic system – CIS ABN requirements

TECH_Req.17. The ABN shall allow to: **[KSA] [Essential]**

- a. transmit, receive and exchange surveillance and ground based sensor related information, tactical and situational awareness data, and messages between the network nodes;
- b. transmit, receive, and exchange all military messages/orders and information needed by the Fire Units for engagement operations;

TECH_Req.18. The ABN subsystems (PWT for MANPADS, Mobile AAA launchers and Mobile C2C/3D radar) shall allow their operators to produce information concerning situational awareness, location status, readiness states and engagement results. **[KSA] [Essential]**

TECH_Req.19. Between the Mobile C2C/3D radars, Mobile AAA launchers and PWTs for MANPADS), the ABN shall be implemented by using Combat Net Radios (CNR) providing secure end-to-end encrypted, jam resistant and interoperable wireless mobile and fixed networking and real time voice and data communication. **[KSA] [Essential]**

TECH_Req.20. DELETED **[Essential]**

TECH_Req.21. The ABN shall achieve radio network connection under the following conditions: **[Essential]**

- a. All the way up to 15 km Line of Sight (LoS) distance between all vehicular network nodes;
- b. All the way up to 4 km LoS distance between handheld/man pack nodes and all other nodes.

8.7. AAA basic system – Environmental conditions

TECH_Req.22. The AAA system shall have a design allowing operation, storage, tactical standby to operational and manipulation in a temperature range of at least the following: -25°C to +44°C. The Contractor shall justify the compliancy with this requirement with the appropriate tests in either MIL-STD-810 G or H or STANAG 4370. [Essential]

8.8. AAA basic system – Design and integration constraints

TECH_Req.23. The Contractor shall inform NSPA when using any hardware, software, technical data, and documentation subject to any Export Regulations (EAR, ITAR or other restrictions) in the frame of the AAA project. [Essential]

TECH_Req.24. The Contractor shall provide all equipment that requires calibration calibrated together with their calibration certificates/labels in accordance with ISO/IEC 17025. [Essential]

TECH_Req.25. For the AAA system and unless otherwise specified, the user interface of all computer terminals operating systems and all other CIS HW/SW shall be English. The associated keyboard layout, when applicable, shall be US QWERTY. [Essential]

TECH_Req.26. The Contractor shall supply all CIS hardware and software together with the required ancillaries for a fully operation system. This is for instance but without being limited to cabling/wiring, connectors/adapters/power adapters, mounts/fixtures etc. [Essential]

TECH_Req.27. All power and communication interfaces shall be fitted with military grade connectors in accordance with the power consumption and the environment they are used in. These interfaces shall provide environmental sealing and electrical grounding compliant with MIL-STD-188/124A and MIL-HDBK-419A. [Essential]

TECH_Req.28. DELETED [Essential]

TECH_Req.29. All subsystems of the AAA system, except those whose functional characteristics or safety rationale dictates otherwise, shall be painted in Military Green colour no. 24079, according to FED. STD. 595C of December 15, 1989, or equivalent GE RAL Classic 840HR 6014, matte / no gloss. [Essential]

TECH_Req.30. The AAA system shall be provided with the necessary marking in order to minimize the risk of human error. This is for instance but without being limited to the type of fuel, the tyre pressure indication, the grease/lubrication points etc. [Essential]

8.9. AAA basic system – Safety and operational health requirements

TECH_Req.31. The AAA subsystems shall offer the proper protection for personnel in terms of health and safety, including but without being limited to grounding of electrical equipment, lightning protection etc. [Essential]

8.10. AAA basic system – Mobile C2C/3D radar requirements

8.10.1. Mobile C2C/3D radar – Functional components

TECH_Req.32. The Mobile C2C/3D radar subsystem shall have at least the following functional components: [KSA] [Essential]

- a. Command&Control Centre (C2C) and communication information system (CIS);
- b. 3D radar including GPS and IFF ;
- c. Electrical power supply system.

TECH_Req.33. The Mobile C2C/3D radar subsystem shall be integrated in the Fire Unit C2 structure. [KSA] [Essential]

TECH_Req.34. The 3D radar shall have 3D capability (meaning that it shall continuously compute, update, record and report all three coordinates in space for each target detected and tracked i.a.w. the requirements specified below). [Essential]

TECH_Req.35. The 3D radar shall have the capability to detect and track the following types of air threats: [KSA] [Essential]

- a. fixed wing aircrafts;
- b. rotary wing aircrafts (helicopters);
- c. unmanned air vehicles (UAV);

TECH_Req.36. The radar shall have an IFF interrogator with at least mode 5 (MK XIIA) Level 1 capability and the necessary equipment to update and load the crypto keys. [Essential]

TECH_Req.37. DELETED [Essential]

8.10.2. Mobile C2C/3D radar – Subsystem modes

TECH_Req.38. The C2IS shall be implemented and operated through the LC2 terminal and the C2IS software user interfaces to perform the C2IS functions according to the AAA system modes as specified in this document (TECH_Req.6). [Essential]

TECH_Req.39. The 3D radar shall be able to operate in the following modes: [Essential]

- a. Integrated in the Air Battle Network (in this mode, the 3D radar generates the local air picture including IFF data and feeds it in real time in the Air Battle Network via its command-control and communications system);
- b. Standalone (in this mode, the 3D radar generates the local air picture including IFF data, displays it locally and records it for future use).

8.10.3. Mobile C2C/3D radar – C2IS functional requirements

TECH_Req.40. Through the Air Battle Network, the Mobile C2C shall: [Essential]

- a. Exchange instant chat messages and C2 orders/messages with the Mobile AAA launchers and PWTs for MANPADS;



NATO SUPPORT AND PROCUREMENT AGENCY

AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

- b. Provide interfaces allowing future establishment of an IP-based network connection between the Mobile C2C and a legacy Fire Distribution Center (FDC) through microwave LOS communication and/or cable (Ethernet/Fibre optic)
- c. Establish real time data communication between its C2IS terminal and the other ABN nodes through radio;
- d. Change track identities manually when operating in standalone mode;
- e. Filter and edit data to be distributed to the PWTs for MANPADS and Mobile AAA launchers manually/automatically on a "need-to-know" basis using the C2IS software;
- f. Display all units and tracks detailed information on an operational picture by simple click/mouse operations;
- g. Receive and display real-time air picture produced by 3D radar, and other information about the targets to be engaged, and send the filtered LAP information to the selected PWTs for MANPADS and Mobile AAA launchers;
- h. Direct and control engagement of the MANPADS and Mobile AAA Launchers;
- i. Perform Threat Evaluation and Weapon Assignment (TEWA): Evaluate targets, compute/perform engagement sequences/operations and make engagement decisions standalone by taking into account the ammunition/missile performance characteristics to be used by the MANPADS and Mobile AAA launchers, firing doctrine, weapon status, weapon orders and any other air defence relevant data available;
- j. Assign appropriate MANPADS (via the PWTs for MANPADS) and Mobile AAA launchers to the appropriate targets in order to ensure the best target-weapon assignment:
 - i. m1- manually (the operator decides which target to be engaged by which weapon, and in which order)
 - ii. m2- semi-automatically (the system generates the target priority list along with the recommended weapon assignment, and the operator takes the final decision which weapon engages which target and in which order)
- k. Provide information to assess engagement results;
- l. Disseminate tactical warnings and alerting data to support MANPADS and Mobile AAA launchers operations;
- m. Receive geographical location and situational awareness information from the MANPADS and Mobile AAA launchers;
- n. Share the Mobile C2C/3D radar geographical position (based on its GPS data and the operator's manual entry) with the Fire Unit subsystems terminals;
- o. Display information to monitor the assigned air space based on the LAP from the 3D radar;

- p. Display situational awareness information to monitor the MANPADS and Mobile AAA Launchers mission/system status and provide situational awareness information, which shall be selectively displayed on the digital maps, during ongoing air defence operations;
- q. Perform network administration for the ABN radio/cable networks operation, maintenance and configuration;
- r. Record and replay operational/configurational history;
- s. Synchronize all networks, communication, and defence operations using a centralized network timing based on, by default, a reference time from a GPS source;
- t. Establish voice communication with the other units (PWTs for MANPADS, Mobile AAA launchers).

TECH_Req.41. The 3D radar CIS (HW/SW) shall: **[Essential]**

- a. Establish network connection for information/data exchange with the C2IS,
- b. Send the LAP including IFF data to the C2IS;
- c. Exchange with the C2IS the 3D radar system status and configuration information;
- d. Produce simulated tracks as configured by the C2IS and send them to the C2IS to ensure training capability for the AAA system.

8.10.4. Mobile C2C/3D radar – Radar performance requirements

TECH_Req.42. The radar shall be able to detect, identify, locate and track aerial targets (standard fighter, 2,5 sqm. of RCS) in benign conditions, 360° coverage in azimuth, within a **range of 20 km**. **[KPP] [Essential]**

TECH_Req.43. The radar shall be capable of tracking targets up to an **elevation angle of at least 55 degrees**. **[KPP] [Essential]**

TECH_Req.44. The radar shall have an accuracy better than or equal to: **[Essential]**

- a. 0.3 degrees in azimuth;
- b. 50 m in range;
- c. 0.5 degrees in elevation angle.

TECH_Req.45. The radar shall achieve a discrimination between targets better than or equal to: **[KPP] [Essential]**

- a. 4 degrees in azimuth;
- b. 150 meters in range;
- c. 10 degrees in elevation.

TECH_Req.46. The radar shall achieve a **refresh rate of no more than 3 seconds**. **[KPP] [Essential]**

8.11. AAA basic system – PWT for MANPADS requirements

8.11.1. PWT for MANPADS – Subsystem modes

TECH_Req.47. The C2IS shall be implemented and operated through the PWT and the C2IS software user interfaces to perform the C2IS functions according to the AAA system modes as specified in this document (TECH_Req.6). **[Essential]**

8.11.2. PWT for MANPADS – C2IS functional requirements

TECH_Req.48. The PWT CIS (HW/SW) shall: **[Essential]**

- a. Establish data communication through the Air Battle Network for the C2IS,
- b. Exchange instant chat messages with the other AAA subsystems, and C2 orders/messages with the Mobile C2C,
- c. Receive the air picture and situational awareness information required for target engagement,
- d. Receive target assignments and target identification information sent by the Mobile C2C,
- e. Provide slew-to-cue information for early warning and engagement to assist the MANPAD unit in visual target acquisition, target tracking and ranging,
- f. Share own geographical position of the MANPADS unit (based on its GPS data and operator's input) with the Mobile C2C,
- g. Create and transmit military report and messages to the Mobile C2C about the MANPADS mission/system status,
- h. Ensure joint training and simulation capability using the C2IS software and when applicable created/simulated scenarios/data,
- i. Establish voice communication between the PWT operator and the other Fire Unit subsystems operators, by the CNR.

8.12. AAA basic system – Mobile AAA launcher requirements

8.12.1. Mobile AAA launcher – Functional components

TECH_Req.49. The Mobile AAA launcher subsystem shall have at least the following functional components: **[KSA] [Essential]**

- a. AAA launcher and the AAA missiles;
- b. at least one electro-optical sight;
- c. command-control (C2) and communication system;
- d. electrical power system;
- e. tactical vehicle.

TECH_Req.50. The Mobile AAA launcher shall be integrated within the Fire Unit Command and Control structure. **[KSA] [Essential]**

TECH_Req.51. The Mobile AAA launcher shall have the capability to engage and destroy the following types of air threats: **[KSA] [Essential]**

- a. fixed wing aircrafts (i.e. standard fighters with RCS of 2.5sqm);
- b. rotary wing aircrafts (helicopters);
- c. unmanned air vehicles (UAV).

8.12.2. Mobile AAA launcher – Subsystem modes

TECH_Req.52. The Mobile AAA launcher shall have the following operating modes: **[KSA] [Essential]**

- a. Centralized mode, in which:
 - i. the selected and processed air picture (either local or recognized, including IFF data) is sent from the Mobile C2C to the Mobile AAA launchers C2IS;
 - ii. air defence commands are sent from the Mobile C2C to the Mobile AAA launchers C2IS;
 - iii. air defence reports are produced by the Mobile AAA launchers C2IS and sent to the Mobile C2C;
 - iv. engagement of the designated air threats is performed at the Mobile AAA launcher level, based on the information/data provided by the Mobile C2C.
- b. Decentralized mode, in which:
 - i. the selected and processed air picture (either local or recognized, including IFF data) is sent from the Mobile C2C to the Mobile AAA launchers C2IS;
 - ii. air defence reports are produced at the Mobile AAA launcher C2IS and sent to the Mobile C2C;
 - iii. engagement of the air threats is initiated and performed by the Mobile AAA launcher.
- c. Standalone mode, when the Mobile AAA launcher C2IS has no communication with the Mobile C2C; in this case:
 - i. surveillance of the designated air space is performed by the Mobile AAA launcher with its own electro-optics system(s);
 - ii. track identification is performed by the Mobile AAA launcher by editing the tracks by the C2IS operator;
 - iii. engagement for the air threats is initiated and performed by the Mobile AAA launcher.

8.12.3. Mobile AAA launcher – C2IS functional requirements

TECH_Req.53. The C2IS shall be implemented and operated through the LC2 Weapon Terminal and the C2IS software user interfaces in order to perform the C2IS functions according the Mobile AAA Launcher operating modes. **[Essential]**



NATO SUPPORT AND PROCUREMENT AGENCY

AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

- TECH_Req.54. The Mobile AAA launcher CIS (HW/SW) shall: **[Essential]**
- a. Establish real time data communication between its C2IS and the other ABN nodes through radio:
 - b. Exchange instant chat messages and C2 orders/messages with the Mobile C2Cs.
 - c. Receive the air picture and situational awareness information required for target engagement.
 - d. Receive target assignments and target identification information sent by the Mobile C2Cs.
 - e. Provide slew-to-cue information for early warning and engagement and to assist the gunner in visual target acquisition, target tracking and ranging.
 - f. Evaluate targets and make engagement decisions standalone/under the C2C guidance by taking into account the ammunition/missile performance characteristics.
 - g. Share own geographical position (based on its GPS data and operator's input) with the Mobile C2Cs.
 - h. Create and transmit to the Mobile C2C military report and messages about the Mobile AAA launcher mission/system status.
 - i. Establish voice communication between the gunner/the team leader and the other subsystems (Mobile C2C, PWT for MANPADS and Mobile AAA launchers) with the CNR.

8.12.4. Mobile AAA launcher – Performance requirements

- TECH_Req.55. The Mobile AAA launcher shall be able to engage, in benign weather conditions, flying targets with a speed comprised between 0 m/s (hovering targets) and 500 m/s, with a flying profile up to 7g and operating within the following effective engagement envelope: **[KPP] [Essential]**
- a. **Range:**
 - i. **greater or equal to 5 km ;**
 - b. **Height:**
 - i. **Higher or equal to 4.000m;**
 - c. **Single Shot Kill Probability (SSKP):**
 - i. **Higher of equal to 0.75.**
- TECH_Req.56. The Mobile AAA launcher shall have at least 2 rails / launching tubes per each Mobile AAA launcher subsystem. **[Essential]**
- TECH_Req.57. The Contractor shall deliver **one (1) batch of seven (7) missiles**, consisting in the initial loading for 3 Mobile AAA launchers and 1 missile for the LFX. **[Essential]**
- TECH_Req.58. The Mobile AAA launcher shall be able to start a second engagement in no more than 15 seconds after the end of the previous engagement. **[Essential]**

- TECH_Req.59. The Mobile AAA launcher shall be able to engage the specified air threats in standalone mode, at the maximum range of its weapon, during both day and night. [KSA] [Essential]
- TECH_Req.60. The guidance of the AAA missile of the Mobile AAA launcher shall be either “fire and forget” (by “fire and forget” shall be understood the possibility of starting a new engagement immediately after the launch of the previous missile, without waiting for the end of the previous engagement) or Command-to-Line-Of-Sight (CLOS). [Essential]
- TECH_Req.61. The AAA missile of the Mobile AAA launcher shall have proximity fuse. [Essential]
- TECH_Req.62. The AAA missile of the Mobile AAA launcher shall have a warhead with an **explosive charge weighting at least 0.5 Kg**. [Essential]
- TECH_Req.63. The AAA missiles of the Mobile AAA launcher shall have the capability of self-destruct at the end of the flight. [Essential]

8.13. AAA basic system – Tactical vehicle requirements

8.13.1. Tactical vehicle – General requirements

- TECH_Req.64. The Contractor shall integrate the Mobile AAA launcher on tactical vehicles (called “vehicles” in the rest of this Section). [Essential]
- TECH_Req.65. The Contractor shall make sure that the integration of any subsystems and/or components in/on the vehicles does not compromise the vehicles’ performance (especially, but not limited to, roadworthiness). [Essential]
- TECH_Req.66. The vehicles, fitted with the associated subsystems and equipment, shall comply with the EU legislation applicable at the date of delivery w.r.t. their usage on public roads. The associated roadworthiness certificates shall be presented to NSPA prior each delivery. [Essential]
- TECH_Req.67. The vehicles used for the Mobile AAA launcher shall have the capacity to transport, seated, at least 3 fully armed and equipped soldiers (e.g. commander, driver and gunner). [Essential]

Note: For the vehicle capacity, the assumptions shall be that each soldier will be armed with one FN SCAR-L assault rifle and equipped with one backpack 45L.

- TECH_Req.68. The vehicles shall be in left hand side configuration (i.e. the driver's seat and dashboard shall be located on the left side). [Essential]
- TECH_Req.69. The vehicles shall be equipped with adjustable size attachment supports compatible for FN SCAR-L automatic rifles and in sufficient number for the whole crew of each vehicle. The location of each of the supports shall be within the reach of the concerned crew member. [Essential]

8.13.2. Tactical vehicle – Engine and transmission

- TECH_Req.70. The vehicles shall be provided with a supercharged diesel engine of Euro III type or better with a quick heating capacity. [Essential]



NATO SUPPORT AND PROCUREMENT AGENCY

AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

TECH_Req.71. The vehicles shall have a minimum power-to-weight ratio higher than 20 hp per ton of gross vehicle weight. **[Essential]**

TECH_Req.72. The vehicles shall be provided with automatic transmission with a minimum of 4 forward gears and 1 reverse gear. **[Essential]**

8.13.3. Tactical vehicle – Mobility

TECH_Req.73. All vehicles fully loaded (i.e. with the crew, fuel tank full, launching tubes/rails loaded etc.) and with all AAA subsystems, accessories mounted shall have a top speed of at least 60 km/h on a paved road **[Essential]**

8.13.4. Tactical vehicle – Ballistic/mine protection

TECH_Req.74. DELETED **[Essential]**

TECH_Req.75. DELETED **[Essential]**

TECH_Req.76. DELETED **[Essential]**

8.13.5. Tactical vehicle – Air conditioning/ventilation

TECH_Req.77. Each vehicle shall be provided with a heating and ventilation system for the vehicle's entire crew cabin. **[Essential]**

TECH_Req.78. Each vehicle shall be provided with an air conditioning system. **[Essential]**

8.14. AAA basic system – ILS performance requirements

8.14.1. ILS performance – Product marking

TECH_Req.79. All markings and inscriptions on the sub-systems and when applicable packaging shall be clearly indicated in English (UK) language. **[Essential]**

TECH_Req.80. All controls and indicating devices shall be labelled in a way that identifies their function. **[Essential]**

TECH_Req.81. Hazard warning labels shall be attached to equipment wherever there exists a potential electrical, chemical, electromagnetic radiation or heat hazard caused by human contact with materials, particularly when removal of covers expose the hazard. **[Essential]**

TECH_Req.82. Any potential hazards (i.e. excessive weight) shall have warning labels attached. **[Essential]**



9. AAA BASIC SYSTEM – ILS REQUIREMENTS

9.1. Integrated Logistic Support (ILS) General

9.1.1. ILS Programme

MGMT_Req.73. The Contractor shall re-use relevant RAMT/ILS/LSA/LORA data already available from previous conducted analysis/projects. **[Essential]**

9.1.2. ILS Management

MGMT_Req.74. The Contractor shall designate an experienced ILS Manager to ensure that the logistics considerations and the logistics planning are an integral part of the production and support identification processes. **[Essential]**

9.1.3. ILS Planning

MGMT_Req.75. The Contractor shall provide a single **Integrated Logistic Support Plan (ILSP)** in accordance with the requirements of the ILS programme. **[Essential]**

MGMT_Req.76. The Contractor shall identify the maintenance support requirements for all sub-systems. **[Essential]**

9.1.4. ILS Reviews

MGMT_Req.77. The Contractor shall conduct the required ILS reviews in conjunction with, or as part of, other project reviews like for instance the Project Management Reviews. When deemed necessary and if agreed by both parties, specific ILS reviews can be organised. **[Essential]**

9.1.5. Maintenance Concept

MGMT_Req.78. The Contractor shall consider a 3-level maintenance concept as follows: **[Essential]**

- a. Organizational Level Maintenance (OLM): Activities performed by the end user, starting upon successful completion of SAT and using Built In Test (BIT) capabilities and simple Tools and Test Equipment (TTE). Typical OLM tasks include visual inspection, preventive maintenance tasks, simple reconfiguration if necessary, external adjustments, the incorporation of minor modifications and the removal and replacement of consumables,
- b. Intermediate Level Maintenance (ILM): Activities performed by the end user, starting upon successful completion of SAT, at its maintenance facilities and through on-site intervention/work by maintenance personnel with skills enabling tasks to be accomplished within the relevant technologies, as well as the on site correction of system level faults/failures which are beyond the scope of Organizational Maintenance capabilities. ILM activities may include the removal and replacement of LRUs. 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 TMs.



- c. Depot Level Maintenance (DLM): Activities performed at Contractor's premises and comprising, among other things, materiel maintenance (incl. SW maintenance when applicable) or repair involving the overhaul, upgrading, rebuilding, testing, inspection of weapon systems, equipment end items, parts, components, assemblies, and subassemblies. No preventive maintenance activities are expected to be performed at DLM level

Preventive maintenance activities are expected to be minimised and to include periodic inspections, condition monitoring activities, consumable replacement, cleaning and when applicable adjustment/calibration.

9.2. Logistic Support Analysis

MGMT_Req.79. DELETED [Essential]

9.3. Maintenance Planning

9.3.1. Level of Repair Analysis

MGMT_Req.80. DELETED [Essential]

MGMT_Req.81. The Contractor shall develop a LORA candidate list. [Essential]

MGMT_Req.82. The results of the LORA shall be documented in the Recommended Provisioning List (RPL). [Essential]

9.3.2. Task Analysis

MGMT_Req.83. DELETED [Essential]

MGMT_Req.84. DELETED [Essential]

9.3.3. Source Maintenance and Recoverability Codes

MGMT_Req.85. The Contractor shall propose a Source Maintenance and Recoverability (SMR) coding methodology, utilising **AR 700-82** as guidance. [Essential]

MGMT_Req.86. DELETED [Essential]

9.4. Supply Support and Support Equipment

9.4.1. Supply Concept

MGMT_Req.87. DELETED [Essential]

MGMT_Req.88. DELETED [Essential]

MGMT_Req.89. DELETED [Essential]

MGMT_Req.90. The Contractor shall provide a **Recommended Provisioning List (RPL)** which includes a Recommended Spare Parts List (RSPL) and a Recommended Consumable (technical and non-technical) Items List (RCIL) for the support of the AAA system during 1 (one) year as per the Usage Profile described in section 7.6 and for all activities that can be performed at the Organisational and Intermediate maintenance levels according to the

maintenance concept described in section 9.1.5. The lists shall be broken down per main subsystems (Mobile C2C/3D radar, Mobile AAA launchers and PWT) and shall allow to differentiate the spares and consumable required for the support of the vehicles other the other assemblies of the subsystems. [Essential]

MGMT_Req.91. DELETED [Essential]

MGMT_Req.92. Spare parts, including consumables, required to support test and validation efforts prior to each acceptance (i.e. prior the associated transfer of responsibilities), shall be the responsibility of the Contractor. [Essential]

9.4.2. Support Tools and Test Equipment

MGMT_Req.93. The Contractor shall deliver all required **Support & Test Equipment** (General Purpose Tools and Test Equipment (GTTE), Special-to-Type Tools, Test Equipment (STTE), jigs, fixtures, material handling equipment and firmware) required to perform all maintenance tasks at Organisational and Intermediate level of repair per maintenance concept defined in section 9.1.5 and deliver them to a designated located in Portugal. [Essential]

Standart support equipment (see example in the list provided in **Annex E**) will be considered as being already available at end user maintenance premises level and are therefore not part of the project scope.

9.4.3. Equipment Codification

MGMT_Req.94. The Contractor shall support the NATO codification of all spare parts and consumable which will be Line Replaceable Units of the Organisational and Intermediate maintenance levels. In this extent, the Contractor shall furnish the Codification Authority (NSPA codification section or National Codification Bureau (NCB) of the producing country) the required **codification data (NSNCod)** in accordance with **STANAG 4177** as well as the engineering drawings, specifications and related documentation conveying item identification data, as specified by the producing country. [Essential]

MGMT_Req.95. The documentation provided by the Contractor shall allow full identification of the items including their operational use. [Essential]

MGMT_Req.96. DELETED [Essential]

MGMT_Req.97. The Contractor shall provide existing NATO Stock Numbers (NSNs), for the items already codified for previous projects. [Essential]

MGMT_Req.98. DELETED [Essential]

MGMT_Req.99. DELETED [Essential]

MGMT_Req.100. DELETED [Essential]

MGMT_Req.101. DELETED [Essential]

MGMT_Req.102. The codification process shall be re-conducted by the Contractor when any new equipment or any change in equipment (modifications, design or drawing changes) is proposed by the Contractor and is accepted by NSPA during the life of the Contract. [Essential]

9.4.4. Obsolescence Management

MGMT_Req.103. DELETED [Essential]



MGMT_Req.104. DELETED [Essential]
MGMT_Req.105. DELETED [Essential]
MGMT_Req.106. DELETED [Essential]
MGMT_Req.107. DELETED [Essential]
MGMT_Req.108. DELETED [Essential]

9.5. Technical Documentation

9.5.1. General

MGMT_Req.109. The technical documentation shall only contain unclassified data to ease the distribution, storage and its use for training purposes. To enable this, the technical documentation shall maintain data classified higher than NATO UNCLASSIFIED separately. The external higher classified data shall be represented in the technical documentation by coded parameters, allowing people to refer to a separate higher classified document to obtain the classified information. [Essential]

MGMT_Req.110. **Technical Manuals (TM)** shall include as a minimum, but not be limited to, system manuals, equipment manuals, user manuals, maintenance manuals, and illustrated parts' breakdowns, which detail all user/operator/system manager/security manager functions to support fault isolation and recovery and on-system hardware/software maintenance and repair according to the agreed maintenance concept. TM content shall allow the end-user to operate and maintain the system (including deployment, transportability, build-up and teardown) taking into account any health and safety regulations. [Essential]

MGMT_Req.111. The Contractor shall provide manufacturers' standard user manuals and documentation every time that they are provided by vendors and every time that they are needed to supplement the Technical Manuals (TM) for operation and maintenance of the system. [Essential]

MGMT_Req.112. The TMs shall be in unlocked PDF format: interactive PDF documents that shall resolve all internal document references as hyperlinks and shall contain an interactive Table of Content (ToC). [Essential]

9.5.2. Technical Manual Validation

MGMT_Req.113. The Contractor shall perform TM validation to ensure that the data are technically accurate and can be used to efficiently operate and maintain the system. [Essential]

MGMT_Req.114. The Contractor shall conduct the TM validation on the approved deliverable/installed configuration of the hardware, software and firmware. [Essential]

MGMT_Req.115. The Contractor shall complete all the required updates to the TMs per the comments raised by NSPA during the validation process (for instance link error, not appropriate illustration etc) before the TM delivery. [Essential]

MGMT_Req.116. DELETED [Essential]

9.5.3. Technical Manual Delivery

MGMT_Req.117. DELETED [Essential]



9.6. Training

9.6.1. General

MGMT_Req.118. The Contractor shall develop, organise and conduct training courses, according to agreed maintenance concept, to enable the end-user to operate and maintain the AAA system. **[Essential]**

MGMT_Req.119. The Contractor shall ensure that all support equipment is included in the applicable operator/system manager/security manager and maintainer training. **[Essential]**

MGMT_Req.120. The Contractor shall carry out, taking into account any health and safety regulations, appropriate courses to cover the following requirements: **[Essential]**

- a. Initial training for one crew of site personnel for each sub-system who will operate and maintain the system (Organizational Level Maintenance) ;
- b. Specialist training for end-user personnel who will conduct Intermediate Level Maintenance.

Note: Up to two NSPA staff members will have the possibility to attend the training courses in a monitoring role. Such attendees will be additional to the planned course size.

MGMT_Req.121. The Contractor shall complete all initial training courses required, prior the SAT and all specialist training courses the latest 3 months after a successful SAT. **[Essential]**

9.6.2. Training Plan

MGMT_Req.122. The Contractor shall develop and provide a **Training Plan (TRP)** covering the training needs for the overall system. **[Essential]**

MGMT_Req.123. The Contractor shall recommend in the Training Plan the mode(s) of training (e.g. formal classroom, individual computer-based, on-the-job, commercial or a combination) and the rationale for those recommendations. **[Essential]**

MGMT_Req.124. The Contractor shall describe in the Training Plan the approach to training, milestones, resource requirements, management structure, interrelationships, and other related tasks required for training development. **[Essential]**

MGMT_Req.125. The Training Plan shall describe each course in detail to allow NSPA to review the proposed training and comment on it before approval. **[Essential]**

9.6.3. Initial Training for Site Personnel (OLM)

MGMT_Req.126. DELETED **[Essential]**

9.6.4. Specialist Training (ILM)

MGMT_Req.127. DELETED **[Essential]**

MGMT_Req.128. DELETED **[Essential]**

9.6.5. Training for Instructors

MGMT_Req.129. DELETED **[Essential]**



9.6.6. Training Courses

- MGMT_Req.130. The Contractor shall conduct courses at the times and in the locations approved by NSPA in the Training Plan. **[Essential]**
- MGMT_Req.131. The training shall be conducted for up to 6 hours of instruction per day during daytime and five days per week. **[Essential]**
- MGMT_Req.132. DELETED **[Essential]**
- MGMT_Req.133. In the event that more than one course is to be provided, the Contractor shall be cognisant that individual trainees may participate in more than one course. **[Essential]**
- MGMT_Req.134. Where appropriate, the Contractor shall organise courses as modules, to allow flexibility in attendance. **[Essential]**
- MGMT_Req.135. The Contractor shall recommend in his TRP the number of trainees for each course. **[Essential]**
- MGMT_Req.136. DELETED **[Essential]**
- MGMT_Req.137. The Contractor shall include appropriate hands-on training in all courses, using a ready for delivery system for this purpose with at least 40% of any course being hands-on. **[Essential]**

9.6.7. Training Documentation and Equipment

- MGMT_Req.138. The Contractor shall provide each trainee with an approved **Training Documentation (TRD)** of the course in both paper and electronic format, the latter allowing the trainer to view the TRD by using portable viewing equipment. **[Essential]**
- MGMT_Req.139. The training documentation shall cover at least all topics included in the syllabus of that course. **[Essential]**
- MGMT_Req.140. The training documentation shall contain unclassified data only to ease the distribution, storage and its use. To enable this, the training documentation shall maintain data classified higher than NATO UNCLASSIFIED separately. The external higher classified data shall be represented in the training documentation by coded parameters, allowing people to refer to a separate higher classified document to obtain the classified information. **[Essential]**
- MGMT_Req.141. DELETED **[Essential]**
- MGMT_Req.142. DELETED **[Essential]**
- MGMT_Req.143. The Contractor shall use validated TMs and portable viewing facilities for training. **[Essential]**
- MGMT_Req.144. DELETED **[Essential]**
- MGMT_Req.145. DELETED **[Essential]**
- MGMT_Req.146. The Contractor shall make available for each course all required training equipment: all the tools in the classroom and also for the hands-on lessons (e.g. TMs, Standard and Special TTE) **[Essential]**

9.6.8. Course Administration

- MGMT_Req.147. The Contractor shall provide NSPA with a **Training Certificate and Completion Report (TRCCR)** for each applicable course. **[Essential]**
- MGMT_Req.148. The Contractor shall provide each trainee with a certificate of training



NATO SUPPORT AND PROCUREMENT AGENCY

AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

for each course successfully completed. [Essential]

9.7. Packaging, Handling, Storage and Transportation

MGMT_Req.149. DELETED [Essential]

MGMT_Req.150. The Contractor shall provide any special packing instructions for the shipment of spare LRUs/repairable items. [Essential]

MGMT_Req.151. The Contractor shall ensure that, when fully packed, LRU's shall not exceed the recommended maximum weight of 25 kg. [Essential]

MGMT_Req.303. Unless otherwise stated in this document, the Contractor shall provide the required packaging for all removable assets (terminals, radios, LRUs and subassemblies, Missiles etc.). This packaging, compliant with the NATO packaging level 3 of STANAG 4280 shall allow their safe transportation if removed from the system/subsystems. [Essential]

10.AAA SYSTEM – ENHANCED CAPABILITIES

10.1. EC ML#1 – Enhanced Mobile AAA launcher performance

TECH_Req.83. The Mobile AAA launcher should have the capability to engage and destroy also the following types of air threats: [Desirable]

- a. UAVs with low (1sqm RCS) and very low signature (0.1sqm RCS);
- b. cruise missiles (CM);
- c. air to ground missiles (AGM).

TECH_Req.84. The Mobile AAA launcher should be able to engage, in benign weather conditions, flying targets with a speed comprised between 0 m/s (hovering targets) and 500 m/s, with a flying profile up to 7g and operating within the following effective engagement envelope: [Desirable]

- a. Range:
 - i. in excess of 5 km, up to 9 km;
- b. Height:
 - i. higher or equal to 5.000m;
- c. Single Shot Kill Probability (SSKP):
 - i. higher or equal to 0.9.

TECH_Req.85. The guidance of the AAA missile of the Mobile AAA launcher should be one of the following, in an ascending order of preference: [Desirable]

- a. with automatic laser beam guidance (i.e. Line of Sight Beam Riding LOSBR);
- b. “fire and forget” with multiband detector; or
- c. “fire and forget” with Imaging Infra-Red (IIR) seeker.

TECH_Req.86. The AAA missile of the Mobile AAA launcher should have a warhead with an explosive charge weighting at least 2 kg. [Desirable]

TECH_Req.87. The Mobile AAA launcher should be able to be remotely operated from inside the vehicle in order to protect the crew from enemy fire. [Desirable]

TECH_Req.88. The Mobile AAA launcher should allow the operator to define No-Fire zones (Forbidden Fire Zones), in which the firing of missile(s) would be disabled when pointing to these zones. [Desirable]

TECH_Req.89. The Mobile AAA launcher should have software defined limits and/or mechanical stoppers in elevation and/or azimuth axis. [Desirable]

10.2. EC ML#2 – Enhanced self-defence capabilities

TECH_Req.90. For self-defence capabilities against unarmoured ground targets, the Mobile AAA launcher should be equipped, in an ascending order of preference: [Desirable]

- a. with a manned 12.7x99 (i.e. cal. 0.50) NATO calibre machine gun;



NATO SUPPORT AND PROCUREMENT AGENCY

AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

- b. with a 7.62x51 NATO calibre medium machine gun fitted on a Remote Weapon Station (RWS) operated from the inside of the vehicle;
- c. with a 12.7x99 (i.e. cal. 0.50) NATO calibre machine gun fitted on a RWS operated from the inside of the vehicle;

The magazine capacity of the machine guns should be at least of 100 rounds for 12.7x99 and 200 rounds for 7.62x51, and should be delivered "full".

TECH_Req.91. The AAA Mobile launcher should be fitted with a RWS that is able to track and engage aerial targets with, in an ascending order of preference: **[Desirable]**

- a. a complementary light missile launcher with proximity fuses;
- b. a 40 mm automatic grenade launcher with airburst capability;
- c. a 30 mm automatic cannon with proximity fuses or airburst capability.

TECH_Req.92. The vehicles should be pre-equipped with a smoke grenade launch system operated from the inside the vehicle and capable of covering a sector of at least 180°. (The smoke grenades will not be delivered in the frame of the AAA project) **[Desirable]**

10.3. EC R – Enhanced 3D radar performance

TECH_Req.300. The 3D radar subsystem should be either mounted on or towed by the tactical vehicle used by the Mobile C2C/3D radar subsystem. **[Desirable]**

TECH_Req.93. The 3D radar should have the capability to detect and track also the following types of air threats: **[Desirable]**

- a. UAVs with low (1sqm RCS) and very low signature (0.1sqm RCS);
- b. cruise missiles (CM);
- c. air to ground missiles (AGM).

10.3.1. EC R – Subsystem modes

TECH_Req.94. The 3D radar should have also simulation/training capability (in which dummy air targets are generated and fed into the Air Battle Network via its command-control and communication system, for training). **[Desirable]**

10.3.2. EC R – Radar performance requirements

TECH_Req.95. The radar should be able to detect, identify, locate and track aerial targets (standard fighter, 2,5 sqm. of RCS) in benign conditions, at a range of at least 30 km. **[Desirable]**

TECH_Req.96. The maximum height of the aforementioned target at the aforementioned detection range should be better than or equal to 11000 meters. **[Desirable]**

TECH_Req.97. The radar should be capable of tracking targets up to an elevation angle of at least 65 degrees. **[Desirable]**

TECH_Req.98. The radar should achieve a refresh rate of no more than 2 seconds. [Desirable]

TECH_Req.99. The radar should be able to detect, locate and track also small size air threats (RCS ≤ 0.1 sqm.) with a 90% probability of detection in at least 50% of the maximum range. [Desirable]

TECH_Req.100. The radar should be able to classify the type of target (fixed-wing, rotary-wing targets, UAV, Cruise Missiles (CM) etc.) [Desirable]

10.4. EC C2 – Enhanced C2 performance

TECH_Req.301. The Contractor should integrate the Mobile C2C on a tactical vehicle. The vehicles used for the Mobile C2C could be different from the one used for the Mobile AAA launchers but should have the capacity to transport, seated, at least 3 fully armed and equipped soldiers (e.g. commander, driver and radar operator). [Desirable]

TECH_Req.302. The AAA system C2 should allow an interoperability with the higher echelon. In this extent, the AAA system ABN should have the capability to receive/transmit, process, forward/exchange tactical/situational awareness and sensor information/data, messages/reports using either JREAP-C protocol (STANAG 5518/ATDLP-5.18) or Link 16 tactical datalink (STANAG 5516/ATDLP-5.16). [Desirable]

TECH_Req.303. The AAA system C2 should be extended with a C2IS terminal + radio physically implemented in a legacy Fire Distribution Centre (FDC) shelter but with no data connection with SICCA3¹. [Desirable]

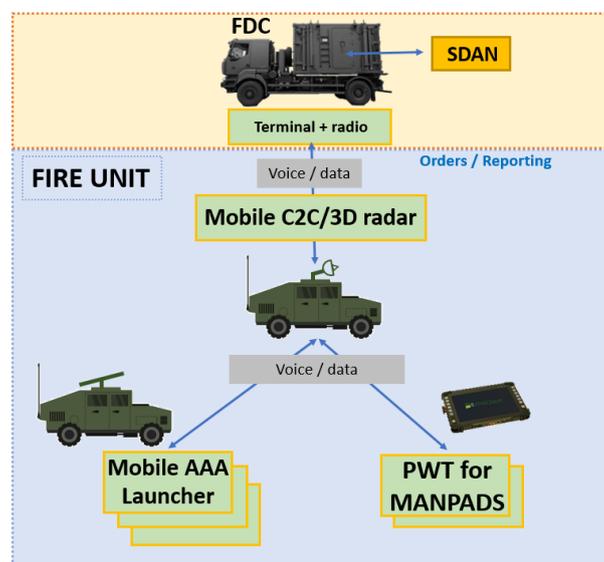


Figure 3 – AAA system enhanced C2 architecture

¹ The SICCA3 (Sistema Integrado de Comando e Controlo para a Artilharia Antiaérea) is a system connected to the National Air Defence network (SDAN) and composed of two shelters, the Tactical Operation Centre (TOC) for non-real time operations such as force operations, logistics etc. and the FDC for real time operations such as engagement operations.



NATO SUPPORT AND PROCUREMENT AGENCY

AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

TECH_Req.304. After implementation of a C2IS terminal + radio in the FDC, the AAA system C2 should allow information/data exchanges between the FDC, the Mobile C2C/3D radar(s), the Mobile AAA launchers and the PWTs for MANPADS according to the following modes: **[Desirable]**

- a. Centralized mode, in which:
 - i. Local Air Picture (LAP), including IFF data, is produced by the 3D radars and transmitted through the Mobile C2C to a C2IS terminal in the FDC;
 - ii. Threat Evaluation and Weapons Assignment (TEWA) is performed by the C2IS terminal in the FDC and the air defence commands produced here are sent first to the Mobile C2C and then further transmitted to the PWTs for MANPADS and the Mobile AAA launchers respectively;
 - iii. Air defence reports are produced by the PWTs for MANPADS and the Mobile AAA launchers before being sent to the respective Mobile C2C. Then, selected air defence reports are further transmitted to the C2IS terminal in the FDC.
- b. Decentralized mode, in which:
 - i. LAP, including IFF data, is produced by the 3D radars and transmitted through the Mobile C2C to the C2IS terminal in the FDC;
 - ii. TEWA is performed by the Mobile C2C; air defence commands are produced at the Mobile C2C level and sent to the PWTs for MANPADS and to the Mobile AAA launchers respectively;
 - iii. Air defence reports are produced by the PWTs for MANPADS and the Mobile AAA launchers before being sent to the respective Mobile C2C. Air defence reports are produced at the Mobile C2C and sent to the C2IS terminal in the FDC.

TECH_Req.305. After implementation of a C2IS terminal + radio in the FDC, the AAA system C2IS functional requirements described in section 8.10.3 should be extended by allowing the Mobile C2C to receive fire direction/distribution orders, target assignments, surveillance/track data. **[Desirable]**

10.5. EC V – Enhanced vehicle operational suitability

10.5.1. EC V – General requirements

TECH_Req.101. The vehicles should have the capacity to transport in specific areas (for instance the cargo compartment) at least three (3) Days of Supply (DOS) (see **Annex E**), for a crew of three (3) soldiers. **[Desirable]**

TECH_Req.102. The Mobile AAA Launcher vehicle should have the capacity to transport 2 (two) spare missiles in addition to those loaded on the rails / launching tubes. **[Desirable]**



NATO SUPPORT AND PROCUREMENT AGENCY

AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

TECH_Req.103. The vehicles should be provided with a tow hook, in accordance with **STANAG 4101 (Ed. 02)**. [Desirable]

TECH_Req.104. The vehicles should have the capacity to tow another vehicle of the AAA system, in battle order and in all-terrain (AT), under the terms of **STANAG 4478 (Ed. 01)**. [Desirable]

10.5.2. EC V – Engine and transmission

TECH_Req.105. DELETED [Desirable]

TECH_Req.106. DELETED [Desirable]

10.5.3. EC V – Mobility

TECH_Req.107. The vehicles fully loaded (i.e. with the crew, fuel tank full, 3 DOS (if applicable), launching tubes/rails loaded etc.) and with all AAA subsystems, accessories mounted /should: [Desirable]

- a. have a top speed of at least 100 km/h on a paved road;
- b. be able to travel on slopes of up to 8% while maintaining a speed of at least 40 km/h;
- c. have an autonomy of at least 500 km without refuelling;
- d. have the following all-terrain capabilities:
 - i. angle of approach of 40° or greater;
 - ii. angle of departure of 30° or greater;
 - iii. max. climbing ability on a gradient of 60% or steeper;
 - iv. max. side slope of 30% or steeper;
 - v. max. climbing ability - (vertical of 0.35 m or higher);
 - vi. ground clearance of 0.30 m or more;
 - vii. fording depth of 0.75 m (without preparation).

TECH_Req.108. The vehicles should be provided with a Central Tyre Inflation System (CTIS) to allow the driver to increase/decrease tyre pressure from inside the vehicle, even when in motion. [Desirable]

TECH_Req.109. The vehicles should be provided with wheels with a "runflat" system according to FINABEL Agreement No. A.20.A (20.A.5). [Desirable]

TECH_Req.110. The vehicles should be provided with a submersible front winch with the following characteristics: [Desirable]

- a. operated by the driver from the driving position;
- b. operated remotely using a control, with an extension lead with a minimum length of 3.5 m;
- c. provided with a cable with a minimum useful length of 30 m, and marking to indicate the end of the cable;
- d. a minimum pulling capacity corresponding to the Gross Vehicle Weight.



10.5.4. EC V – Battlefield protection & monitoring

TECH_Req.111. DELETED [Desirable]

TECH_Req.112. DELETED [Desirable]

10.5.5. EC V – All terrain driving protection

TECH_Req.113. DELETED [Desirable]

TECH_Req.114. DELETED [Desirable]

TECH_Req.115. Each vehicle should be provided with front protection (“bull bar”).
[Desirable]

TECH_Req.116. All vehicles headlights and tail lights should be provided with protection against projected materials. [Desirable]

10.5.6. EC V – Electrical system

TECH_Req.117. DELETED [Desirable]

TECH_Req.118. DELETED [Desirable]

TECH_Req.119. DELETED [Desirable]

TECH_Req.120. DELETED [Desirable]

10.5.7. EC V – Air conditioning/ventilation

TECH_Req.121. The air conditioning system installed in the vehicles should be capable of maintaining the following temperature [Desirable]:

- a. A minimum of 16°C guaranteed at any point inside the vehicle's cabin in basic cold conditions environment according to MIL-STD-810 G or H or STANAG 4370;
- b. A maximum of 30°C guaranteed at any point inside the vehicle's cabin in basic hot conditions according to MIL-STD-810 G or H or STANAG 4370.

10.5.8. EC V – Ancillaries

TECH_Req.122. Each vehicle should be provided with a minimum of two ducts for running cables from the inside to the outside, without affecting the ballistic protection levels. [Desirable]

TECH_Req.123. Each vehicle should be provided with a Combat Identification Device (CID) system, in accordance with STANAG 2129 (Ed. 07), considering the Combat Identification Panels (CIP) module. [Desirable]

TECH_Req.124. Each vehicle should be delivered with a camouflage net with the following characteristics [Desirable]:

- a. the net should cover the entire vehicle and conceal its shapes;
- b. the net should be equipped with infra-red protection;

- c. the net should be with disruptive pattern for the European Theatre of Operations (woodland);
- d. the net should be delivered with a bag for transport and storage.

TECH_Req.125. Each vehicle should be equipped with a beacon system. [Desirable]

TECH_Req.126. Each vehicle should be equipped with a black&white or colour outside camera for a view of the rear of the vehicle, with a display at the driver's position, to allow the driver to see obstacles when performing manoeuvres. [Desirable]

TECH_Req.127. Each vehicle should be provided with standard accessories as per the table in **Annex E**. [Desirable]

10.5.9. EC V – Enhanced Ballistic/mine protection

TECH_Req.306. Without any add-on of modules, the vehicles should ensure level 1 ballistic protection, in accordance with STANAG 4569 (Ed. 01), tested and certified under the conditions of AEP 55, Volume 1 (Ed. 01) [Desirable]

TECH_Req.128. By using additional modules to be installed on the crew cabin including the roof, the vehicles' basic structure should ensure level 2 ballistic protection, in accordance with **STANAG 4569** (at least Ed. 01), tested and certified under the conditions of AEP 55, Volume 1 (at least Ed. 01). The windows should ensure level 2 ballistic protection through a permanent solution or by using an installation kit. Those Add-on modules and potential installation kit for the windows should be delivered by the Contractor already installed on the vehicles. [Desirable]

TECH_Req.307. The vehicle cabin should have a ballistic protection, without the installation of any additional modules, with a minimum level of 2a against anti-tank mines, in accordance with STANAG 4569 (Ed. 01), tested and certified under the conditions of AEP 55, Volume 2 (at least Ed. 01). [Desirable]

TECH_Req.129. The base of the vehicle's cabin should be provided with a ballistic floor mat to protect occupants against 2.84 g (FSP) .30 fragments at a speed of 600 m/s, in accordance with **STANAG 2920 (Ed. 02)** which, in conjunction with the anti-mine protection defined at TECH_Req.76, should protect against 13.39 g (FSP) .50 fragments at a speed of 600 m/s (in accordance with **STANAG 4569** (at least Ed. 01)). [Desirable]

TECH_Req.130. The vehicles should be provided with seats for the crew equipped with devices to attenuate the detonation of mines (vertical acceleration force dissipaters) and safety devices aimed at minimizing the respective effects. [Desirable]

10.6. EC ILS – Enhanced logistic support

10.6.1. ILS Performance

TECH_Req.131. The AAA system should have a Mean Time Between Failure (MTBF), that comprises all systems faults, of not less than 600 hours. [Desirable]

TECH_Req.132. The AAA system should have a Mean Time Between Critical Failure (MTBCF), that comprises all system faults affecting the mission Operational Availability (Ao) of not less than 2000 hours. [Desirable]



NATO SUPPORT AND PROCUREMENT AGENCY

AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

- 10.6.2. ILS Planning
MGMT_Req.152. DELETED [Desirable]
- 10.6.3. Maintenance Concept
MGMT_Req.153. The Contractor should provide a **Preventive Maintenance Cost List (PMCL)** of Organizational and Intermediate Level Maintenance (OLM and ILM) tasks for the system, according to the Usage Profile defined and for a duration of 20 years. The assumptions considered by the Contractor should be exhaustively explained. [Desirable]
- 10.6.4. Logistic Support Analysis Plan
MGMT_Req.154. DELETED [Desirable]
MGMT_Req.155. DELETED [Desirable]
- 10.6.5. Supply Concept
MGMT_Req.156. The Contractor should provide an **Itemised Cost List (ICL)**, including the "item price", "item quantity/system" and "item consumption/year" according to the Usage Profile defined, of all special-to-type support equipment, spare parts and consumables deemed necessary to perform Organizational, Intermediate and Depot Level Maintenance (OLM, ILM and DLM) on the equipment. The price should be itemised to ease NSPA selective procurement of required items throughout the duration of the acquisition contract. [Desirable]
- 10.6.6. Support Tools and Test Equipment
MGMT_Req.157. DELETED [Desirable]
- 10.6.7. Obsolescence Management
MGMT_Req.158. DELETED [Desirable]
- 10.6.8. Technical Documentation
MGMT_Req.159. The Contractor should produce and deliver all technical content according to **ASD S1000D** specification (preferably version 4.1 and above) and should be responsible for the publication of the IETM data using an IETM Viewer. The minimum HW/SW requirement for the use of the Contractor's viewer will be communicated at the same time. [Desirable]
- 10.6.9. Technical Manual Validation
MGMT_Req.160. DELETED [Desirable]
- 10.6.10. Packaging, Handling, Storage and Transportation
MGMT_Req.161. DELETED [Desirable]
MGMT_Req.162. DELETED [Desirable]



NATO SUPPORT AND PROCUREMENT AGENCY
AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

10.6.11. Facilities
MGMT_Req.163. DELETED [Desirable]

11.AAA SYSTEM – OPTIONAL CAPABILITIES

11.1. OC ML#1 – Additional Mobile AAA launchers

TECH_Req.133. The Contractor should deliver additional Mobile AAA launchers (maximum quantities presented in Annex A), compliant with the requirements fulfilled by the Mobile AAA launchers delivered as part of the AAA basic system, when the option(s) is(are) exercised. The acceptance of additional Mobile AAA launchers will be based on a FAT and SAT as described in the SoW but without LFX. This option could be exercised during the first year of Contract. [Optional]

11.2. OC ML#2 – Additional PWTs for MANPADS

TECH_Req.134. Throughout the validity of the Contract, the Contractor should deliver additional PWTs for MANPADS (maximum quantities presented in Annex A), compliant with the requirements fulfilled by the Mobile AAA launchers delivered as part of the AAA basic system, when the option(s) is(are) exercised. The acceptance of additional PWTs for MANPADS will be based on a delivery note and CoC. [Optional]

11.3. OC ML#3 – Batch of missiles

TECH_Req.135. Throughout the validity of the Contract, the Contractor should deliver additional batches of AAA missiles (maximum quantities presented in Annex A), when the option(s) is(are) exercised. The acceptance of additional missiles will be based on a delivery note and CoC. [Optional]

11.4. OC ML#4 – Batch of ammunitions for self-defence equipment

TECH_Req.136. Throughout the validity of the Contract and only if a technical solution is offered as per EC ML#2, the Contractor should deliver up to four (4) batches of associated ammunitions, when the option(s) is(are) exercised. Each of batches should be considered as follows: [Optional]

- a. One (1) batch of complementary light missiles (if applicable) = 8 missiles;
- b. One (1) batch of 40 mm grenade with airburst capability = 40 grenades;
- c. One (1) batch of 30 mm shells with proximity fuses or airburst = 80 shells or nearest unit of delivery.

11.5. OC C2C/3DR – Additional Mobile C2C/3D radar

TECH_Req.308. The Contractor should deliver additional Mobile C2C/3D radar (maximum quantities presented in Annex A), compliant with the requirements fulfilled by the Mobile C2C/3D radar delivered as part of the AAA basic system, when the option(s) is(are) exercised. The acceptance of additional Mobile C2C/3D radar will be based on a FAT and SAT as described in the SoW but without LFX. This option could be exercised during the first year of Contract. [Optional]

Note: Should the options OC ML#1, OC ML#2 and OC C2C/3DR all be exercised, PRT would reorganise the AAA system C2 architecture in 2 Fire Units each composed of a Mobile C2C/3D radar, 2 Mobile AAA launchers and 2 PWTs for MANPADS.



11.6. OC ILS#1 – Follow-on training sessions and documentation

MGMT_Req.164. Throughout the validity of the Contract, NSPA may decide to task the Contractor to perform follow-on training activities as follows: **[Optional]**

- a. Training for Site Personnel (OLM) (see section 9.6.3);
- b. Specialist Training (ILM) (see section 9.6.4);

These follow-on training activities should be organised as per the requirements of the section 9.6, i.e. as per the associated training activities part of the scope. The option for following training activity(ies) will be exercised by NSPA the latest six (6) months prior the planned start of the course while clearly specifying the type of training needed. NSPA may repeatedly exercise this option.

MGMT_Req.165. Throughout the validity of the Contract, NSPA may decide to task the Contractor to provide additional sets of Training Documentation (TRD) for the course(s) indicated by NSPA, thus enabling the end-user to repeat the same courses. **[Optional]**

11.7. OC ILS#2 – Batch of spares

MGMT_Req.304. The Contractor should deliver a batch of Spare Parts and Consumable (technical and non-technical) required for the support of the AAA system during 1 (one) year as per the Usage Profile described in section **Error! Reference source not found.** and for all activities that can be performed at the Organisational and Intermediate maintenance levels according to the maintenance concept described in section **Error! Reference source not found.** The acceptance of a batch of spares will be based on a delivery note and CoC. The Contractor shall pack all Spare Parts and Consumable in transportable cases designed to meet the requirements of the NATO packaging level 3 of **STANAG 4280** and to protect the items from the environmental conditions as specified in this SoW. This option could be exercised during the first two years of Contract. **[Optional]**



NATO SUPPORT AND PROCUREMENT AGENCY
AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

ANNEX A: List of Deliverable Products and Services

The following goods and services are in the scope of the AAA project:

Del#	Main Goods/Services	Type	Quantities	Expected delivery timeline (in months) for [Essential] and [Desirable] (when applicable) qty	Remarks
1	Mobile C2C/3D radar in i.a.w. section 8	AAA subsystems	[Essential]: 1 ea [Optional]: + 1 ea	T0+24	As [Essential] requirement, the Mobile C2C/3D radar shall be transportable. As [Desirable] requirement, the Mobile C2C and 3D radar should be mounted on tactical vehicle. (the 3D radar could be towed by the tactical vehicle)
2	Mobile AAA launchers in i.a.w. section 8		[Essential]: 3 ea [Optional]: + 1 ea	T0+24	Mounted on tactical vehicles
3	Initial stock of missiles in i.a.w. section 8		[Essential]: 7 ea [Optional]: + up to 3x8 ea	qty 1 ea. available prior LFX + remaining 6 ea at SAT + 1 month	-
4	PWTs for MANPADS in i.a.w. section 8		[Essential]: 2 ea [Optional]: + 2 ea	T0+24	Man-portable
5	C2IS terminal + radio		[Desirable]: 1 ea	T0+24 (see remark)	As per EC C2 and only if the associated Desirable req. are met.
6	Spares and consumables in i.a.w. OC ILS#2		[Optional]: 1 batch	See remark	Delivery leadtime addressed in the proposal associated to this option
7	Support & Test Equipment in i.a.w. section 9.4.2	ILS	As per SoW	See remark	Support & Test Equipment will be available prior the SAT
8	Operator & Maintainer Training (incl. training means) in i.a.w. section 9.6		As per SoW	Initial training prior SAT Specialist training SAT+3 months	As per SoW requirements



NATO SUPPORT AND PROCUREMENT AGENCY
AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

ANNEX B: Contract Data Requirement List (CDRL) and main meetings/reviews

AAA Project CDRL

Section	Acronym	Deliverable	Type (Plan, Report, List, MoM...)	First release	Updates (“-“ = minus)
7.2.1	PMP	Project Management Plan	Plan	T0+6 weeks	After receipt of NSPA comments
7.2.1	PMS	Project Master Schedule	Schedule	with PMP	With each PPR following the first release with the PMP.
7.2.2	QMP	Quality Management Plan	Plan	with PMP	As per PMP.
7.3.1	-	Agenda	Agenda	2 weeks prior KoM	Two weeks prior each project meeting
7.3.1	MoM	Minute of Meetings	MoM	2 weeks after KoM	Within two weeks AFTER each project meeting
7.3.3	PPR	Project Progress Reports	Report	2 weeks prior the first PMR	Two weeks prior each Project Management Review (PMR) meeting
7.9.3	-	Configuration overview	List	Prior SAT	Only if required after receipt of NSPA comments
7.9.3	ECP	Engineering Change Proposal	Document	To be defined when required	Only if required after receipt of NSPA comments
7.11	V&ATP	Verification and Acceptance Test Plan	Plan	6 weeks before starting the V&A activities	Only if required after receipt of NSPA comments
7.11	TRAC	TRACeability matrix	Document	With V&ATP	Only if required after receipt of NSPA comments
7.11.2	-	Factory Acceptance Tests Report	Report	Within 4 weeks after FAT	Only if required after receipt of NSPA comments



NATO SUPPORT AND PROCUREMENT AGENCY
AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

Section	Acronym	Deliverable	Type (Plan, Report, List, MoM...)	First release	Updates (“-“ = minus)
7.11.2	CoC	Certificate of Conformity	Document	Within 4 weeks after FAT	Only if required after receipt of NSPA comments
7.11.3	V&AR	Verification & Acceptance Report	Report	Within 4 weeks after SAT	Only if required after receipt of NSPA comments
7.11.4	-	Failure Register	Document	With V&AR	Living document during all V&A activities
9.1.3	ILSP	Integrated Logistic Support Plan	Plan	with PMP	Only if required after receipt of NSPA comments
9.4.1	RPL	Recommended Provisioning List	List	Prior detailed design presentation	Revisions every 6 months, final submission SAT – 4 weeks
9.4.3	NSNCod	Codification Data	Document	Detailed design presentation + 4 months	Final submission SAT – 4 weeks
9.5.1	TM	Technical Manuals PDF format	Document	TM validation – 4 weeks	Revisions every 6 months, final submission/approval SAT – 2 weeks
9.6.2	TRP	Training Plan	Plan	Detailed design presentation + 4 months	Revisions every 6 months, final submission course start date – 2 weeks
9.6.7	TRD	Training Documentation	Document	Each course – 6 weeks	Only if required after receipt of NSPA comments
9.6.8	TRCCR	Training Certificate & Completion Report	Document	Each course + 1 week	-



NATO SUPPORT AND PROCUREMENT AGENCY
AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

Section	Acronym	Deliverable	Type (Plan, Report, List, MoM...)	First release	Updates (“-“ = minus)
10.6.3	PMCL [Desirable]	Preventive Maintenance Cost List	List	<u>With RFP</u>	Detailed design presentation + 4 months, revisions every 6 months, final submission SAT – 4 weeks
10.6.5	ICL [Desirable]	Itemised Cost List	List	<u>Prior detailed design presentation</u>	Detailed design presentation + 4 months, revisions every 6 months, final submission SAT – 4 weeks
10.6.8	IETM [Desirable]	Technical Manuals IETM (ASD S1000D)	Document	TM validation-4 weeks	Revisions when relevant as par of the validation/review process, final submission/approval SAT – 2 weeks

AAA Project main (i.e. [Essential]) meetings/reviews

Acronym	Meeting/Review	First meeting	Recurrence
KoM	Kick-Off Meeting	T0 + 1 month	N/A
-	Detailed design presentation (see MGMT_Req.36)	Within T0+6 months	N/A
PMR	Project Management Review meetings	To be commonly agreed between NSPA and the Contractor	<u>One</u> per contract year

ANNEX C: Glossary of Definitions and Acronyms

Definitions

- **AAA system:** entire system with all integrated HW, SW & FW in the aforementioned organisational structure.
- **AAA subsystems:** Mobile C2C/3D radars, Mobile AAA launchers, PWTs for MANPADS, tactical armoured vehicles, etc...
- The word **item** will be used to either designate a **LRU** or **component** from the AAA subsystems. A **product** will be, in general term, associated to a physical deliverable in the frame of this project. This normally refer to HW, SW, FW or all at the same time
- A Commercial Off-The-Shelf or Modified Off-The-Shelf (**COTS/MOTS**) **component** is a regular element available on the market and directly procurable for use/integration in the frame of the project (for instance ruggedized laptops).
- A **COTS/MOTS based solution** is a solution available today and neither requiring major Research and Developpment (R&D) efforts for its integration nor high non-recurring costs to be funded upfront.
- A Non-Developmental Item (**NDI**) is an item of supply used exclusively for governmental purposes and customarily available in the commercial marketplace.
- A "**qualified item**" is an item which the Contractor already performed verification and acceptance activities in the frame of another project.
- **Initial Operational Capability (IOC):** The IOC refers to a partial AAA system, i.e. one Fire Unit.
- **Final Operational Capability (FOC):** The FOC refers to the entire AAA system.

Acronyms

Acronym	Acronym (full text)
AAA	Anti-Aircraft Artillery
ABN	Air Battle Network
ACSN	Advanced Change Study Notice
AEP	Allied Engineering Publication
AGM	Air-to-Ground Missile
Ao	Operational Availability
AP	Acceptance Phase
AQAP	Allied Quality Assurance Publication
ASD	Aerospace and Defence Industries
ATDLP	Allied Tactical Data Link Publication
C2	Command and Control
C2C	C2 and communication system
C2IS	Command, Control and Information Systems



NATO SUPPORT AND PROCUREMENT AGENCY
AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

Acronym	Acronym (full text)
CAGE	Commercial And Government Entity
CCP	Change Control Programme
CDRL	Contract Data Requirement List
CI	Configuration Item
CID	Combat Identification Device
CIP	Combat Identification Panel
CIS	Communication and Information System
CLOS	Command-to-Line-Of-Sight
CM	Configuration Management, or Cruise Missile (depending on context)
CNR	Combat Network Radio
COTS	Commercial Off The Shelf
CTIS	Central Tyre Inflation System
DC	Direct Current
DID	Data Item Description
DLM	Depot Level Maintenance
DOS	Day of Supply
EA or ea	Each
EC	Enhanced Capability
ECP	Engineering Change Proposal
EU	European Union
FAT	Factory Acceptance Test
FCA	Functional Configuration Audit
FDC	Fire Distribution Centre
FSP	Fragment Simulated Projectile
FU	Fire Unit
FW	Firmware
GFE	Government Furnished Equipment
GPS	Global Positioning System
GQA	Government Quality Assurance
GTTE	General Purpose Tools and Test Equipment
HDBK	HandBook
HW	Hardware
i.a.w.	In accordance with
ICL	Itemised Cost List
IEC	International Electrotechnical Commission
IETM	Interactive Electronic Technical Manual
IFF	Identification Friend or Foe
IIR	Imaging Infra-Red
ILM	Intermediate Level Maintenance
ILS	Integrated Logistic Support



NATO SUPPORT AND PROCUREMENT AGENCY
AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

Acronym	Acronym (full text)
ILSP	ILS Plan
ISO	International Standardisation Organisation
ITAR	International Traffic in Arms Regulations
JREAP	Joint Range Extension Application Protocol
KPP	Key Performance Parameter
KSA	Key System Attribute
LAP	Local Air Picture
LC2	Light Command & Control
LFX	Live Fire eExercise
LGC	Logistic Guidance Conference
LORA	Level of Repair Analysis
LOSBR	Line of Sight Beam Riding
LRU	Line Replaceable Unit
LSA	Logistic Support Analysis
LUX	Luxembourg
MANPADS	Man-Portable Air Defense System
MCI	Mission Critical Item
MGMT	Management
MIL	Military
MM	Milimeter
MOTS	Military/Modified off the Shelf
MTBF or MTBCF	Mean Time Between (Critical) Failure
NATO	North Atlantic Treaty Organisation
NCAGE	NATO Commercial And Government Entity
NCB	National Codification Bureau
NDI	Non Developmental Items
NSN	NATO Stock Number
NSPA	NATO Support and Procurement Agency
OC	Optional Capability
OEM	Original Equipment Manufacturer
OLM	Organisational Level Maintenance
OR	Obsolescence Report
PCA	Physical Configuration Audit
PHST	Packaging, Handling, Storage & Transportation
PMCL	Preventive Maintenance Cost List
PMP	Project Management Plan
PMR	Project Management Review meeting
PMS	Project Master Schedule
PPR	Project Progress Report
PRT	Portugal or Portuguese (i.a.w. the context)



NATO SUPPORT AND PROCUREMENT AGENCY
AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

Acronym	Acronym (full text)
PWT	Portable Weapon Terminal
QA	Quality Assurance
QMP	Quality Management Plan
RAMT	Reliability Availability Maintainability and Testability
RCIL	Recommended Consumable Items List
RCS	Radar Cross Section
REACH	Registration, Evaluation and Authorisation of Chemical
RFD	Request for Deviation
RFP	Request for Proposal
RFW	Request for Waiver
RPL	Recommended Provisioning List
ROM	Rough Order of Magnitude
RSPL	Recommended Spare Parts List
SA	Sales Agreement
SAT	Site Acceptance Test
SDAN	Portuguese National Air Defence System & Network
SICCA3	Sistema Integrado de Comando e Controlo para a Artilharia Antiaérea
SME	Subject Matter Expert
SMR	Source, Maintenance and Recoverability
SOW	Statement of Work
SRCL	Security Requirements Check List
SSKP	Single Shot Kill Probability
STD	Standard
STP	Shielded Twisted Pair
STTE	Special-to-Type Tools, Test Equipment
SW	Software
TE	Technical Event
TEWA	Threat Evaluation and Weapons Assignment
TM	Technical Manual
TOC	Tactical Operations Centre or Table of Content (depending on context)
TRAC	TRACeability matrix
TRCCR	Training Certificate and Completion Report
TRD	Training Documentation
TRP	Training Plan
TTE or TTEL	Tools and Test Equipment / List
UAV	Unmanned Air Vehicle
UK	United Kingdom
US	United States
VSHORAD	Very Short Range Air Defence



ANNEX D: Live Firing Exercise scenario

LFX_Req.1. The Contractor shall organize one consolidated Live Firing Exercise (LFX) in Portugal as per the requirements of this SoW. The aim of this LFX shall be to demonstrate the capabilities of the Mobile AAA launcher for both its missile launcher and (if applicable) its self-defence capabilities. The scenario presented below is to be considered a preliminary LFX scenario, with the understanding that the final LFX scenario will be agreed as part of the Verification and Acceptance Test Plan (V&ATP). **[Essential]**

Note: The LFX will be accommodated by the Portuguese Army in the Firing Range at Fonte dos morangos (Vieira de Leiria). All the LFX activities will be organized i.a.w. PRT range safety rules. For the LFX, PRT Army will provide:

- a. general range safety measures and general logistic support;*
- b. the ammunitions, targets as well as all other required assets for the good execution of the LFX.*

LFX_Req.2. The LFX shall be part of the Site Acceptance Test (SAT). The successful completion of this LFX shall be considered by the Contractor as a pre-requisite for the successful completion of the overall SAT. **[Essential]**

LFX_Req.3. The Contractor shall organize at least one successful missile firing on an Unmanned Air Vehicle (UAV) simulating fixed-wing aircrafts on a head-on profile, at the following parameters: **[Essential]**

- a. Range: at least 5 km
- b. Height: at least 4 km

For the firing, the Contractor shall use missile(s) from the project scope and of the same production lot as the missiles to be delivered for the first batch in the frame of the contract.

LFX_Req.4. In case the Mobile AAA launcher is equipped with one of the self-defence and/or RWS capabilities, the Contractor shall demonstrate also their capability to the maximum effective range announced in the offer. These tests shall be performed for ground and, when applicable, aerial targets, with a minimum of 100 shots (in case of machinegun), 1 shot (in case of complementary missile launcher), 10 shots (in case of grenade launcher or automatic cannon). **[Essential]**

LFX_Req.5. The Contractor shall record each live firing and its results using its own means (radar, IR/video, telemetry etc.). The Contractor shall provide all the necessary records, explanations and interpretations of the results required for the assessing of the compliancy of the delivered system with technical requirements. **[Essential]**



ANNEX E: Technical details

Items constituting 3 Days of Supply (DOS) for a crew of 3 soldiers

(TECH_Req.101 [Desirable])

Designation	Quantity
<i>Field ration/combat ration</i>	9
<i>Water (1.5 litres)</i>	9
<i>Munitions - small arms 9 MM</i>	<i>24 or nearest amount with standard ammunition boxes.</i>
<i>Munitions - small arms 5.56 MM</i>	<i>2160 or nearest amount with standard ammunition boxes.</i>
<i>Hand Grenade</i>	18
<i>Backpack medium (cap. 45 liters) (covered by TECH_Req.67)</i>	3
<i>Army sleeping bag</i>	3



Vehicle standard accessories/on-board assets

(See TECH_Req.127 [Desirable])

	Designation	Qty
a	Shovel, installed on its own support with a quick release system	1
b	Pickaxe, installed on its own support with a quick release system	1
c	Axe, installed on its own support and with a quick release system	1
d	20 litre metal jerrycan for fuel	4
e	Portable 2 kg ABC chemical powder fire extinguisher, installed inside the cabin	2
f	Spare wheel installed on the outside of the vehicle	1
g	Vehicle first aid kit, in a green canvas bag and marked with a red cross symbol on a square white background, installed inside the vehicle on its own support, large enough to contain at least the following perishable and non-perishable items: <ul style="list-style-type: none"> - Scissors for cutting clothes (1 EA) - Non-pneumatic tourniquet (5 EA) 	1
h	Tow bar with eyes and attachment shackles in accordance with STANAG 4478 (Ed. 01) , with a towing capacity of at least 1500 kg.	1
i	Hoist with double pulley	1
j	Metal chocks	2
k	Jump leads set with Type 2 plugs in accordance with that defined in STANAG 4074 (Ed. 02) , with a minimum length of 3 metres	1
l	Box of spare bulbs and fuses, comprising at least the following: <ul style="list-style-type: none"> - 1 headlamp bulb - 2 indicator bulbs - 1 of each type of fuse used in the vehicle 	1
m	12 V troubleshooting light with a 6 metre connection wire	1
n	Pairs of cotton and leather work gloves (mechanic type)	2
o	Tool set (including wheel wrench)	1
p	Warning triangle	1
q	High-Visibility vest	3
r	Hydraulic jack with handle and capacity for the maximum weight per axle	1
s	Snow chains (complete set for the 4 wheels of the vehicle) with transport and storage bags	1



NATO SUPPORT AND PROCUREMENT AGENCY
AGENCE OTAN DE SOUTIEN ET D'ACQUISITION

**Example of general purpose (i.e. standard) tools and test equipment
not expected to be delivered as part of the delivered STTE**

(See MGMT_Req.93 [Essential])

Item #	Item Description
1.	BERT tester for E1 and Datacom: Albedo Telecom AT-2048
2.	LAN Copper tester: Ideal Network Division LAN Xplorer PRO Premium
3.	Fiber kit to measure the attenuation of optical fibers: Ideal Network Division Fiber Master kit
4.	Visual Lightsource to locate faults in optical fiber: Ideal Network Division Unipro VoIP
5.	Unipro Tester for testing SIP Voice: Ideal Network Division RPPX0000
6.	Clamp on AC meter
7.	Digital Multimeter
8.	Torx Set
9.	Ladder 3 steps
10.	Ladder 7 steps
12.	Wire wrap tools
13.	Hexagon wrench key
14.	Set of .25 drive metric socket & spanners
15.	Set of .50 drive metric socket & spanners
16.	Set of .25 drive standard socket & spanners
17.	Set of .50 drive standard socket & spanners
18.	Battery checker 12 V
24.	Crimp tonge RJ 11/12, RJ 45
25.	Torque key 80 - 420 NM
26.	Pinch off pliers lockgrip
27.	Insulated comb/pliers 150mm
28.	Slip Joint Pliers
29.	Snipe nose pliers
30.	Wire stripper
31.	Diagonal cutters
32.	Adjustable Wrench
33.	Water pump pliers
36.	Electricians scissors
37.	XHT-612 self closing tweezers
38.	CK 9040 electricians knife
39.	Metric Allen s/drivers: 99-71mm & 99-72mm
40.	Metric Allen hex s/drivers: 99-73mm to 99-77mm
41.	Screwdriver - pozidrive from Nø 1 to Nø 3
42.	Screwdriver - 5.6mm blade
43.	Screwdriver - 9.0 mm blade
44.	Jewellers screwdrivers
45.	Screwdriver - gripping
46.	Inspection mirror
47.	Reverse action tweezers
48.	Trimming tools
49.	W41H ball pen hammer - 113 grams
50.	TCT 1 5 way crimping tool