

**Office of Acquisition**

Boulevard Léopold III  
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NCIA/ACQ/2023/06610

24 February 2023

To: See Distribution List

Subject: **Provision of Tactical Deployable Communications and Information Systems (TDCIS) for the Portuguese Army  
Request for Quotation RFQ-CO-115363-PRT-TDCIS, Amendment 10**

Reference:

- A. AC/4-D(2019)0004 (INV)
- B. NCIA/ACQ/2021/06476 Notification of Intent dated 18 January 2021
- C. NCIA/ACQ/2021/06775 Notification of Intent AMD 1 dated 9 April 2021
- D. NCIA/ACQ/2021/68940 RFQ-CO-115363-PRT-TDCIS, dated 2 Jun 2021
- E. NCIA/ACQ/2021/06983 RFQ-CO-115363-PRT-TDCIS, Amendment 1 dated 15 June 2021
- F. NCIA/ACQ/2021/07015 RFQ-CO-115363-PRT-TDCIS, Amendment 2 dated 25 June 2021
- G. NCIA/ACQ/2021/07065 RFQ-CO-115363-PRT-TDCIS, Amendment 3 dated 14 July 2021
- H. NCIA/ACQ/2021/07140 RFQ-CO-115363-PRT-TDCIS, Amendment 4 dated 6 August 2021
- I. NCIA/ACQ/2021/07259 RFQ-CO-115363-PRT-TDCIS, Amendment 5 dated 17 September 2021
- J. NCIA/ACQ/2021/07281 RFQ-CO-115363-PRT-TDCIS, Amendment 6 dated 28 September 2021
- K. NCIA/ACQ/2022/07059 Notification of Intent AMD 2 dated 6 September 2022
- L. NCIA/ACQ/2021/07195 RFQ-CO-115363-PRT-TDCIS, Amendment 7 dated 25 October 2022
- M. NCIA/ACQ/2022/07365 RFQ-CO-115363-PRT-TDCIS, Amendment 8, dated 09 December 2022.
- N. NCIA/ACQ/2023/06501 RFQ-CO-115363-PRT-TDCIS, Amendment 9, dated 14 February 2023

Dear Sir/Madam,

1. At Reference D your firm was invited, in conformance with the terms of your active Basic Ordering Agreement (BOA) with the NCI Agency, or the nomination through your National Delegation, to participate in a BOA Plus competition for the for the provision of Tactical Deployable Communications and Information Systems (TDCIS) for the Portuguese Army.
2. The purpose of this Amendment 10 to RFQ-CO-115363-PRT-TDCIS is to:
  - a. Publish Purchaser's answers to Clarification Requests (CRs) received for the subject RFQ. The Purchaser is providing their response at Annex A attached to this letter
  - b. Issue revised RFQ Documents as follows:
    - RFQ-CO-115363-PRT-TDCIS Book I Bidding Instructions AMD10
    - RFQ-CO-115363-PRT-TDCIS Book I Bidding Annex C Bidding Sheets AMD10

- RFQ-CO-115363-PRT-TDCIS Book II Part I Schedule of Supplies and Services AMD10
- RFQ-CO-115363-PRT-TDCIS Book II Part II Contract Special Provisions AMD10
- RFQ-CO-115363-PRT-TDCIS Book II Part IV– SoW Annex A SRS v.2.4

c. **Extend the Bid Closing Date to 17:00 HOURS (BRUSSELS TIME) on Friday, 24<sup>th</sup> March 2023.**

3. By virtue of this Amendment, the documents replace and supersede any previous versions issued in the context of RFQ-CO-115363-PRT TDCIS. All other RFQ documents remain unchanged in this Amendment.

4. The RFQ documents are revised as follows:

RFQ-CO-115363-PRT-TDCIS Book I Bidding Instructions AMD10:

amending the Bid Closing Date in section 2.3.1.

RFQ-CO-115363-PRT-TDCIS – Book I Annex C – Bidding Sheets – AMD10

adding Item 7.1.1.2.6 for HCLOS

changing Item 7.1.1.2.5 quantity to “0”.

RFQ-CO-115363-PRT-TDCIS Book II Part I Schedule of Supplies and Services AMD10

amending date for the accomplishment of CDR to EDC+28 weeks

RFQ-CO-115363-PRT TDCIS Book II Part II Contract Special Provisions AMD10

amending section 12.9 (Payment Schedule)

RFQ-CO-115363-PRT TDCIS Book II Part IV – SRS v.2.4 – SoW Annex A

please see Annex A under “Status”

5. **THE NEW CLOSING TIME FOR SUBMISSION OF QUOTATIONS IN RESPONSE TO THE RFQ IS 17:00 HOURS (BRUSSELS TIME) ON Friday, 24<sup>th</sup> March 2023.**

6. The reference for this RFQ is RFQ-CO-115363-PRT-TDCIS, and all correspondence concerning the RFQ should reference this number.

7. Prospective Offerors are advised that the NCI Agency reserves the right to cancel this RFQ at any time in its entirety and bears no liability for quotation preparation costs incurred by firms or any other collateral costs if solicitation cancellation occurs.

8. In accordance with the NATO Management of Non-Classified NATO Information policy (C-M(2002)60), this RFQ is the property of the NCI Agency and shall therefore NOT be published on the internet.

9. Your point of contact for all information concerning this RFQ is Mr. Ole Hubner, Senior Contracting Officer, who may be reached at [RFQ-CO-115363-PRT-TDCIS@ncia.nato.int](mailto:RFQ-CO-115363-PRT-TDCIS@ncia.nato.int)

On behalf of the Chief of Acquisition:

Mr. Ole Hubner  
Senior Contracting Officer

**Enclosures:**

- Annex A - Purchaser's answers to the Clarification Requests
- RFQ-CO-115363-PRT-TDCIS Book I Bidding Instructions AMD10
- RFQ-CO-115363-PRT-TDCIS Book I Annex C – Bidding Sheets – AMD10
- RFQ-CO-115363-PRT-TDCIS Book II Part I Schedule of Supplies and Services AMD10
- RFQ-CO-115363-PRT TDCIS Book II Part II Contract Special Provisions AMD10
- RFQ-CO-115363-PRT TDCIS Book II Part IV SRS v2.4 - SoW Annex A

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# **REQUEST FOR QUOTATION**

## **RFQ-CO-115363-PRT TDCIS**

### **Amendment 10**

## **Tactical Deployable Communications and Information Systems (TDCIS) for the Portuguese Army**

### **ANNEX A**

## **Response to Clarification Requests**

ADMINISTRATIVE/CONTRACTUAL				
Serial Nr	RFQ Section Ref.	OFFEROR'S QUESTION	NCI AGENCY ANSWER	Status
A.16	RFQ-CO-115363-PRT-TDCIS Book II – Part II Contract Special Provisions - Clause 12	Contractor will submit invoices to the Purchaser in accordance with the table shown in Clause 12. From this table the first three milestones covering the 15% of the contract value will be invoiced 21 weeks after EDC. The following payment is linked to finalization of the FAAT at week 84, this leaving 62 weeks with no cash in and leading to a dramatic negative cash flow during this long period when most of the material will be bought. Please reconsider the payments scheme in order to provide a fair non negative cash flow along the project execution.	The NCI Agency is paying against deliverables under the contract and cannot consider advance payments for material orders. However, we have reviewed the payment milestones and added an additional payment milestone against CLIN 7.4 (Purchaser approval of training materials, EDC+65). Furthermore, we increased the payment milestone for CRD acceptance from 5% to 10% of the contract value and moved the milestone to the back to allow the awarded contractor more time for the design.	Please see AMD10 Book II Part II Contract Special Provisions, Section 12



**ANNEX A – Responses to Clarification Requests**

<b>TECHNICAL</b>				
<b>Serial Nr</b>	<b>RFQ Section Ref.</b>	<b>OFFEROR'S QUESTION</b>	<b>NCI AGENCY ANSWER</b>	<b>Status</b>
<b>T.207</b>	SRS (PRTTDCIS-1795)	MOTS equipment, components and systems to be used in tactical operations don't have audio signalling. Please confirm we can use MOTS equipment, components and systems without audio signalling.	As per PRTTDCIS-4504, Shelter and HCLOS Trailer variant UPS remain with audio alarm. UAM UPS audio alarm requirement removed. See updated PRTTDCIS-1795 in SRS v2.4.	Please see updated SRS v2.4.
<b>T.208</b>	SRS (PRTTDCIS-1795)	MOTS equipment, components and systems to be used in tactical operations don't have audio signalling. Please confirm we can use MOTS equipment, components and systems without audio signalling.	Duplicate of T.207. See reply to T.207.	No amendment to RFQ required.
<b>T.209</b>	SRS (PRTTDCIS-4211)	MOTS equipment, components and systems are already ruggedised, not prepared to accomodate patch panels and given the number of ports required, no connectorized panels for the UAM should be required. Please confirm we can use MOTS equipment, components and systems without patch panels.	Patch panel requirement pertains.	No amendment to RFQ required.
<b>T.210</b>	SRS (PRTTDCIS-1275)	We understand that this WAP can be deployed inside and outside the shelter. Please confirm.	Correct. WAP shall be primarily installed inside the shelter but can also be remoted outside the shelter as described in PRTTDCIS-4648.	No amendment to RFQ required.

TECHNICAL				
Serial Nr	RFQ Section Ref.	OFFEROR'S QUESTION	NCI AGENCY ANSWER	Status
T.211	SRS (PRTTDCIS-1609)	All PFE Cisco phones have SRST licenses. Please confirm.	PFE phones will be licensed to align with the Contractor design.	No amendment to RFQ required.
T.212	SRS (PRTTDCIS-4515) Bidding sheets	Bidding sheets considers a DRS for RAP xU. Please confirm.	As per PRTTDCIS-1454, RAP includes both an ISM-xU and ISM-xR but is only enabled for ISM-xS. As both CAS and DRS are subsystems of ISM, the bidding sheets is correct to list DRS-xU for RAP.	No amendment to RFQ required.
T.213	SRS (PRTTDCIS-2221)	HxMA vs HMA? Taking into account that PRT Army has equipment using HMA connectors, TDCIS solution can also uses HMA connectors. Please confirm.	Not confirmed. HxMA to be applied.	No amendment to RFQ required.
T.214	SRS (PRTTDCIS-1275) Bidding sheets	Which line in bidding sheets includes the shelter WAP?	It is included in CCA-xU.	No amendment to RFQ required.
T.215	SRS (PRTTDCIS-1555) Bidding sheets	SRS-1555 indicates that the main shelter PCA connects to CCA-xU and CCA-xR in remote shelter. This doesn't require a second PCA in remote shelter. Bidding sheets requires a PCA in remote shelter. Please confirm.	PRTTDCIS-1555 lists interfaces for each PCA instance. As described in PRTTDCIS-4635, for dual shelter nodes, PCA functions are present in both shelters and connections between shelters is ensured through the PCA. With this in mind, the Purchaser expects to have some PCA implementation in each shelter as the interconnection between shelters is over BLK and not Color	No amendment to RFQ required.

TECHNICAL				
Serial Nr	RFQ Section Ref.	OFFEROR'S QUESTION	NCI AGENCY ANSWER	Status
			<p>Clouds. How this spread PCA is implemented is design driven. Having a dedicated PCA in each shelter is one of the different options which may emerge from the Contractor design.</p> <p>The bidding sheet does not imply the requirement of a dedicated PCA in each shelter, it is a placeholder to capture the PCA costs associated to the elements implemented in each shelter.</p>	
T.216	NOTE (PRTTDCIS-2670)	Figure 72 refers to UAM Small and Medium or just to UAM Medium?	<p>PRTTDCIS-2670 introduces the generic UAM in context.</p> <p>Small UAM is described in PRTTDCIS-2673 as being realized by User Network Interfaces directly implemented in the CCA.</p> <p>Medium UAM is described in PRTTDCIS-2674 as being realized by an Access Break out Box which is further detailed in PRTTDCIS-1800, PRTTDCIS-3242 and PRTTDCIS-3243.</p>	No amendment to RFQ required.
T.217	SRS (PRTTDCIS-1363)	Which line in bidding sheets includes HCLOS Relay Router?	Please see the updated Bidding Sheets.	Please see the updated Bidding Sheets.

TECHNICAL				
Serial Nr	RFQ Section Ref.	OFFEROR'S QUESTION	NCI AGENCY ANSWER	Status
T.218	SRS (PRTTDCIS-4385)	Software licenses are provided in relation with the pooled elements quantities?	As captured in PRTTDCIS-4392, no deliverable licenses for CAS and SAN pooled servers. All other pooled elements (e.g. SBC, DDM, Spectrum Analyser, etc.) are to be delivered with applicable licenses to ensure that those elements are directly usable when installed in any Node.	No amendment to RFQ required.
T.219	SRS (PRTTDCIS-3231) and SRS (PRTTDCIS-2227)	"lightning and surge protection" and "surge arrester filters" are the same requirement. Please confirm.	Both share the same purpose. PRTTDCIS-3231 makes lightening and surge protection implementation design driven. PRTTDCIS-2227 (but also PRTTDCIS-2230, PRTTDCIS-2234 and PRTTDCIS-2240) makes mandatory the implementation of Surge arrester filters in those particular Termination panels.	No amendment to RFQ required.
T.220	SRS (PRTTDCIS-2233)	Each ERFPs shall include, as a minimum, TWO (02) type N female coaxial connectors and TWO (02) type TNC female coaxial connectors.	This is a copy of the SRS statement and not a question.	No amendment to RFQ required.
T.221	PRTTDCIS-4163	The Carrier aggregation goal is to increase the data throughput, in case of voice over IMT gateway does not make sense. This SRS still required?	Correct, CA is not required for the Voice IMT Gateway. PRTTDCIS-4163 removed from SRS v2.4.	Please see updated SRS v2.4.
T.222	PRTTDCIS-4151	For each voice over IMT concurrent calls is required a modem connected to 2 independent antennas. This requires 20 antennas?	The solution for the gateway to handle 10 concurrent calls is design driven. There is no requirement for 10 independent modems nor for a single modem that can handle 10 calls. MIMO is not required for the Voice IMT	Please see updated SRS v2.4.

TECHNICAL				
Serial Nr	RFQ Section Ref.	OFFEROR'S QUESTION	NCI AGENCY ANSWER	Status
			Gateway, PRTTDCIS-4164, PRTTDCIS-4165 and PRTTDCIS-4151 removed from SRS v2.4.	
T.223	PRTTDCIS-4151	For each voice over IMT concurrent calls is required a modem connected to 2 independent antennas.The solution can be two independents' antennas connected by two antenna couplers to all modems?	See reply to T.222.	Please see updated SRS v2.4.
T.224	Book II Part IV SRS - 5.2.2.3.2 Voice over IMT Gateway	The voice over IMT gateway can be implemented with data over IMT and SIP/VOIP software/hardware. Please confirm.	The solution implementing the Voice over IMT Gateway is design driven. Nothing forbids the usage of software, hardware or any combination of both based solution, as long as it meets the requirements expressed in the SRS. The purpose of the Voice over IMT Gateway is primarily to allow users to make calls to the civilian network from the xU Voice service directly through the Voice over IMT Gateway by converting the VoIP service into the carrier's voice service. The Voice IMT over Gateway intends to be an alternative to the Data over IMT Gateway in that it enables a voice service, provided by local carriers, and based on regular consumer voice subscriptions. See updated PRTTDCIS-4146 in SRS v2.4.	Please see updated SRS v2.4.

TECHNICAL				
Serial Nr	RFQ Section Ref.	OFFEROR'S QUESTION	NCI AGENCY ANSWER	Status
T.225	Ref Q&A T178 Book II Part IV SOW Annex A Section 6.4 Military SATCOM Terminal para 6.4.3.4 Antenna Subsystem Pag. 232 (PRTTDCIS- 2069)	If there is a single carrier per each up-link there is no risk of intermodulation, neither passive nor active. Thus, is it still mandatory to provide a Low PIM feed (Low PIM is a cost driver!) ?	Low PIM requirement is removed. See removed PRTTDCIS-2069 in SRS v2.4.	Please see updated SRS v2.4.
T.226	Ref Q&A T178 Book II Part IV SOW Annex A Section 6.4 Military SATCOM Terminal para 6.4.3.4 Antenna Subsystem Pag. 231 (PRTTDCIS- 3858)	"The antenna design shall be capable of simultaneously transmitting LHCP and receiving RHCP in all bands (inverted polarization)" In X-band in order to invert the polarisation, the position of the transmit and receive path filters need to be inverted on polariser of the feed. These flanges require special care and design to avoid passive intermodulation. If the low PIM requirement is maintained, it is not recommended to open these flanges as it is highly probable to jeopardise their low PIM properties. Some types of low PIM feeds are electro-formed in one piece together with the filters and therefore cannot be converted to inverted	SRS-887 new reference is PRTTDCIS-3858. SRS-889 new reference is PRTTDCIS-2069. As replied on T.226, Low PIM requirement is removed. See removed PRTTDCIS-2069 in SRS v2.4.	Please see updated SRS v2.4.

TECHNICAL				
Serial Nr	RFQ Section Ref.	OFFEROR'S QUESTION	NCI AGENCY ANSWER	Status
		polarisation. Please consider the requirements SRS-887 and SRS-889 as mutually exclusive. Either it is low PIM or the polarisation is invertable in the field.		
T.227	Ref Q&A T40 AMD9	The NCIA answer states "...As explained in PRTTDCIS-4509, the UPS function (of the Access BoB) it is not mandatory to implement the UPS function as a dedicated appliance....". Since the UPS functions remain, the relevant batteries and electronic control are to be computed in the Tiny Case weight budget making the sistem critical for this. Please confirm the statement.	Correct, whatever design driven solution will be implemented for the UPS function of the Access Bob, it will be contained in the TINY Case and be accounted for the maximum Size and Weight limitations.	No amendment to RFQ required.
T.228	Ref Q&A T182 AMD9	PRTTDCIS-2231 requires six ERFP for different systems. Please confirm that a single mechanical ERFP structure housing sections for ERFP systems can be used to meet the SRS	The objective of having 6 separate ERFP, each close to the Whip antenna mounting point is to reduce the length of the cable running from the ERFP to the antenna base to its minimum. If, while meeting PRTTDCIS-4740, two antennas mountings points are relatively close to each other and depending of the design, 2 ERFPs could be considered to be grouped into a single mechanical construct. However, at this stage and without more details on the target design, the Purchaser doubts that it is possible to group all ERFP into a single mechanical construct while efficiently distributing antennas around the shelter and avoiding cables to be routed along the shelter outside walls for multiple meters.	No amendment to RFQ required.

TECHNICAL				
Serial Nr	RFQ Section Ref.	OFFEROR'S QUESTION	NCI AGENCY ANSWER	Status
T.229	Book II Part IV SRS Pag. 263 (PRTTDCIS-2125)	SRS 2125 states: "Racks shall be equipped with removable meshed panels...". Should a Tempest Rack (for xS domain) be needed (in the Shelters), a meshed panel cannot be used. Please confirm that, for Tempest racks, the "meshed" feature of panels can be neglected, provided that all the other rack requirements are satisfied.	Correct.	No amendment to RFQ required.
T.230	Book II Part IV SRS Pag. 284 (PRTTDCIS-3517)	The lifting jacks shall be powered at 24VDC. Please confirm the 24 VDC power will be from the Vehicle since PRTTDCIS-2218 does not require any 24VDC power output for shelter	Correct, the source of 24VDC power for the lifting jacks will not be the shelter and will be provided by PRT Army where and when needed during deployments, for instance, from a Vehicle. When lifting jack is being operated on 230VAC (PRTTDCIS-3518), power could be provided by Mains or from the Shelter. The combination of PRTTDCIS-3517 and PRTTDCIS-3518 ensures that the lifting jack kit can be operated on 230VAC and 24VDC.	No amendment to RFQ required.
T.231	Book II Part IV SRS - pag. 308 (PRTTDCIS-4734) and Book II Part IV SRS - pag. 73 (PRTTDCIS-4469)	System Administrator Workstation Breakdown shows Headset to Semi-Rugged Laptop to the System Administrator Workstation. Please clarify if Headset shall follow OPE-1c specifications or "Semi-Rugged" specifications as per PRTTDCIS-4033	As per PRTTDCIS-4465, End User devices shall operate in OPE-1c this extends to the Headset as a component of the Sys Admin Workstation End User device. However, as per PRTTDCIS-1823, only the laptop component of the workstation shall meet "Semi-Rugged" environmental target.	No amendment to RFQ required.



TECHNICAL				
Serial Nr	RFQ Section Ref.	OFFEROR'S QUESTION	NCI AGENCY ANSWER	Status
T.232	Book II Part IV SRS - pag. 199 (PRTTDCIS-1793)	PRTTDCIS-1793 states "The UPS element shall implement ability for the UAM to continue to operate through [...] Mains or generator power blackout for at least 10 minutes for xU and, xR including 75% of the ports powering a PoE powered VoIP telephone". Could you please specify the quantity of VoIP Phones expected to be connected to the Access BoB in order to define the 75% absolute value?	As per PRTTDCIS-1789, the UAM switching element shall be implemented with 24-ports ethernet switching capability. 75% of 24 ports = 18 ports => maximum 18 VoIP phones.	No amendment to RFQ required.
T.233	Ref Q&A T40 AMD9	As specified in the PRTTDCIS-4509, "...may be implemented as a single system supporting multiple elements...". Please confirm that UPS can be stored in an additional transit case, in order to power the required Transit Cases (e.g. BoB and NS Kit).	No, UPS cannot be stored in a separate case to support multiple cases. The elements implementing UPS functions for transit case housed elements need to be contained into the transit case and are accounted for the total transit case Size and Weight. This applies to: - the HANDCARRY transit case containing the elements of the Core Node Light of the NS Kit; and, - the HANDCARRY transit case containing the elements of the Remote Node Light of the NS Kit; and, - the TINY case containing the Access BoB xU and xR.	No amendment to RFQ required.
T.234	Ref Q&A T175 AMD9	Please confirm that Engine Heater can be manually activated not relying on Mains nor Shelter UPS.	If, by "Manually activated", the bidder means "the operator will activate a switch to turn on the engine heater" as per opposition to automatically activating the engine heater by measuring the environmental conditions (temperature, etc.), then: yes.	No amendment to RFQ required.

TECHNICAL				
Serial Nr	RFQ Section Ref.	OFFEROR'S QUESTION	NCI AGENCY ANSWER	Status
T.235	Book II Part IV SRS - pag. 307 (PRTTDCIS-1823)	According to PRTTDCIS-1823 xS and NS Kit laptops shall rely on 100BASE-FX Network Adapter. At the same time RJ45 Ethernet interface is requested as part of the minimum I/O Ports set. Please clarify or confirm that RJ45 Ethernet Port is not required for xS and NS Kit laptops	Correct, see updated PRTTDCIS-1823 in SRS v2.4.	Please see updated SRS v2.4.
T.236	Book II Part IV SRS - pag. 199 (PRTTDCIS-2091) and Book II Part IV SRS - pag. 199 (PRTTDCIS-4745) and Book II Part IV SRS - pag. 199 (PRTTDCIS-1823)	PRTTDCIS-4745 states that "xS variants of modules connections to EUD shall be Eth-FO-SR" In PRTTDCIS-2091 Eth-FO-SR is defined as "1G/10G Multimode Fiber Optic (FO) Interface (Short Range)". This appears to be in conflict with PRTTDCIS-1823 where 100BASE-FX connectivity is requested for xS and NSKit laptops. Please clarify or confirm that 100BASE-FX connectivity is accepted for xS variants of modules connections to EUD (including Access-BoB)	Correct, See updated PRTTDCIS-4745 in SRS v2.4.	Please see updated SRS v2.4.
T.237	Book II Part IV SRS - pag. 199 (PRTTDCIS-4747) and Book II Part IV SRS - pag. 199 (PRTTDCIS-4394) and Book II Part IV	PRTTDCIS-4747 and PRTTDCIS-4394 state that Wired VoIP Phones for the xS security domain and for the NSKit shall connect to the corresponding UAM over an Eth-FO-SR interface. In PRTTDCIS-2091 Eth-FO-SR is defined as "1G/10G Multimode Fiber Optic (FO) Interface (Short Range)" Considering that 1G/10G FO connectivity is not a technical need for VoIP	Correct, See updated PRTTDCIS-4747 in SRS v2.4.	Please see updated SRS v2.4.

TECHNICAL				
Serial Nr	RFQ Section Ref.	OFFEROR'S QUESTION	NCI AGENCY ANSWER	Status
	SRS - pag. 199 (PRTTDCIS-4747)	Phones to properly operate, would 100BASE-FX be acceptable for the connection of xS and NSKit EUDs to corresponding UAM?		
T.238	Q&A T.2 Q&A T.63 Part IV, SOW, Par. 2.2 RFQ-CO-115363-PRT-TDCIS – Book I Annex C – Bidding Sheets – AMD9	<p>We understand from T.2 that "Qualification tests can be done at a facility at the discretion of the Contractor", this meaning also outside Portugal. In addition to that SOW par.2.2. states that "first instance of each TDCIS node type, hereafter referred to as the First Article, including the set of non-CIS elements supporting those nodes, is to be qualified at the factory", with "factory clearly meaning Contractor facilities wherever they are. However the above statements seem to be in contradiction with:</p> <ol style="list-style-type: none"> <li>1) Bidding Sheets, where CLIN 3.3.1 indicates that Qualification test shall be carried out in "System Build Facility, Portugal"</li> <li>2) Clarification T.63, where is stated that "First Article Test shall be carried in Customer's Home Nation (Portugal). Purchaser will provide the PFE required for the first article test."</li> <li>3) SOW WP-2-22 stating that "All Qualification Tests shall be performed with all components (including PFE</li> </ol>	<p>All testing under SOW2.2. is to be performed in Portugal. Purchaser refers to test level not the place by "factory" at SoW paragraph 2.2. First Article Test shall be carried out in Customer's Home Nation (Portugal). CLIN 3.3.1 pertains as is to be carried out in "System Build Facility, Portugal. This reply supersedes the reply to T.2 in order to clarify any other understanding about the test locations. Please also consider WP2-17, WP2-18, WP2-19.</p>	No amendment to RFQ required.

TECHNICAL				
Serial Nr	RFQ Section Ref.	OFFEROR'S QUESTION	NCI AGENCY ANSWER	Status
		<p>crypto) physically integrated"</p> <p>3) SOW WP-2-19 stating that "The Contractor shall ensure that in their planning, the access to and use of Crypto will be carried out within the Customer's home Nation."</p> <p>Please clarify the locations where the "Qualification of the First Article" in its different phases has to take place.</p>		

NATO UNCLASSIFIED



**RFQ-CO-115363-PRT-TDCIS**

**Tactical Deployable Communications and Information  
Systems (TDCIS) for the Portuguese Army**

**BOOK I**

**BIDDING INSTRUCTIONS**

**AMENDMENT 10**

NATO UNCLASSIFIED

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## SECTION I - INTRODUCTION

### 1.1 OVERVIEW

- 1.1.1 The purpose of this Request for Quotation (RFQ) is to establish a contract for the acquisition of tactical deployable Communications and Information Systems (TDCIS) for the Portuguese (PRT) Army with a secure, modular, sustainable and interoperable means of communications and information exchange with the other deployed PRT Army units connected to the Portuguese National Defence Network (NDN), or with deployed elements of mission partners connected to the NATO Federated Mission Network (FMN).
- 1.1.2 Portugal (PRT) is the Host Nation (HN) for the TDCIS project and has the overall financial authority for the programme. The NATO Communications and Information Agency (NCIA) has been authorised to act as the Procurement Agency on behalf of the HN and is vested with the acquisition authority to conduct the NATO International Competitive Bidding (ICB) Procedure, and to award and administer the resulting Contract.
- 1.1.3 The contract performance requirements are set forth in the prospective contract Statement of Work (Book II Part IV) and in the Contract Schedule of Supplies and Services (Book II Part I).
- 1.1.4 This RFQ for TDCIS is conducted under Basic Ordering Agreement Plus (BOA+) procedures outlined within the “Procedure Governing the Use of Basic Ordering Agreements concluded by the NATO Communications and Information Agency – 2019 version, Ref: AC/4-D(2019)0004 (INV)”. Pursuant to these procedures, quotation submittal is restricted to companies from participating NATO member nations in accordance with paragraph 2.1.7 of Section II of the Bidding Instructions. The security of this RFQ is “NATO UNCLASSIFIED”.
- 1.1.5 This RFQ will not be the subject of a public opening.
- 1.1.6 Award of the Contract will be made on a Firm Fixed Price Basis to the lowest priced, compliant Offeror.
- 1.1.7 The solicitation, evaluation and award processes will be conducted in accordance with the terms and conditions contained herein.
- 1.1.8 A single contract will be placed with one Contractor. No partial bidding shall be allowed.
- 1.1.9 Site survey visits shall take place in Porto (Oporto), Portugal:
- Conduct Site survey of the customer provided training facility; EDC+ 30 weeks
  - Conduct a pre-UAT(E) Site Survey and submit an SSR for Purchaser approval; EDC + 38 weeks

The site surveys intent is to collect information on the training, Acceptance Testing and OpTEVal Sites of the requirement.



- 1.1.10 The overall security classification of this RFQ is “NATO UNCLASSIFIED”.
- 1.1.11 The Offeror shall refer to the Purchaser all queries for a resolution of conflicts found in information contained in this document in accordance with the procedures set forth in paragraph 2.7 of Section II of the Bidding Instructions entitled "Requests for RFQ Clarifications".
- 1.1.12 The target date for Contract Award is 3rd Quarter 2023.
- 1.1.13 The Contractor shall achieve Final System Acceptance within 142 Weeks after the Effective Date of Contract (EDC).

## 1.2 PURPOSE

- 1.2.1. The Tactical Deployed Communication Information System (TDCIS) shall deploy with the Portuguese Army (PTA), who developed as a prototype, the proof-of-concept system called “Sistema de Informação e Comunicações - Tático (SIC-T)”.
- 1.2.2. The TDCIS is a modular System of Systems (SoS) configured into truck-mounted Shelters and Trailers that provides a CIS used on National and International (NATO and non-NATO) Deployed Operations and Exercises.
- 1.2.3. This TDICS is designed to support PTA national and multi-national expeditionary operations at a Brigade level and below; that proof-of-concept now needs uplifting.
- 1.2.4. This project is the basis for delivering a TDCIS to the Portuguese Army, as the uplift to the SIC-T system which they developed.

## 1.3 PROJECT SCOPE

- 1.3.1 TDCIS will comprise a range of Shelters and Trailers based Node types and a NATO S\*cr\*t (NS) Kit configured for a specific Mission deployment.
- 1.3.2 The Shelters are mounted on all-terrain vehicles that can be located in the operational scenario as per the mission requirements.
- 1.3.3 Missions may use both Shelters and Trailers, some will use two Shelters, others a single Shelter.
- 1.3.4 The trailers can be used independently as a Communication rebroadcast facility. In addition, to the Shelters there are also specialist Trailers, these too are Mission specific but their usage and variability is less complex than the Shelter.
- 1.3.5 The TDCIS **does not** include a dedicated Test and Reference Environment.
- 1.3.6 The TDCIS **does not** include a dedicated Training Environment.
- 1.3.7 The project will be executed in six phases, spanning from the Effective Date of Contract (EDC) to two (2) years of warranty following the declaration of FSA.
  - 1.3.7.1 As a guide, the Purchaser has developed an Acitivity Flow that shall be used by the Contractor to understand the requirement.

1.3.7.2 The Activity Flow has 6 Phases with supporting enablers that comprise the following:

**Phase 1** – System Design. This phase firmly sets the scene for the whole delivery, it shall conclude with a Preliminary Design Review (PDR) that sets expectation levels on the delivery lifecycle. This is the strategy phase with some of the CDRLs delivered as ‘Presentational’ with some information back up.

**Phase 2** – System Development. This phase develops the PDR baseline further and places a number of key blueprint designs. It also offers the Contractor an opportunity to mature their individual strategies into firm baselined plans. This phase concludes with a Key Milestone CDR.

**Phase 3** – Batch 1 Build. This phase focusses on the manufacture of the Batch 1 nodes. The Phase consists of 5-tranches of build and concludes with a full batch 1 Factory Acceptance Systems Test (FAST).

**Phase 4** – Deliver Training, Conduct UAT(E) and PSA. The Contractor shall be responsible for the execution of this entire phase, including the conducting of Training and UAT(E) at the Customer’s establishment. UAT(E) shall comprise of System and Interoperability Testing when the system’s integration and compliance with NATO Federated Mission Network, Spiral 3, is to be evidenced.

**Phase 5** – Support OpTEVal, and Build Batches 2 & 3 (Batch 3 is an Option). Following successful completion of the PSA, the OpTEVal exercise plus production of Batches 2 & 3 are to be carried out concurrently. The Contractor shall provide consultancy type support to the TDCIS acceptance activity performed by the Customer during OpTEVal. Batches 2 and 3 shall be manufactured with a Factory Acceptance Test (FAT) carried out before delivery to the Customer Site.

**Phase 6** – Achieve FSA. This Phase finalises the Project delivery. The phase will conclude when the Contractor and the Purchaser conclude their FSA Report. Contractor Warranty shall commence on successful completion of the FSA, and shall last for a period of two consecutive years.

1.3.8 The TDCIS design shall cover the full scope of the TDCIS systems.

1.3.8.1 This design documentation shall separately identify the design for the operational (production) and training systems.

1.3.8.2 The scope of the design shall encompass all the components needed to achieve the capability, including:

- a. CIS Hardware;
- b. Software and licensing;
- c. Tooling to manage and support the TDCIS;
- d. Non-CIS hardware (e.g. transit cases, tents, etc.).

- 1.3.8.3 The design shall strictly follow the structure in which requirements are formulated in Book II Part IV, Annex A (SRS).
- 1.3.8.4 The implementation of the TDCIS consists of the assembly, connection, integration and configuration of Commercial of The Shelf (COTS) components, into bespoke systems that are fit for purpose of meeting the Purchaser's requirements and used in support of National and NATO expeditionary operations.

## 1.4 SECURITY

- 1.4.1 This Request For Quotation has been classified as NATO UNCLASSIFIED. There is a limited number of references classified at NATO RESTRICTED level.
- 1.4.2 Contractor will be required to handle and store classified material to the level of "NATO S\*CR\*T" and the Contractor shall have the appropriate facility and personnel clearances of "NATO S\*CR\*T". Should a Contractor be unable to perform the Contract due to the fact that the facility clearance has not been provided by their respective national security agency, this lack of clearance cannot be the basis for a claim of adjustment or an extension of schedule, nor the lack of clearance be considered a mitigating circumstance in the case of an assessment of Liquidated Damages or a determination of Termination For Default by the Purchaser.
- 1.4.3 Contractor personnel working at NATO sites are required to possess a security clearance of "NATO S\*CR\*T". Contractor personnel without such a clearance, confirmed by the appropriate national security authority and transmitted to the cognisant NATO security officer at least fourteen (14) days prior to the site visit, will be denied access to the site. Denial of such access by the Purchaser may not be used by the Contractor as the basis for a claim of adjustment or an extension of schedule nor can the denial of access be considered a mitigating circumstance in the case of an assessment of Liquidated Damages or a determination of Termination for Default by the Purchaser. Contractor personnel who need System Administrator or Operator privileges when working on NATO S\*CR\*T systems shall be required to hold NATO CTS clearance.
- 1.4.4 Offerors are advised that Contract signature will not be delayed in order to allow the processing of security clearances for personnel or facilities and, should the otherwise successful Offeror not be in a position to accept the offered Contract within a reasonable period of time, due to the fact that its personnel or facilities do not possess the appropriate security clearance(s), the Purchaser may determine the Offeror's quotation to be non-compliant and offer the Contract to the next ranking Offeror.
- 1.4.5 All documentation, including the RFQ itself, all applicable documents and any reference documents provided by the Purchaser are solely to be used for the purpose of preparing a response to this RFQ. They are to be safeguarded at the appropriate level according to their classification and reference documents are provided "as is, without any warranty" as to quality or accuracy.

## 1.5 BIDDERS' CONFERENCE

- 1.5.1 Prospective Bidders are invited to participate in the Bidders' Conference that will be held on 18<sup>th</sup> November 2022 in Brussels. The Bidders' Conference will be chaired by the NCI Agency.
- 1.5.2 Participation to the Bidders' Conference is limited to a maximum of two (2) persons per company. No exception to this number of attendees will be made. The Bidders

- are responsible for the costs of travel, lodging and per diem for its representatives during the Bidders' Conference.
- 1.5.3 The Bidders' Conference will be held in accordance with the tentative agenda below. Details of the precise venue will be provided to the participating companies in due course via the event portal identified below.
- Introduction
  - RFQ package presentation
  - Review of Scope and Schedule
  - Review of Service Requirements and SLA framework
  - Questions and Answers
- 1.5.4 Those Bidders who wish to participate in the Bidders' Conference shall indicate their intention to attend not later than 10 days prior to the conference date by submitting the "Request for Visit" form, which is enclosed to the cover letter of this RFQ, to the Point of Contact under Para. 1.5.12.1 below. Each Bidder may nominate up to 3 representatives to attend the conference.
- 1.5.5 Bidders Conference is NATO UNCLASSIFIED.
- 1.5.6 Prospective Bidders are informed that the participation to the Bidders' Conference is not mandatory for bidding purposes.
- 1.5.7 Any questions which the potential Bidders would like to be answered at the Bidders' Conference must be submitted in writing not later than three (3) working days prior to the conference to the to the Point of Contact under Para. 1.5.12.1 below.
- 1.5.8 The Purchaser will respond to the previously submitted questions at the Bidders Conference. If any additional questions are asked by the potential Bidders at the Bidders Conference, the Purchaser might attempt to provide answers at that time, but any answer that might appear to amend terms, conditions and/or specifications of the Contract shall be considered to be formally included in the RFQ only if a written amendment to the RFQ is issued in writing by the Purchaser.
- 1.5.9 Any question that the potential Bidders would like to have answered after the Bidders' Conference must be submitted in writing within one (1) week after the Bidders' Conference, but not later than ~~twenty eight (28)~~ fourteen (14) calendar days prior to the Bid closing date, to the Contracting Officer at the address mentioned in Para. 1.5.12.1 below.
- 1.5.10 Answers to all questions will be issued in writing to all Bidders as soon as practicable, whether or not the Bidders have attended the Bidders' Conference. The formal written answers will be the official response of the Purchaser, even if the written answer differs from the verbal response provided at the Bidders' Conference.
- 1.5.11 Irrespective of the written answers provided by the Purchaser after the Bidders' Conference, the terms, conditions and language of the RFQ remains unaltered unless a formal RFQ amendment is issued by the Purchaser, and is identified as such.
- 1.5.12 The Agency Point of Contact (POC) for the Bidders' Conference is as follows:
- 1.5.12.1 Mr Ole Hubner (NCI Agency Senior Contracting Officer), Email: ole.hubner@ncia.nato.int

- 1.5.13 COVID-19 related requirements will be provided closer to the date of the event. The Purchaser reserves the right to cancel the event at any time should the pandemic restrictions prevent holding it. The Purchaser shall not be liable for any event cancellation costs incurred by the Prospective Bidders.

## **SECTION II – GENERAL BIDDING INSTRUCTIONS**

### **DEFINITIONS**

- 2.1.1 “Assembly”: As used herein, the term “Assembly” means an item forming a portion of equipment that can be provisioned and replaced as an entity and that normally incorporates replaceable parts or groups of parts.
- 2.1.2 The term “Basic Ordering Agreement” (BOA) refers to the acquisition instruments negotiated between suppliers of products / services and the NCI Agency, on behalf of NATO.
- 2.1.3 The term "Compliance" as used herein means strict conformity to the requirements and standards specified in this Request for Quotation.
- 2.1.4 The term "Contractor" refers to a firm of a participating country which has signed a Contract under which he will perform a service, manufacture a product, or carry out works for NATO.
- 2.1.5 “Host Nation”: A Participating Country, major NATO Command or a NATO Agency which is responsible for implementing a project. In this particular RFQ, the Host Nation refers to Portugal (PRT).
- 2.1.6 The term "Offeror" as used herein refers to a firm, consortium, or joint venture which submits an offer in response to this solicitation.
- 2.1.7 The term “Participating Country” as used herein means one of the contributory NATO nations in the project, namely, (in alphabetical order): ALBANIA, BELGIUM, BULGARIA, CANADA, CROATIA, CZECH REPUBLIC, DENMARK, ESTONIA, FRANCE, GERMANY, GREECE, HUNGARY, ICELAND, ITALY, LATVIA, LITHUANIA, LUXEMBOURG, MONTENEGRO, NETHERLANDS, NORTH MACEDONIA, NORWAY, POLAND, PORTUGAL, REPUBLIC OF TÜRKIYE, ROMANIA, SLOVAKIA, SLOVENIA, SPAIN, UNITED KINGDOM, UNITED STATES OF AMERICA.
- 2.1.8 The term "Purchaser" refers to the authority issuing the RFQ and/or awarding the Contract (the NCI Agency).
- 2.1.9 “Sub-Assembly”: The term “Sub-Assembly” as used herein refers to a portion of an Assembly consisting of two or more parts that can be provisioned and replaced as an entity. The definition purposely excludes components and/or parts as defined in ACodP-1.

## **2.2 ELIGIBILITY**

- 2.2.1 This RFQ is being conducted under BOA plus procedures, therefore, firms which hold an active Basic Ordering Agreement (BOA) with the NCI Agency are eligible to take part in this RFQ along with those firms nominated through their Delegations via a Declaration of Eligibility.

- 2.2.2 All Contractors, sub-Contractors and manufacturers, at any tier, must be from Participating Countries.
- 2.2.3 None of the work, including project design, labour and services shall be performed other than by firms from and within Participating Countries.
- 2.2.4 No materials or items of equipment down to and including identifiable sub-assemblies shall be manufactured or assembled by a firm other than from and within a Participating Country.
- 2.2.5 The intellectual property rights to all design documentation and related system operating software shall reside in NATO member countries, and no license fee, or royalty charges shall be paid by the Contractor to firms, individuals or governments other than within the NATO member countries.

### 2.3 QUOTATION SUBMITTAL AND QUOTATION CLOSING DATE

- 2.3.1 All Quotations shall be in the possession of the Purchaser at the email address given below in Paragraph 2.3.2.1 below before **17:00 hours (Brussels Time) on Friday, 24<sup>th</sup> March 2023**, at which time and date Quotations shall be closed.
- 2.3.2 Offerors are requested to submit their quotation electronically to the following email address:
  - 2.3.2.1 Email: RFQ-CO-115363-PRT-TDCIS@ncia.nato.int
- 2.3.3 The Quotation shall consist of three (3) separate subject emails:
  - 2.3.3.1 For the first e-mail the subject line shall read: “**PRT TDCIS– Official Bid for [company name] – Part I - Admin**”. The e-mail content shall be as described in Paragraph 3.2.2, Part I: Administration Package below, with no password protection to the file and shall be not larger than 20MB total.
  - 2.3.3.2 For the second e-mail the subject line shall read: “**PRT TDCIS-Official Bid for[company name] – Part II - Price**”. The e-mail content shall be as described in Paragraph 3.2.2, Part II: Price Proposal below, with no password protection to the file, and shall be not larger than 20MB total.
  - 2.3.3.3 For the third e-mail the subject line shall read: “**PRT TDCIS – Official Bid for [company name] – Part III – Technical**”. The e-mail content shall be as described in Paragraph 3.2.2, Part III: Technical Proposal below, with no password protection to the file, and shall be not larger than 20MB total per e-mail. For large Technical Proposals, multiple e-mails may be required to submit the entire package. In such case, Offerors shall clearly indicate the correct order in the e-mail subject line.

### 2.4 LATE BIDS

- 2.4.1 Quotations received at the NCIA e-mail address after the date and time indicated in paragraph 2.3.1 may not be eligible for award.
  - 2.4.1.1 Bids submitted electronically may be considered late unless the Offeror completes the entire transmission of the bid before the closing date and time for receipt of bids under this solicitation.
- 2.4.2 **Consideration of Late Bid**

- 2.4.2.1 The Purchaser considers that it is the responsibility of the Offeror to ensure that the bid submission arrives by the specified bid closing time. A late bid will only be considered for award under the following circumstances:
  - 2.4.2.1.1 A contract has not already been awarded pursuant to the RFQ, and;
  - 2.4.2.1.2 The bid was sent to the correct email specified in paragraph 2.3.2.1 above, and;
  - 2.4.2.1.3 The delay was due solely to the fault of the Purchaser.

### 2.4.3 Receipt of an Unreadable Electronic Bid

- 2.4.3.1 If a bid received at the NCIA's facility by electronic data interchange is unreadable to the degree that conformance to the essential requirements of the solicitation cannot be ascertained, or due to Offerors's submission, in contravention of these bidding instructions, of electronic files that are encrypted or which contain passwords, the CO shall immediately notify the Offeror that the bid will be rejected unless the Offeror provides clear and convincing evidence:
  - 2.4.3.1.1 of the content of the bid as originally submitted, and;
  - 2.4.3.1.2 that the unreadable condition of the bid was caused by Purchaser software or hardware error, malfunction, or other Purchaser mishandling.
- 2.4.3.2 A bid that fails to conform to the above requirements may be declared noncompliant and may not be evaluated further by the Purchaser.
- 2.4.3.3 If it is discovered, during either the Administrative, Price or Technical evaluation, that the Offeror has submitted an unreadable electronic bid, the Offeror may be determined to have submitted a non-compliant bid.

## 2.5 REQUESTS FOR EXTENSION OF QUOTATION CLOSING DATE

- 2.5.1 All questions and requests for extension of the Quotation Closing Date must be submitted by e-mail. Such questions shall be forwarded to the point of contact specified in paragraph 2.6.2.1 below and shall arrive not later than seven (7) calendar days prior to the stated "Quotation Closing Date". The Purchaser is under no obligation to answer requests submitted after this time. Extensions to the quotation closing date are at the discretion of the Purchaser.

## 2.6 PURCHASER POINT OF CONTACT

- 2.6.1 The Purchaser point of contact for all information concerning this RFQ is:

NATO Communications and Information Agency  
Acquisition Directorate  
Attention: Mr. Ole Hubner, Senior Contracting Officer  
Boulevard Leopold III  
B-1110 Brussels, Belgium

- 2.6.2 Email:

- 2.6.2.1 RFQ-CO-115363-PRT-TDCIS@ncia.nato.int

***\*Please remember do not password protect any of your documents***

## 2.7 REQUESTS FOR RFQ CLARIFICATIONS

- 2.7.1 Offerors, during the solicitation period, are encouraged to query and seek clarification of any matters of a contractual, administrative and technical nature pertaining to this RFQ.
- 2.7.2 All questions and requests for clarification must be submitted by e-mail and using the form in Annex A of Book I – Bidding Instructions. All questions and requests must reference the section(s) in the RFQ subject for clarifications. The questions and/or requests shall be forwarded to the email address specified in paragraph 2.6.2.1 above and shall arrive not later than ~~seven (7)~~ fourteen (14) calendar days prior to the stated “Quotation Closing Date”. The Purchaser is under no obligation to answer questions submitted after this time. Requests for clarification must address the totality of the concerns of the Offeror for any given area, as the Offeror will generally not be permitted to revisit areas of the RFQ for additional clarification as noted in 2.7.3 below.
- 2.7.3 Offerors are advised that subsequent questions and/or requests for clarification included in a quotation shall neither be answered nor considered for evaluation and may be grounds for a determination of non-compliance.
- 2.7.4 Except as provided above, all questions will be answered by the Purchaser and the questions and answers (deprived of any means of identification of the questioner) will be issued in writing to all prospective Offerors. Answers will be provided via an amendment to the RFQ.
- 2.7.5 The published answers issued by the Purchaser shall be regarded as the authoritative interpretation of the RFQ, and may lead to a formal amendment to the RFQ. Such amendment may also contain changes to the language, terms, conditions and/or specifications of the RFQ. Amendments to the language of the RFQ included in the answers, and/or the formal RFQ amendment, shall be incorporated by the Offeror in its offer.
- 2.7.6 It is the responsibility of the Offerors to ensure that all Clarification Requests submitted bear no mark, logo or any other form or sign that may lead to reveal the Offeror’s identity in the language constituting the clarification itself. This prescription is not applicable to the means used for the transmission of the clarification (i.e. email or form by which the clarification is forwarded).
- 2.7.7 The Purchaser declines all responsibilities associated to any and all circumstances regardless of the nature or subject matter arising from the Offeror’s failure or inability to abide to the prescription in paragraph 2.7.6.
- 2.7.8 The Purchaser may provide for the removal of any form of identification in the body of the clarification request in those instances in which such practice is feasible as well as providing for a re-wording of the clarification request in those cases in which the original language submitted is deemed ambiguous, unclear, subject to different interpretation or revelatory of the Offeror’s identity.
- 2.7.9 The Purchaser reserves the right to reject clarification requests clearly devised or submitted for the purpose of artificially obtaining an extension of the Bidding time (i.e. clarifications re-submitted using different wording where such wording does not change the essence of the clarification being requested).



## **2.8 REQUESTS FOR WAIVERS AND DEVIATIONS**

- 2.8.1 Offerors are informed that requests for alteration to, waivers of, or deviations from the Schedule, the Special Contract Provisions, the Terms and Conditions in the NCI Agency's Basic Ordering Agreement, the Technical Specifications, the Statement of Work and any other Terms and Conditions of the Prospective Contract will not be considered after the Request for Clarification process.
- 2.8.2 Requests for alterations to the other requirements, terms or conditions of the RFQ or the Prospective Contract may only be considered as part of the clarification process set forth in paragraph 2.7 above. Requests for alterations to the specifications, terms and conditions of the Contract which are included in a Quotation as submitted may be regarded by the Purchaser as a qualification or condition of the Quotation and may be grounds for a determination of non-compliance.

## **2.9 AMENDMENT OF THE RFQ**

- 2.9.1 The Purchaser may revise, amend or correct the terms, conditions and/or specifications and provisions of the RFQ documents at any time prior to the date set for the Quotation Closing Date. Any and all modifications will be transmitted to all prospective Offerors by an official amendment designated as such and signed by the Contracting Authority. Such amendment shall be recorded in the Acknowledgement of Receipt which the Offeror shall complete and enclose as part of his quotation. This process may be part of the clarification procedures set forth in paragraph 2.7 above or may be an independent action on the part of the Purchaser.
- 2.9.2 The Purchaser will consider the potential impact of amendments on the ability of prospective Offerors to prepare a proper quotation within the allotted time. The Purchaser may extend the "Quotation Closing Date" at his discretion and such extension will be set forth in the amendment document.
- 2.9.3 In no case, however, will the closing date for receipt of quotation be less than seven (7) days from the date of issuance of any amendment to the RFQ.
- 2.9.4 All Amendments issued by the Purchaser shall also be acknowledged by the Offeror in its Quotation by completing the "Annex B-6 – Acknowledgement of Receipt of RFQ Amendments and Responses to Clarification Requests" Failure to acknowledge receipt of all Amendments may be grounds to determine the Quotation to be non-compliant.

## **2.10 MODIFICATION AND WITHDRAWAL OF QUOTATION**

- 2.10.1 Quotations, once submitted, may be modified by Offerors, but only to the extent that the modifications are in writing, conform to the requirements of the RFQ, and are received by the Purchaser prior to the exact time and date established for Quotation Closing. Such modifications shall be considered as an integral part of the submitted bid.
- 2.10.2 Modifications to quotations which arrive after the Quotation Closing Date will be considered as "Late Modifications" and will be processed in accordance with the procedure set forth above concerning "Late Quotation", except that unlike a "Late Quotation", the Purchaser will retain the modification until a selection is made. A modification to a quotation which is determined to be late will not be considered in the evaluation and selection process. If the Offeror submitting the modification is

determined to be the successful Offeror on the basis of the unmodified quotation, the modification may then be opened. If the modification makes the terms of the quotation more favourable to the Purchaser, the modified quotation may be used as the basis of Contract award. The Purchaser, however, reserves the right to award a Contract to the apparent successful Offeror on the basis of the quotation submitted and disregard the late modification.

2.10.3 An Offeror may withdraw his Quotation at any time prior to Quotation Opening without penalty. In order to do so, an authorised agent or employee of the Offeror must provide an original statement of the firm's decision to withdraw the Quotation.

## **2.11 BID VALIDITY**

2.11.1 Offerors shall be bound by the term of their quotation in which the Offeror has provided a quotation for a period of 12 months starting from the Quotation Closing Date specified at paragraph 2.3.1.

2.11.2 In order to comply with this requirement, the Offeror shall complete the Certificate of Quotation Validity set forth in Annex B-3. Quotations offering less than the period of time referred to above for acceptance by the Purchaser may be determined to be non-compliant.

2.11.3 The Purchaser will endeavour to complete the evaluation and make an award within the period referred to above. However, should that period of time prove insufficient to render an award, the Purchaser reserves the right to request an extension of the period of validity of all quotations which remain under consideration for award.

2.11.4 Upon notification by the Purchaser of such a request for a time extension, the Offerors shall have the right to:

(a) accept this extension of time in which case Offerors shall be bound by the terms of their quotation for the extended period of time and the Certificate of Quotation Validity extended accordingly; or

(b) refuse this extension of time and withdraw the quotation without penalty.

2.11.5 Offerors shall not have the right to modify their quotations due to a Purchaser request for extension of the quotation validity unless expressly stated in such request.

## **2.12 CANCELLATION OF REQUEST FOR QUOTATIONS**

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

## **2.13 ELECTRONIC TRANSMISSION OF INFORMATION AND DATA**

2.13.1 The Purchaser will endeavour to communicate answers to requests for clarification and amendments to this RFQ to the prospective Offerors by the fastest means possible, including the use of e-mail where the firms have forwarded the necessary address information. All Offerors are consequently strongly encouraged to provide

accurate email addressing information and notify the Purchaser at the earliest practicable date should any changes occur.

- 2.13.2 Offerors are cautioned that the Purchaser will rely exclusively on electronic mail to manage all correspondence, amendments, etc., related to this RFQ.
- 2.13.3 Offerors are cautioned that electronic transmission of documentation which contains classified information is not permissible.

## **2.14 SUPPLEMENTAL AGREEMENTS**

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

## **2.15 MANDATORY QUALITY ASSURANCE AND QUALITY CONTROL STANDARDS**

- 2.15.1 Offerors are requested to note that, in accordance with the Certificate at Annex B-11 hereto, Offerors shall provide documentary evidence that the Offeror possesses a current certification that is compliant with the requirements of Allied Quality Assurance Publication (AQAP) 2110, ISO 9001:2015, or an equivalent QA/QC regime.
- 2.15.2 Offerors shall further demonstrate that such regime is applied within the Offeror's internal organisation, as well as extended to its relationships with Subcontractors.
- 2.15.3 If the Offeror is offering a QA/QC regime that is claimed to be equivalent to AQAP 2110 or ISO 9001:2015, the burden of proof of such equivalency shall be on the Offeror and such evidence of equivalency shall be submitted with the Certificate at Annex B-11 in the Bid Administration Package.
- 2.15.4 Failure to execute this Certificate, or failure to provide documentary evidence of compliance with this requirement may result in a determination of non-compliance for the submitted Bid.

## **2.16 NOTICE TO OFFERORS OF CONTRACT DISTRIBUTION AND DISCLOSURE OF INFORMATION**

- 2.16.1 The resulting Contract is subject to release to the applicable NATO Resource Committee through the NATO Office of Resources (NOR).

- 2.16.2 The resulting Contract may be subject to release to (i) NATO Resource Committees for audit purposes (including audits carried out using third party companies- See Book II, Special Provisions Article entitled, “Notice of Authorized Disclosure of Information for Mandated NATO Third Party Audits by Resource Committees”; and (ii) to the customer holding a Service Level Agreement with the Agency related to this requirement, upon request from that customer.

### SECTION III - BID PREPARATION INSTRUCTIONS

#### 3.1 GENERAL

- 3.1.1 Offerors shall prepare and submit their quotation in accordance with the instructions set forth herein. Failure to comply with these instructions may result in the Offer being declared non-compliant.
- 3.1.2 Offerors shall prepare their quotation in three (3) parts:
  - (a) Administrative Package (Part I): Electronic Submission
  - (b) Price Proposal (Part II): Electronic Submission
  - (c) Technical Proposal (Part III): Electronic Submission
- 3.1.3 The specific format for each volume is stated in paragraph 3.2.2
- 3.1.4 Quotations and all related documentation shall be submitted in the English language.
- 3.1.5 Offerors shall prepare a complete quotation which comprehensively addresses all requirements stated herein. The quotation shall demonstrate the Offeror's understanding of the RFQ and his ability to provide all the deliverables and services listed in the Bidding Sheets (Annex C). Quotations which are not complete will be declared non-compliant.
- 3.1.6 The Offeror **shall not restate** the RFQ requirements in confirmatory terms only. The Offeror must clearly describe what is being offered and how the Offeror will meet all RFQ requirements. Statements in confirmatory terms will only be sufficient for determining the bid to be non-compliant.
- 3.1.7 Partial quotations and or/ quotations containing conditional statements will be declared non-compliant.
- 3.1.8 If no specific format has been established for electronic versions, Offerors shall deliver documentation in an electronic format which is best suited for review and maintenance by the Purchaser (e.g., Project Master Schedule in MS Project format, Project Highlight Reports in MS Word).
- 3.1.9 All documentation submitted as part of the Quotation shall be classified no higher than "NATO UNCLASSIFIED".

#### 3.2 BID PACKAGE AND MARKING

- 3.2.1 The complete Quotation shall consist of three distinct and separated volumes each of which will be sent as an individual electronic submission as described in the following subparagraphs. Detailed requirements for the structure and content of each of these packages are contained in these Bidding Instructions.
- 3.2.2 Offerors shall prepare their quotation in 3 volumes in the following quantities and with the following specifications:

Part	Format and Quantity Details
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<p>I: Administration Package</p>	<p><u>One (1) Email no larger than 20MB total and without password protection including:</u></p> <ul style="list-style-type: none"> <li>• Email subject line: <i>RFQ-CO-115363-PRT-TDCIS [Company Name] Part I - Admin</i></li> <li>• One (1) Scanned PDF copy of the certificates with physical or electronic signatures of the prescribed certifications</li> </ul> <p>➤ All of the required contents are outlined in Section 3.3</p>
<p>II: Price Proposal</p>	<p><u>One (1) Email no larger than 20MB total and without password protection including:</u></p> <ul style="list-style-type: none"> <li>• Email subject line: <i>RFQ-CO-115363-PRT-TDCIS [Company Name] Part II - Price</i></li> <li>• One (1) electronic copy in Microsoft Excel (readable and searchable) of the completed Bidding Sheets</li> <li>• One (1) PDF copy with physical or electronic signatures of the completed Bidding Sheets as detailed in Section 3.4</li> </ul>
<p>III: Technical Proposal</p>	<p>One (1) Email no larger than 20MB total and without password protection including:</p> <ul style="list-style-type: none"> <li>• Email subject line: <i>RFQ-CO-115363-PRT-TDCIS [Company Name] Part III - Technical</i></li> <li>• The Technical Proposal shall be self-contained as a separate electronic file, named as described in Section 3.5</li> </ul>

3.2.2.1 “Company Name” – In the subject line of the email, and in the names of the individual files shall be abbreviated to no more than 10 characters. For example, if a company’s name is “Computer and Technology Research Company”, the company name could be shorted to “CTRC” in the email and file names.

3.2.2.2 Multiple emails may be submitted for each part if the content of the file(s) is larger than 20MB per email submission; however, each file must clearly identify the part number and the sequence to which it relates. For example: *RFQ-CO-115363-PRT-TDCIS [Company Name] Part III - Technical Part 1 of 4; RFQ-CO-115363-PRT-TDCIS [Company Name] Part III - Technical Part 2 of 4 and so forth.*

3.2.2.3 Acceptable File Formats:

3.2.2.3.1 Where no specific format is mandated, electronic quotation documentation shall be delivered in PDF format without limitations of printing or “copy & paste”. The Purchaser reserves the right to request native format electronic files of the proposal to facilitate the evaluation process.

3.2.2.3.2 The Purchaser does NOT accept hard copies of bids CDs, thumb drives, or zip files.

- 3.2.3 No information disclosing or contributing to disclose the quotation price shall be made part of the Technical Proposal. Failure to abide to this prescription shall result in the quotation being declared non-compliant.
- 3.2.4 As part of the Technical Proposal, the Offeror shall provide One (1) unpriced copy of the Bidding Sheets detailing the breakdown of labour, hours and equipment.
- 3.2.5 Documents submitted in accordance with paragraph Section 3.2 above shall be classified no higher than “NATO UNCLASSIFIED” material.
- 3.2.6 Partial Quotations on a Schedule and/or Quotations containing conditional statements will be declared non-compliant.

### **3.3 PREPARATION OF THE ADMINISTRATIVE ENVELOPE (VOLUME I)**

- 3.3.1 The Bid Administrative Package shall include in accordance with Section 3.2.2 Part I one email comprised of the required documents to the Purchaser. No information disclosing or contributing to disclose the quotation price shall be made part of the Administration Volume. Failure to abide to this prescription shall result in the quotation being declared non-compliant.
- 3.3.2 Volume 1 shall include the certificates set forth in the Annex to these Bidding Instructions, signed in the original by an authorised representative of the Offeror. The text of the certificates must not be altered in any way. The certificates are as follows:

- B-1: Certificate of Legal Name of Offeror
- B-2: Certificate of Independent Determination
- B-3: Certificate of Quotation Validity
- B-4: Certificate of Understanding
- B-5: Certificate of Exclusion of Taxes, Duties and Charges
- B-6: Acknowledgement of Receipt of RFQ Amendments (if applicable)
- B-7: Disclosure of Requirements for NCI Agency Execution of Supplemental Agreements
- B-8: Certification of NATO Member Country of Origin of Delivered Equipment, Services, Materials and Intellectual Property Rights
- B-9: Comprehension and Acceptance of Contract Special Provisions and General Provisions.
- B-10: List of Prospective Sub-Contractors / Consortium members
- B-11: Certificate of AQAP 2110 or ISO-9001: 2015 Compliance. The Offeror shall attach a copy of the company's AQAP 2110 certification or ISO 9001: 2015 compliance.
- B-12: List Of Proposed Key Personnel With Security Clearance Information
- B-13: Disclosure of Involvement of Former NCI Agency Employment
- B-14: Offeror Background IPR
- B-15: List of Subcontractor IPR

- 3.3.2.1 **Concerning Certificate B-6**, taking into account that Amendment 7 to the RFQ replaces the RFQ and its Amendments 1 to 6 in its entirety, the acknowledgement of Amendment 7 and from there consecutive Amendments is sufficient.
- 3.3.2.2 **Concerning Certificate B-7**, Disclosure of Requirements for NCI Agency Execution of Supplemental Agreements, Offerors shall note especially the following:
- 3.3.2.2.1 If supplemental agreements, such as End-User Certificates or Technical Assistance Agreements, are required by national regulations, these must be submitted with the Offerors quote. Supplemental agreements submitted after the Quotation Closing Date shall not be considered.
- 3.3.2.2.2 The terms of supplemental agreements, if necessary, are the Offerors / Contractors responsibility and shall be totally consistent with the terms of the (Prospective) Contract, and shall not duplicate, negate, or further interpret any provisions of this Contract. The terms of the (Prospective) Contract shall take precedence over the Supplemental Agreement.
- 3.3.2.2.3 A problem with the supplemental agreement in any of the areas mentioned previously in this provision may result in a determination that the Quotation is not compliant with the terms of the RFQ, and in rejection of the Quotation, or termination for default of the Contract if the supplemental agreement is submitted after Contract award.
- 3.3.2.3 **Concerning Certificate B-10**, the Contractor shall identify by name, project role, and country of origin, all sub-contractors whose sub-contract value is expected to equal or exceed EUR 125,000, if any. A list of consortium members shall also be completed and included. If there are no sub-contractors/consortium members involved, the Offeror shall state this separately. The subcontractors listed in this certificate shall be traceable in the Bidding Sheets.
- 3.3.2.4 **Concerning Certificate B-11** Offerors shall provide documentary evidence that the Offeror possesses a current certification that is compliant with the requirements of Allied Quality Assurance Publication (AQAP) 2110, ISO 9001:2015, or an equivalent QA/QC regime.
- 3.3.2.4.1 If the Offeror is presenting a QA/QC regime that is claimed to be equivalent to AQAP 2110 or ISO 9001:2015, the burden of proof of such equivalency shall be on the Offeror and such evidence of equivalency shall be submitted with the Certificate at Annex B-11 in the Administration Package.
- 3.3.2.4.2 Failure to execute this Certificate, or failure to provide documentary evidence of compliance with this requirement may result in a determination of a non-compliant quotation.
- 3.3.3 The Offeror shall send Volume I - Administrative Envelope to the Purchaser's point of contact specified in paragraph 2.6.2.1 above via email.

#### 3.4 PREPARATION OF THE PRICE QUOTATION (VOLUME II)

- 3.4.1 Offerors shall prepare their Price Proposal in accordance with Section 3.2.2 Part II by submitting one email containing the completed electronic copy of the Bidding Sheets (Excel) provided with this RFQ under Book I, Annex C and D. The Offeror shall



- propose an accurate and complete price quotation in completing the Bidding Sheets as defined in these Bidding Instructions.
- 3.4.2 No alteration of the form and pre-filled content of the Bidding Sheets is allowed, unless otherwise specified. The structure of the Bidding Sheets shall not be changed, other than as indicated elsewhere, nor should any quantity or item description in the Bidding Sheets. The currency(ies) of each Contract Line Item and sub-item shall be shown. The prices provided shall be intended as the comprehensive total price offered for the fulfilment of all requirements as expressed in the RFQ documentation including but not limited to those expressed in the SOW.
- 3.4.3 When completing the Bidding Sheets the Offeror shall insert information in all yellow cells of the Bidding Sheets and complete the Pricing Summary as instructed. A price for each specified element needs to be supplied on each CLIN. Prices should not be grouped. The prices and quantities entered on the document shall reflect the total items required to meet the contractual requirements. The total price shall be indicated in the appropriate columns and in the currency quoted. If the price of a line item is expressed in different currencies, these shall be identified, and there shall be as many totals on that line item as there are currencies; unless Offerors choose to use one bidding sheet per currency. In preparing the Price Quotation, Offerors shall ensure that the prices of the Sub-items total the price of the major item of which they constitute a part.
- 3.4.4 Offerors shall furnish Firm Fixed Prices for all required items in accordance with the format set forth in the Instructions for preparation of the Bidding Sheets. The detailed tabs (Labour, Other Material, Travel and ODC) and the “Batch #1”, “Batch #2” and “Batch #3” tabs need to match the CLIN Summary and Offer Summary tabs.
- 3.4.5 Offerors are responsible for the accuracy of their Price Quotations. Price Quotations that have apparent computational errors may have such errors resolved in the Purchaser’s favour or, in the case of gross omissions, inconsistencies or errors, may be determined to be non-compliant. In the case of inconsistencies between the electronic version of the Bidding Sheets and the PDF of the Bidding Sheets, the “hard copy” will be considered by the Purchaser to have precedence over the electronic version.
- 3.4.6 Offerors shall furnish Firm Fixed Prices for all CLINs to include Options as defined in the SOW. Purchaser evaluation of the submitted bids will be on the basis of the complete submission including administrative, price and technical components for all CLINs. The Contract will be awarded for CLINs 1 through 9 as the basic contract (base contract) and the work defined for CLIN 10 (evaluated option) shall be evaluated; CLIN 11 is a non-evaluated Option. These evaluated / non-evaluated options may be exercised by the Purchaser, at the sole discretion of the Purchaser as described in the Book II Special and General Provisions. The Purchaser’s decision to exercise any Options will take into consideration the availability of the required funding.
- 3.4.7 Offered prices shall not be “conditional” in nature. Any comments supplied in the Bidding Sheets or in any part of the bid package which are conditional in nature, relative to the offered prices may result in a determination that the bid is non-compliant.
- 3.4.8 Offeror shall quote in their own national currency or in EUR, the host nation currency. Offeror may also submit Quotations in multiple currencies including other NATO member states' currencies under the following conditions:

- (a) the currency is of a "Participating Country" in the project, and
- (b) The Offeror can demonstrate, either through sub-contract arrangements or in its proposed work methodology, that it will have equivalent expenses in that currency. All major sub-contracts and their approximate anticipated value should be listed on a separate sheet and included with the Price Quotation.

- 3.4.9 The Purchaser, by virtue of its status under the terms of Article IX and X of the Ottawa Agreement, is exempt from all direct taxes (incl. VAT) and all customs duties on merchandise imported or exported. The Contractor, therefore, shall certify that the prices stipulated in this Contract do not include amounts to cover such direct taxes or customs duties.
- 3.4.10 The Contractor shall be responsible for ensuring that its respective Sub-contractors are aware that the Purchaser is exempt from taxes and customs duties. The Contractor (and its respective Sub-contractors) shall be responsible for complying with all applicable national and local legal and administrative procedures to ensure that authorities do not attempt to assess taxes and customs duties on goods and property imported or exported through NATO member nation frontiers under this Contract nor assess direct taxation (VAT) on goods sold to the NCI Agency under this Contract. Offerors are reminded of the requirement to complete the certification to this effect in Annex B-5.
- 3.4.11 Unless otherwise specified in the instructions for the preparation of bidding sheets, all prices quoted in the proposal shall be DDP (Delivered Duty Paid) to specified destination, in accordance with the International Chamber of Commerce INCOTERMS 2020 and shall also cover all packaging, packing, preservation, insurance and transportation charges. Prices quoted shall include all costs for items supplied and delivered to final destination.
- 3.4.12 The Offeror's attention is directed to the fact that Price Quotation shall contain no document and/or information other than the priced copies of the Bidding Sheets. Any other document of a contractual or technical nature will not be considered for evaluation and may be cause for a determination of non-compliance by the Purchaser.
- 3.4.13 The Offeror shall furnish Firm Fixed Price quotations, for all proposed items. Partial quotations shall be rejected.
- 3.4.14 The Offeror understands that there is no obligation under this Contract for the Purchaser to exercise an optional increase of the quantities set forth in any line items, and that the Purchaser bears no liability should it decide not to exercise such Option. Furthermore, the Purchaser reserves the right to order another contractor through a new contract with other conditions for the additional quantities of any line item it might need.
- 3.4.15 The Contractor shall be liable for all other taxes, assessments, fees, licences, administrative charges or other Government assessments or charges which are applicable to the performance of this Contract. It is the Contractor's responsibility to inform itself of its liability in each country where such liability may arise.
- 3.4.16 Price Proposals exceeding the deadlines for delivery and completion of works indicated in the Schedule of Supplies and Services may be declared non-compliant.

- 3.4.17 The Offeror shall identify for each CLIN all significant sub-contractors and provide required information about their prospective sub-contractors whose estimated value of the subcontract is expected to equal or exceed EUR 125,000 using the “List of Prospective Sub-Contractors” form attached to Book I Annex B-10.
- 3.4.18 The Offeror shall separately price the cost of Warranty. Zero values or the statement that the Quotation price includes the cost of warranty are not allowed.
- 3.4.19 All prices bid shall be clearly traceable in the detailed bidding sheets.
- 3.4.20 Any adjustment or discount to prices should be clearly traceable to the lowest level of breakdown in the bidding sheets and should not be aggregated or summed. Any lack of clarity or traceability may render the bid non-compliant
- 3.4.21 The Offeror shall send Volume II - Pricing Envelope to the Purchaser’s point of contact specified in paragraph 2.6.2.1 above via email.

### **3.5 PREPARATION OF THE TECHNICAL PROPOSAL (VOLUME III)**

- 3.5.1 Offerors shall submit their Technical Proposal in accordance to Section 3.2.2 Part III an electronic package with separate documents in PDF or MS Office formats as required, containing all the information addressing the technical specifications and requirements of the stated in Sections 3.5.2– 3.5.9. The Technical Proposal shall have a confirmation that all requirements in the SOW, Book II Part IV are included in the proposed solution.
- 3.5.2 The Technical Proposal package shall include the following:
  - 3.5.2.1 Table of Contents. The Offeror shall compile a detailed Table of Contents which lists not only section headings but also major sub-sections, and topic headings required set forth in these Instructions or implicit in the organisation of the Technical Proposal.
  - 3.5.2.2 Cross-Reference/Compliance Table. The Offeror shall include the completed Technical Proposal Cross-Reference Table at Annex E of Book I. The Offeror shall complete the Column marked “QUOTATION REFERENCE” of the Table, citing the appropriate section of the Technical Proposal that corresponds to each paragraph of these Instructions for the Preparation of the Technical Proposal. The completed Table serves as an index for the Purchaser's Technical Evaluation Panel and also as an aide memoire to the Offeror to ensure that all the required information has been provided in the Technical Proposal.
- 3.5.3 **Section 1: Project Management Documentation (PMP and PIP)**
  - 3.5.3.1 Project Overview. The Offeror shall provide a Project Overview which shall provide an executive summary overview of the offered capability. The Project Overview shall also summarise the main features of each of the sections of the Technical Proposal and shall indicate in broad detail how and in which geographic regions the Project’s phases as illustrated in Appendix A of the SoW will be executed during the full lifetime of the Project.
  - 3.5.3.2 The Offeror shall submit a preliminary Project Management Plan (PMP) in accordance with the requirements of Section 3.2.1 of the SoW (Book II Part IV) that defines how the Offeror intends to manage this project from contract signature through Final System Acceptance and throughout any warranty periods. The preliminary PMP shall consider all aspects of project management and control and demonstrate how all the critical dates defined in the contract will be met. The

preliminary PMP with all appendices shall be a minimum of 20 pages but not to exceed 35 pages, and shall have a GANNT Chart as an Appendix that maps to both the Offerers PMS and the Bidding Sheet CLINs.

- 3.5.3.3 The Offeror shall submit a preliminary Project Implementation Plan (PIP) in accordance with the requirements of Section 3.2.2 of the Statement Of Work (SOW) (Book II Part IV), which clearly describes how the Offeror intends to implement the totality of the project in compliance with the contractual requirements and the following specific requirements:
- 3.5.3.3.1 The Offeror shall provide a statement assuring that all requirements shall be met for the Site Survey and Site Survey Report in accordance to the requirements stated in Sections 2.5.1, 2.7.2, and 4.10 of the SoW (Book II Part IV). The site survey shall be performed according to the Schedule of Supplies and Services after the Effective Date of the Contract.
- 3.5.3.3.2 The preliminary PIP shall include a preliminary Project Master Schedule (PMS) in accordance to the requirements stated in Section 3.2.2.3 of the SoW (Book II Part IV) that shall contain all contract events and milestones for the Project. The preliminary PMS shall show all contractual deliverables, their delivery dates, and the tasks associated with them. The preliminary PMS shall for each task identify the start and finish dates, duration, predecessors, constraints, and resources. The PMS shall provide network, milestone, and Gantt views, and identify the critical path for the overall project.
- 3.5.3.3.3 The preliminary PIP shall include required security accreditation documents as described in Section 9 of the Sow.
- 3.5.3.4 Project Personnel. The Offeror shall provide a curriculum vitae for the personnel proposed for this project listed in Appendix D Key Personnel Requirements of the SoW (Book I Part IV). The Offeror shall provide a narrative describing the rationale for the selection of these individuals for these posts and provide detailed descriptions of the relevant experience of the individuals and security clearance information. This subsection shall also describe the authority and responsibility (and the limits) of the Project Manager within the overall corporate organisation, including the circumstances at which the Project Manager must refer decision making authority to the next level of Corporate management.

### 3.5.4 **Section 2: Engineering**

- 3.5.4.1 The Offeror shall provide a draft System Design Plan (SDP), as detailed in Section 2.1 (WP1) of the SoW. The SDP shall have minimum of 10 pages but not more than 20 pages.
- 3.5.4.2 Offerors shall provide an initial draft High Level Design (HLD), as detailed Section 2.1.5.1 of the SOW. The HLD shall address all HLD requirements as detailed in the SOW. In addition that HLD shall:
- 3.5.4.3 Provide an initial draft demonstrating an understanding of the design objective, constraints and the need to integrate PFE to the system design and in turn integrate the system with external PFE connectivity;
- ~~3.5.4.4 Provide an initial draft for system Low Level Design (LLD) on:~~
- ~~a. Access Node;~~
  - ~~b. Battalion Node;~~
  - ~~c. Company Communication Node;~~

- ~~d. Transit Node;~~
- ~~e. Rear Link Node;~~
- ~~f. GAR-T Relay;~~
- ~~g. Radio Access Point.~~
- ~~h. NS Kit~~
- ~~i. pooled appliances~~
- ~~j. Describe the Offerors intent for Interface Control Documentation (ICD);~~

3.5.5 Offerors shall provide an initial draft detailed description of how they intend to Build and Provide Production Units, as detailed in Section 2.2 (WP2) and Section 2.6 (WP6) of the SoW. The Offeror shall describe the full end to end processes they intend for:

- a. Batch #1 First Article Systems;
- b. Batch #2 and #3 (Option) Production Units.

### 3.5.6 Section 3: Supportability

- 3.5.6.1 Offerors shall provide a preliminary **Integrated Product Support Plan (IPSP)**, as detailed in the SOW section 4.1;
- 3.5.6.2 Offerors shall provide a **Product Support Case** to cover in one document the preliminary version for the following topics:
  - 3.5.6.2.1 **Reliability Availability Maintainability Testability (RAMT)** Case Report, as detailed in the SOW section 4.2;
  - 3.5.6.2.2 **Failure Mode Effects and Criticality Analysis (FMECA)**, as detailed in the SOW section 4.3;
  - 3.5.6.2.3 **Maintenance Task Analysis (MTA)**, as detailed in the SOW section 4.4;
  - 3.5.6.2.4 **Level of Repair Analysis (LORA)**, as detailed in the SOW section 4.5;
  - 3.5.6.2.5 **Obsolescence Report**, as detailed in the SOW section 4.6;
  - 3.5.6.2.6 **Warranty Report**, as detailed in the SOW section 4.11;
- 3.5.6.3 Offerors shall provide a preliminary **Training Plan (TNRP)**, as detailed in the SOW section 2.4.2;
- 3.5.6.4 Offerors shall provide a preliminary **In-Service Support Plan (ISSP)**, as detailed in the SOW section 4.12;
- 3.5.6.5 Offerors shall provide a preliminary **System Safety Program Plan (SSPP)**, as detailed in the SOW section 4.13;
- 3.5.6.6 Offerors shall provide a preliminary **Configuration Management Plan (CMP)** as detailed in the SOW Section 6.1;
- 3.5.6.7 Offerors shall provide a preliminary **Quality Assurance Plan (QAP)** as detailed in SOW Section 7.4.

### 3.5.7 Section 4: Testing and Acceptance

3.5.7.1 The Offeror shall in this section demonstrate how it can meet the TDCIS capability testing requirements and conducting all related activities. This includes the development of all test documentation required, the conduct of all testing and the evaluation and documentation of the tests results as specified in Section 8 of the SoW.

**3.5.8 Section 5: Security Accreditation**

3.5.8.1 The Offeror shall provide a draft Security Accreditation Plan (SAP) describing the steps to be taken to achieve security accreditation for TDCIS addressing all points under SEC-18 of SOW Section 9.4.

3.5.8.2 The Offeror shall provide an initial draft design proposal to be used as basis for the initial CIS Description, containing the most important planned elements such as hardware typology, SW typology, data flows, general purpose/functions, and initial system diagram(s) in accordance with SOW Section 9.5.

**3.5.9 Section 6: Manufacturers Datasheets**

3.5.9.1 The Offeror shall provide as part of the System Design Plan (SDP) under section 2.1.2 of the SoW, manufacturers datasheets for all equipment, demonstrating compliance with the requirements stated in the SRS, Annex A of the SoW.

3.5.9.2 The Offeror shall send Volume III – Technical Envelope to the Purchaser's point of contact specified in paragraph 2.6.2.1 above via email.

## **SECTION IV - QUOTATION EVALUATION**

### **4.1 GENERAL**

- 4.1.1 The evaluation of Quotations will be made by the Purchaser solely on the basis of the requirements in this RFQ.
- 4.1.2 The evaluation of Quotations and the determination as to the compliance or technical adequacy of the supplies and services offered will be based only on that information furnished by the Offeror and contained in its Quotation. The Purchaser shall not be responsible for locating or securing any information which is not included in the Quotation.
- 4.1.3 To ensure that sufficient information is available, the Offeror shall furnish with its Quotation all information appropriate to provide a complete description of the work which will be performed and/or the supplies to be delivered. The information provided shall be to a level of detail necessary for the Purchaser to determine exactly what the Offeror proposes to furnish and whether the offer meets the technical, administrative and contractual requirements of this RFQ. Significant omissions and/or cursory submissions may result in a determination of non-compliance without recourse to further clarification.
- 4.1.4 During the evaluation, the Purchaser may request clarification of the Quotation from the Offeror, and the Offeror shall provide sufficient detailed information in connection with such requests as to permit the Purchaser to make a final determination based upon the facts. The purpose of such clarifications will be to resolve ambiguities in the Quotation and to permit the Offeror to state its intentions regarding certain statements contained therein. The Offeror is not permitted any cardinal alteration of the Quotation regarding technical matters and shall not make any change to its price quotation at any time nor restate the Statement of Work (SOW).
- 4.1.5 The Offeror's prompt response to the Purchaser's RFQ clarification requests is important and therefore failure to provide the requested clarifications within the time-limits set forth in the specific Clarification Requests may cause the Quotation to be deemed non-compliant.
- 4.1.6 The evaluation will be conducted in accordance with the Use of Basic Ordering Agreements (BOAs) by the NATO Communications and Information Agency (NCI Agency) set forth in the NATO document AC/4-D(2019)0004 (INV).
- 4.1.7 The administrative compliance of the Quotations will be evaluated first. Quotations that are declared administratively non-compliant may be rejected without further evaluation. Following evaluation for administrative compliance, evaluation will be carried out in the following two areas: Volume II - Price, Volume III- Technical.
- 4.1.8 All administrative compliant Quotations will be reviewed for price compliancy and then technical compliance. The Contract(s) resulting from this RFQ will be awarded to the Offeror whose offer, as evaluated by the Purchaser, is the lowest priced, technically compliant quotation and in compliance with the requirements of this RFQ.

### **4.2 ADMINISTRATIVE CRITERIA**

- 4.2.1 Prior to commencement of the Price and Technical evaluation, Quotations will be reviewed for compliance with the Quotation Submission Requirements of this RFQ. These are as follows:

- (a) The Quotation was received by the Quotation Closing Date and Time,
  - (b) The Quotation was packaged and marked properly (paragraphs 3.3.1 to 3.3.3),
  - (c) The Administrative Package contains all Certificates at Annex B hereto (paragraph 3.3.2).
- 4.2.2 A Quotation that fails to conform to the above requirements may be declared non-compliant and may not be evaluated further by the Purchaser.
- 4.2.3 If it is discovered, during either the Price or Technical evaluation, that the Offeror has taken exception to the Terms and Conditions of the Prospective Contract, or has qualified and/or otherwise conditioned its Quotation on a modification or alteration of the Terms and Conditions or the language of the Statement of Work, the Offeror may be determined to have submitted a non-compliant Quotation.

### **4.3 PRICE CRITERIA**

- 4.3.1 The Offeror's Price Quotation will be first assessed for compliance against the following standards:

- 4.3.1.1 The Price Quotation meets the requirements for preparation and submission of the Price Quotation set forth in the Quotation Preparation Section and the Instructions for preparation of the Bidding Sheets (Annex C) in particular:
- a. The Offeror has furnished Firm Fixed Prices for all items listed. Not having provided a price for all items as required per the Bidding sheets, i.e. to fill out **all** yellow fields, may render the Quotation non-compliant. Prices cannot be embedded/included in other prices.
  - b. All pricing data, i.e., quantities, unit prices, has been provided as reflected in the Bidding Sheets.
  - c. Quotation prices include all costs for items supplied, delivered, and supported.
  - d. All prices have been accurately entered into appropriate columns and accurately totalled.
  - e. The Offeror has provided accurate unit prices (where required) and a total price for each line item.
  - f. The Offeror has provided accurate unit prices and a total price of each of the sub-items it added (if any).
  - g. The currency of all line items has been clearly indicated.
  - h. The Offeror has quoted in its own national currency or in the Host Nation currency, Euros. Where multiple currencies including other NATO member states' currencies are quoted, the conditions of Section III, paragraph 3.4.8 shall be met.



- i. The Offeror has indicated that in accordance with the treaties governing the terms of business with NATO, it excluded from its prices all taxes, duties and customs charges from which the Purchaser has been exempted.
- j. Price quotes for each individual item(s), and totalled prices are accurate and realistic (based on historic data, and/or market and competitive trends in the specified industrial sector(s)).
- k. Detailed pricing information has been provided and is adequate, accurate, traceable, and complete.
- l. The detailed tabs (Labour, Other Material, Travel and ODC) and the “Batch #1”, “Batch #2” and “Batch #3” tabs shall match the CLIN Summary and Offer Summary tabs.

4.3.1.2 The Price Quotation meets requirements for price realism as described below in paragraph 4.3.4.

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

#### **4.3.2 Basis of Price Comparison to determine lowest priced, compliant Quotation**

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

4.3.2.2 The price comparison will be based on the Offered Grand Total Firm Fixed Price which includes all CLINs in the Bidding Sheets including all evaluated Option prices. Offerors who do not provide a quote for each Option (evaluated and non-evaluated) shall be deemed non-compliant (partial bidding is not authorized).

4.3.2.3 The Options referred to in Section 1.11 of the SOW and the Bidding Sheets are requirements which are not within the received authorization and are included as evaluated Options for CLINs 10; and CLIN 11 as a non-evaluated Option. Offerors who do not provide a quote for each Option shall be deemed non-compliant. These are being incorporated as Indefinite Delivery Options addressing special requirements the fulfilment of which is subject to express authorization to be provided by the relevant NATO authorities. Therefore, at the time of the signature of any Contract resulting from this RFQ, no obligation for the parties will arise with respect to the performance and/or payments associated with tasks and deliverables which are made part of any Option. The obligation of the parties with respect to these Options is subject to the authorization by the relevant NATO authorities and the unilateral express exercise of the Options by the Purchaser. The Purchaser reserves the right to exercise any or all Options at any point during the Contract including at Contract Award.

#### **4.3.3 Inconsistencies and discrepancies in Quotation price quotation**

4.3.3.1 In case of inconsistencies, discrepancies and/or contradictory pricing information in the different parts of the Quotation price submission and notwithstanding the possibility for the Purchaser, at its sole discretion to obtain clarification from the Offeror, for the purpose of determining the total price of the Quotation, the following order of precedence shall apply:

4.3.3.1.1 PDF copy of the completed Bidding Sheets

- a. Schedule of Supplies and Services Total to be Evaluated Quotation Price as indicated by the Offeror
- b. Total of the Quotation calculated from the indicated Total Prices(s) indicated per CLIN(s)

4.3.3.1.2 Microsoft Excel copy of the completed Bidding Sheets

- a. Schedule of Supplies and Services Total to be Evaluated Quotation Price as indicated by the Offeror
- b. Total of the Quotation calculated from the indicated Total Prices(s) indicated per CLIN(s)

#### **4.3.4 Price Realism**

4.3.4.1 Should an Offeror submit a price quotation that it is not a realistic reflection of the objective cost of performance of the associated technical proposal, this may be considered by the Purchaser to be an unrealistic offer and may be determined to be non-compliant.

4.3.4.2 Indicators of an unrealistic Quotation may include, but are not limited to:

- a. Labour Costs that, when amortised over the expected or proposed direct labour hours, indicate average labour rates far below those prevailing in the Bidder locality for the types of labour proposed.
- b. Direct Material costs that are considered to be too low for the amounts and types of material proposed, based on prevailing market prices for such material.
- c. Numerous Line Item prices for supplies and services that are provided at no cost or at nominal prices.

4.3.4.3 If the Purchaser has reason to suspect that a Offeror has artificially debased its prices in order to secure contract award, the Purchaser will request clarification of the Quotation in this regard and the Offeror shall provide explanation on one of the following basis:

a. An error was made in the preparation of the Price Quotation. In such a case, the Offeror must document the nature of the error and show background documentation concerning the preparation of the Price Quotation that makes a convincing case that a mistake was made by the Offeror. In such a case, the Offeror shall petition the Purchaser to both remain in the competition and accept the Contract at the offered price, or to withdraw from the competition.

b. The Offeror has a competitive advantage due to prior experience or industrial/technological processes that demonstrably reduce the costs of Offeror

performance and therefore the price offered is realistic. Such an argument must support the technical proposal offered and convincingly and objectively describe the competitive advantage and the net savings achieved by this advantage over standard market practices and technology.

c. The Offeror recognises that the submitted Price Quotation is unrealistically low compared to its cost of performance and, for business reasons, the Offeror is willing to absorb such a loss. Such a statement can only be made by the head of the business unit submitting the Quotation and will normally be made at the level of Chief Operating Officer or Chief Executive Officer. In such a case, the Offeror shall estimate the potential loss and show that the financial resources of the Offeror are adequate to withstand such reduction in revenue.

- 4.3.4.4 If an Offeror fails to submit a comprehensive and compelling response on one of the basis above, the Purchaser may determine the Quotation submitted as non-compliant. If the Offeror responds on the basis of the above and requests to withdraw from the competition, the Purchaser may, depending on the nature and gravity of the mistake, allow the Offeror to withdraw.
- 4.3.4.5 If the Purchaser accepts the Offeror's explanation of mistake in Paragraph 4.3.4.3 (a) and allows the Offeror to accept the Contract at the offered price, or the Purchaser accepts the Offeror's explanation pursuant to paragraph 4.3.4.3(c) above, the Offeror shall agree that the supporting pricing data submitted with its Quotation will be incorporated by reference in the resultant Contract. The Offeror shall agree as a condition of Contract signature, that the pricing data will be the basis of determining fair and reasonable pricing for all subsequent negotiations for modifications of or additions to the Contract and that no revisions of proposed prices will be made.
- 4.3.4.6 If the Offeror presents a convincing rationale pursuant to paragraph (b) above, no additional action will be warranted. The Purchaser, however, reserves its right to reject such an argument if the rationale is not compelling or capable of objective analysis. In such a case the Quotation may be determined to be non-compliant.

#### **4.4 TECHNICAL CRITERIA**

4.4.1 Upon determination of the lowest-priced Quotation as described above, the Quotation shall be evaluated to confirm compliance with the following technical criteria associated with the respective sections of the Technical Proposal.

##### **4.4.2 Technical Proposal**

4.4.2.1 The Offeror shall have provided a Technical Proposal which includes all of information required in Sections 3.5.1 – 3.5.9.

##### **4.4.3 Table of Contents**

4.4.3.1 Offeror shall have compiled a detailed Table of Contents which lists not only section headings but also major sub-sections, and topic headings required set forth in these Instructions or implicit in the organisation of the Technical Proposal in accordance to Section 3.5.2.1 of Book I.

#### 4.4.4 Technical Proposal Cross Reference Matrix Table

4.4.4.1 The Offeror shall have included the completed Technical Proposal Cross-Reference Table at Annex E of Book I. The Offeror shall complete the Column marked “QUOTATION REFERENCE” of the Table, citing the appropriate section of the Technical Proposal that corresponds to each paragraph of these Instructions for the Preparation of the Technical Proposal. The completed Table serves as an index for the Purchaser's Technical Evaluation Panel and also as an aide memoire to the Offeror to ensure that all the required information has been provided in the Technical Proposal in accordance to Section 3.5.2.2 of Book I.

#### 4.4.5 Section 1: Project Management Documentation (PMP and PIP)

4.4.5.1 Project Overview. The Offeror shall have provided a Project Overview which shall provide an executive summary overview of the offered capability. The Project Overview shall also summarise the main features of each of the sections of the Technical Proposal and shall indicate in broad detail how and in which geographic regions the Project's phases as illustrated in Appendix A of the SoW will be executed during the full lifetime of the Project.

4.4.5.2 The Offeror shall have submitted a preliminary Project Management Plan (PMP) in accordance with the requirements of Section 3.2.1 of the SoW (Book II Part IV) that defines how the Offeror intends to manage this project from contract signature through Final System Acceptance and throughout any warranty periods. The preliminary PMP shall consider all aspects of project management and control and demonstrate how all the critical dates defined in the contract will be met. The preliminary PMP with all appendices shall be a minimum of 20 pages but not to exceed 35 pages, and shall have a GANNT Chart as an Appendix that maps to both the Offerers PMS and the Bidding Sheet CLINs.

4.4.5.3 The Offeror shall have submitted a preliminary Project Implementation Plan in accordance with the requirements of Section 3.2.2 of the Statement Of Work (SOW) (Book II Part IV), which clearly describes how the Offeror intends to implement the totality of the project in compliance with the contractual requirements and the following specific requirements:

4.4.5.3.1 The Offeror shall have provided a statement assuring that all requirements shall be met for the Site Survey and Site Survey Report in accordance to the requirements stated in Sections 2.5.1, 2.7.2, and 4.10 of the SoW (Book II Part IV).

4.4.5.3.2 The preliminary PIP shall have included a preliminary Project Master Schedule (PMS) in accordance with the requirements of Section 3.2.2.3 of the SoW containing all contract events and milestones for the project. The preliminary PMS shall show all contractual deliverables, delivery dates, and the tasks associated with them. The preliminary PMS shall for each task have identified the start and finish dates, duration, predecessors, constraints, and resources. The preliminary PMS shall have provided network, milestone, and Gantt views, and identify the critical path for the overall project.

4.4.5.3.3 The Offeror shall have identified all activities related to the security accreditation process according Section 9 of the SoW in the preliminary Project Implementation Plan (PIP) and in the Project Management Plan (PMP).

4.4.5.4 The Offeror shall have provided a curriculum vitae for the personnel proposed for this project as identified in the SoW Appendix D. For each role identified (at least

one person per role and a maximum of one role per person), the resumes shall meet or exceed the experience, knowledge and educational criteria stated in the SoW Section 3.1 and Appendix D, Table 3, demonstrating that they have the expected knowledge, capability and experience to meet the requirements of this Contract. The Offeror shall have provided a narrative describing the rationale for the selection of the Project Team for key posts and have provided detailed descriptions of the experience of the individuals in managing similar procurement programmes. This section shall have described the authority and responsibility (and the limits) of the Project Manager within the overall corporate organisation. The narrative must confirm that the Project Manager has access to the corporate resources required to successfully perform the Contract. The Offeror shall include for identified key personnel for this project their security clearance certificate with expiration date of the clearance.

#### **4.4.6 Section 2: Engineering**

4.4.6.1 The Offeror shall have provided a draft System Design Plan (SDP) with the information as required and detailed in the SOW 2.1.2 (WP1) and the SDP shall demonstrate compliance with the System Requirements Specification (Annex A of the SoW). The SDP shall be minimum of 10 Pages but not more than 20 pages.

4.4.6.2 The Offeror shall have provided a draft High Level Design (HLD), as detailed Section 2.1.5.1 of the SOW. The HLD shall address all HLD requirements as detailed in the SOW. In addition that HLD shall:

4.4.6.2.1 Be sufficiently detailed to demonstrate an understanding of the design objective, constraints and the need to integrate with PFE and external connectivity;

~~4.4.6.2.2 The Offeror shall have demonstrated their intent for system level Low Level Design (LLD) Documentation and how the LLD's for each of the following shall be presented:~~

~~4.4.6.2.2.1 Access Node;~~

~~4.4.6.2.2.2 Battalion Node;~~

~~4.4.6.2.2.3 Company Communication Node;~~

~~4.4.6.2.2.4 Transit Node;~~

~~4.4.6.2.2.5 Rear Link Node;~~

~~4.4.6.2.2.6 GART Relay;~~

~~4.4.6.2.2.7 Radio Access Point.~~

~~4.4.6.2.2.8 NS Kit~~

~~4.4.6.2.2.9 Pooled Appliances~~

~~4.4.6.2.2.10 Describe the Offerors intent for Interface Control Documentation (ICD) and how these shall map to the LLD, DLD and the Portuguese National Network;~~

4.4.6.2.3 Offerors shall provide a draft detailed description of how they intend to Build and Provide Production Units, as detailed in Section 2.2 (WP2) and 2.6 (WP6) of the SoW, the Offeror shall describe the full end to end processes they intend for:

4.4.6.2.3.1 Batch #1 Prototype First Article Systems;

4.4.6.2.3.2 Batch #2 and #3 (Batch #3 is an option) Production Units.

#### **4.4.7 Section 3: Supportability**

4.4.7.1 Offeror shall have provided a preliminary Integrated Product Support Plan (IPSP), as detailed in the SOW section 4.1 describing in detail each relevant content for each paragraph of the provided structure demonstrating the concept, understanding (who, what, when, where, how) and commitment of each activity. The preliminary IPSP shall include an annex with the traceability matrix to match coverage for all Integrated Product Support (IPS) requirements in the SOW section 4.1 to 4.12 vs relevant ISPS paragraphs. The preliminary IPSP shall be at least 20 pages and no more than 40 pages.

4.4.7.2 Offeror shall have provided a Product Support Case that shall support the IPSP and ISSP providing concise and precise answers to each requirement in one document. The Support Case shall be at least 40 pages and no more than 80 pages, and provide sufficient details for the following:

4.4.7.2.1 Reliability Availability Maintainability Testability (RAMT) Case Report, as detailed in the SOW section 4.2, describing in detail each relevant content for each paragraph of the provided structure;

4.4.7.2.2 Failure Mode Effects and Criticality Analysis (FMECA), as detailed in the SOW section 4.3, describing in detail each relevant content for each paragraph of the provided structure;

4.4.7.2.3 Maintenance Task Analysis (MTA), as detailed in the SOW section 4.4, describing in detail each relevant content for each paragraph of the provided structure;

4.4.7.2.4 Level of Repair Analysis (LORA), as detailed in the SOW section 4.5, describing in detail each relevant content for each paragraph of the provided structure;

4.4.7.2.5 Obsolescence Report, as detailed in the SOW section 4.6, describing in detail each relevant content;

4.4.7.2.6 Warranty Report, as detailed in the SOW section 4.11, describing in detail each relevant content;

4.4.7.3 Offeror shall have provided a preliminary Training Plan (TRNP), as detailed in the SOW section 2.4.2, describing in detail each relevant content for each paragraph of the provided structure (for both the TRNP and the Training Needs Analysis) demonstrating the concept, understanding (who, what, when, where, how) and commitment of each activity. The preliminary TRNP shall be at least 20 pages and no more than 40 pages.

4.4.7.4 Offeror shall provide a preliminary In-Service Support Plan (ISSP), as detailed in the SOW section 4.12, describing in detail each relevant content for each

paragraph of the provided structure demonstrating the concept, understanding (who, what, when, where, how) and commitment of each activity. The preliminary ISSP shall include an annex with a traceability matrix to match coverage for all Integrated Product Support (IPS) requirements in the SOW section 4.12 vs relevant ISSP paragraphs. The preliminary ISSP shall be at least 20 pages and no more than 40 pages.

- 4.4.7.5 Offeror shall provide a preliminary System Safety Program Plan (SSPP), as detailed in the SOW section 4.13, describing in detail each relevant content demonstrating the concept, understanding (who, what, when, where, how) and commitment of each activity. The preliminary ISSP shall be at least 10 pages and no more than 20 pages.
- 4.4.7.6 Offeror shall provide a preliminary Configuration Management Plan (CMP) as detailed in the SOW Section 6.1, describing in detail each relevant content so to demonstrate the concept, understanding (who, what, when, where, how) and commitment of each activity. The preliminary CMP shall include an annex with a traceability matrix to match coverage for all Configuration Management requirements in the SOW section 6 vs relevant CMP paragraphs. The preliminary CMP shall be at least 10 pages and no more than 20 pages.
- 4.4.7.7 Offeror shall provide a preliminary Quality Assurance Plan (QAP) as detailed in SOW Section 7.4. The preliminary QAP shall include an annex with a traceability matrix to match coverage for all Quality Assurance and Control requirements in the SOW section 7 vs relevant QAP paragraphs. The preliminary QMP shall be at least 10 pages and no more than 20 pages.

#### **4.4.8 Section 4: Testing and Acceptance**

4.4.8.1 The Offeror shall in this section demonstrate how it can meet the TDCIS capability testing requirements and conducting all related activities. This includes the draft of all test documentation required, the conduct of all testing and the evaluation and documentation of the tests results as specified in Sections 8.2, 8.3, 8.5 and 8.6 of the SoW.

4.4.8.2 The Offerors approach to testing, its resourcing, its structure;

4.4.8.2.1 All test areas where testing shall be required during the delivery, in particular:

4.4.8.2.2 Quality First Articles Section 2.2 (WP2);

4.4.8.2.3 Conduct User Testing Section 2.5 (WP5);

4.4.8.2.4 Provide Production Units Section 2.6 (WP6);

4.4.8.2.5 Support Operational Test and Evaluation Section 2.7 (WP7);

4.4.8.2.6 System Acceptance as per Section 10 of the SOW.

#### **4.4.9 Section 5: Security Accreditation**

4.4.9.1 The Offeror shall have provided a draft Security Accreditation Plan describing the steps to be taken to achieve security accreditation for TDCIS addressing all points under SEC-18 of SOW Section 9.4.

- 4.4.9.2 The Offeror shall have provided an initial draft design proposal to be used as basis for the initial CIS Description, containing the most important planned elements such as hardware typology, SW typology, data flows, general purpose/functions, and initial system diagram(s) in accordance with SOW Section 9.5.

**4.4.10 Section 6: Manufacturers Datasheets**

- 4.4.10.1 The Offeror shall provide as part of the System Design Plan (SDP) under section 2.1.2 of the SoW, manufacturers datasheets for all equipment, demonstrating compliance with the requirements stated in the SRS, Annex A of the SoW.



## ANNEX A – CLARIFICATION REQUESTS FORMS

INSERT COMPANY NAME HERE

INSERT SUBMISSION DATE HERE

ADMINISTRATIVE/CONTRACTUAL				
Serial Nr	RFQ Section Ref.	OFFEROR'S QUESTION	NCI AGENCY ANSWER	Status*
A.1				
A.2				
A.3				

\* Status: Is Amendment to RFQ required as a direct result of the Clarification Request?

INSERT COMPANY NAME HERE

INSERT SUBMISSION DATE HERE

PRICE				
Serial Nr	RFQ Section Ref.	OFFEROR'S QUESTION	NCI AGENCY ANSWER	Status*
P.1				
P.2				
P.3				

\* Status: Is Amendment to RFQ required as a direct result of the Clarification Request?

INSERT COMPANY NAME HERE

INSERT SUBMISSION DATE HERE

TECHNICAL				
Serial Nr	RFQ Section Ref.	OFFEROR'S QUESTION	NCI AGENCY ANSWER	Status*
T.1				
T.2				
T.3				

\* Status: Is Amendment to RFQ required as a direct result of the Clarification Request?

**Annex B – Administrative Certificates**

**ANNEX B-1**

**CERTIFICATE OF LEGAL NAME OF OFFEROR**

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

FULL NAME OF CORPORATION: \_\_\_\_\_

DIVISION (IF APPLICABLE): \_\_\_\_\_

SUB DIVISION (IF APPLICABLE): \_\_\_\_\_

OFFICIAL MAILING ADDRESS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

E-MAIL ADDRESS: \_\_\_\_\_

FAX NO.: \_\_\_\_\_

BOA NO.: \_\_\_\_\_

POINT OF CONTACT (POC) REGARDING THIS QUOTATION:

NAME: \_\_\_\_\_

POSITION: \_\_\_\_\_

TELEPHONE: \_\_\_\_\_

E-MAIL ADDRESS: \_\_\_\_\_

ALTERNATIVE POC:

NAME: \_\_\_\_\_

POSITION: \_\_\_\_\_

TELEPHONE: \_\_\_\_\_

E-MAIL ADDRESS: \_\_\_\_\_

\_\_\_\_\_  
DATE

\_\_\_\_\_  
SIGNATURE OF AUTHORISED REPRESENTATIVE

\_\_\_\_\_  
PRINTED NAME

\_\_\_\_\_  
TITLE

NATO UNCLASSIFIED

ANNEX B-2

**CERTIFICATE OF INDEPENDENT DETERMINATION**

1. Each Offeror shall certify signing this Quotation shall also certify that:

Each Offeror shall certify that in connection with this procurement:

- a. This quotation has been arrived at independently, without consultation, communication or agreement, for the purpose of restricting competition, with any other Offeror or with any competitor;
- b. The contents of this Quotation have not been knowingly disclosed by the Offeror and will not knowingly be disclosed by the Offeror prior to award, directly or indirectly to any other Offeror or to any competitor, and;
- c. No attempt has been made, or will be made by the Offeror to induce any other person or firm to submit, or not to submit, a Quotation for the purpose of restricting competition.

2. Each person signing this Quotation shall also certify that:

- a. They are the person in the Offeror's organisation responsible within that organisation for the decision as to the quotation and that they have not participated and will not participate in any action contrary to 1(a) through 1(c) above, or;
- b. (i) They are not the person in the Offeror's organisation responsible within that organisation for the quotation but that they have been authorised in writing to act as agent for the persons responsible for such a decision in certifying that such persons have not participated, and will not participate in any action contrary to 1(a) through 1(c) above, and as their agent does hereby so certify, and;
- (ii) They have not participated and will not participate in any action contrary to 1(a) through 1(c) above.

.....  
Date

.....  
Signature of Authorised Representative

.....  
Printed Name and Title

.....  
Company

NOTE: IF THE OFFEROR DELETES OR MODIFIES SUBPARAGRAPH (1B) OF THIS ANNEX, THE OFFEROR MUST FURNISH WITH ITS QUOTATION A SIGNED STATEMENT SETTING FORTH IN DETAIL THE CIRCUMSTANCES OF THE DISCLOSURE.

ANNEX B-3

**CERTIFICATE OF QUOTATION VALIDITY**

I, the undersigned, as an authorised representative of the firm submitting this quotation, do hereby certify that the pricing and all other aspects of our Quotation will remain valid for a period of 12(twelve) months from the Quotation Closing Date of this Request for Quotation.

.....  
Date

.....  
Signature of Authorised Representative

.....  
Printed Name and Title

.....  
Company

ANNEX B-4

**CERTIFICATE OF UNDERSTANDING**

I certify that

.....  
.....(Company Name) has read and fully understands  
the requirements of this Request for Quotation (RFQ) and that the Quotation recognises these  
requirements in total.

I also certify to the best of my expert knowledge that this Quotation is within the "state of art"  
boundaries as they exist at the time of quotation for this project.

.....  
Date

.....  
Signature of Authorised Representative

.....  
Printed Name and Title

.....  
Company



ANNEX B-5

**CERTIFICATE OF EXCLUSION OF TAXES, DUTIES AND CHARGES**

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

.....  
Date

.....  
Signature of Authorised Representative

.....  
Printed Name and Title

.....  
Company



ANNEX B-6

**ACKNOWLEDGEMENT OF RECEIPT OF RFQ AMENDMENTS**

I confirm that the following Amendments to Request for Quotation No RFQ-CO-115363-PRT-TDICS have been received and the Quotation as submitted reflects the content of such Amendments:

<b>Amendment Number</b>	<b>Date of Issue by the Purchaser</b>	<b>Date of Receipt by the Offeror</b>

.....  
Date

.....  
Signature of Authorised Representative

.....  
Printed Name and Title

.....  
Company

ANNEX B-7

**DISCLOSURE OF REQUIREMENTS FOR NCI AGENCY EXECUTION OF  
SUPPLEMENTAL AGREEMENTS**

I, the undersigned, as an authorised representative of .....  
.....(*Company Name*), certify the following statement (*Check  
the applicable statement below*):

- I do not have any supplemental agreements to disclose for the performance of this contract [*cross out points 1 to 5 of this certificate*].
  - I do have supplemental agreements to disclose for the performance of this contract (*complete points 2 and 3 below in a separate attachment to this certificate*).
1. All supplemental agreements, defined as agreements, documents and/or permissions outside the body of the Contract but required by my Government, and the governments of my sub-Contractors, to be executed by the NCI as a condition of my firm's performance of the Contract, have been identified, as part of the Quotation.
  2. Examples of the terms and conditions of these agreements are attached hereto. The anticipated restrictions to be imposed on NATO, if any, have been identified in our offer along with any potential conflicts with the terms, conditions and specifications of the Prospective Contract, see ..... (*complete, if any*). These anticipated restrictions and potential conflicts are based on our knowledge of and prior experience with such agreements and their implementing regulations. We do not certify that the language or the terms of these agreements will be exactly as we have anticipated.
  3. The processing time for these agreements has been calculated into our delivery and performance plans and contingency plans made in the case that there is delay in processing on the part of the issuing government(s), see ..... (*complete, if any*).
  4. We recognise that additional supplemental agreements, documents and permissions presented as a condition of Contract performance or MOU signature after our firm would be selected as the successful Offeror may be cause for the NCI to determine the submitted quotation to be non-compliant with the requirements of the RFQ.
  5. We accept that should the resultant supplemental agreements issued in final form by the government(s) result in an impossibility to perform the Contract in accordance with its schedule, terms or specifications, the Contract may be terminated by the Purchaser at no cost to either Party.

.....  
Date

.....  
Signature of Authorised Representative

.....  
Printed Name and Title

.....  
Company

ANNEX B-8

**CERTIFICATION OF NATO MEMBER COUNTRY ORIGIN OF DELIVERED EQUIPMENT,  
SERVICES, MATERIALS AND INTELLECTUAL PROPERTY RIGHTS**

The Offeror hereby certifies that, if awarded the Contract pursuant to this solicitation, it will perform the contract subject to the following conditions:

- (a) none of the work, including project design, labour and services shall be performed other than by firms from and within participating NATO member countries;
- (b) no material or items of equipment down to and including identifiable sub-assemblies shall be manufactured or assembled by a firm other than from and within a participating NATO member country (a sub-assembly is defined as a portion of an assembly consisting of two or more parts that can be provided and replaced as an entity)\*; and
- (c) the intellectual property rights to all design documentation and related system operating software shall reside in NATO member countries, and no license fees or royalty charges shall be paid by the Contractor to firms, individuals or governments other than within the NATO member countries.

.....  
Date

.....  
Signature of Authorised Representative

.....  
Printed Name and Title

.....  
Company

ANNEX B-9

**COMPREHENSION AND ACCEPTANCE OF CONTRACT GENERAL AND SPECIAL PROVISIONS**

The Offeror hereby certifies that it has reviewed the Contract Special Provisions set forth in the Prospective Contract, Book II of this Request for Quotation (RFQ) and the Contract Provisions set forth in the Basic Ordering Agreement signed with the NCI Agency. The Offeror hereby provides its confirmation that it fully comprehends the rights, obligations and responsibilities of the Contractor as set forth in the Articles and Clauses of the Prospective Contract. The Offeror additionally certifies that the Quotation submitted by the Offeror is without prejudice, qualification or exception to any of the Terms and Conditions and it will accept and abide by the stated Special Contract Provisions if awarded the contract as a result of this RFQ.

.....  
Date

.....  
Signature of Authorised Representative

.....  
Printed Name and Title

.....  
Company

ANNEX B-10

**LIST OF PROSPECTIVE SUB-CONTRACTORS/CONSORTIUM MEMBERS**

Name and Address of Sub-Contractor, incl. country of origin/registration	Primary Location of Work	Items/Services to be Provided	Estimated Value of Sub-Contract

**If no** sub-Contractors/consortium members are involved, state this here:

.....  
 .....  
 .....  
 .....

.....  
 Date

.....  
 Signature of Authorised Representative

.....  
 Printed Name and Title

.....  
 Company



ANNEX B-11

**CERTIFICATE OF AQAP 2110 OR ISO 9001:2015 COMPLIANCE**

I hereby certify that ..... (*Company Name*) is fully compliant with the AQAP 2110 or ISO 9001:2015 Quality Assurance Standards and Procedures and is currently so certified.

A copy of the quality certification is **attached herewith.**

.....  
Date

.....  
Signature of Authorised Representative

.....  
Printed Name and Title

.....  
Company

ANNEX B-12

LIST OF PROPOSED KEY PERSONNEL WITH SECURITY CLEARANCE INFORMATION

*Although NATO, as an international organization, is not subject to GDPR and national data protection law, it is committed to protecting the personal data that it processes. All processing of personal data will be done in accordance with applicable NATO policies and regulations.*

POSITION	NAME	LEVEL OF CLEARANCE	DATES OF VALIDITY	CERTIFYING AUTHORITY	EXPECTED DATE OF RELEASE OF REQUIRED SECURITY CLEARANCE	DESIGNATION PERIOD
Project Manager						EDC thru Contract expiration date
Technical Lead						EDC thru Contract expiration date
Test Director						EDC thru Contract expiration date
CIS Security Manager						EDC thru Contract expiration date
IPS Manager						EDC thru Contract expiration date
Training Manager						EDC thru Contract expiration date
Configuration Manager						EDC thru Contract expiration date
Quality Manager						EDC thru Contract expiration date

Signature of authorised Representative: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Company: \_\_\_\_\_

**ANNEX B-13**

**Disclosure of Involvement of Former NCI Agency Employment**

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

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

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

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

Employee Name	Former NCIA Position	Current Company Position

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

\_\_\_\_\_

Date

\_\_\_\_\_

Signature of Authorised Representative

\_\_\_\_\_

Printed Name

\_\_\_\_\_

Title

\_\_\_\_\_

Company



**Excerpt of NCI Agency AD. 05.00, Code of Conduct dated May 2017**

**Article 14 PROCUREMENT AND CONTRACTORS**

- 14.1 NCI Agency Personnel are required to maintain unquestionable integrity and impartiality in relation to procurements initiated by the NCI Agency.
- 14.2 NCI Agency Personnel shall not disclose any proprietary or contract related information regarding procurement directly or indirectly to any person other than a person authorized by the NCI Agency to receive such information. NCI Agency Personnel shall not disclose any documentation related to a procurement action to any third party without a need to know<sup>1</sup> (e.g., draft statement of work, statement of requirements) unless this is expressly provided under NATO Procurement Regulations or authorized in writing by the Director of Acquisition. During an on-going selection, NCI Agency Personnel shall not disclose any information on the selection procedure unless authorized by the Chairman of the award committee/board. The NCI Agency Personnel concerned will ensure that proper access controls are put in place to prevent disclosure of procurement information that has not yet been authorized for release for outside distribution, including draft statements of work and requirement documentations.
- 14.3 NCI Agency Personnel will not participate in a source selection if an offer has been provided by a friend, family member, a relative, or by a business concern owned, substantially owned, or controlled by him/her or by a friend, family member or a relative. NCI Agency Personnel appointed as part of an evaluation shall report such links to the Director of Acquisition immediately upon becoming aware of it.
- 14.4 Contractors and consultants shall not be allowed to participate in the drafting of the statement of work or in the source selection process unless they and their company/employer will be excluded from competition of the related contract. The same will apply to contractors and consultants involved in the definition and development of requirements.
- 14.5 Contractors will be given specific and coherent statements of work, providing precise explanation of how she/he is going to be employed. Tasks to be performed and minimum qualifications are to be well defined from the start. In addition, supervisors will ensure that contractors do not occupy managerial positions within the Agency.
- 14.6 NCI Agency Personnel shall not enter into authorized commitments in the name of NCI Agency or NATO unless specifically authorized. NCI Agency Personnel must abstain from making promises or commitment to award or amend a contract or otherwise create the appearance of a commitment from the NCI Agency unless properly authorized by the NCI Agency.
- 14.7 NCI Agency Personnel shall not endorse directly or indirectly products from industry. Therefore, NCI Agency Personnel shall not name or make statements endorsing or appearing to endorse products of specific companies.
- 14.8 Industry partners will need to abide with the post-employment measures under this Directive upon submission of their Quotations / proposals to the NCI Agency. As part of the selection process, industry will be requested to agree with an ethical statement.

**15 INDUSTRY INITIATIVES**

- 15.1 Industry initiatives may include loans, displays, tests or evaluation of equipment and software, requesting NCI Agency speakers at industry gatherings and conferences, inviting speakers from industry to NCI Agency events, consultancy or studies of technical or organizational issues, etc. These initiatives are usually at no cost to the NCI Agency and take place at a pre-contractual phase or before the development of requirements and specifications. While there are benefits associated with the early involvement of industry in the definition of requirements and specifications, this also raises the potential for unfair treatment of potential competitors.
- 15.2 Industry initiatives which go beyond routine interaction in connection with on-going contracts must be reported to and coordinated by the NCI Agency Acquisition Directorate for approval. Industry initiatives shall be properly documented and governed by written agreements between the NCI Agency and the company concerned where relevant. Such agreements may contain provisions describing the nature of the initiative, the non-disclosure of NCI Agency/NATO information, NCI Agency ownership of any resulting work, the NCI Agency's right to release such work product to future competitors for any follow-on competition or contract, the requirement that any studies must provide non-proprietary solutions and/or an acknowledgement that the participating companies will not receive any preferential treatment in the contracting process.
- 15.3 Any authorized industry initiatives must be conducted in such a way that it does not confer an unfair advantage to the industry concerned or create competitive hurdles for potential competitors.

## **16 POST EMPLOYMENT MEASURES**

- 17.1 The NCI Agency will not offer employment contracts to former NCI Agency Personnel who departed less than 2 years earlier, unless prior approval by the General Manager has been received.
- 17.2 Former NCI Agency Personnel will not be accepted as consultants or commercial counterpart for two (2) years after finalization of their employment at NCI Agency, unless the General Manager decides otherwise in the interest of the Agency and as long as NATO rules on double remuneration are observed. Such decision shall be recorded in writing. Commercial counterparts include owners or majority shareholders, key account managers, or staff member, agent or consultant of a company and/or subcontractors seeking business at any tier with the NCI Agency in relation to a procurement action in which the departing NCI Agency staff member was involved when they were under the employment of the NCI Agency. As per the Prince 2 Project methodology, a Project is defined as a "temporary organization that is created for the purpose of delivering one or more business products according to an agreed business case". For the purpose of this provision, involvement requires (i) drafting, review or coordination of internal procurement activities and documentation, such as statement of work and statement of requirement; and/or (ii) access to procurement information that has not yet been authorized for release for outside distribution, including draft statements of work and requirement documentations; and/or (iii) being appointed as a representative to the Project governance (e.g., Project Board) with access to procurement information as per (ii) above; and/or (iv) having provided strategic guidance to the project, with access to procurement information as per (ii) above.
- 17.3 In addition to Section 17.2 above, former NCI Agency Personnel at grades A5 and above or ranks OF-5 and above are prohibited during twelve months following the end of their employment with the NCI Agency to engaging in negotiations,

representational communications and/or advisory activities with the NCI Agency on behalf of a private entity, unless this has been agreed in advance by the NCI Agency General Manager and notified to the ASB.

- 17.4 NCI Agency Personnel leaving the Agency shall not contact their former colleagues in view of obtaining any information or documentation about procurement activities not yet authorized' release. NCI Agency Personnel shall immediately report such contacts to the Director of Acquisition.
- 17.5 The ASB Chairman will be the approving authority upon recommendation by the Legal Adviser when the NCI Agency Personnel concerned by the above is the NCI Agency General Manager and will notify the ASB.
- 17.6 NCI Agency Personnel leaving the Agency shall sign a statement that they are aware of the post-employment measures set out in this Directive.
- 17.7 The post-employment measures set out in this Directive shall be reflected in the NCI Agency procurement documents, such as RFQs, and contract provisions.

ANNEX B-14

**OFFEROR BACKGROUND IPR**

The Offeror Background IPR specified in the table below will be used for the purpose of carrying out work pursuant to the Contract.

ITEM	DESCRIPTION

The Offeror has and will continue to have, for the duration of the Contract, all necessary rights in and to the Background IPR specified above.

The Background IPR stated above complies with the terms specified in Article 29, Part II-Special Provisions and Article 30 of the NCI Agency, Part III - General Provisions.

ANNEX B-15

**LIST OF SUBCONTRACTOR IPR**

The Subcontractor IPR specified in the table below will be used for the purpose of carrying out work pursuant to the Contract.

ITEM	DESCRIPTION

The Offeror has and will continue to have, for the duration of the Contract, all necessary rights in and to the IPR specified above necessary to perform the Offeror's obligations under the Contract.

The Subcontractor IPR stated above complies with the terms specified in Article 30 of the NCI Agency, Part III - General Provisions.

## Annex C – Bidding Sheets

[Provided under separate MS Excel File:

*“RFQ-CO-115363-PRT-TDCIS – Book I Annex C – Bidding Sheets – AMD7”*]

## Annex D – Instructions for the Preparation of Bidding Sheets

1. Offerors are required, in preparing their Price Quotation to utilise the Bidding Sheets following the instructions detailed in Section III– Quotation Preparation Instructions and CLIN **Bidding Sheet instructions within the Bidding Sheets itself.**
2. The prices entered on the Bidding Sheets shall reflect the total items required to meet the contractual requirements.
3. The total price shall be indicated in the appropriate columns and in the currency quoted.
4. The total evaluated price shall be the price of the basic Contract with evaluated option.
5. Prices shall not include any provision for taxes or duties for which the Purchaser is exempt.
6. The Offeror shall not introduce any changes or deviations to the bidding sheets as Published by the Purchaser.

**Annex E – Compliance table**

Offeror shall complete column “QUOTATION REFERENCE” with Quotation references that locate the technical proposal documentation required by the RFQ, e.g. section, paragraph, table (if applicable), page number etc. One copy each of the duly completed Cross Reference/Compliance Table is to be included in the Quotation Technical Proposal package. The Quotation shall follow the instructions in Section 3.5, and will be evaluated according to the instructions in Section 4.4.

Bidding Instructions Requirement Ref.	SOW Requirement Ref	REQUIREMENT DESCRIPTION	Evaluation Criterion Ref.	QUOTATION REFERENCE
				<i>Offeror to complete</i>
3.5.2.1		<u>Table of Contents</u> Offeror shall compile a detailed Table of Contents which lists not only section headings but also major sub-sections, and topic headings required set forth in these Instructions or implicit in the organisation of the Technical Proposal.	4.4.3.1	
3.5.2.2		<u>Cross-Reference/Compliance Table</u> The Offeror shall include the completed Technical Proposal Cross-Reference Table at Annex E of Book I. The Offeror shall complete the Column marked “QUOTATION REFERENCE” of the Table, citing the appropriate section of the Technical Proposal that corresponds to each paragraph of these Instructions for the Preparation of the Technical Proposal. The completed Table serves as an index for the Purchaser's Technical Evaluation Panel and also as an aide memoire to the Offeror to ensure that all the required information has been provided in the Technical Proposal.	4.4.4.1	
		<b>Section 1 Project Management Documentation (PMP and PIP)</b>		
3.5.3.1	3.2.1	Project Overview. The Offeror shall provide a Project Overview which shall provide an executive summary overview of the offered capability. The Project Overview	4.4.5.1	



Bidding Instructions Requirement Ref.	SOW Requirement Ref	REQUIREMENT DESCRIPTION	Evaluation Criterion Ref.	QUOTATION REFERENCE
		shall also summarise the main features of each of the sections of the Technical Proposal and shall indicate in broad detail how and in which geographic regions the Project's phases as illustrated in Appendix A of the SoW will be executed during the full lifetime of the Project.		
3.5.3.2	3.2.1	The Offeror shall submit a preliminary Project Management Plan (PMP) in accordance with the requirements of Section 3.2.1 of the SoW (Book II Part IV) that defines how the Offeror intends to manage this project from contract signature through Final System Acceptance and throughout any warranty periods. The preliminary PMP shall consider all aspects of project management and control and demonstrate how all the critical dates defined in the contract will be met. The preliminary PMP with all appendices shall be a minimum of 20 pages but not to exceed 35 pages, and shall have a GANNT Chart as an Appendix that maps to both the Offerers PMS and the Bidding Sheet CLINs.	4.4.5.2	
3.5.3.3	3.2.2	The Offeror shall submit a preliminary Project Implementation Plan in accordance with the requirements of Section 3.2.2 of the Statement Of Work (SOW) (Book II Part IV), which clearly describes how the Offeror intends to implement the totality of the project in compliance with the contractual requirements and the following specific requirements:	4.4.5.3	
3.5.3.3.1	2.5.1, 2.7.2, 4.10	The Offeror shall provide a statement assuring that all requirements shall be met for the Site Survey and Site Survey Report in accordance to the requirements stated in Sections 2.5.1, 2.7.2, and	4.4.5.3.1	

Bidding Instructions Requirement Ref.	SOW Requirement Ref	REQUIREMENT DESCRIPTION	Evaluation Criterion Ref.	QUOTATION REFERENCE
		4.10 of the SoW (Book II Part IV). The site survey shall be performed according to the Schedule of Supplies and Services after the Effective Date of the Contract.		
3.5.3.3.2	3.2.2.3	The preliminary PIP shall include a Project Master Schedule (PMS) in accordance to the requirements stated in Section 3.2.2.3 of the SoW (Book II Part IV) that shall contain all contract events and milestones for the Project. The PMS shall show all contractual deliverables, their delivery dates, and the tasks associated with them. The PMS shall for each task identify the start and finish dates, duration, predecessors, constraints, and resources. The PMS shall provide network, milestone, and Gantt views, and identify the critical path for the overall project.	4.4.5.3.2	
3.5.3.3.3	9	The preliminary PIP shall included required security accreditation documents as described in Section 9 of the Sow.	4.4.5.3.3	
3.5.3.4	Appendix D	Project Personnel. The Offeror shall provide a curriculum vitae for the personnel proposed for this project listed in Appendix D Key Personnel Requirements of the SoW (Book I Part IV). The Offeror shall provide a narrative describing the rationale for the selection of these individuals for these posts and provide detailed descriptions of the relevant experience of the individuals and security clearance information. This subsection shall also describe the authority and responsibility (and the limits) of the Project Manager within the overall corporate organisation, including the circumstances at which the Project Manager must refer decision making authority to the next level of Corporate	4.4.5.4	

Bidding Instructions Requirement Ref.	SOW Requirement Ref	REQUIREMENT DESCRIPTION	Evaluation Criterion Ref.	QUOTATION REFERENCE
		management.		
		<b>SECTION 2: ENGINEERING</b>		
3.5.4.1	2.1.2	The Offeror shall provide a draft System Design Plan (SDP), as detailed in Section 2.1 (WP1) of the SoW.	4.4.6.1.	
3.5.4.2	2.1.5.1	Offerors shall provide a draft High Level Design (HLD), as detailed Section 2.1.5.1 of the SOW. The HLD shall address all HLD requirements as detailed in the SOW. In addition that HLD shall:	4.4.6.2	
3.5.4.3		Provide an initial draft demonstrating an understanding of the design objective, constraints and the need to integrate PFE to the system design and in turn integrate the system with external PFE connectivity;	4.4.6.2.1	
3.5.4.4	2.1.5	<del>Provide an initial draft for system Low Level Design (LLD) on:</del>  <del>Access Node;</del> <del>Battalion Node;</del> <del>Company Communication Node;</del> <del>Transit Node;</del> <del>Rear Link Node;</del> <del>GAR-T Relay;</del> <del>Radio Access Point.</del> <del>NS Kit;</del> <del>Pooled Appliances;</del> <del>Describe the Offerors intent for Interface Control Documentation (ICD);</del>	4.4.6.2.2	
3.5.5	2.2, 2.6	Offerors shall provide an initial draft detailed description of how they intend to Build and Provide Production Units, as detailed in Section 2.2 (WP2) and Section 2.6 (WP6) of the SoW. The Offeror shall describe the full end to end processes they intend for:  <ul style="list-style-type: none"> <li>a. Batch #1 First Article Systems;</li> <li>b. Batch #2 and #3 (Option) Production Units.</li> </ul>	4.4.6.2.23	

Bidding Instructions Requirement Ref.	SOW Requirement Ref	REQUIREMENT DESCRIPTION	Evaluation Criterion Ref.	QUOTATION REFERENCE
		<b>SECTION 3: SUPPORTABILITY</b>		
3.5.6.1	4.1 – 4.12	Offeror shall provide a preliminary Integrated Product Support Plan (IPSP), as detailed in the SOW section 4.1 describing in detail each relevant content for each paragraph of the provided structure demonstrating the concept, understanding (who, what, when, where, how) and commitment of each activity. The preliminary IPSP shall include an annex with the traceability matrix to match coverage for all Integrated Product Support (IPS) requirements in the SOW section 4.1 to 4.12 vs relevant ISPS paragraphs. The preliminary IPSP shall be at least 20 pages and no more than 40 pages.	4.4.7.1	
3.5.6.2	4.1	Offeror shall provide a Product Support Case that shall support the IPSP and ISSP providing concise and precise answers to each requirement in one document. The Support Case shall be at least 40 pages and no more than 80 pages, and provide sufficient details for the following:	4.4.7.2	
3.5.6.2.1	4.2	Reliability Availability Maintainability Testability (RAMT) Case Report, as detailed in the SOW section 4.2 , describing in detail each relevant content for each paragraph of the provided structure;	4.4.7.2.1	
3.5.6.2.2	4.3	Failure Mode Effects and Criticality Analysis (FMECA), as detailed in the SOW section 4.3, describing in detail each relevant content for each paragraph of the provided structure;	4.4.7.2.2	
3.5.6.2.3	4.4	Maintenance Task Analysis (MTA), as detailed in the SOW section 4.4, describing in detail each relevant content for each paragraph of the provided structure;	4.4.7.2.3	

Bidding Instructions Requirement Ref.	SOW Requirement Ref	REQUIREMENT DESCRIPTION	Evaluation Criterion Ref.	QUOTATION REFERENCE
3.5.6.2.4	4.5	Level of Repair Analysis (LORA), as detailed in the SOW section 4.5, describing in detail each relevant content for each paragraph of the provided structure;	4.4.7.2.4	
3.5.6.2.5	4.6	Obsolescence Report, as detailed in the SOW section 4.6 , describing in detail each relevant content;	4.4.7.2.5	
3.5.6.2.6	4.11	Warranty Report, as detailed in the SOW section 4.11, describing in detail each relevant content;	4.4.7.2.6	
3.5.6.3	2.4.2	Offeror shall provide a preliminary Training Plan (TNRP), as detailed in the SOW section 2.4.2, describing in detail each relevant content for each paragraph of the provided structure (for both the TNRP and the Training Needs Analysis) demonstrating the concept, understanding (who, what, when, where, how) and commitment of each activity. The preliminary TNRP shall be at least 20 pages and no more than 40 pages.	4.4.7.3	
3.5.6.4	4.12	Offeror shall provide a preliminary In-Service Support Plan (ISSP), as detailed in the SOW section 4.12, describing in detail each relevant content for each paragraph of the provided structure demonstrating the concept, understanding (who, what, when, where, how) and commitment of each activity. The preliminary ISSP shall include an annex with a traceability matrix to match coverage for all Integrated Product Support (IPS) requirements in the SOW section 4.12 vs relevant ISSP paragraphs. The preliminary ISSP shall be at least 20 pages and no more than 40 pages.	4.4.7.4	
3.5.6.5	4.13	Offeror shall provide a preliminary System Safety Program Plan (SSPP), as detailed in the SOW	4.4.7.5	

Bidding Instructions Requirement Ref.	SOW Requirement Ref	REQUIREMENT DESCRIPTION	Evaluation Criterion Ref.	QUOTATION REFERENCE
3.5.6.6	6.1	<p>section 4.13, describing in detail each relevant content demonstrating the concept, understanding (who, what, when, where, how) and commitment of each activity. The preliminary ISSP shall be at least 10 pages and no more than 20 pages.</p> <p>Offeror shall provide a preliminary Configuration Management Plan (CMP) as detailed in the SOW Section 6.1 , describing in detail each relevant content so to demonstrate the concept, understanding (who, what, when, where, how) and commitment of each activity. The preliminary CMP shall include an annex with a traceability matrix to match coverage for all Configuration Management requirements in the SOW section 6 vs relevant CMP paragraphs. The preliminary CMP shall be at least 10 pages and no more than 20 pages.</p>	4.4.7.6	
3.5.6.7	7.4	<p>Offeror shall provide a preliminary Quality Assurance Plan (QAP) as detailed in SOW Section 7.4. The preliminary QAP shall include an annex with a traceability matrix to match coverage for all Quality Assurance and Control requirements in the SOW section 7 vs relevant QAP paragraphs. The preliminary QMP shall be at least 10 pages and no more than 20 pages.</p>	4.4.7.7	
		<b>SECTION 4: TESTING AND ACCEPTANCE</b>		
3.5.7	8	The Offeror shall in this section demonstrate how it can meet the TDCIS capability testing requirements and conducting all related activities. This includes the development of all test documentation required, the	4.4.8.1	

Bidding Instructions Requirement Ref.	SOW Requirement Ref	REQUIREMENT DESCRIPTION	Evaluation Criterion Ref.	QUOTATION REFERENCE
		conduct of all testing and the evaluation and documentation of the tests results as specified in Sections 8.2, 8.3, 8.5 and 8.6 of the SoW.		
	2.2	The Offerors approach to testing, its resourcing, its structure;	4.4.8.2	
	2.5	All test areas where testing shall be required during the delivery, in particular:	4.4.8.2.1	
	2.6	Quality First Articles Section 2.2 (WP2);	4.4.8.2.2	
	2.7	Conduct User Testing and PSA Section 2.5 (WP5);	4.4.8.2.3	
	10	Provide Production Units Section 2.6 (WP6)	4.4.8.2.4	
		Support Operational Test & Evaluation Section 2.7 (WP7);	4.4.8.2.5	
		System Acceptance as per Section 10 of the SOW.	4.4.8.2.6	
		<b>SECTION 5: SECURITY ACCREDITATION</b>		
3.5.8.1	9.4	The Offeror shall have provided a draft Security Accreditation Plan describing the steps to be taken to achieve security accreditation for TDCIS addressing all points under SEC-18 of SOW Section 9.4.	4.4.9.1	
3.5.8.2	9.5	The Offeror shall provide an initial draft design proposal to be used as basis for the initial CIS Description, containing the most important planned elements such as hardware typology, SW typology, data flows, general purpose/ functions, and initial system diagram(s) in accordance with SOW Section 9.5.	4.4.9.2	

Bidding Instructions Requirement Ref.	SOW Requirement Ref	REQUIREMENT DESCRIPTION	Evaluation Criterion Ref.	QUOTATION REFERENCE
		<b>SECTION 6: MANUFACTURERS DATASHEETS</b>		
3.5.9	2.1.2	The Offeror shall provide as part of the System Design Plan (SDP) under section 2.1.2 of the SoW, manufacturers datasheets for all equipment, demonstrating compliance with the requirements stated in the SRS, Annex A of the SoW.	4.4.10.1	



Schedule of Supplies and Services (COMMERCIAL)

RFQ-CO-115363-PRT-TDCIS  
Book II Part I

CLIN	Description	SOW Reference	Delivery Date (EDC +weeks)	Delivery Destination	Quantity	Unit of measure	Unit Price	Total Firm Fixed Price	Comments NCI Agency	Optional Comments (Mandatory for zero costs lines)
<b>CLIN 1 - PROJECT MANAGEMENT</b>										
1	Project Management Plan (PMP)	3	10	NCIA Brussels	1	Lot			All documentation delivery dates indicate date after the completion of the Purchaser review cycle and approval date.	
1.1	Project Management Plan (PMP)	3.1	10	NCIA Brussels	1	Lot				
1.2	Project Implementation Documentation									
1.2.1	Project Implementation Plan (PIP)	3.2.2	10	NCIA Brussels	1	Lot				
1.2.2	Product Breakdown Structure (PBS)	3.2.2	10	NCIA Brussels	1	Lot				
1.2.3	Project Work Breakdown Structure (PWBS)	3.2.2	10	NCIA Brussels	1	Lot				
1.2.4	Project Master Schedule (PMS)	3.2.2	10	NCIA Brussels	1	Lot				
1.2.5	Risk Management Plan (RMP)	3.2.2	10	NCIA Brussels	1	Lot				
1.2.6	Issue Management Plan (IMP)	3.2.2	10	NCIA Brussels	1	Lot				
1.3	Communication Plan									
1.3.1	Communication Plan (CP)	3.2.3	10	NCIA Brussels	1	Lot				
1.4	Configuration Management & Quality Assurance	3.6 & 7								
1.4.1	Configuration Management Plan (CMP)	6.1	10	NCIA Brussels	1	Lot			Draft delivery EDC+2weeks	
1.4.2	Physical Configuration Audit (PCA) Report	6.5.1	Multiple	NCIA Brussels	1	Lot			Before PSA, at each location	
1.4.3	Functional Configuration Audit (FCA) Report	6.5.2	80	NCIA Brussels	1	Lot			Between CDR and PSA	
1.4.4	Configuration Item Tree	6.2	21	NCIA Brussels	1	Lot			4 weeks before CDR. Draft delivery at PDR-4 weeks.	
1.4.5	Quality Assurance Plan (QAP)	7.2	10	NCIA Brussels	1	Lot				
1.4.6	CMS	6.6	FSA	NCIA Brussels	1	Lot			Draft at CDR-4 weeks / Final CDR+4 weeks	
1.4.7	Implement Collaborate Environment	3.6	6	NCIA Brussels	1	Lot			To be established 2 weeks after Reach laptop is provided by the Purchaser	
1.5	Conduct Project Review Meetings	3.3		NCIA Location					The collaborative environment is to remain fully operational until the project has achieved FSA	
1.5.1	Project Progress Reports	3.4	2 weeks before PPRM	NCIA Brussels	1	Lot			Based on a 6 weekly cycle	
1.5.2	Project Meetings	3.3	Multiple	NCIA Brussels	1	Lot			Multiple reports, 6 week cycle of meetings after KOM in support of the PPRMs and Ad-hoc meetings	
<b>TOTAL PRICE CLIN 1 (BASE-EVALUATED) PROJECT MANAGEMENT</b>										
<b>CLIN 2 - SYSTEM DESIGN</b>										
2	System Design Plan (SDP)	2.1.2	10	NCIA Brussels	1	Lot				
2.1	Configuration Capture (CCAP) Plan	2.1.3	3	NCIA Brussels	1	Lot				
2.2	Configuration Capture (CCAP) Report	2.1.3	12	NCIA Brussels	1	Lot			Draft CCAP report at T0+10 weeks	
2.3	System Requirements Review (SRR)	2.1.3	9	NCIA Brussels	1	Lot			The SRR shall be conducted parallel to the CCAP.	
2.3.1	Draft System Requirements Review Report (SRRR)	2.1.3	9	NCIA Brussels	1	Lot				
2.3.2	Final System Requirements Review Report (SRRR)	2.1.3	12	NCIA Brussels	1	Lot				
2.4	System Design Reviews	2.1								
2.4.1	Preliminary Design Review (PDR)	2.1.6							PDR Artefacts shall be submitted 2weeks before the PDR. To be updated 1 week after the PDR	
2.4.1.1	High Level Design (HLD)	2.1.5.1	14	NCIA Brussels	1	Lot				
2.4.1.2	Project Master Test Plan (PMTF)	2.1.5.1	14	NCIA Brussels	1	Lot				
2.4.1.3	Support Case	2.1.5.1	14	NCIA Brussels	1	Lot				
2.4.1.4	Final CCAP Report	2.1.5.1	14	NCIA Brussels	1	Lot				
2.4.1.5	Final SRR Report	2.1.5.1	14	NCIA Brussels	1	Lot				
2.4.1.6	Requirements Traceability Matrix (RTM)	2.1.5.1	14	NCIA Brussels	1	Lot				
2.4.1.7	CIS Description	2.3.2	14	NCIA Brussels	1	Lot			Initial version (final version to be submitted for CDR)	
2.4.1.8	Security Risk Assessment (SRA)	2.3.2	14	NCIA Brussels	1	Lot			Initial version (final version to be submitted for CDR)	
2.4.1.9	System Specific Security Requirement Statement (SSRS)	2.3.2	14	NCIA Brussels	1	Lot			Initial version (final version to be submitted for CDR)	
2.4.1.10	Project Management Plan (PMP)	3.2.1	10	NCIA Brussels	1	Lot			PMP needs to be approved for successful completion of PDR	
2.4.1.11	Configuration Management Plan (CMP)	6.1	10	NCIA Brussels	1	Lot			CMP needs to be approved for successful completion of PDR	
2.4.1.12	Quality Assurance Plan (QAP)	7.2	10	NCIA Brussels	1	Lot			QAP needs to be approved for successful completion of PDR	
2.4.2	Critical Design Review	2.1.6							CDR Artefacts shall be submitted 2 weeks before the CDR. To be updated 1 week after the CDR.	
2.4.2.1	Low Level Design Document (LLD)	2.1.5.2	28	NCIA Brussels	1	Lot				
2.4.2.2	Requirements Traceability Matrix (RTM)	2.1.5.2	28	NCIA Brussels	1	Lot				
2.4.2.3	Verification Cross Reference Matrix (VCRM)	2.1.5.2	28	NCIA Brussels	1	Lot				
2.4.2.4	Test Plan (for each Test Phase)	2.1.5.2	Multiple	NCIA Brussels	1	Lot			First version for CDR	
2.4.2.5	Testing Scenarios	2.2	28	NCIA Brussels	1	Lot				
2.4.2.6	CIS Description	2.3.2 80.5	28	NCIA Brussels	1	Lot				
2.4.2.7	Security Risk Assessment (SRA)	2.3.280.6	28	NCIA Brussels	1	Lot				
2.4.2.8	System Specific Security Requirement Statement (SSRS)	2.3.280.7	28	NCIA Brussels	1	Lot				
2.4.2.9	Deployment Scenario	4.9.1.2	28	NCIA Brussels	1	Lot				
2.4.3	Baselines	6.2.2								
2.4.3.1	TDCIS Functional Baseline (FBL)	6.2.2.1	9	NCIA Brussels	1	Lot			Draft at SRR-4 weeks / Final SRR+4 weeks	
2.4.3.2	TDCIS Allocated Baseline (ABL)	6.2.2.2	29	NCIA Brussels	1	Lot			Draft at PDR-4 weeks / Final CDR-4 weeks	
2.4.3.3	TDCIS Product Baseline (PBL)	6.2.2.3	Multiple	NCIA Brussels	1	Lot			Draft at CDR+4 weeks / Final FAT+4 weeks	
2.4.3.4	TDCIS Operational Baseline (OBL)	6.2.2.4	142	NCIA Brussels	1	Lot			Draft at FSA-4weeks / Final at FSA+4 weeks	
<b>TOTAL PRICE CLIN 2 (BASE-EVALUATED) SYSTEM DESIGN</b>										
<b>CLIN 3 - BATCH #1</b>										
3	First Articles - Hardware, Software & non-CIS (BATCH #1)	2.2	66	System Build Facility, Portugal	1	Lot				
3.1	Build First Articles	2.2.3	74	System Build Facility, Portugal	1	Lot				
3.2	Conduct Factory Acceptance Testing (FAT)	2.2								
3.3	Conduct Qualification Testing	2.2.4	79	System Build Facility, Portugal	1	Lot			This is the finalization date of the test	
3.3.1	Conduct Qualification Testing	2.2.4	79	System Build Facility, Portugal	1	Lot				
3.3.2	Conduct Factory Acceptance Testing (FAT)	2.2.5	82	System Build Facility, Portugal	1	Lot			Material is captured under CLIN 3.1 (BATCH #1 tab). This is the finalization date of the test	
3.3.3	Ship First Articles	2.2.6	84	Customer Facility	1	Lot				
3.3.4	FAT Batch#1	2.2.5	96	System Build Facility, Portugal	1	Lot			Material is captured under CLIN 3.1 (BATCH #1 tab). This is the finalization date of the test	
3.3.5	Ship Batch#1 Units	2.2.6	98	Customer Facility	1	Lot				
<b>TOTAL PRICE CLIN 3 (BASE-EVALUATED) FIRST ARTICLES</b>										
<b>CLIN 4 - SECURITY ACCREDITATION DOCUMENTATION</b>										
4	Security Accreditation Plan (SAP)	2.3	6	NCIA Brussels	1	lot				
4.1	Security Accreditation Plan (SAP)	2.3	6	NCIA Brussels	1	lot				
4.2	Security Related Documentation (SRD)	2.3								
4.2.1	CIS Description	2.3	14	NCIA Brussels	1	Lot			To align with PDR / CDR - Please see 2.4	
4.2.2	Security Risk Assessment (SRA)	2.3	14	NCIA Brussels	1	Lot			To align with PDR / CDR - Please see 2.4	
4.2.3	System Specific Security Requirement Statement (SSRS)	2.3	14	NCIA Brussels	1	Lot			To align with PDR / CDR - Please see 2.4	
4.2.4	Generic System Interconnection Security Requirement Statement (SISRS)	2.3	39	NCIA Brussels	1	Lot				
4.2.5	Security Operating Procedures (SecOps)	2.3	39	NCIA Brussels	1	Lot				
4.2.6	Security Test and Verification Plan (STVP)	2.3	Multiple	NCIA Brussels	1	Lot			STVP shall be aligned with the IV&V planning	
4.2.7	Security Test and Verification Report (STVR)	2.3	Multiple	NCIA Brussels	1	Lot			There are multiple STV testing and hence report throughout the project	
4.2.8	Electronic Security Environment (ESE) Conformance Statement (ESECS)	2.3	Multiple	NCIA Brussels	1	Lot			4 weeks before Security Tests	
<b>TOTAL PRICE CLIN 4 (BASE-EVALUATED) SECURITY ACCREDITATION DOCUMENTATION</b>										
<b>CLIN 5 - CONDUCT INDEPENDENT VERIFICATION AND VALIDATION ASSESSMENT AND PROVISIONAL SYSTEMS ACCEPTANCE (PSA)</b>										
5	User Testing Site Survey Report	2.5.1	38	Customer Facility	1	Lot			2 weeks after Site surveys	
5.1	User Testing Site Survey Report	2.5.1	38	Customer Facility	1	Lot				
5.2	Provide Release Package	2.5.2	88	NCIA Brussels	1	lot				
5.3	Install First Articles for IV&V Assessment	2.5.3	100	System Build Facility, Portugal	1	lot				
5.4	Conduct System Integration Testing (SIT)	2.5.4	100	Customer Facility	1	lot				
5.5	Conduct Security Testing	2.5.5	102	Customer Facility	1	lot				
5.6	Security Test and Verification Report (STVR)	2.5.5	103	Customer Facility	1	lot				
5.7	Conduct User Acceptance Testing (UAT)	2.5.6	105	Customer Facility	1	lot				

5.8	System Acceptance Testing	2.5.8	108	Customer Facility	1	Lot				
5.9	First Article PBL (CI-tree, Inventory, technical documentation, manuals, as-built)	2.4.7	108	Customer Facility	1	Lot				
<b>TOTAL PRICE CLIN 5 (BASE-EVALUATED) CONDUCT INDEPENDENT VERIFICATION AND PSA</b>										
6	<b>CLIN 6 - PROVIDE &amp; SHIP PRODUCTION UNITS (BATCH #2)</b>									
6.1	Provide & Ship Production Units (Batch #2)	2.6		Customer facility						
6.1.1	Batch #2 Hardware, Software & Non-CIS	2.6	69	Contractor's Factory	1	Lot				
6.1.2	Install and configure at the Factory	2.6.1	105	System Build Facility, Portugal	1	Lot				
6.1.3	Conduct Factory Testing (FAT) (Batch #2)	2.6.2	120	System Build Facility, Portugal	1	Lot				
6.1.4	Provide System Documentation	2.6.3	120	NCIA Brussels	1	Lot				
6.1.5	Ship Production Units (Batch #2)	2.5.4	121	Customer Site	1	Lot				
<b>TOTAL PRICE CLIN 6 (BASE-EVALUATED) PROVIDE PRODUCTION UNITS</b>										
7	<b>CLIN 7 - TRAINING</b>									
7.1	Training Plan (TP)	4	24	NCIA Brussels	1	Lot				Draft at CDR-4 weeks / Final Draft at CDR+8 weeks / Final PSA-4 weeks
7.2	Training Need Analysis (TNA)	4.1								
7.2.1	Training Need Analysis (TNA) Report	4.10.1	17	NCIA Brussels	1	Lot				
7.2.2	Training Equipment Documentation and PBL (CI-tree, Inventory, technical documentation, manuals, as-built)	4.1	67	NCIA Brussels	1	Lot				Dependency on successful IV&V Assessment Batch #1
7.3	Install and Validate Training Units	2.7								
7.3.1	Site Survey Report (Training location)	2.7.2	30	NCIA Brussels	1	Lot				
7.3.2	Ship Production units (Batch #1 - Training) - Customer Training Location	2.7.3	98	Training location, Portugal	1	Lot				Follow ILS procedures.
7.3.3	Training Equipment Installation & Validation	2.7.3.3 & 2.7.3.4	100	Training location, Portugal	1	Lot				
7.4	Developed Training material approved	2.7.4	65	NCIA Brussels	1	Lot				
7.5	Train the IV&V Personnel	2.7.5	76	Training location, Portugal	1	Lot				
7.6	Provide Training Courses & Training Evaluation	2.7.5	92	Training location, Portugal	1	Lot				Completion is at week 1st Article Test+8 weeks.
<b>TOTAL PRICE CLIN 7 ( BASE-EVALUATED) TRAINING</b>										
8	<b>CLIN 8 - SUPPORT SYSTEM ACCEPTANCE</b>									
8.1	Support Provisional System Acceptance									
8.1.1	Deficiency Log	6.7	108	NCIA Brussels	1	Lot				To be started at First Article Testing up to PSA is achieved.
8.1.2	PSA Report	8.1	110	NCIA Brussels	1	Lot				PSA report 4 weeks before PSA Review Meeting
8.1.3	PSA Review Meeting Minutes	8.1	114	NCIA Brussels	1	Lot				
8.2	Support Operational Testing Evaluation Testing (OptEval)	2.8								
8.2.1	Perform Service Provisioning (SRTS)	2.8	95	OpEval location	1	Lot				Dependency on achievement of PSA
8.2.2	Perform System Installation and Configuration	2.8	138	OpEval location	1	Lot				
8.2.3	Maintain log book of events relevant to acceptance	2.8	138	NCIA Brussels	1	Lot				
8.3	Support Final System Acceptance	2.8 & 8.2	138							
8.3.1	OpEval Execution	2.8 & 8.2								
8.3.1.1	Maintain functional and performance of the TDCIS system	2.8	138	OpEval location	1	Lot				Lot. from once operational to completion of the OptEval
8.3.1.2	Maintain TDCIS system during OptEval	2.8	138	OpEval location	1	Lot				Lot. Fix any deficiencies within SRS scope
8.3.1.3	OpEval Hands-on Training (repetition)	2.8	138	OpEval location	1	Lot				Lot. 2 week training during OPT EVAL
8.3.2	PSA Report	8.2	140	NCIA Brussels	1	Lot				
8.3.3	PSA Observations Meeting Report	8.2	142	NCIA Brussels	1	Lot				
<b>TOTAL PRICE CLIN 8 (BASE-EVALUATED) SUPPORT SYSTEM ACCEPTANCE</b>										
9	<b>CLIN 9 - INTEGRATED PRODUCT SUPPORT (IPS)</b>									
9.1	Integrated Product Support Plan (IPSP)	4		NCIA Brussels	1	Lot				Draft at EDC+2 weeks / Final Draft at PDR-4 weeks / Final at CDR+4 weeks
9.2	Reliability, Availability, Maintainability and Testability (RAMT) Case	4		NCIA Brussels	1	Lot				Draft at SRR-4 weeks / Final Draft at PDR -4 weeks / Final at CDR-4 weeks / Test&Demo at PSA
9.3	Failure Mode Effects and Criticality Analysis (FMECA)	4		NCIA Brussels	1	Lot				Draft at SRR-4 weeks / Final Draft at CDR-4 weeks / Final at FAT+4 weeks
9.4	Maintenance Task Analysis (MTA) [incl. Product Support Database]	4		NCIA Brussels	1	Lot				Draft at PDR-4 weeks / Final Draft at CDR-4 weeks / Final at FAT+4 weeks
9.5	Level of Repair Analysis (LORA) [incl. Repair Price List (RPL)]	4		NCIA Brussels	1	Lot				Draft at PDR-4 weeks / Final Draft at CDR-4 weeks / Final at FAT+4 weeks
9.6	Packaging, Handling, Storage and Transportation (PHST) Report	4		NCIA Brussels	1	Lot				Draft at CDR-4 weeks / Final at FAT+4 weeks
9.7	Initial Provisioning List (IPL)	4		NCIA Brussels	1	Lot				Draft at CDR-4 weeks / Final at FAT+4 weeks
9.8	Obsolescence Report	4		NCIA Brussels	1	Lot				Draft at CDR-4 weeks / Final Draft at FAT-8 weeks / Quarterly (1st delivery at PSA+ 3 months)
9.9	Warranty Report	4		NCIA Brussels	1	Lot				Draft FAS-6 months / Quarterly (1st delivery at FSA+3 months)
9.10	Operation Manual	4		NCIA Brussels	1	Lot				Draft CDR-4 weeks / Final FAT+4 weeks
9.11	Maintenance Manuals	4		NCIA Brussels	1	Lot				Draft CDR-4 weeks / Final FA+4 weeks
9.12	In Service Support Plan (ISSP)	4		NCIA Brussels	1	Lot				Draft FSA - 6 months / Final FSA+6 months
9.13	Warranty (Batch #1 and Batch #2)	4	FSA + 2 years	Multiple Locations	1	Lot				Starts at PSA and Ends at FSA+2 years
9.14	Spare Set	4	106	Customer Site	1	Lot				Starts at PSA and Ends at FSA+2 years
9.15	System Safety	4		NCIA Brussels	1	Lot				PSA - 4 weeks
9.15.1	System Safety Programme Plan (SSPP)	4.5.5	7	NCIA Brussels	1	Lot				Draft at EDC+ 2 weeks
9.15.2	System Safety Hazard Analysis Report (SSHAR)	4.5.5	17	NCIA Brussels	1	Lot				To be provided CDR-4 weeks for review
9.16	Load Plan and tool	4.1.2	67	NCIA Brussels	1	Lot				To be apart of the training Draft at +40 weeks to start the review cycle
<b>TOTAL PRICE CLIN 9 (BASE-EVALUATED) INTEGRATED PRODUCT SUPPORT (IPS)</b>										
Total Firm Fixed Price-Base Contract										
<b>EVALUATED OPTIONS</b>										
CLIN	Description	SOW Reference	Delivery Date (EDC +weeks)	Delivery Destination	Quantity	Unit of measure	Unit Price	Total Firm Fixed Price	Comments NCI Agency	
Declare Currency =>										
10	CLIN 10 - BATCH #3 UNITS									
10.1	Batch # 3 - Hardware, Software & Non-CIS	1.11.1	TBD	TBD	1	Lot				
10.2	Implementation	1.11.1	TBD	TBD	1	Lot				
10.3	Batch # 3 - Warranty	1.11.1	TBD	TBD	1	Lot				
10.4	Batch # 3 - Spare Set	1.11.1	TBD	TBD	1	Lot				
<b>TOTAL PRICE CLIN 10 (OPTION EVALUATED)</b>										
<b>NON EVALUATED OPTIONS</b>										
CLIN	Description	SOW Reference	Delivery Date (EDC +weeks)	Delivery Destination	Quantity	Unit of measure	Unit Price	Total Firm Fixed Price	Comments NCI Agency	
Declare Currency =>										
11	CLIN 11 - IN-SERVICE SUPPORT EXTENSION									
11.1	In Service Support	1.11.2	TBD	TBD	1	Lot				
11.2	Implementation	1.11.2	TBD	TBD	1	Lot				
<b>TOTAL PRICE CLIN 11 (OPTION NON-EVALUATED) IN SERVICE SUPPORT EXTENSION</b>										
Total Firm Fixed Price- Base Contract										
Total Firm Fixed Price - Base Contract + Evaluated Options										
Total Firm Fixed Price - Base Contract + Evaluated Options + Non-Evaluated Options										



**Tactical Deployable Communications and Information  
Systems (TDCIS) for the Portuguese Army**

**RFQ-CO-115363-PRT-TDCIS**

**BOOK II – PART II**

**CONTRACT SPECIAL PROVISIONS**

**Amendment 10**

NATO UNCLASSIFIED

RFQ-CO-115363-PRT-TDCIS  
Book II – Part II Contract Special Provisions

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NATO UNCLASSIFIED

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**1. ALTERATIONS, MODIFICATIONS AND DELETIONS OF THE BOA/ GENERAL AND SPECIAL PROVISIONS**

- 1.1. Clause 7 “Participating Countries” supplements Clause 9 “Participating Countries” of the NCI Agency Contract General Provisions.
- 1.2. Clause 9 “Inspection and Acceptance” augments Clause 21 “Inspection and Acceptance” of the NCI Agency Contract General Provisions.
- 1.3. Clause 11 “Pricing of Changes, Modifications, Follow-on Contracts and Claims” augments Clause 19 “Pricing of Changes, Amendments and Claims” of the NCI Agency Contract General Provisions.
- 1.4. Clause 12 “Invoices and Payment” augments Clause 25 “Invoices and Payment” of the NCI Agency Contract General Provisions.
- 1.5. Clause 13 “Liquidated Damages” replaces Clause 38 “Liquidated Damages” of the NCI Agency Contract General Provisions.
- 1.6. Clause 15 “Security” augments Clause 11 “Security” of the NCI Agency Contract General Provisions.
- 1.7. Clause 22 “Warranty” augments Clause 27 “Warranty of Work (Exclusive of Software)” and Clause 30 “Software Warranty” of the NCI Agency Contract General Provisions.
- 1.8. Clause 29 “Intellectual Property” augments Clause 30 “Intellectual Property” of the NCI Agency Contract General Provisions.
- 1.9. Clause 30 “Intellectual Property Right, Indemnity and Royalties” augments Clause 29 “Patent and Copyright Indemnity” of the NCI Agency General Provisions.
- 1.10. Clause 34 “Permits and Responsibilities” supplements Clause 5 “Language” and Clause 6 “Authorisation to Perform/Conformance to National Laws and Regulations”.
- 1.11. Clause 9 “Inspection and Acceptance” augments Clause 7 “Inspection, Acceptance, and Rejection” of the Basic Ordering Agreement General Provisions.
- 1.12. Clause 12 “Invoices and Payment” augments Clause 8 of the Basic Ordering Agreement Special Provisions.
- 1.13. Clause 14 “Supplemental Agreements(s), Documents and Permissions” augments Clause 9 of the Basic Ordering Agreement Special Provisions.
- 1.14. Clause 15 “Security” augments Clause 27 “Security” of the Basic Ordering Agreement General Provisions.
- 1.15. Clause 22 “Warranty” augments Clause 7 “Warranty” of the Basic Ordering Agreement Special Provisions.
- 1.16. Clause 30 “INDEMNITY” augments Clause 4 of the Basic Ordering Agreement General Provisions.
- 1.17. Clause 40 “FORCE MAJEURE” augments Clause 30 “FORCE MAJEURE” of the Basic Ordering Agreement General Provisions.

## **2. ORDER OF PRECEDENCE**

- 2.1. In the event of any inconsistency in this Contract, the inconsistency shall be resolved by giving precedence in the following order:
  - a. Signature sheet
  - b. Part I - The Schedule of Supplies and Services (SSS)
  - c. Part II - The Contract Special Provisions (SP)
  - d. Part III – The Terms of the governing Basic Ordering Agreement/General Provisions as specified in Block 11 of the Signature Sheet.
  - e. Part IV – The Statement of Work (SOW) and SOW Annexes

## **3. TYPE OF CONTRACT**

- 3.1. This is a Firm Fixed Price Contract established for the supplies and services defined in Part I - Schedule of Supplies and Services and Part IV – Statement of Work.
- 3.2. The Purchaser assumes no liability for costs incurred by the Contractor in excess of the stated Firm Fixed Price except as provided under other provisions of this Contract.
- 3.3. The Total Contract price is inclusive of all expenses related to the performance of the present contract.

## **4. SCOPE OF WORK**

- 4.1. TDCIS will comprise a range of Shelters and Trailers based Node types and a NATO Secret (NS) Kit configured for a specific Mission deployment.
- 4.2. The Shelters are mounted on all-terrain vehicles that can be located in the operational scenario as per the mission requirements.
- 4.3. Missions may use both Shelters and Trailers, some will use two Shelters, others a single Shelter.
- 4.4. The trailers can be used independently as a Communication rebroadcast facility. In addition, to the Shelters there are also specialist Trailers, these too are Mission specific but their usage and variability is less complex than the Shelter.
- 4.5. The TDCIS does not include a dedicated Test and Reference Environment.
- 4.6. The TDCIS does not include a dedicated Training Environment.
- 4.7. The project will be executed in six phases, spanning from the Effective Date of Contract (EDC) to two (2) years following the declaration of FSA.
- 4.8. As a guide, the Purchaser has developed a Plan On A Page (POAP) that shall be used by the Contractor to understand the requirement.
- 4.9. The POAP has 6 Phases with supporting enablers that comprise the following:



- 4.9.1. **Phase 1** – System Design. This phase firmly sets the scene for the whole delivery, it shall conclude with a Preliminary Design Review (PDR) that sets expectation levels on the delivery lifecycle. This is the strategy phase with some of the CDRLs delivered as ‘Presentational’ with some information back up.
- 4.9.2. **Phase 2** – System Development. This phase develops the PDR baseline further and places a number of key blueprint designs. It also offers the Contractor an opportunity to mature their individual strategies into firm baselined plans. This phase concludes with a Key Milestone CDR.
- 4.9.3. **Phase 3** – Batch 1 Build. This phase focusses on the manufacture of the Batch 1 nodes. The Phase consists of 5-tranches of build and concludes with a full batch 1 Factory Acceptance Systems Test (FAST).
- 4.9.4. **Phase 4** – Deliver Training, Conduct UAT(E ) and PSA. The Contractor shall be responsible for the execution of this entire phase, including the conducting of Training and UAT(E) at the Customer’s establishment. UAT(E) shall comprise of System and Interoperability Testing when the system’s integration and compliance with NATO Federated Mission Network, Spiral 3 , is to be evidenced.
- 4.9.5. **Phase 5** – Support OpTEVal, and Build Batches 2 & 3 (Batch 3 is an Option). Following successful completion of the PSA, the OpTEVal exercise plus production of Batches 2 & 3 are to be carried out concurrently. The Contractor shall provide consultancy type support to the TDCIS acceptance activity performed by the Customer during OpTEVal. Batches 2 and 3 shall be manufactured with a Factory Acceptance Test (FAT) carried out before delivery to the Customer Site.
- 4.9.6. **Phase 6** – Achieve FSA. This Phase finalises the Project delivery. The phase will conclude when the Contractor and the Purchaser conclude their FSA Report. Contractor Warranty shall commence on successful completion of the FSA, and shall last for a period of 2 consecutive years.
- 4.10. The TDCIS design shall cover the full scope of the TDCIS systems.
- 4.11. This design documentation shall separately identify the design for the operational (production) and training systems.
- 4.12. The scope of the design shall encompass all the components needed to achieve the capability, including:
- 4.13. CIS Hardware;
- 4.14. Software and licensing;
- 4.15. Tooling to manage and support the TDCIS;
- 4.16. Non-CIS hardware (e.g. transit cases, tents, etc.).
- 4.17. The design shall strictly follow the structure in which requirements are formulated in Book II Part IV, Annex A (SRS).

- 4.18. The implementation of the TDCIS consists of the assembly, connection, integration and configuration of Commercial of The Shelf (COTS) components, into bespoke systems that are fit for purpose of meeting the Purchaser's requirements and used in support of National and NATO expeditionary operations.
- 4.19. This Contract encompasses procurement, design, manufacturing, delivery of equipment, installation, integration, testing, acceptance and IPS support as defined in the Statement of Work (SOW) of the Contract and Annexes.
- 4.20. The Contractor shall provide the supplies and services indicated in the Schedule of Supplies and Services (SSS) and further described in the SOW and Annexes, and perform the work described in the SOW and Annexes for the implementation of the above stated project.
- 4.21. Portugal is the Host Nation for this project and has the overall financial authority. The NCI Agency has been authorised to act as a Procurement Agent on behalf of the Host Nation and is vested with the acquisition authority.
- 4.22. The definition of "Purchaser" for the purposes of this Contract is therefore modified from the definition of Contract General Provisions Clause 2 "Definitions of Terms and Acronyms" to "NATO C&I Organisation, as represented by the General Manager, NCI Agency, acting on behalf of the Host Nation Portugal. The Purchaser is the legal entity who awards and administers the Contract and stands as one of the Contracting Parties. The definition of Purchaser encompasses any legal successor to the NATO C&I Organisation and its designated representative, as may be agreed by the NATO member Nations."

## **5. PLACE AND TERMS OF DELIVERY**

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

## **6. COMPREHENSION OF CONTRACT AND SPECIFICATIONS**

- 6.1. The Contractor warrants that he has read, understood and agreed to each and all terms, clauses, specifications and conditions specified in the Contract and that this signature of the Contract is an acceptance, without reservations, of the said Contract terms within their normal and common meaning.
- 6.2. The specifications set forth the performance requirements for the Contractor's proposed work as called for under this Contract. Accordingly, notwithstanding any conflict or inconsistency which hereafter may be found between achievement of the aforesaid performance requirements and adherence to the Contractor's proposed design for the work, the Contractor hereby warrants that the work to be delivered will meet or exceed the performance requirements of the said specifications.
- 6.3. The Contractor hereby acknowledges that he has no right to assert against the Purchaser, its officers, agents or employees, any claims or demands with respect

to the aforesaid specifications as are in effect on the date of award of this Contract.

- 6.4. Based upon impossibility of performance, defective, inaccurate, impracticable, insufficient or invalid specifications, implied warranties of suitability of such specifications, or
- 6.5. Otherwise derived from the aforesaid specifications, and hereby waives any claims or demands so based or derived as might otherwise arise.
- 6.6. Notwithstanding the “Changes” clause or any other clause of the Contract, the Contractor hereby agrees that no changes to the aforesaid specifications which may be necessary to permit achievement of the performance requirements specified herein for the Contractor’s proposed work shall entitle the Contractor either to any increase in the firm fixed price as set forth in this Contract or to any extension of the delivery times for the work beyond the period of performance in the Schedule of Supplies and Services.

## **7. PARTICIPATING COUNTRIES**

- 7.1. This Clause supplements Clause 9 (Participating Countries) of the Contract General Provisions.
- 7.2. Participating countries are as follows NATO nations in ALBANIA, BELGIUM, BULGARIA, CANADA, CROATIA, THE CZECH REPUBLIC, DENMARK, ESTONIA, FRANCE, GERMANY, GREECE, HUNGARY, ICELAND, ITALY, LATVIA, LITHUANIA, LUXEMBOURG, MONTENEGRO, THE NETHERLANDS, NORTH MACEDONIA, NORWAY, POLAND, PORTUGAL, REPUBLIC OF TÜRKIYE, ROMANIA, SLOVAKIA, SLOVENIA, SPAIN, THE UNITED KINGDOM and THE UNITED STATES.

## **8. TRANSPORTATION OF EQUIPMENT**

- 8.1. All supplies covered under this Contract, including Purchaser Furnished Equipment (PFE), once handed over to the Contractor, and items shipped under warranty for repair or otherwise, shall be transported to and from all destinations at the responsibility of the Contractor. The Purchaser shall not be liable for any storage, damage, accessorial or any other charges involved in such transporting of supplies.

## **9. INSPECTION AND ACCEPTANCE**

- 9.1. This Clause augments Clause 21 “Inspection and Acceptance” of the Contract General Provisions.
- 9.2. The supplies and services to be provided by the Contractor’s personnel under this Contract shall conform to the highest professional and industry standards and practices. Inspection of the services provided will be made by the Purchaser’s Technical representatives or another authorised designee in accordance with the specifications in Part IV - Statement of Work. Services performed by the Contractor which do not conform to the highest professional and industry standards may result in the Purchaser requesting that such work be performed again at no increase in the price of the contract. Repeated instances

of work performed which fails to meet the standards and practices may result in termination of the Contract for Default.

- 9.3. The Purchaser and Host Nation reserves the right to charge to the Contractor any additional cost incurred by the Purchaser for inspection and test when Work is not ready at the time such inspection and test is requested by the Contractor or when re-inspection or retest is necessitated by prior rejection.
- 9.4. Purchaser review and acceptance procedures specific to contract documentation to be submitted by the Contractor as described in Part IV, Statement of Work.
- 9.5. Under the terms of this Contract, Acceptance will be made in three (3) steps:
  - 9.5.1. Step 1: System Design, Development and Factory Acceptance Test (FAT) phase;
  - 9.5.2. Step 2: System Acceptance Test (SAT) Report phase;
  - 9.5.3. Step 3: Final System Acceptance (FSA) phase at which time the Purchaser will take Title and Warranty will commence.

## **10. CONTRACTOR'S RESPONSIBILITY**

- 10.1. The Contractor shall monitor changes and/or upgrades to commercial off the shelf (COTS) software or hardware to be utilized under subject Contract.
- 10.2. For COTS items which are or could be impacted by obsolescence issues, as changes in technology occur, the Contractor will propose substitution of new products/items for inclusion in this Contract. The proposed items should provide at least equivalent performance and/or lower life-cycle support costs, or enhanced performance without a price or cost increase.
- 10.3. The Contractor will provide evidence with respect to price and performance of the equipment being proposed as well as data proving an improvement in performance and/or a reduction in price and/or life-cycle support costs. If necessary for evaluation by the Purchaser, the Contractor shall provide a demonstration of the proposed items. Should the Purchaser decide that the proposed item(s) should be included in the Contract, an equitable price adjustment will be negotiated and the proposed item(s) shall be added to the Contract by bilateral modification under the authority of this Article.
- 10.4. The Contractor shall notify the Purchaser of any proposed changes in the commercial off the shelf software or hardware to be utilized. Such notification shall provide an assessment of the changes and the impact to any other items to be delivered under this Contract.

## **11. PRICING OF CHANGES, MODIFICATIONS, FOLLOW-ON CONTRACTS AND CLAIMS**

- 11.1. This clause augments Clause 19 "Pricing of Changes, Amendments and Claims" of the NCI Agency Contract General Provisions.

- 11.2. The Purchaser may at any time, by written order designated or indicated to be a change order, and without notice to the sureties, if any, make changes within the scope of any Contract or Task Order, in accordance with Clause 16 (Changes) of the Contract General Provisions.
- 11.3. Changes, modifications, follow-on Contracts of any nature, and claims shall be priced in accordance with Clause 19 (Pricing of Changes, Amendments and Claims) of the Contract General Provisions, and with the "Purchaser's Pricing Principles" as set out in the Annex 1 to the Contract General Provisions.
- 11.4. Except otherwise provided for in this Contract, prices quoted for the above-mentioned changes, modifications, etc. shall have a minimum validity period of twelve (12) months from the date of purchaser acceptance of proposal.

**12. INVOICES AND PAYMENTS**

- 12.1. This Clause augments Clause 25 of the Contract General Provisions.
- 12.2. Following Purchaser acceptance, in writing, payment for supplies and services furnished shall be made in the currency specified for the relevant portion of the Contract.
- 12.3. The term of the Contract may not be exceeded without prior approval of the Purchaser. In no case will the Purchaser make payment above the total of the corresponding CLINs.
- 12.4. No payment will be made if CLIN items agreed for delivery before milestones are not complete as described in bidding sheets, SSS and SoW.
- 12.5. No payment shall be made with respect to undelivered supplies; works not performed, services not rendered and/or incorrectly submitted invoices.
- 12.6. No payment will be made for additional items delivered that are not specified in the contractual document.
- 12.7. The invoice amount shall be exclusive of VAT and exclusive of all Taxes and Duties as per Clause 26 (Taxes and Duties) of the Contract General Provisions.
- 12.8. CLINs will be paid as below based on Purchaser milestone approval in writing.
- 12.9. The Contractor shall be entitled to submit invoices as follows:

Mile-stone #	Description	CLIN	Percentage of contract	Delivery NLT (Not Later Than)
1	Project Implementation Plan (PIP)	Purchaser Acceptance/Approval of CLIN 1.2.	5%	EDC + 10
2	Approval of Preliminary Design Review (PDR)	Purchaser Acceptance/Approval of CLIN 2.4.1 (PDR)	5%	EDC + 14

3	Delivery/Acceptance of Critical Design Review (CDR)	Purchaser Acceptance/ Approval of CLIN 2.4.2 (CDR)	10%	EDC + 28
4	Developed Training material approved	Purchaser acceptance/approval CLIN 6.4, training materials	5%	EDC + 65
5	Purchaser Acceptance of First Article Testing (FAAT)	Purchaser Acceptance/Approval CLIN 3.3.2, Conduct First Article Acceptance Testing (FAAT) WP2	15%	EDC + 84
6	Delivery and Purchaser Acceptance of Batch 1 Equipment	Purchaser Acceptance/Approval CLIN 3.3.5 Ship Productions Units (Batch 1)	15%	EDC + 98
7	Delivery and Purchaser Acceptance of Batch 2 Equipment	Purchaser Acceptance/Approval CLIN 6.1.4 Ship Productions Units (Batch 2)	15%	EDC + 121
8	Provisional System Acceptance	Purchaser Acceptance/Approval CLIN 8.1.3 Support Provisional System Acceptance	10%	EDC + 114
9	Full System Acceptance	Purchaser Acceptance/Approval CLIN 8.3.3	15%	EDC + 142
10	End of Warranty	Contractor fulfilment of Warranty through to FSA + 24 Months  CLIN 9.13	5%	EDC + 246

12.10. Evidence of the acceptance by the Purchaser shall be attached to all invoices.

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

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

12.12.1. Contract number CO-115363-PRT-TDCIS

- 12.12.2. Purchase Order number (TBD at Contract Award)
- 12.12.3. Contract Amendment number (if any)
- 12.12.4. Contract Line Item(s) (CLIN) as they are defined in the priced Schedule of Supplies and Services.
- 12.12.5. Bank Account details for International wire transfers
- 12.13. The invoice shall contain the following certificate:

“I certify that the above invoice is true and correct, that the delivery of the above described items has been duly effected and/or that the above mentioned services have been rendered and the payment therefore has not been received”. The certificate shall be signed by a duly authorised company official on the designated original.”

- 12.14. Invoices referencing “CO-115363-PRT-TDCIS/ PO (TBD at Contract Award)” shall be submitted in electronic format to:

AccountsPayable@ncia.nato.int

- 12.15. An Electronic copy shall be sent to the Contracting Officer, at the email address specified in the clause “Contract Administration”.
- 12.16. NCI Agency will make payment within 45 days of receipt by NCI Agency of a properly prepared and documented invoice.

### **13. LIQUIDATED DAMAGES**

- 13.1. This Clause replaces Clause 38 (Liquidated Damages) of the Contract General Provisions.
- 13.2. If the Contractor fails to:
  - 13.2.1. meet the delivery schedule of the Deliverables or any specified major performance milestones or required performance dates specified in the Schedule of Supplies and Services to this Contract, or any extension thereof, or
  - 13.2.2. deliver and obtain acceptance of the Deliverables or to acceptably perform the services as specified in the Schedule of Supplies and Services to this Contract, the actual damage to the Purchaser for the delay will be difficult or impossible to determine. Therefore, in lieu of actual damages the Contractor shall pay to the Purchaser, for each day of delinquency in achieving the deadline or milestone, fixed and agreed liquidated damages of 0.1% (one tenth of one per cent) per day of the associated payment set forth in the schedule of payments provided in Clause 12 of the Contract Special Provisions.
- 13.3. In addition to the liquidated damages, the Purchaser shall have the possibility of terminating this Contract in whole or in part, as provided in Clause 39 (Termination for Default) of the Contract General Provisions. In the event of such

termination, the Contractor shall be liable to pay the excess costs provided in Clause 39.5 (Termination for Default) of the Contract General Provisions.

- 13.4. The Contractor shall not be charged with liquidated damages when the delay arises out of causes beyond the control and without the fault or negligence of the Contractor as defined in Clause 39.6 (Termination for Default) of the Contract General Provisions. In such event, subject to the provisions of Clause 41 (Disputes) of the Contract General Provisions, the Purchaser shall ascertain the facts and extent of the delay and shall extend the time for performance of the Contract when in his judgement the findings of the fact justify an extension.
- 13.5. Liquidated damages shall be payable to the Purchaser from the first day of delinquency and shall accrue at the rate specified in Clause 13.2.2 above to 15% of the value of each line item individually and an aggregate sum of all delinquent items not to exceed 15% of the value of the total Contract. These liquidated damages shall accrue automatically and without any further notice being required.
- 13.6. The amount of Liquidated Damages due by the Contractor shall be recovered by the Purchaser in the following order of priority:
- a. By deducting such damages from the amounts due to the Contractor against the Contractor's invoices.
  - b. By proceeding against any surety or deducting from the Performance Guarantee if any
  - c. By reclaiming such damages through appropriate legal remedies.
- 13.7. The rights and remedies of the Purchaser under this clause are in addition to any other rights and remedies provided by law or under this Contract.

#### **14. SUPPLEMENTAL AGREEMENT(S), DOCUMENTS AND PERMISSIONS**

- 14.1. If any supplemental agreements, documents and permissions are introduced after Contract award, the execution of which by the Purchaser is/ are required by national law or regulation, and it is determined that the Contractor failed to disclose the requirement for the execution of such agreement from the Purchaser prior to Contract signature, the Purchaser may terminate this Contract for Default, in accordance with Clause 39 (Termination for Default) of the Contract General Provisions.
- 14.2. Supplemental agreement(s), documents and permissions, the execution of which by the Purchaser is/are required by national law or regulation and that have been identified by the Contractor prior to the signature of this Contract, but have not yet been finalised and issued by the appropriate governmental authority, are subject to review by the Purchaser. If such supplemental agreement(s), documents and permissions are contrary to cardinal conditions of the signed Contract between the Parties, and the Parties and the appropriate governmental authority cannot reach a mutual satisfactory resolution of the contradictions, the Purchaser reserves the right to terminate this Contract and the Parties agree that in such case the Parties mutually release each other from claim for damages and costs of any kind, and any payments received by the



Contractor from the Purchaser will be refunded to the Purchaser by the Contractor.

## **15. SECURITY**

- 15.1. This Clause augments Clause 11 (Security) of the Contract General Provisions.
- 15.2. The security classification of this Contract is NATO UNCLASSIFIED.
- 15.3. In the performance of all works under this Contract it shall be the Contractor's responsibility to ascertain and comply with all applicable NATO and National security regulations as implemented by the Purchaser and by the local authorities.
- 15.4. Contractor and /or Subcontractor personnel employed under this Contract that will require access to locations, such as sites and headquarters, where classified material and information up to and including "NATO SECRET" are handled shall be required to have a NATO security clearance up to this level. Contractor personnel who need System Administrator or Operator privileges when working on NATO SECRET systems shall be required to hold NATO CTS (Cosmic Top Secret) clearances.
- 15.5. All NATO CLASSIFIED material entrusted to the Contractor shall be handled and safeguarded in accordance with applicable security regulations.
- 15.6. The Contractor will be required to handle and store classified material to the level of "NATO SECRET".
- 15.7. It shall be the Contractor's responsibility to obtain the appropriate personnel and facility clearances to the levels stated in the preceding paragraphs and to have such clearances confirmed to the Purchaser by the relevant National security authority for the duration of the Contract in its entirety.
- 15.8. Failure to obtain or maintain the required level of security for Contractor personnel and facilities for the period of performance of this Contract shall not be grounds for any delay in the scheduled performance of this Contract and may be grounds for termination under Clause 39 (Termination for Default) of the Contract General Provisions.
- 15.9. The Contractor shall note that there are restrictions regarding the carriage and use of electronic device (e.g. laptops) in Purchaser secured locations. The Contractor shall be responsible for satisfying and obtaining from the appropriate site authorities the necessary clearance to bring any such equipment into the facility.
- 15.10. At the end of the Contract, the Contractor shall deliver all the documentation and information collected and generated in support of this Contract to the Purchaser. This includes a certificate that no copies are retained at the Contractor's facilities. Additionally, any equipment that had been connected to a classified network during this Contract shall be returned to the Purchaser (i.e. laptops, USB-keys, etc.).

- 15.11. The Statement of Work defines the level of security of information exchanged and used for performance of the Contract.
- 15.12. In particular, the Contractor undertakes to:
- 15.12.1. Appoint an official responsible for supervising and directing security measures in relation to the Contract and communicating details of such measures to the Purchaser on request;
  - 15.12.2. Maintain, preferably through the official responsible for security measures, a continuing relationship with the national security authority or designated security agency charged with ensuring that all NATO classified information involved in the Contract is properly safeguarded;
  - 15.12.3. Abstain from copying by any means, without the authorization of the Purchaser, the national security authority or designated security agency, any classified documents, plans, photographs or other classified material entrusted to him;
  - 15.12.4. Furnish, on request, information to the national security authority or designated security agency pertaining to all persons who will be required to have access to NATO classified information;
  - 15.12.5. Maintain at the work site a current record of his employees at the site who have been cleared for access to NATO classified information. The record should show the date of issue, the date of expiration and the level of clearance;
  - 15.12.6. Deny access to NATO classified information to any person other than those persons authorized to have such access by the national security authority or designated security agency;
  - 15.12.7. Limit the dissemination of NATO classified information to the smallest number of persons (“need to know basis”) as is consistent with the proper execution of the Contract;
  - 15.12.8. Comply with any request from the national security authority or designated security agency that persons entrusted with NATO classified information sign a statement undertaking to safeguard that information and signifying their understanding both of their obligations under national legislation affecting the safeguarding of classified information, and of their comparable obligations under the laws of the other NATO nations in which they may have access to classified information;
  - 15.12.9. Report to the national security authority or designated security agency any breaches, suspected breaches of security, suspected sabotage, or other matters of security significance which would include any changes that may occur in the ownership, control or management of the facility or any changes that affect the security arrangements and security status of the facility and to make such other reports as may be required by the national security authority or designated security agency, e.g. reports on the holdings of NATO classified material;

- 15.12.10. Apply to the Purchaser for approval before Sub-contracting any part of the work, if the Sub- contract would involve that the Subcontractor would have access to NATO classified information, and to place the Sub-contractor under appropriate security obligations no less stringent than those applied to his own contract;
- 15.12.11. Undertake not to utilize, other than for the specific purpose of the Contract, without the prior written permission of the Purchaser or his authorized representative, any NATO classified information furnished to him, including all reproductions thereof in connection with the Contract, and to return all NATO classified information referred to above as well as that developed in connection with the Contract, unless such information has been destroyed, or its retention has been duly authorized with the approval of the Purchaser. Such NATO classified information will be returned at such time as the Purchaser or his authorized representative may direct;
- 15.12.12. Classify any produced document with the highest classification of the NATO classified information disclosed in that document.
- 15.13. The Contractor’s Team Members shall possess a valid passport or ID Card and is required to maintaining its validity for the duration of the contract.

**16. KEY PERSONNEL**

16.1. The designated Contractor personnel fulfilling the roles as described in Statement of Work are considered Key Personnel for successful Contract performance and are subject to the provisions of this Clause as set forth in the following paragraphs.

16.2. The following individuals are identified as Key Personnel under this Contract:

Role	Name
Project Manager	To be completed based on proposal
Technical Lead	To be completed based on proposal
Test Director	To be completed based on proposal
CIS Security Manager	To be completed based on proposal
IPS Manager	To be completed based on proposal
Training Manager	To be completed based on proposal
Configuration Manager	To be completed based on proposal
Quality Manager	To be completed based on proposal

- 16.3. Under the terms of this Clause, Key Personnel may not be voluntarily diverted by the Contractor to perform work outside the Contract unless approved by the Purchaser. In cases where the Contractor has no control over the individual’s non-availability (e.g. resignation, sickness, incapacity, etc.), the Contractor shall notify the Purchaser immediately of a change of Key Personnel and offer a substitute with equivalent qualifications at no additional costs to the Purchaser within 21 days of the date of knowledge of the prospective vacancy.
- 16.4. The Contractor shall take all reasonable steps to avoid changes to Key Personnel assigned to this project except where changes are unavoidable or are of a temporary nature. Any replacement personnel shall be of a similar grade, standard and experience as the individual to be substituted and must meet the

minimum qualifications and required skills cited in the attached Statement of Work.

- 16.5. In the event of a substitution of any Key Personnel listed above and prior to commencement of performance, the Contractor shall provide a CV for the personnel proposed. The CV shall clearly stipulate full details of professional and educational background, and evidence that the personnel is qualified in pertinent Contract related areas of the SOW.
- 16.6. The Purchaser reserves the right to interview any Contractor personnel proposed in substitution of previously employed Contractor Key Personnel to verify their language skills, experience and qualifications, and to assess technical compliance with the requirements set forth in the SOW.
- 16.7. The interview, if required, may be conducted as a telephone interview, or may be carried out at the Purchaser's premises in Brussels, Belgium.
- 16.8. If, as a result of the evaluation of the CV and/or interview the Purchaser judges that the proposed replacement Key Personnel does not meet the required skills levels, he shall have the right to request the Contractor to offer another qualified individual in lieu thereof.
- 16.9. All costs to the Contractor associated with the interview(s) shall be borne by the Contractor, independently from the outcome of the Purchaser's evaluation.
- 16.10. The Purchaser Contracting Authority will confirm any consent given to a substitution in writing and only such written consent shall be deemed as valid evidence of Purchaser consent. Each of the replacement personnel will also be required to sign the Non-Disclosure Declaration at Annex A hereto prior to commencement of work.
- 16.11. Furthermore, even after acceptance of Contractor personnel on the basis of his/her CV and/or interview, the Purchaser reserves the right to reject Contractor personnel, if the individual is not meeting the required level of competence. The Purchaser will inform the Contractor, in writing, in cases where such a decision is taken and the Contractor shall propose and make other personnel available within ten working days after the written notification. The Purchaser shall have no obligation to justify the grounds of its decision and the Purchaser's acceptance of Contractor personnel shall in no way relieve the Contractor of his responsibility to achieve the contractual and technical requirements of this Contract nor imply any responsibility of the Purchaser.
- 16.12. The Purchaser may, for just cause, require the Contractor to remove his employee. Notice for removal will be given to the Contractor by the Purchaser in writing and will state the cause justifying the removal. The notice will either demand substitution for the individual involved and/or contain a notice of default and the remedies to be sought by the Purchaser.
- 16.13. In those cases where, in the judgement of the Purchaser, the inability of the Contractor to provide a suitable replacement in accordance with the terms of this Clause may potentially endanger the progress under the Contract, the Purchaser shall have the right to terminate the Contract as provided under Clause 39 (Termination for Default) of the Contract General Provisions.

## **17. INDEPENDENT CONTRACTOR**

- 17.1. The Personnel provided by the Contractor are at all times employees of the Contractor and not the Purchaser. In no case shall Contractor personnel act on behalf of or as an agent for NATO or any of its bodies. In no way shall the Contractor personnel claim directly or indirectly to represent NATO in an official capacity or claim themselves to be NATO employees.
- 17.2. The Purchaser shall not be responsible for securing work permits, lodging, leases nor tax declarations, driving permits, etc., with national or local authorities. Contractors personnel employed under this Contract are not eligible for any diplomatic privileges or for NATO employee benefits.

## **18. NON DISCLOSURE AGREEMENT**

- 18.1. All Contractor and Subcontractor personnel working at any NATO Organisation / Commands premises or having access to NATO classified / commercial-in-confidence information must certify and sign the Declaration attached hereto at Annex A and provide it to the NCI Agency Contracting Officer prior to the commencement of any performance under this Contract.

## **19. CARE AND DILIGENCE OF PROPERTY**

- 19.1. The Contractor shall use reasonable care to avoid damaging buildings, walls, equipment, and vegetation (such as trees, shrub and grass) on the work site.
- 19.2. If the Contractor damages any such buildings, walls, equipment or vegetation on the work site, he shall fix or replace the damage as directed by the Purchaser and at no expense to the Purchaser. If he fails or refuses to make such repair or replacement, the Contractor shall be liable for the cost thereof, which may be deducted from the Contract price.
- 19.3. The Purchaser will exercise due care and diligence for the Contractor's furnished equipment and materials on site. The Purchaser will, however, not assume any liability except for gross negligence and wilful misconduct on the part of the Purchaser's personnel or agents.
- 19.4. The Contractor shall, at all times, keep the site area, including storage areas used by the Contractor, free from accumulations of waste. On completion of all work the Contractor is to leave the site area and its surroundings in a clean and neat condition.

## **20. RESPONSIBILITY OF THE CONTRACTOR TO INFORM EMPLOYEES OF WORK ENVIRONMENT**

- 20.1. The Contractor shall inform his employees under this Contract of the terms of the Contract and the conditions of the working environment.
- 20.2. Specifically, personnel shall be made aware of all risks associated with the performance under this Contract, the conditions of site in which the performance is to take place and living conditions while performing within the boundaries of the Contract. The selection of adequate personnel shall remain sole responsibility of the Contractor.

**21. SOFTWARE**

- 21.1. The Purchaser reserves the right to exclude from the awarded Contract the purchase of software licenses for which NATO has established centralized Contracts. In this case, the Contract terms, schedule and prices will be modified accordingly, and the software licenses will be provided to the Contractor in the form of "Purchaser Furnished Property (including software)".
- 21.2. Where the term Purchaser Furnished Equipment (PFE) is used it should be interpreted as Purchaser Furnished Property as defined in the Contract General Provisions.

**22. WARRANTY**

- 22.1. This Clause augments Clause 27 "Warranty of Work (Exclusive of Software)" and Clause 30 "Software Warranty" of the NCI Agency Contract Special Provisions.
- 22.2. The Contractor shall provide warranty on all material provided under this Contract and in accordance with Book II, Part IV of the Statement of Work for a period of two (2) years.
- 22.3. Notwithstanding inspection and acceptance by the Purchaser or its appointed agents of supplies furnished under the Contract or any provision of this Contract concerning the conclusiveness thereof, the Contractor warrants for the total duration of the above referred period and covering all items of hardware and software, that:
- a) all deliverables furnished under this Contract shall be free from defect and will conform with the specifications and all other requirements of this Contract; and,
  - b) the system will, under normal conditions, perform without errors which make it unusable; and
  - c) the preservation, packaging, packing and marking and the preparation for and method of, shipment of such supplies will conform to the requirements of this Contract.
- 22.4. During the Warranty period, the Contractor shall perform in-depth analysis of failures of equipment and components and parts thereof, and functional performance failures to due sub-system or equipment group malfunctions. Such failures shall not be limited to hardware, but shall include failures due to application or embedded software.
- 22.5. Fault analysis results shall be provided to the Host Nation Portugal representative in writing within seven calendar days after its discovery, with the diagnosed causes reported along with recommendations for corrective actions, as appropriate. The resolution of defects remains the Contractors responsibility within the Warranty. The Contractor shall resolve all defects within 7 calendar days of their first being reported for those items that need not be returned to the Contractor's facility for service or repair. Items needing service or repair at the

Contractor's facility shall be repaired/replaced and dispatched back to the Purchaser within 15 calendar days of their arrival at the Contractor's facility.

- 22.6. Transportation and handling charges for items returned under warranty claim to the Contractor will be the responsibility of the Contractor, as well as responsibility for such supplies, i.e. damage and loss that may occur during transportation under Warranty.
- 22.7. In the event of the Contractor's failure to repair or replace failed equipment within the timeframes expressed in this Article, the Purchaser will have the right, at its discretion, and having given the Contractor due notice, to:
- a) remedy, or have remedied, the defective or non-conforming supplies, in both cases at the Contractor's expenses;
  - b) equitably reduce the Contract price; and/or
  - c) terminate for default that portion of the Contract relating to the defective work.
- 22.8. Repeated failure of the same equipment, component or part, as well as failures due to software malfunctions may be considered by the Host Nation Portugal to be evidence of latent defect in the subject equipment (and or its associated software). In such a case the HN Portugal may require the Contractor to redesign such elements of the system as may be necessary in order to correct the repeated failure, or to substitute the failed element with a more reliable version or functional equivalent thereof. Such redesign and/or substitution shall be tested, and if found appropriate and applied.
- 22.9. For this purpose the Contractor shall provide exact warranty conditions by type of equipment and detailed handling instructions, including information of points of contact to be contacted in case of a warranty claim.
- 22.10. Such extension of the Warranty period will not apply in cases where the Contractor can convincingly demonstrate that the critical failure was due to HN Portugal negligence or a wilful act on the part of HN Portugal personnel.
- 22.11. Corrective action required of the Contractor under the Warranty also applies to errors or omissions in any delivered documentation which could not have reasonably been discovered prior to the Final System Acceptance under this Contract. Errors or omissions in delivered documentation shall not be considered a basis for extension of the Warranty as set forth in paragraphs above, except as can be demonstrated that such error or omission was the cause of a critical system failure.

### **23. COTS PRODUCT REPLACEMENT**

- 23.1. If any COTS products specified in the Contract are upgraded or discontinued by their original providers for commercial or technological reasons, the Contractor shall propose their substitution by the new versions that are intended as market replacement of the original products. The proposed items shall provide an equivalent or enhanced performance without a price or life-cycle support cost increase.

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

23.3. All COTS furnished by the Contractor under this Contract shall be current production and upgraded to the most current versions at Provisional Site Acceptance (PSA).

## **24. OPTIONS**

24.1. The options are available for exercise by the Purchaser at any time and in any combination from the date of Contract execution to Final System Acceptance (FSA) plus two (2) years. If the Purchaser exercises such options, the Contractor shall deliver such specified quantities of additional or alternative supplies and services as specified in the Schedule of Supplies and Services.

24.2. Prices for all optional line items shall have a validity period that corresponds to the option exercise period cited above.

24.3. The Contractor understands that there is no obligation under this Contract for the Purchaser to exercise any of the optional line items and that the Purchaser bears no liability should he decide not to exercise the options (totally or partially). Further, the Purchaser reserves the right to request another Contractor (or the same), to perform the tasks described in the optional line items of the current Contract through a new Contract with other conditions.

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

## **25. OPTIMISATION**

25.1. The Contractor is encouraged to examine methods and technology that may increase efficient operation and management of the system(s) on which the required services are provided to the Purchaser, thus reducing operating and manpower costs and the overall cost to the Purchaser.

25.2. The Contractor may, during the Period of Performance, introduce Engineering Change Proposals (ECPs) offering innovations and/or technology insertion with a view towards reducing the Total Cost of Ownership TCO to the Purchaser.

25.3. Any such ECP submitted shall cite this Clause as the basis of submission and provide the following information:

25.3.1. A detailed description of the technical changes proposed, the advantages, both long and short term, and an analysis of the risks of implementation;



- 25.3.2. A full analysis of the prospective savings to be achieved, in the form of a TCO Assessment Report, in both equipment and manpower, including, as appropriate, utility and fuel consumption and NATO manpower, travel, etc.;
- 25.3.3. A full impact statement of changes that the Purchaser would be required to make, if any, to its operational structure and management procedures;
- 25.3.4. A fully detailed proposal of any capital investment necessary to achieve the savings;
- 25.3.5. A schedule of how the changes would be implemented with minimal negative impact to on-going performance and operations.

**26. CONTRACT ADMINISTRATION**

- 26.1. The Purchaser is the NATO Communications and Information Agency (NCI Agency). The Purchaser is the Point of Contact for all contractual and technical issues. The Contractor shall accept Contract modifications only in writing from the Purchaser’s Contracting Authority.
- 26.2. All notices and communications between the Contractor and the Purchaser shall be written and conducted in English.
- 26.3. Formal letters and communications shall be personally delivered or sent by mail, registered mail, courier or other delivery service, to the official points of contact quoted in this Contract.
- 26.4. Informal notices and informal communications may be exchanged by any other communications means including telephone and e-mail.
- 26.5. All notices and communications shall be effective upon receipt.
- 26.6. Official points of contact are:

<b><u>PURCHASER</u></b>	
<p><u>Contractual issues:</u> NCI Agency Acquisition Directorate  Boulevard Leopold III B-1110 Brussels Belgium  POC: Ole Hubner Tel: +32 (0)2 707 2407 Email: <a href="mailto:Ole.Hubner@ncia.nato.int">Ole.Hubner@ncia.nato.int</a></p>	<p><u>Technical issues:</u> NCI Agency Network Services and IT Infrastructure Building 302 B-7010 SHAPE, Mons Belgium  POC: Kayhan Vardareri Tel: +32 (0) 6544 1253 E-mail: <a href="mailto:Kayhan.Vardareri@ncia.nato.int">Kayhan.Vardareri@ncia.nato.int</a></p>

<b><u>CONTRACTOR</u></b>	
<p><u>Contractual issues:</u> Company Name</p>	<p><u>Technical issues:</u> Company Name</p>

Address	Address
POC:	POC:
Tel:	Tel:
Fax:	Fax:
E-mail:	E-mail:

**27. CONFLICT OF INTEREST**

- 27.1. A conflict of interest means that because of other activities or relationships with other persons or entities, a Contractor is unable, or potentially unable to render impartial assistance or advice to the Purchaser, or the Contractor's objectivity in performing the Contract work is, or might be otherwise impaired, or the Contractor has an unfair competitive advantage. Conflict of interest includes situations where the capacity of a Contractor (including the Contractor's executives, directors, consultants, subsidiaries, parent companies or Subcontractors) to give impartial, technically sound advice or objective performance is or may be impaired or may otherwise result in a biased work product or performance because of any past, present or planned interest, financial or otherwise in organizations whose interest may substantially affected or be substantially affected by the Contractor's performance under the Contract.
- 27.2. The Contractor is responsible for maintaining and providing up-to-date conflict of interest information to the Purchaser. If, after award of this Contract or any task order herein, the Contractor discovers a conflict of interest with respect to this Contract or task order which could not reasonably have been known prior to award, or if any additional conflicts or potential conflicts arise after award, the Contractor shall give written notice to the Purchaser as set forth below.
- 27.3. If, after award of this Contract or any order herein, the Purchaser discovers a conflict of interest with respect to this Contract or order, which has not been disclosed by the Contractor, the Purchaser may at its sole discretion request additional information from the Contractor, impose mitigation measures, or terminate the Contract for default in accordance with Clause 39 (Termination for Default) of the Contract General Provisions.
- 27.4. The Contractor's notice called for in paragraph 27.2 above shall describe the actual, apparent, or potential conflict of interest, the action(s) the Contractor has taken or proposes to take to avoid or mitigate any conflict, and shall set forth any other information which the Contractor believes would be helpful to the Purchaser in analysing the situation. Any changes to the Contractor's conflict of interest mitigation plan, if any is incorporated in the Contract, should be also detailed.
- 27.5. The Contractor has the responsibility of formulating and forwarding a proposed conflict of interest mitigation plan to the Purchaser, for review and consideration. This responsibility arises when the Contractor first learns of an actual, apparent, or potential conflict of interest.
- 27.6. If the Purchaser in its discretion determines that the Contractor's actual, apparent, or potential conflict of interest remains, or the measures proposed are insufficient to avoid or mitigate the conflict, the Purchaser will direct a course of action to the Contractor designed to avoid, neutralize, or mitigate the conflict of

interest. If the parties fail to reach agreement on a course of action, or if having reached such agreement, the Contractor fails to strictly adhere to such agreement during the remaining period of Contract performance, the Purchaser has the discretion to terminate the Contract for default or alternatively refrain from exercising any further Option or Work Package under the Contract.

27.7. The Contractor's misrepresentation of facts in connection with a conflict of interest reported, or a Contractor's failure to disclose a conflict of interest as required shall be a basis for default termination of this Contract.

## **28. TECHNICAL DIRECTION**

28.1. The Contract will be administered by the Purchaser on behalf of the Host nation Portugal in accordance with the Clause 26 of these Contract Special Provisions entitled "Contract Administration".

28.2. The individuals working on this Contract shall perform the effort within the general scope of work identified in the Contract Part III - Statement of Work (SOW). This effort will be directed on a more detailed level by the Purchaser's Project Manager who will provide detailed tasking and instruction on how to proceed.

28.3. The Purchaser reserves his right to assign a Technical Representative who will provide the Contractor personnel with instruction and guidance, within the general scope of work, in performance of their duties and working schedule.

28.4. Neither the Purchaser's Project Manager as identified in Clause 26 of these Contract Special Provisions, nor any Technical Representative, as mentioned in Clause 28.3 above, has the authority to change the terms and conditions of the Contract. If the Contractor has reason to believe that the Project Manager/Technical Representative is requesting products and services on terms inconsistent with that in the scope of the Contract, the Contractor shall immediately inform the Purchaser's Contracting Authority for confirmation of the actions. Failure to obtain confirmation that the action of the Project Manager is under the authority of the Contract shall render any subsequent claim null and void.

28.5. Upon receipt of such notification above, the Purchaser's Contracting Authority will:

- a) confirm the effort requested is within scope, or;
- b) confirm that the instructions received constitute a change and request a quotation for a modification of scope and/or price, or;
- c) rescind the instructions.

## **29. INTELLECTUAL PROPERTY**

29.1. This Article supplements Clause 30 of the NCI Agency Contract General Provisions.

- 29.2. Any use of Contractor Background IPR and Third Party IPR for the purpose of carrying out the Work pursuant to the Contract shall be free of any charge to Purchaser. The Contractor hereby grants to NATO and NATO Nations a non-exclusive, royalty-free and irrevocable licence to use without limitation in the number of users, provided the background is used with the foreground and authorise others to use any Contractor Background IPR for the purpose of exploiting or otherwise using the Foreground IPR.
- 29.3. All rights arising out of the results of work undertaken by or on behalf of the Purchaser for the purposes of this Contract, including all deliverables in the Schedule of Supplies and Services, any and all technical data specifications, reports, drawings, computer software data, computer programmes, computer databases, computer software, computer source code, documentation including software documentation, design data, specifications, instructions, test procedures, training material, produced or acquired in the course of such work and, in particular, all rights, including copyright therein, shall from its creation vest in and be the sole and exclusive property of the Purchaser in both object and source code.
- 29.4. The Purchaser will accept no constraints or limitations on the use of Contract deliverables. Accordingly, the Contractor shall not include any Background Intellectual Property or third party software in the code provided to the Purchaser. In the event that any such code would have to be included, the Contractor shall seek Purchaser's prior agreement and ensure that unlimited rights are secured for the Purchaser to use the deliverables under the Contract

### **30. INTELLECTUAL PROPERTY RIGHT INDEMNITY AND ROYALTIES**

- 30.1. This Clause augments Clauses 29 of the NCI Agency Contract General Provisions.
- 30.2. The Contractor shall assume all liability and indemnify the Purchaser, its officers, agents and employees against liability, including costs for the infringement of any patents or copyright in force in any countries arising out of the manufacture, services performed or delivery of supplies, or out of the use or disposal by or for the account of the Purchaser of such supplies. The Contractor shall be responsible for obtaining any patent or copyright licences necessary for the performance of this Contract and for making all other arrangements required to indemnify the Purchaser from any liability for patent or copyright infringement in said countries.
- 30.3. The Contractor shall exclude from his prices any royalty pertaining to patents which in accordance with agreements reached between NATO countries may be utilised free of charge by member nations of NATO and by NATO organisations.
- 30.4. The Contractor shall report in writing to the Purchaser during the performance of this Contract:
- 30.4.1. The royalties excluded from his price for patent utilised under the agreements mentioned in Para 31.3 above;
- 30.4.2. The amount of royalties paid or to be paid by the Contractor directly to others in performance of this Contract.

### **31. INDEMNITY**

- 31.1. The Contractor will indemnify and hold harmless NATO, its servants or agents, against any liability, loss or damage arising out of or in connection of the Supplies and Services under this Contract, including the provisions set out in Clause 9, "Intellectual Property Rights, Indemnity and Royalties".
- 31.2. The parties will indemnify each other against claims made against the other by their own personnel, and their Subcontractor Subcontractors (including their personal representatives) in respect of personal injury or death of such personnel or loss or destruction of or damage to the property of such personnel.
- 31.3. NATO will give the Contractor immediate notice of the making of any claim or the bringing of any action to which the provisions of this Clause may be relevant and will consult with the Contractor over the handling of any such claim and conduct of any such action and will not without prior consultation and without the consent of the Contractor settle or compromise any such claim or action.
- 31.4. In the event of an accident resulting in loss, damage, injury or death arising from negligence or wilful intent of an agent, officer or employee of NATO for which the risk has been assumed by the Contractor, the cause of the accidents will be investigated jointly by the Parties and the extent to which NATO will be liable to recompense the Contractor will be determined together.

### **32. PURCHASER FURNISHED PROPERTY**

- 32.1. The Purchaser shall deliver to the Contractor, for use only in connection with this Contract, the Purchaser Furnished Property at the times and locations stated in the Contract. In the event that Purchaser Furnished Property is not delivered by such time or times stated in the Schedule, or if not so stated, in sufficient time to enable the Contractor to meet such delivery or performance dates the Purchaser shall, upon timely written request made by the Contractor, and if the facts warrant such action, equitably adjust any affected provision of this Contract pursuant to Clause 16 (Changes).
- 32.2. In the event that Purchaser Furnished Property is received by the Contractor in a condition not suitable for its intended use, the Contractor shall immediately notify the Purchaser. The Purchaser shall within a reasonable time of receipt of such notice replace, re-issue, authorise repair or otherwise issue instructions for the disposal of Purchaser Furnished Property agreed to be unsuitable. The Purchaser shall, upon timely written request of the Contractor, equitably adjust any affected provision of this Contract pursuant to Clause 16 (Changes).
- 32.3. Title to Purchaser Furnished Property will remain in the Purchaser. The Contractor shall maintain adequate property control records of Purchaser Furnished Property in accordance with sound industrial practice and security regulations.
- 32.4. Unless otherwise provided in this Contract, the Contractor, upon delivery to him of any Purchaser Furnished Property, assumes the risk of, and shall be responsible for, any loss thereof or damage thereof except for reasonable wear and tear, and except to the extent that Purchaser Furnished Property is consumed in the performance of this Contract.

- 32.5. Upon completion of this Contract, or at such earlier dates as may be specified by the Purchaser, the Contractor shall submit, in a form acceptable to the Purchaser, inventory schedules covering all items of Purchaser Furnished Property.
- 32.6. The inventory shall note whether:
- 32.6.1. The property was consumed or incorporated in fabrication of final deliverable(s);
- 32.6.2. The property was otherwise destroyed;
- 32.6.3. The property remains in possession of the Contractor;
- 32.6.4. The property was previously returned
- 32.7. The Contractor shall prepare for shipment, deliver DDP at a destination agreed with the Purchaser, or otherwise dispose of Purchaser Furnished Property as may be directed or authorised by the Purchaser. The net proceeds of any such disposal shall be credited to the Contract price or paid to the Purchaser in such other manner as the Purchaser may direct.
- 32.8. The Contractor shall not modify any Purchaser Furnished Property unless specifically authorised by the Purchaser or directed by the terms of the Contract.
- 32.9. The Contractor shall indemnify and hold the Purchaser harmless against claims for injury to persons or damages to property of the Contractor or others arising from the Contractor's possession or use of the Purchaser Furnished Property. The Contractor shall indemnify the Purchaser for damages caused by the Contractor to the Purchaser, its property and staff and arising out of the Contractor's use of the Purchaser Furnished Property.

### **33. REACH CAPABILITY**

- 33.1. The purpose of this Article is to define the conditions under which specific Purchaser provided NROI capability (newly called REACH) is made available to the Contractor in the course of this Contract.
- 33.2. The provision of the REACH capability is governed by the standard Article 13 of the NCI Agency, Part III - General Provisions (Purchaser Furnished Property), Article 33 of the Special Provisions and Annex B to the Special Provisions.
- 33.3. Should the Purchaser not be able to meet the SLA related to the provision of the REACH capability as laid down in Annex B of these Special Provisions, the Contractor shall not be entitled to claim an excusable delay nor any compensation against any Articles for the Performance of this Contract and its Amendments.

### **34. PERMITS AND RESPONSIBILITIES**

- 34.1. This Clause Supplements Clause 5 "Language" and Clause 6 "Authorisation to Perform/Conformance to National Laws and Regulations."

34.2. The Contractor shall, without additional expense to the Purchaser, be responsible for obtaining any necessary licenses and permits, and for complying with Host Nation national, local and municipal laws, codes, regulations and standards applicable to the performance of the work. The Contractor shall be aware that, in order to comply with SOW requirements and Clause 6 of the NCI Agency Contract General Provisions, this responsibility shall include provision of documentation in the Host Nation language (Portuguese language). The Contractor shall also be responsible for all damages to persons or property that occurs as a result of the Contractor's fault or negligence. The Contractor shall also be responsible for all materials delivered and work performed until FSA.

### **35. PROTECTION OF WATER, LAND, EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS**

35.1. The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site that are not to be removed and that do not unreasonably interfere with the work required under this Contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Authority.

35.2. The Contractor shall protect from damage all existing improvements and utilities

- a) at or near the work site, and
- b) on adjacent property of a third party, the locations of which are made known to or shall be known by the Contractor.

35.3. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this Contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Authority may have the necessary work performed and charge the cost to the Contractor.

### **36. OPERATIONS AND STORAGE AREAS**

36.1. The Contractor shall confine all operations (including storage of materials) on HN Portugal premises to areas authorized or approved by the Contracting Authority. The Contractor shall hold and save the Purchaser, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.

36.2. Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the Contracting Authority and shall be built with labour and materials furnished by the Contractor without expense to the Purchaser. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting

Authority, the buildings and utilities may be abandoned and need not be removed.

- 36.3. The Contractor shall, under regulations prescribed by the Contracting Authority, use only established roadways. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any national or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

### **37. SITE CLEAN UP**

- 37.1. The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. Before completing the work, the Contractor shall remove from the work and premises any rubbish, tools, scaffolding, equipment, and materials that are not the property of the Purchaser. Upon completing the work, the Contractor shall leave the work area in a clean, neat, and orderly condition satisfactory to the Purchaser.

### **38. AVAILABILITY AND USE OF UTILITY SERVICES**

- 38.1. As stated in SOW Section 1.8 the Purchaser and the HN Portugal will make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies. Unless otherwise provided in the Contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the Host Nation Governments or, where the utility is produced by the Host Nation, at reasonable rates determined by the Host Nation. The Contractor shall carefully conserve any utilities furnished without charge.

- 38.2. The Contractor shall not be billed for utility usage after FSA.

### **39. NOTICE OF AUTHORIZED DISCLOSURE OF INFORMATION FOR MANDATED NATO THIRD PARTY AUDITS BY RESOURCE COMMITTEES**

- 39.1. (a) Definitions. As used in this clause -
- 39.2. Resource Committees means committees under the North Atlantic Council (NAC) that are responsible, within the broad policy guidance provided by the Resource Policy and Planning Board (RPPB) on matters of resource allocation, for the implementation of the NATO Security Investment Programme (NSIP) or Budget/Civil budgets.
- 39.3. Mandated Third Party Audits means audits mandated by a resource committee.
- 39.4. Third Party Auditor means an independent, external audit body for NATO such as the International Board of Auditors for NATO (IBAN) or an appointed private contractor (including its experts, technical consultants, subcontractors, and suppliers) providing audit support under a Resource Committee Appointment based on an agreed mandate.



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

39.6. (b) The Purchaser may disclose to a mandated third party auditor, for the sole purpose of audit support activities, any information, including sensitive information, received -

(1) Within or in connection with a bid, quotation or offer; or

(2) In the performance of or in connection with a contract.

39.7. (c) Flowdown. Include the substance of this clause, including this paragraph (c), in all subcontracts, including subcontracts for commercial items.

#### **40. FORCE MAJEURE**

40.1. "Force Majeure" means the occurrence of an event or circumstance that prevents a Party (the "Affected Party") from performing one or more of its contractual obligations under the Contract, provided that: (i) it renders performance impossible; (ii) it is beyond the Affected Party's reasonable control and without the Affected Party's cause, fault or negligence; (iii) by its nature it could not have been reasonably foreseen at the time of conclusion of the Contract; and (iv) the effects of it could not reasonably have been avoided or overcome by the Affected Party.

40.2. Examples of Force Majeure, provided conditions (i)-(iv) of paragraph [1] are all fulfilled, include:

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

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

40.2.3. currency and trade restriction, embargo, sanction;

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

40.2.5. plague, epidemic, natural disaster or extreme natural event;

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

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

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

- 40.4. If the Other Party accepts the occurrence as Force Majeure, the Contract shall remain in force but the Parties will be relieved from performance of their obligations (including payment) under Contract, from the date at which the Other Party received written notice, for so long as the effects of Force Majeure continue or for ninety (90) days, whichever is the shorter, provided that:
- 40.4.1. the Affected Party makes all reasonable efforts to limit the effects of Force Majeure upon performance and to avoid or overcome the effects of Force Majeure;
  - 40.4.2. the suspension of performance is of no greater scope than is necessitated by Force Majeure;
  - 40.4.3. the Affected Party continues to furnish weekly updates by email while the effects of Force Majeure continue detailing reasonable efforts made in accordance with [40.4.1], and notifies the Other Party immediately when the effects of Force Majeure are avoided or overcome, or cease, and resumes performance immediately thereafter.
- 40.5. Neither Party shall be in breach of the Contract nor liable for delay in performing, or for failing to perform, its obligations under the Contract, due to Force Majeure.
- 40.6. Unless otherwise agreed by the Parties, if Force Majeure continues for more than ninety
- 40.7. (90) days, the Parties may agree:
- a) to a revised delivery schedule at no cost;
  - b) to a reduction of scope terminating part of the contract at no cost; or
  - c) to terminate the whole of the Contract at no cost.

#### **41. NCI AGENCY SUPPLIER CODE OF CONDUCT**

- 41.1. The NCI Agency has a Supplier Code of Conduct located at <https://www.ncia.nato.int/business/do-business-with-us/code-of-conduct.html> and it constitutes part of this contract.
- 41.2. This Supplier Code of Conduct sets standards and practices for suppliers and their subcontractors to adhere to when doing business with the NCI Agency in the areas of labour rights, human rights, data protection, ethical conduct and the environment. It contains fundamental, basic principles that any supplier based in a NATO country should already be operating in compliance with.
- 41.3. In the event of any inconsistency in language, terms or conditions with the Contract General Provisions, the Contract General Provisions takes precedence.

**ANNEX A: NCI AGENCY NON-DISCLOSURE DECLARATION**

We, the undersigned.....(Company) duly represented by ..... (hereinafter "Contractor") do hereby certify that we shall ensure that the following conditions be accepted and observed by all (Contractor) employees working under CO-115363-PRT-TDCIS.

---

(Signature)

---

(Full name in block capitals)

---

(Date)

=====

TO BE SIGNED BY THE CONTRACTOR'S EMPLOYEES WORKING IN THE NATO'S PREMISES UPON COMMENCEMENT OF THEIR WORK.

I UNDERSTAND:

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

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

That I must not, without the approval of the General Manager of the NCI Agency publish (in any document, article, book, CD, video, film, play, or other form) any classified /commercial-in-confidence information which I have acquired in the course of my work under CO-115363-PRT-TDCIS.

That, at the end of Contract and after performance of all required tasks, I must surrender any official document or material made or acquired by me in the course of my work under CO-115363-PRT-TDCIS, save such as I have been duly authorised to retain.

That the provisions of the above Declaration apply not only during the period of work under CO-115363-PRT-TDCIS, but also after my Contract has ceased and that I am liable to prosecution if either by intent or negligence I allow classified/commercial-in-confidence information to pass into unauthorised hands.

That by accepting the position of Support Contractor for NATO corresponding to the tasks and duties described in the present Contract, I will be considered as a Key personnel as specified in Contract Special Provision Article 15.

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

That shall I decide for personal interest to leave the position, I will do my best effort to fulfil my obligations until the Company that is currently employing me has provided NATO with an acceptable suitable substitute in accordance with Special Provision – Article 15.

That I solemnly undertake to exercise in all loyalty, discretion and conscience the functions entrusted to me and to discharge these functions with the interests of NATO and the Host Nation only in view. I undertake not to seek or accept instructions in regard to the performance of my duties from any government, company or from any authority other than that of NCI Agency or the Host Nation.

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

Date

Full name (in block capitals)

Signature

## **ANNEX B: SERVICE LEVEL AGREEMENT (SLA) FOR THE PROVISION OF REACH LAPTOPS IN ACCORDANCE WITH ARTICLE 33 OF THE CONTRACT SPECIAL PROVISIONS**

### **Introduction**

To improve collaboration between the Contractor and the Purchaser teams, a collaborative environment for the two teams will be established that will provide the ability to process, store and handle information up to and including NATO RESTRICTED. Access to the collaborative environment is provided to the Contractor's Team via the Purchaser NR capability (informally called REACH). This capability will be complemented by a limited access to Purchaser Project Portal.

### **Parties**

The REACH capability will be provided by the Purchaser to support the Contractor Team under Contract No CO-115363-PRT-TDCIS.

### **General Overview**

This is an agreement between the Purchaser and the Contractor under this Contract to establish the:

- Provision of REACH capability for the Contractor Team;
- General levels of response, availability, and maintenance associated with the REACH capability;
- Respective responsibilities of the Purchaser and the Contractor Team.

These provisions shall be in effect for an initial period of three years from the effective date of the Contract or until the end of Contract No CO-115363-PRT-TDCIS, whichever occurs first. It can be extended based on a mutual agreement between the Parties.

### **Provided Capability**

#### **References**

<https://dnbl.ncia.nato.int/Pages/ServiceCatalogue/CPSList.aspx>  
(WPS006, WPS003, WPS008 services)

The Purchaser accepts no liability and provides no warranty in respect of the third party software mentioned above. It is emphasized that the REACHs can only be used by the Contractor's Team within the limits set out in this project description.

### **Scope**

- As described in reference Service Descriptions above

### **Aim**

The REACH capability enables exchanges of information and collaboration up to and including NATO Restricted classification.

### **Limitations**

- The use of the REACH capability requires a NATO Security clearance at NATO SECRET level. Proof of the users' security clearances will be provided to the Purchaser.
- The exchange and collaboration of information is provided through e-mail and Instant Messaging.
- Direct printing capability is not provided, but can be arranged through an extension of this contract requested by the Contractor's Team.
- In case of any problems which cannot be solved remotely from the service desk (The Hague, NLD), the equipment shall be sent to NCIA, The Hague at the Contractor's expenses. Any damages resulting from inappropriate operation or operation in harsh environment or adverse weather conditions, as well as a loss of the system shall be compensated by the Contractor.

### **Assumptions**

The following assumptions apply to this Agreement:

- Any support provided by Purchaser is documented in the service descriptions above
- Security violations of the non-NCIA REACH users are investigated through their local security officers/managers applying NATO rules (CM(2002)49, NCIA (CapDev)AD3-2, and NCIA(CapDev)NR SECOPS).
- Required changes to this Agreement and/or the provision of the REACH capability will be jointly assessed and the implementation agreed between the Parties. The implementation of changes may have an impact on the charges which will be handled through an update of this Agreement.

### **Roles and Responsibilities**

The roles and responsibilities for the provision of the REACH capability are defined in the referenced Service Description, but summarized also herein:

- Contractor Team will receive three (3) REACH terminal.
- The Purchaser will provide the REACH capability and related services.

Points of Contact

- As described in the service descriptions above (WPS008 Service Desk).

**Purchaser's responsibilities**

The Purchaser will:

- Provide to the Purchaser the necessary documentation required for the activation of user accounts and certifications.
- Provide the REACH capability including basic end-user training (1.5-hour duration) and deliver 1 Initial REACH, 2 Additional REACHs.
- Set up and maintain the project web-portal at NR level,
- Provide introduction to the management of the portal (1-2 hours) and service desk for the portal on-site at NCIA, The Hague or through electronic media,
- Grant temporary use of REACH hardware and the software licences for the contracted period,

**Contractor Team Responsibilities**

The Contractor Team shall:

- Sign and return to the Purchaser the required security documentation.
- Provide the internet access required for Remote Access via NCIA REACH,
- Be responsible for the backup of files and data of the REACH on NR accredited media on an authorized Removable Storage Device provided by service provider,
- Ensure that Contractor personnel operating the REACH units possess security clearance of a minimum of NS,
- Provides Security clearance for up to and including NS for the personnel using the REACH capability,
- Provides the contact details of the local Security Officer/Manager and the commitment to apply NATO rules as defined in (CM(2002)49, NCIA (CapDev)AD3-2, and NCIA(CapDev)NR SECOPS)for the investigation.
- Return the equipment at the end of the Agreement at its expenses to the Purchaser,

- Not use the equipment for any other purposes than the purpose set out herein,
- Not lend, rent, lease and/or otherwise transfer the equipment to a third party,
- Not copy or reverse engineer the equipment.

#### **Hours of Coverage, Response Times & Escalation**

- As described in the service descriptions above.

#### **Incidents**

- As described in the service descriptions above.
- Resolution of disagreements

In case of disagreements, all disputes shall be resolved by consultation between the Parties and shall not be referred to any national or international tribunal or other third party for settlement.

#### **Changes**

- For any changes of the REACH capability which will be required to be made during the term of this Agreement, the Purchaser will notify the Contractor CISAF Team at least one week prior to the event and inform about the required consequences.
- Any changes concerning the elements provided by the Contractor Team shall be communicated to the NCIA Service Desk at least one week prior to the event.

#### **Maintenance**

Use of the REACH capability and/or related components require regularly scheduled maintenance (“Maintenance Window”) performed by the Purchaser. These activities will render systems and/or applications unavailable for normal user interaction as published in the maintenance calendar. Users will be informed of the maintenance activities with sufficient notice.





# Portuguese Republic Ministry of Defence Tactical Deployable Communication and Information System

**Short Title: PRT TDCIS**

**Book II - Part IV**

**Statement of Work (SoW)**

**Annex A – System Requirements Specification (SRS)**

Reference:	RFQ-CO-115363-PRT-TDCIS
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# 1 Introduction

## NOTE (PRTTDCIS-1108)

This System Requirements Specification (SRS) document provides the Functional and Technical requirements, together with the Implementation Constraints for The Tactical Deployable Communication and Information System (TDCIS) for the Portuguese (PRT) Army to be used up to Brigade level, for National, NATO or other multinational deployment scenarios in Portuguese National and/or International territory. TDCIS is designed to operate on military and civilian operational scenarios and to support Joint and/or Combined operations.

## SRS (PRTTDCIS-1109)

This SRS defines the sizing, standards, quality and design requirements, and constraints that shall be adhered to in the design (or modification of a COTS design) and implementation of this project.

## NOTE (PRTTDCIS-1110)

The SRS does not discuss Node quantities. These are covered under the scope description in the Statement of Work (SOW) Main Body.

## NOTE (PRTTDCIS-1667)

This SRS is structured as follow:

- 1) **Introduction** (this chapter) covers the *Purpose* of the document; then,
- 2) **Conventions and Standards** covers all Conventions, Definitions, NATO and other Standards which are applicable all this document long; then,
- 3) **High Level Specifications** covers
  - 1) The TDCIS in *General* and the architecture which supports it,
  - 2) The *Nodes* and *Housing* elements TDCIS is composed of,
  - 3) The *Performance Targets* TDCIS has to meet,
  - 4) The TDCIS level *Implementation Constraints*; then,
- 4) **Services** covers all services (*Business Support, CIS Security, etc.*) TDCIS has to provide; then,
- 5) **Modules** covers in details the *Functional and Technical Requirements*, together with the *Implementation Constraints* applicable to the different Modules and Subsystems which are used to build the TDCIS; then,
- 6) **Transmission Systems** covers in details the *Specifications* of all Transmission Systems (such as SATCOM, Radio, etc.) present in TDCIS; then,
- 7) **Housing Elements** covers in details the *Specifications* of all Housing elements (such as Shelter, Trailer and Casing) present in TDCIS; finally,
- 8) **User Appliances** covers in details the *Specifications* of all End User Devices (such as Workstations, Phones, etc.) present in TDCIS.

## 2 Conventions and Standards

### 2.1 SRS Document

#### NOTE (PRTTDCIS-1119)

Information and requirements contained under a "General" heading are applicable to all the elements covered by the corresponding upper section.

#### NOTE (PRTTDCIS-1120)

All statements are identified with a Unique Reference called the Key.

#### NOTE (PRTTDCIS-1121)

Mandatory requirements are identified as **SRS**.

#### NOTE (PRTTDCIS-1122)

General informational, descriptive text is identified as **NOTE**.

#### SRS (PRTTDCIS-1123)

Statements in numbered lists (i= 1 to n) under a **SRS** requirement shall be considered individual requirements under the "shall" statement of the parent requirement.

#### NOTE (PRTTDCIS-3041)

The acronyms and abbreviations used in this SRS are defined in in the applicable Annex or Appendix of the SOW.

#### NOTE (PRTTDCIS-3042)

No meaning is associated with the order of serial numbering. There could be gaps in numbering and requirement identifiers in a group do not have to be sequential.

#### NOTE (PRTTDCIS-3247)

All Conventions defined in the SOW are equally applicable to the SRS.



## 2.2 Definitions

### NOTE (PRTTDCIS-1124)

"-xx" is the generic suffix denoting either:

- Black Transport Network (BLK); or
- NATO Unclassified (NU);
- Mission Unclassified (MU);
- National Unclassified (Nat-U);
- NATO Restricted (NR);
- Mission Restricted (MR);
- National Restricted (Nat-R);
- NATO Secret (NS);
- Mission Secret (MS); or,
- National Secret (Nat-S).

### NOTE (PRTTDCIS-3089)

"-xU" is the generic suffix denoting both NU and/or MU and/or Nat-U.

### NOTE (PRTTDCIS-3088)

"-xR" is the generic suffix denoting both NR and/or MR and/or Nat-R.

### NOTE (PRTTDCIS-1125)

"-xS" is the generic suffix denoting both NS and/or MS and/or Nat-S.

### SRS (PRTTDCIS-1126)

Requirements stating a capability to be "supported" (i.e. "shall support") shall be understood as the ability of the Purchaser to configure the capability to be active or not active at his discretion. This means that the capability is not necessarily implemented upon delivery, but shall be available in its full extent, without restrictions.

### SRS (PRTTDCIS-1127)

Requirements stating a capability to be "implemented" (i.e. "shall implement") shall be understood as requiring the capability to be implemented and configured for use in the delivered system.

### SRS (PRTTDCIS-1128)

Requirements stating to be supported or implemented "fully conformant" to an architecture shall be understood as requiring full correspondence between architecture specification and implementation, where all features of this specific requirement are implemented in accordance with the architecture specification and there are no features of this specific requirement implemented that are not covered by the architecture specification.

**NOTE** (PRTTDCIS-1129)

The term "including" is never meant to be limiting - the list that follows is always non-exhaustive.

**SRS** (PRTTDCIS-1130)

Any requirements using the term "target" shall be interpreted as hard constraints to be respected during the design process, with any deviation being subject of agreement by the Purchaser. Any such constraints are currently motivated by:

- 1) Compliance with the DCIS TA; or
- 2) Federated Mission Network (FMN) compliance; or
- 3) Interoperability; or
- 4) Lessons Learned; or
- 5) Specific operational constraints.

**NOTE** (PRTTDCIS-1131)

The DCIS TA is neither an Applicable nor a Reference document in this SRS. The interpretation of the TA and its translation into requirements in the specification is the responsibility of the Purchaser.

**NOTE** (PRTTDCIS-1133)

The use of the term "notional" is to be interpreted as guidance only.

**SRS** (PRTTDCIS-1134)

When specifications and/or quantities are specified as "Design Driven", it shall be understood as being subject to design decisions and thus not prescribed by this specification.

**NOTE** (PRTTDCIS-1135)

Availability requirements are formulated in terms of Operational Availability. Assumptions are made for mean logistics delays based on positioning spares locally, at intermediate depots, or at centralized depots.

**SRS** (PRTTDCIS-4025)

The term "Withstand" shall be understood as that the equipment under specified climatic and environmental conditions is stored, transported, handled and shall operate without suffering degradation of system performance (gain, pattern type, sensitivity, etc.) and without suffering permanent mechanical damages.

**SRS** (PRTTDCIS-1523)

The term "enable" (or enabled) shall be understood as an enabling function; i.e. the capability needs to be implemented for, but no CIS equipment is to be installed or delivered. For example, if a rack needs to be "enabled" for the integration of a Radio Transmitter, it means that the rack is equipped with the radio transmitter integration kit (cabling, mounting shelves...), but the radio transmitter itself is not to be delivered.

**SRS** (PRTTDCIS-1846)

"Open" shall be understood as enabling the basic functionality to be modified or extended through mechanisms such as API and plugins without any proprietary constraints.

**NOTE** (PRTTDCIS-2109)

Housing elements are defined as the Non-CIS assets hosting the CIS components. Shelters, Cases (transit and transport) and Trailers are housing elements.

**NOTE** (PRTTDCIS-2917)

The term "User" refers to any personnel member accessing the DPOP and consuming its Services.

**NOTE** (PRTTDCIS-2918)

The term "End User" refers to any personnel member accessing the DPOP and consuming its Services and who is not a System Administrator.

**SRS** (PRTTDCIS-3235)

End-User Devices (EUD) is a naming convention and shall be understood as a generic term to refer to any user (End User or System Administrator) appliance such as Workstations, Phones, Printer, etc.

**SRS** (PRTTDCIS-3844)

The acronym HDD (Hard Disk Drive) shall be understood as a generic term to define a storage device, irrelevantly of the technology it is implemented with (e.g. Solid State).

**NOTE** (PRTTDCIS-3120)

The implementation of any given DPOP information security domains is called a Colour Cloud.

## 2.3 Architecture

**NOTE** (PRTTDCIS-2309)

All architecture diagrams are modeled using Archimate 3.1 modelling language.

**NOTE** (PRTTDCIS-1111)

The infrastructure supporting the DCIS capability is a system-of-systems and is broken down as follows:

- 1) *Deployable Point Of Presence (DPOP)* is a collection of Nodes; and,
- 2) *Node* is a collection of Modules built into Housing Elements, associated with Transmission Systems and User Appliances; and,
- 3) *Module* is a collection of Subsystems; and,
- 4) *Subsystem*, is a Functional blocks which provides Services; and,
- 5) *Components*, are the building blocks of the Subsystems; and,
- 6) *Element* is a generic term which can refer to any of blocks described above.

**SRS (PRTTDCIS-1112)**

The detailed system design shall adhere to, and shall be structured around, the system breakdown structure presented in the following figure.

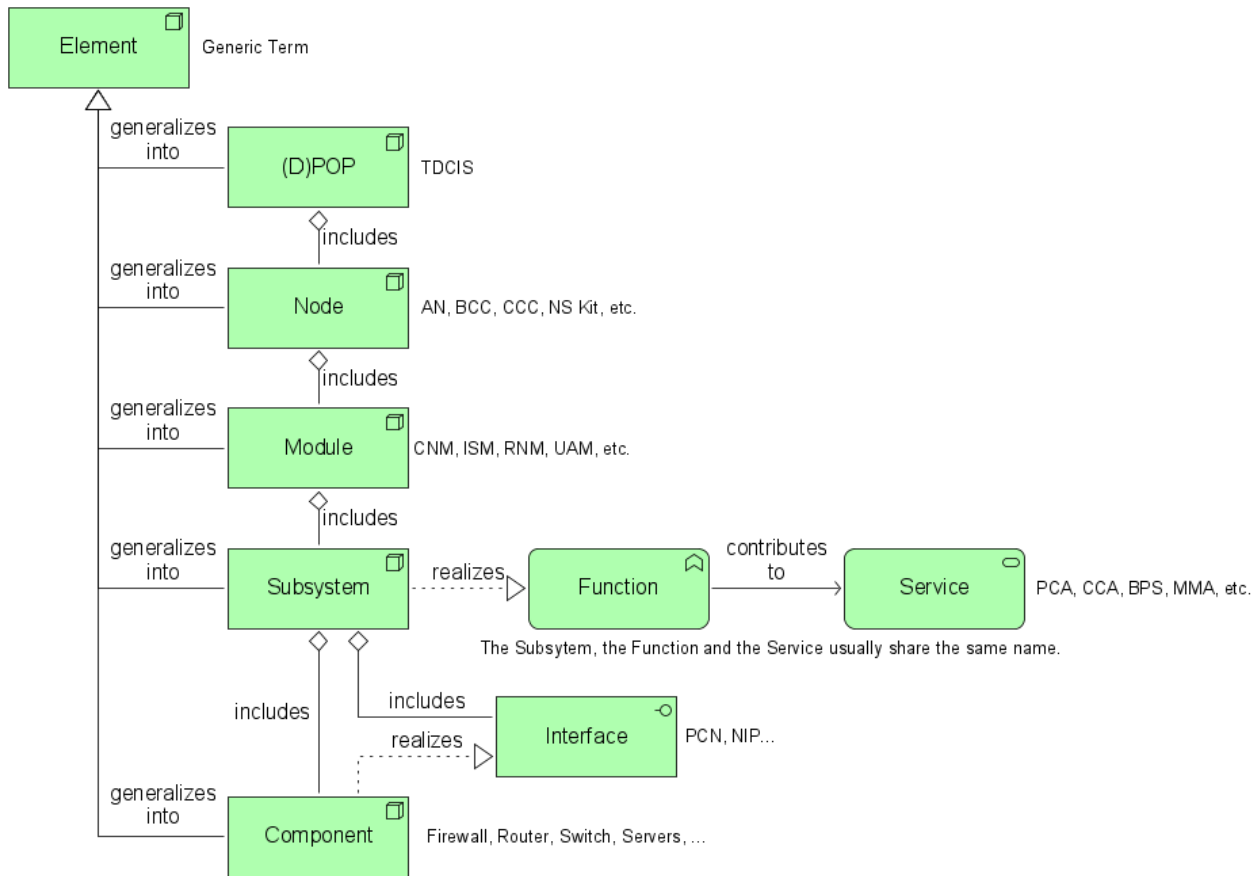


Figure 1 - Architecture Taxonomy

**NOTE (PRTTDCIS-1113)**

The TDCIS Nodes are built from Modules, Transmission Systems, and Housing elements.

**NOTE (PRTTDCIS-1163)**

The TDCIS System is considered as a DPOP, therefore TDCIS and DPOP terminology will be consistently and commonly used.

**NOTE (PRTTDCIS-1114)**

For each CIS Module, the functional and technical requirements will be:

- firstly provided at a Module level; then,
- by the requirements specific to each of the identified subsystems as a part of the preliminary design conveyed in this specification.

**SRS (PRTTDCIS-1115)**

Within this document the Functional Requirements are provided at module level, whereas the Technical (non-functional) Requirements are provided down to subsystem-level. The latter are derived from existing architectures and systems, which are proven and in operation, and detail the DPOP nodes where interoperability is critical. This specification contains Implementation Constraints which the Contractor shall adhere to when preparing the Low Level Design (LLD) specification.

**SRS (PRTTDCIS-4019)**

As illustrated in the following diagrams, a Variant Element shall be understood as a specialization of a Source Element.

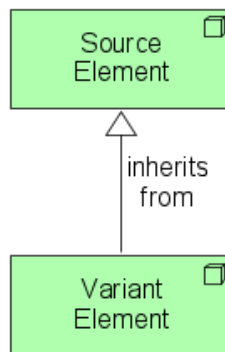


Figure 2 - Variant specialization

**SRS (PRTTDCIS-4020)**

Any set of specifications defined for a certain Element shall be automatically inherited by all its Variants. For instance, what is specified as to be implemented in xx shall be implemented in all Security Domains, what is specified as to be implemented in xU shall be implemented in all UNCLASSIFIED Domains, etc.

**SRS (PRTTDCIS-4021)**

Any set of specifications defined for a Variant Element shall supersede those from the Source it specializes from.

**SRS (PRTTDCIS-4022)**

What is specified as to be implemented in an Element, shall be implemented in all its Variants. For instance (non-exhaustive): what is specified to be implemented in xx shall be implemented in all Security Domains, what is specified as to be implemented in xU shall be implemented in all UNCLASSIFIED Domains, etc.

**SRS (PRTTDCIS-4023)**

A statement defined at a higher level shall automatically be applicable to all its composing elements unless specified otherwise at the element level. For instance: an Environmental Endurance target such as IPxx defined at (D)POP level is automatically applicable to all its composing elements; if the SATCOM Antenna Subsystem states a different IPzz (higher or lower) than the (D)POP level one, this IPzz will take precedence over the IPxx but only for the SATCOM Antenna Subsystem.

**SRS (PRTTDCIS-2092)**

An Element specific SRS statement shall always supersede global conventions.

**NOTE (PRTTDCIS-4237)**

Relationships between building blocks are complemented with text providing additional information. This textual information does not supersede the relationship definition as per Archimate standard.

**NOTE (PRTTDCIS-1116)**

Diagrams representing building blocks are coloured using standard Archimate 3.1 color scheme. The additional following conventions apply:

- 1) Coloured block with continuous border identifies Architectural Building Blocks which are in scope of the project and are project deliverables; and,
- 2) White block with dashed border identifies Architectural Building Blocks which relates to, influences or impacts the project but do not constitute project deliverables (e.g. Purchaser existing infrastructure or systems).

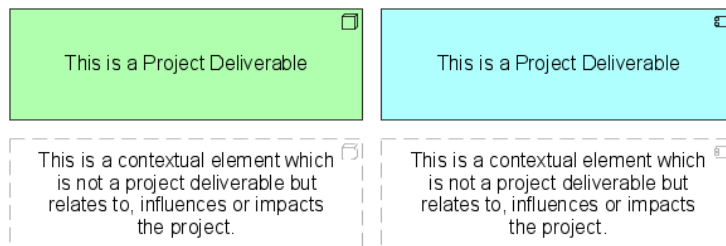


Figure 3 - Block styling convention

**NOTE (PRTTDCIS-4024)**

Purchaser Furnished Equipment (PFE) elements are identified with an additional PFE marking as illustrated on the following diagram.

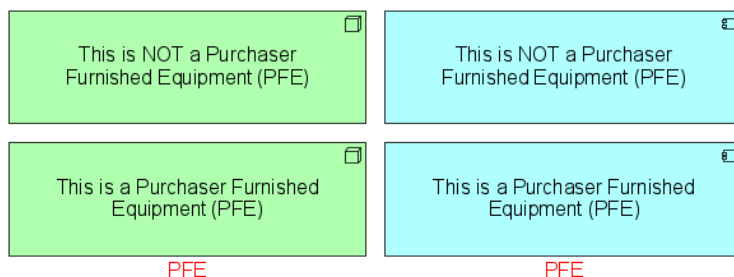


Figure 4 - PFE marking convention

**SRS** (PRTTDCIS-1117)

When calling for implementations conformant with the DCIS Cube Architecture (DCIS CA), it shall be understood as being in accordance with and conformant to the principles described in *DCIS Cube ADD Main, 2018*, and its *DCIS Cube ADD Annexes, 2018*, hereafter referred to as the DCIS CA Annexes. Where conformance to a specific DCIS CA Annex is required, in addition conformance to the DCIS CA as a whole is implicit.

**SRS** (PRTTDCIS-3090)

Implementation examples depicted in DCIS CA and its Annexes shall not be considered as an implementation constraint to deliver specific hardware and software; neither shall it exempt the Contractor from any acquisition regulation constraint.

**NOTE** (PRTTDCIS-1160)

This specification is based on the extant DCIS Target Architecture (TA) and it provides the foundation and the boundary conditions upon which this specification is built.

**NOTE** (PRTTDCIS-1161)

Boundary conditions are formulated as Technical Requirements and Implementation Constraints. In particular, Implementation constraints are introduced:

- 1) To minimize implementation risk, based on lessons learned; and,
- 2) To assure interoperability; and,
- 3) To minimize total cost of ownership across the entire pool of DCIS assets.

**SRS** (PRTTDCIS-1842)

Unless stated specifically, lines interconnecting elements in any figures (context, architecture, illustrative implementation...) are not intended to be representative of the actual number of interfaces/links between any pair of components. Those quantities shall be derived from the design, which shall in turn implement the minimum quantity of interfaces presented in the subsystem interface tables.

**SRS** (PRTTDCIS-3249)

The elements shall be modular in their construction to maximise commonality of components.

**SRS** (PRTTDCIS-3250)

As far as possible, the elements shall be implemented with Commercial Off-The-Shelf (COTS) solutions, field-proven in the Armed Forces of a NATO partner country or in a comparable industry, under similar geographical and climatic conditions.

**SRS** (PRTTDCIS-3251)

The DPOP shall be flexible and adaptable to meet the mission demands, but fundamentally, it shall be technologically robust and stable.

**SRS** (PRTTDCIS-3252)

The DPOP shall also have integrity and resilience and, where appropriate, have inbuilt redundancy.

**SRS** (PRTTDCIS-3253)

The design shall use modern software process and tooling that reduces the burden on the DPOP User and Administrators.

## 2.4 Units of Measurements

**SRS** (PRTTDCIS-4461)

The DPOP shall use metric system for all elements and documentation.

## 2.5 Computations

**SRS** (PRTTDCIS-1136)

The router throughput performances shall assume the following constant packet size distribution, representative of NATO DCIS traffic over the Wide Area Network (WAN):

- 1) IP packets sized  $\leq 64$  bytes is 25%; and,
- 2) IP packets sized  $64 < x < 127$  bytes is 20%; and,
- 3) IP packets sized  $128 < x < 255$  bytes is 9%; and,
- 4) IP packets sized  $256 < x < 511$  bytes is 5%; and,
- 5) IP packets sized  $512 < x < 1023$  bytes is 18%; and,
- 6) IP packets sized larger than 1024 bytes is 23 %.

**SRS** (PRTTDCIS-1503)

With respect to User Port quantities, the rule-set for modelling the design shall be as follows:

- 1 User requires 2.25 switch ports, noting that 1 User consists of:
  - 1 data-port; and,
  - 1 VoIP port, and,
  - Access to a printer at 0.25 port; and,
- Maximum port utilization is 90% on any given access switch; for example: for 48 port switches, a reserve of 5 ports shall be considered as per design.

**SRS** (PRTTDCIS-4271)

With respect to Virtual Compute and Storage, the design rule-set for oversubscription shall be as follows:

- vCPU: maximum 3 to 1 oversubscription; and,
- vRAM: maximum 1.2 to 1 oversubscription; and,
- Storage: no oversubscription.



## 2.6 Interfaces and Cables

### SRS (PRTTDCIS-2091)

Unless stated otherwise, Ethernet Network Termination Equipment shall be Small Form-Factor Pluggable (SFP)-based connectivity providing following variants:

- *Eth-Cu*: 100/1000 Copper RJ45 (Cat. 6 or better) Ethernet Interface;
- *Eth-FO-SR*: 1G/10G Multimode Fiber Optic (FO) Interface (Short Range);
- *Eth-FO-LR*: 1G/10G Single Mode Fiber Optic Interface (Long Range).

### SRS (PRTTDCIS-4262)

Ethernet interfaces shall support Virtual Local Area Network (VLAN) tagging in accordance with IEEE802.1Q:2011.

### SRS (PRTTDCIS-4265)

Copper Ethernet SFPs, where used, shall be able to operate at 100 Megabits per second (Mbps) and 1 Gigabits per second (Gbps).

### SRS (PRTTDCIS-4266)

10Mbps and 100Mbps Ethernet interfaces shall support both half-duplex and full-duplex, both configured through auto-negotiation and through manual configuration.

### SRS (PRTTDCIS-4267)

All 1000BASE-T interfaces shall support 1Gbps auto-negotiation and shall support manual configuration of the speed to 1000Mbps, to 100Mbps and to 10Mbps.

### SRS (PRTTDCIS-3822)

Ethernet Ports providing Power over Ethernet (PoE) shall not be of SFP type.

### SRS (PRTTDCIS-2093)

All physical connections shall have clear indication of the security domain that they are assigned with respect to the following coloring convention:

- Black label for BLK;
- Green label for xU;
- Blue label for xR;
- Red label for xS.

### SRS (PRTTDCIS-2385)

Labels shall be applied using a method that provides a legible, durable and non-fading result capable of withstanding exposure to the environmental conditions during operation, storage, transport and handling.

**SRS (PRTTDCIS-2386)**

Whenever possible, the labels shall be applied in such a manner that allows them to be visible after installation.

**SRS (PRTTDCIS-2388)**

The labels shall withstand the same environmental conditions as the equipment they are attached on (both for indoor and outdoor use).

**SRS (PRTTDCIS-2387)**

The labels shall be subject to the same environmental testing regime as the equipment they are attached on (both for indoor and outdoor use).

**SRS (PRTTDCIS-4026)**

Robust shielded cables, designed for tactical environment, shall be used to interconnect (D)POP elements.

**SRS (PRTTDCIS-4027)**

Insulating and sheathing compounds of all outdoor cables shall have minimum tensile strength of 12 N/mm<sup>2</sup> in compliance with IEC 60811-501:2012.

**SRS (PRTTDCIS-4028)**

All outdoor power and data cables shall be: water, rodent, trampling and Ultra Violet (UV) resistant according to EN 50289-4-17:2015 or its IEC, ISO equivalent.

**SRS (PRTTDCIS-4029)**

All outdoor data cables, as the minimum, shall meet following requirements:

- 1) Tensile load during installation: 1800N; and,
- 2) Tensile load during operation: 600N; and,
- 3) Impact resistance: 200 impacts (according to EIA/TIA-455-25 Military req. or equivalent standard); and,
- 4) Crush resistance: 440 N/cm (according to EIA/TIA-455-41 Military req. or equivalent standard).

**SRS (PRTTDCIS-4030)**

The regulations of ISO/IEC 11801-1:2017 or equivalent shall be followed for the dimensioning of the bending radius of cables.

**SRS (PRTTDCIS-4031)**

In Case MIL-DTL-38999 series III based connectors are used for Copper Ethernet interfaces, they shall have an internal RJ45 connector and a MIL-DTL-38999 series III shell.

**SRS** (PRTTDCIS-4032)

All data cables used for Ethernet Copper connections shall be CAT6 Shielded Foil Twisted Pair (SFTP).

**SRS** (PRTTDCIS-4577)

The Contractor shall apply industry best practices for cable routing, fixing, etc. when integrating Elements in racks.

## 2.7 Environmental Endurance

### 2.7.1 General

**NOTE** (PRTTDCIS-2390)

This section contains the maximum severities that equipment provided under this contract can be exposed to. When the equipment is not able to satisfy those severity levels (especially for solar radiation, rain/snow/hail, wind and humidity), the contractor can make use of enclosures to partially isolate the materiel from the most demanding conditions. When these sheltering enclosures are used, the equipment becomes part of an assembly, and the contractor is responsible to guarantee compliance of the complete assembly (including electrical and electronic equipment, enclosures, fixing and mounting hardware, and all supporting subsystems like heating or cooling) with the totality of the required climatic, environmental, mechanical, biological and chemical parameters and severities.

**NOTE** (PRTTDCIS-1137)

*NC3A Technical Note TN-1078, 2008* (hereafter referenced as TN-1078) defines minimal requirements with respect to: High temperature, Low temperature, Change of temperature (temperature shock), Solar radiation, Humidity, Rainfall, Ice, Hail, Snow load, Wind, Dust/sand particle size and concentration, Min/max elevation, Max/min atmospheric pressure, Shock, Vibration, Acceleration, Bump, Drop and topple, Free-fall, Ingress Protection Rating, Salt mist, Acid atmosphere, Contamination by fluids, Mould growth and Electro-Magnetic Compatibility (EMC).

**SRS** (PRTTDCIS-1138)

TN-1078 shall be considered as the reference for all subjects it covers.

**SRS** (PRTTDCIS-1139)

Any deviation from TN-1078 in this SRS will be clearly articulated, in that instance the deviation shall prevail.

**NOTE** (PRTTDCIS-1140)

Clarifications can be sought from; *NATO Standardization Agreement 4370, "Environmental Testing", Edition 7* - hereafter referenced as STANAG 4370 - and its associated NATO Allied Environmental Conditions and Test Publications, latest edition - hereafter referenced as AECTPs.

**SRS (PRTTDCIS-2391)**

For defining design and test criteria, the contractor shall address all climatic and environmental conditions as stipulated in TN-1078.

**SRS (PRTTDCIS-3108)**

The climatic and environmental conditions are divided into following specifications, where all modes (operation, transport, storage and handling) shall be addressed:

- Climatic specification; and,
- Mechanical specification; and,
- Sealing specification; and,
- Biological and Chemical specification.

**SRS (PRTTDCIS-3109)**

Proof of compliance to all specifications (climatic, mechanical, sealing, biological and chemical) stipulated in TN-1078 shall be demonstrated by testing performed in accordance with STANAG 4370 edition 7 and its all associated AECTPs or equivalent national or commercial standards.

**SRS (PRTTDCIS-2394)**

The environmental tests shall include series of tests conducted in EU or NATO country certified climatic chambers including following tests:

- High temperature; and,
- Low temperature; and,
- Change of temperature (temperature shock); and,
- Solar radiation; and,
- Humidity; and,
- Wind load; and,
- Ingress protection; and,
- Salt mist; and,
- Acidic atmosphere; and,
- Altitude, pressure; and,
- Combined stress testing.

**SRS (PRTTDCIS-3110)**

The mechanical tests shall include series of tests conducted in EU or NATO country certified laboratory/testing plant including following tests:

- Shock; and,
- Vibration; and,
- Acceleration; and,
- Bump; and,
- Drop and topple; and,
- Free fall.

**SRS (PRTTDCIS-1141)**

Where the requirements for testing methods specified in TN-1078 and STANAG 4370 and all its associated AECTPs are in conflict, STANAG 4370 and all its associated AECTPs shall prevail.

**SRS (PRTTDCIS-3111)**

Where the requirements for testing parameters (for example high and low temperature, temperature shock, humidity, pressure etc.) specified in TN-1078 and STANAG 4370 and all its associated AECTPs are in conflict, TN-1078 shall prevail.

**SRS (PRTTDCIS-3112)**

The (D)POP shall be able to withstand the Climatic specification with following additional comments on Test Conditions when packaged as designed during transportation, storage and handling:

- 1) High temperature: test methods according AECTP-300 Edition D, version 1, method 302; and,
- 2) Low temperature: test methods according AECTP-300 Edition D, version 1, method 303; and,
- 3) Change of temperature (temperature shock): test methods according AECTP-300 Edition D, version 1, method 304; and,
- 4) Solar radiation: test methods according to AECTP-300 Edition D, version 1 method 305; and,
- 5) Humidity: test methods according to MIL-STD-810H METHOD 507.6 ; and,
- 6) Rainfall: test methods according to AECTP-300 Edition D, version 1 method 310; and,
- 7) Ice: test methods according to AECTP-300 Edition D, version 1 method 311; and,
- 8) Dust/sand particle size and particle concentration: test methods according to AECTP-300 Edition D, version 1 method 313; and,
- 9) Maximum elevation and atmospheric pressure: test methods according to
  - 1) AECTP-300 Edition D, version 1 method 301; or,
  - 2) MIL-STD-810G, 2008, Method 500.5; or,
  - 3) MIL-STD-810G w/Change 1, 2014, Method 500.6; or,
  - 4) MIL-STD-810H, 2019, Method 500.6.

**SRS (PRTTDCIS-3113)**

The (D)POP shall be able to withstand the Mechanical specifications with following additional comments on Test Conditions when packaged as designed during transportation, storage and handling:

- 1) According to STANAG 7213, Edition 1 and its associated ATP-3.3.4.1 Edition A, Version 1 (Tactics, Techniques and Procedures for NATO Air Movements) all cargo, whether or not on pallets or platforms, when carried in aircraft, shall be restrained to the following minimum ultimate factors:
  - 1) Forward 3.0g; and,
  - 2) Side 1.5g; and,
  - 3) Aft 1.5g; and,
  - 4) Vertical (up) 2.0g; and,
- 2) Shock: 10 G peak value (11 ms, half sine mechanical shock) according to
  - 1) AECTP-400, Edition D Version 1 , Method 403; or,
  - 2) IEC 60068-2-27:2008; or,
  - 3) MIL-STD-810G, 2008, Method 516.6, Procedure I; or,
  - 4) MIL-STD-810G w/Change 1, 2014, method 516.7, Procedure I; or,
  - 5) MIL-STD-810H, 2019, method 516.8, Procedure I; or,
  - 6) AECTP-400, Edition D Version 1, method 403; or,
  - 7) IEC 60068-2-27:2008; and,
- 3) Vibration as per TN-1078 with the following additional comment: test methods according to
  - 1) AECTP-400, Edition D, Version 1, Method 401; or
  - 2) IEC 60068-2-64:2008 +AMD1:2019 CSV; or,
  - 3) MIL-STD-810G, 2008, Method 514.6; or
  - 4) MIL-STD-810G w/Change 1, 2014, Method 514.7; or
  - 5) MIL-STD-810H, 2019, Method 514.8; and,
- 4) Acceleration as per TN-1078 with the following additional comment: with  $\leq 10g$  for transport and  $\leq 2g$  for storage and handling; and, test methods according to
  - 1) IEC 60068-2-7:1983+AMD1:1986 CSV; or,
  - 2) MIL-STD-810G, 2008, Method 513.6; or,
  - 3) MIL-STD-810G w/Change 1, 2014, method 513.7; or,
  - 4) MIL-STD-810H, 2019, method 513.8; and,
- 5) Bump as per TN-1078 with the following additional comment: with 10g, 6 ms, 1000 pulses for transport, storage and handling and test methods according to IEC 60068-2-27:2008; and,
- 6) Drop and topple as per TN-1078 with the following additional comment: test methods according to
  - 1) IEC 60068-2-31:2008; or,
  - 2) ISO 8768; or,
  - 3) MIL-STD-810G, 2008, Method 516.6, Procedure IV; or,
  - 4) MIL-STD-810G w/Change 1, 2014, method 516.7, Procedure IV; or,
  - 5) MIL-STD-810H, 2019, method 516.8, Procedure IV; and,
- 7) Free fall as per TN-1078 with the following additional comment: test methods according to IEC 60068-2-31:2008.

**SRS (PRTTDCIS-4033)**

A component defined as Semi-Rugged shall

- Withstand a drop to concrete surface from the height of 75 cm, without any additional protective accessory (i.e. case, rubber boot, etc.) beyond those belonging to the component itself, while being operated. The component shall be dropped on all sides to verify its ability to withstand shock from any direction. Particularly, the display, and other sensitive components shall be tested to verify if they withstand the shock and operate properly; and,
- Have an ingress protection rating of IP 53 as a minimum; and,
- Withstand High Temperature of +49 degree Celsius while being operated; and,
- Withstand Low Temperature of -20 degree Celsius while being operated; and,
- Withstand road test condition while being docked in the vehicle and being operated.

**SRS (PRTTDCIS-2484)**

The DPOP shall be subject to the acceptance road test.

**SRS (PRTTDCIS-2485)**

If not otherwise specified, all tests shall be performed according to commonly used practices for material test methods or standards (e .g. DIN, ISO and/or MIL-STDs).

**SRS (PRTTDCIS-2486)**

The acceptance road test shall be a rugged road test over the distance of 100km including 10km off-road.

**SRS (PRTTDCIS-2487)**

The equipment under the acceptance road test shall be capable of withstanding the shocks and vibrations induced by ground transport equipment over the mobility courses described for Type V mobility in SAE-AS8090.

**SRS (PRTTDCIS-2488)**

The (D)POP under road test shall be towed by or mounted on a vehicle on all-roads: motorway at 80 km/h, unpaved road (e.g. a gravel road) at 50 km/h and country road at 25 km/h, without sustaining any damage. This shall be demonstrated by a test in which the (D)POP attached to a vehicle will be driven over test tracks. For the verification of these requirements, the following procedures shall be applied in addition to the roadworthiness test:

- Road test over a level hard surface (asphalt or concrete) with a specially prepared course; and,
- The course shall have twelve 10 x 20 cm boards placed 7.5 m apart on the 20 cm face and with the 10 cm face fully above the ground. The edges shall have a 2.5 x 2.5 cm bevel. The sixth and twelfth boards shall be placed 45° to the direction of travel; all the other ones will be placed perpendicular to the direction of travel. The boards shall be long enough to span the vehicle/trailer and shall be anchored securely; and,
- The DPOP shall be subjected to ten (10) laps of the course (one lap is defined as traversing the course in one direction) at each of the following speeds: 8 km/h, 15 km/h, 25 km/h and 30 km/h:
  - After the road test, all (D)POP elements will be inspected using methods defined in the SOW; and,
  - After the test there shall be no evidence of permanent deformation, delamination, buckling or any damage to any of the (D)POP elements.

**SRS (PRTTDCIS-3114)**

The (D)POP shall be able to withstand the Sealing specifications with following additional comments on Test Conditions when packaged as designed during transportation, storage and handling:

- 1) for immersion test methods according to AECTP-300 Edition D, version 1 method 307; and,
- 2) other requirements according to IEC 60529:1989+AMD1:1999+AMD2:2013 CSV.

**SRS (PRTTDCIS-3115)**

The (D)POP shall be able to withstand the Biological and Chemical specification with following additional comments on Test Conditions when packaged as designed during transportation, storage and handling:

- 1) Salt mist: test methods according to AECTP-300 Edition D, version 1 method 309 or IEC 60068-2-52:2017 RLV; and,
- 2) Acid atmosphere: test methods according to AECTP-300 Edition D, version 1 method 319 or MIL-STD-810H method 518.2; and,
- 3) Contamination by fluids: test methods according to AECTP-300 Edition D, version 1 method 314 or MIL-STD-810H method 504.3; and,
- 4) Mould growth: test methods according to AECTP-300 Edition D, version 1 method 308.

**SRS (PRTTDCIS-3245)**

When (D)POP elements are packaged as designed during transportation, storage and handling, all outdoor exposed materials (painted surfaces, sealing, etc.) shall be resistant to Biological and Chemical (BC) contaminants and decontamination agents according to STANAG 4521 edition 2 - NATO AEP-7, edition 5: Chemical, Biological, Radiological and Nuclear (CBRN) contamination survivability factors in the design, testing and acceptance of military equipment.



**SRS** (PRTTDCIS-2110)

All Housing Elements, when exposed to climatic and environmental conditions as defined in TN-1078 (climatic, mechanical, sealing, biological and chemical) shall assure that equipment housed in them meets respective manufacturer climatic and environmental specifications for:

- Operation; and,
- Transport; and,
- Storage and handling.

**SRS** (PRTTDCIS-2481)

The design of Housing Elements and components to be housed in them shall assure that no active heating and cooling is required for transport, storage, and handling.

**SRS** (PRTTDCIS-2455)

Shelter shall be capable of being submerged for a minimum of 2cm from the bottom of the entry door while all drain caps are fully submerged, for 30 minutes without the use of additional external sealing, caulking, taping, and so forth. No water ingress shall be detected.

**SRS** (PRTTDCIS-2564)

Equipment shall meet IP Rating, stipulated in TN-1078, without the use of additional external sealing, caulking, taping, and so forth.

**SRS** (PRTTDCIS-3117)

The IP ratings, stipulated in TN-1078, shall be in compliance with IEC 60529:1989, AMD1:1999 and AMD2:2013.

**SRS** (PRTTDCIS-2420)

All outdoor assemblies and sub-assemblies (Housing Elements, CIS Components (e.g. Antenna, Mast, ODU ...)...) under full operational configuration, shall be capable of withstanding ice accumulation without suffering degradation of system performance (gain, pattern type, sensitivity) and without suffering permanent mechanical damage.

**SRS** (PRTTDCIS-3116)

All outdoor assemblies and sub-assemblies (Housing Elements, CIS Components (e.g. Antenna, Mast, ODU ...)...) under full operational configuration, shall not permit water accumulation in pockets, creases, fissures or depressions that could cause structural damage upon freezing.

**NOTE** (PRTTDCIS-4034)

TN-1078 does not contain a Climatic and Environmental Conditions State (i.e. OPE-xx) fitting all PRT TDCIS Operational Use Cases. To that end, OPE-1c is defined in the next section.

## 2.7.2 Climatic and Environmental Specification for Deployable CIS Assets to be used in tactical exposure conditions (OPE-1c)

### SRS (PRTTDCIS-4035)

OPE-1c State, as defined in this section, shall be considered the same as any other OPE-xx from TN-1078.

### SRS (PRTTDCIS-4036)

OPE-1c compliant Elements shall withstand High Temperature as follow:

- +60 degree Celsius for operation; and,
- +78 degree Celsius for transport, storage and handling.

### SRS (PRTTDCIS-4037)

OPE-1c compliant Elements shall withstand Low Temperature as follow:

- 0 degree Celsius for operation; and,
- -20 degree Celsius for transport, storage and handling.

### SRS (PRTTDCIS-4038)

OPE-1c compliant Elements shall withstand Change of Temperature (temperature shock) as follow:

- For heat radiating devices, 13.4 degree Celsius/min during equipment switch-on. For non-heat radiating devices, or during steady operation, 0.12 degree Celsius/min; and,
- 0.12 degree Celsius/min for natural conditions during transport. 3.5 degree Celsius/min if equipment may be subject to air drops. When moved from open environment into an acclimatised area, the equipment in the applicable storage /transport packaging shall withstand the maximum expected temperature variation of 63 degree Celsius; and,
- 0.12 degree Celsius/min for natural conditions during storage and handling. When moved from open environment into an acclimatised area, the equipment in the applicable storage/transport packaging shall withstand the maximum expected temperature variation of 63 degree Celsius.

### SRS (PRTTDCIS-4039)

OPE-1c compliant Elements shall withstand Solar Radiation up to 1120 W/m<sup>2</sup> for operation, transport, storage and handling.

### SRS (PRTTDCIS-4040)

OPE-1c compliant Elements shall withstand Humidity from 5% to 95% for operation, storage, transport and handling with the applicable change of temperature.

### SRS (PRTTDCIS-4041)

OPE-1c compliant Elements shall withstand Rainfall up to 2.38 mm/min for storage, transport and handling, with short duration peaks of up to 41.5 mm/min.

**SRS (PRTTDCIS-4042)**

OPE-1c compliant Elements shall withstand Ice up to 37 mm for transport, storage and handling.

**SRS (PRTTDCIS-4043)**

OPE-1c compliant Elements shall withstand Hailstones up to 25 mm diameter, 0.9 g/m<sup>3</sup> density and 58 m/s terminal velocity for transport, storage and handling.

**SRS (PRTTDCIS-4044)**

OPE-1c compliant Elements shall withstand Snow Load up to 50 kg/m<sup>2</sup> for transport, storage and handling.

**SRS (PRTTDCIS-4045)**

OPE-1c compliant Elements shall withstand Dust and Sand particle size and concentration as follow:

- Up to 2.0 g/m<sup>3</sup> of 150 micrometer particles for operation, transport, storage and handling. Sedimentation rate as high as 2.0 g/m<sup>2</sup>/day; and,
- Average particle hardness of 7 in the Mohs scale, occasionally reaching 9 on that scale.

**SRS (PRTTDCIS-4046)**

OPE-1c compliant Elements shall withstand Maximum elevation as follow:

- 4,570 m for operation, storage and handling; and,
- 12,000 m for transport.

**SRS (PRTTDCIS-4047)**

OPE-1c compliant Elements shall withstand Maximum and minimum atmospheric pressure from 1,087 mbar to 154 mbar for operation, transport, storage and handling.

**SRS (PRTTDCIS-4048)**

OPE-1c compliant Elements shall withstand Shock at a minimum peak value of 10G and pulse duration of 11ms for operation, transport, storage and handling.

**SRS (PRTTDCIS-4049)**

OPE-1c compliant Elements shall withstand Vibration as defined for OPE-1a.

**SRS (PRTTDCIS-4050)**

OPE-1c compliant Elements shall withstand Acceleration as defined for OPE-1a.

**SRS (PRTTDCIS-4051)**

OPE-1c compliant Elements shall withstand Bump at 10g, 6ms, 1000 pulses for operation, transport, storage and handling.

**SRS (PRTTDCIS-4052)**

OPE-1c compliant Elements shall withstand Drop and topple at a 30 degree angle face and corner during operation, transport, storage and handling.

**SRS (PRTTDCIS-4053)**

OPE-1c compliant Elements shall withstand Free Fall for operation, transport, storage and handling as follow:

- 1000 mm for items <2 kg; and,
- 500 mm for items from 2 kg to <5 kg; and,
- 250 mm for items from 5 kg to <10 kg; and,
- 100 mm for items from 10 kg to <50 kg.

**SRS (PRTTDCIS-4054)**

OPE-1c compliant Elements shall comply with IP rating as follow:

- IP67 for operation, transport, storage and handling for outdoor cables and connectors; and,
- IP65 for operation, transport, storage and handling for outdoor enclosures; and,
- IP54 for outdoor antennas and associated electronics/ mechanisms, when in operation, and IP55 when in transport, storage and handling; and,
- IP42 for outdoor portable terminals when in operation, and IP55 when in transport, storage and handling; and,
- IP41 for outdoor use handheld terminals when in operation, and IP55 when in transport, storage and handling.

**SRS (PRTTDCIS-4055)**

OPE-1c compliant Elements shall withstand Salt mist environments at severity level 4, as described in TN-1078, Section K.3.1.5, for all operation, transport, storage and handling.

**SRS (PRTTDCIS-4056)**

OPE-1c compliant Elements shall withstand, in the pertaining operating configuration (i.e., when properly mounted in the intended assembly), occasional exposure to the acid rainfall conditions existing in heavily industrialized areas or in the proximity of fuel burning machinery or vehicles exhaust systems.

**SRS (PRTTDCIS-4057)**

OPE-1c compliant Elements shall withstand occasional contamination by exposure to the contaminant fluids listed in MIL-STD-810H, Table 504.3-I.

## 2.8 CIS Security

**SRS (PRTTDCIS-1155)**

All the CIS equipment involving firmware and software, and integrated into or directly supporting the (D)POP, shall be hardened in accordance with the Purchaser's standard security hardening settings, to be provided after Contract Award (CAW).

**SRS** (PRTTDCIS-1156)

Each CIS Module shall be implemented with distinct physically independent elements per security domain.

**SRS** (PRTTDCIS-1227)

The (D)POP shall employ technology solutions that conforms to the NATO Technical and Implementation Directive on CIS Security AC/322-D/0048-REV3 (hereafter referenced as D48Rev3).

**SRS** (PRTTDCIS-4320)

User Password credentials shall comply with NATO approved password hashing algorithms as per AC/322-D(2012)0022, 2020 policy.

**SRS** (PRTTDCIS-4073)

Any element including passwords shall allow modification of these passwords.

**NOTE** (PRTTDCIS-4319)

The NATO Information Assurance Product Catalogue (NIAPC - <https://www.ia.nato.int/niapc/>) provides NATO nations, and NATO civil and military bodies with a catalogue of Information Assurance (IA) Products, Protection Profiles and Packages that are in use or available for procurement to meet operational requirements.

## 2.9 EMC and EMSEC

**NOTE** (PRTTDCIS-1142)

Electromagnetic Compatibility (EMC) is a measure of a device's ability to operate as intended in its shared operating environment while, at the same time, not affecting the ability of other equipment within the same environment to operate as intended.

**NOTE** (PRTTDCIS-4058)

Electromagnetic Interference (EMI), is a disturbance generated by an electrical device, an electronic device or natural sources that can adversely affect (by electromagnetic induction, electrostatic coupling, or conduction) the performance of other electrical or electronic device located within the same environment.

**NOTE** (PRTTDCIS-2389)

Emission Security (EMSEC) is an analysis of a system's vulnerability to unauthorized access and subsequent exploitation as a result of issues with electromagnetic emanations from hardware.

**NOTE** (PRTTDCIS-1143)

TEMPEST concerns preventing attacks using compromising radio frequency emanations.

**SRS** (PRTTDCIS-1144)

All CIS Nodes, Modules and their electric and electronic components shall comply with the EMC requirements as contained in the *MIL-STD-461G*, latest edition (hereafter referred to as MIL-STD-461G).

**SRS** (PRTTDCIS-3336)

All CIS Nodes, Modules and their electric and electronic components shall comply with the Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.

**SRS** (PRTTDCIS-1145)

All CIS Nodes, Modules and their electric and electronic components (inc. EUD) shall be compliant with *SDIP-29/2*, (hereafter referred to as SDIP-29/2).

**SRS** (PRTTDCIS-1146)

SDIP-29/2 compliance shall take into consideration the RED/BLACK separation on power lines, equipment and associated data lines (i.e. filters on power lines, minimum distance between RED and BLACK lines, and between RED and BLACK equipment, when operated).

**SRS** (PRTTDCIS-4059)

All CIS Nodes, Modules and their electric and electronic components shall be compliant with *CIS Security Technical and Implementation Directive on Emission Security, AC/322-D(2019)0021(INV)*, latest edition.

**NOTE** (PRTTDCIS-2396)

Unless stated otherwise, Fiber cables will be preferred on xS to avoid the need for separation.

**SRS** (PRTTDCIS-2469)

TEMPEST testing and certification shall only be performed by approved providers listed on the NIAPC.

**SRS** (PRTTDCIS-1150)

When not implemented at Component level, all CIS Nodes and Modules shall implement power filter within their housing element (e.g. transit case or shelter) as per SDIP 29/2.

**SRS** (PRTTDCIS-2470)

The contractor shall implement Power filters with a minimum attenuation of 60 dB over the frequency range from 100 kHz to 1 GHz (as per SDIP-29/2).

**SRS** (PRTTDCIS-1151)

It shall be possible to restore TEMPEST sealing, in theatre, following the replacement of one or more components.

## 2.10 International Mobile Telecom

### NOTE (PRTTDCIS-4060)

Different International Mobile Telecommunication (IMT) terms and names, referring to technology elements, families and generations, are utilized throughout this document. The following are the terminology conventions followed throughout this Document.

### NOTE (PRTTDCIS-4061)

The 3rd Generation Partnership Project (3GPP) is a worldwide recognized specifications body, whose specifications meet the International Telecommunication Union (ITU) targets for IMT systems. 3GPP specifications ensure multinational and multi-manufacturer interoperability. When accepted by ITU, 3GPP specifications are adopted as ITU standards.

### SRS (PRTTDCIS-4062)

Public Mobile Network Operators (MNO) or Private Provider shall be understood as the entity responsible for the procurement, operation and maintenance of IMT networks and enabling services and applications to users.

### SRS (PRTTDCIS-4063)

IMT User Equipment (IMT-UE) shall be understood as the mobile device, which can take the form of several instantiations (smart personal devices, terminals, dongles, embedded devices, etc.) and provides access to the public MNO or private provider services and applications.

### SRS (PRTTDCIS-4064)

Radio Access Network (RAN) shall be understood as the fixed infrastructure, owned and operated by a public MNO or private provider, with the role to wirelessly connect IMT-UE and the public MNO / private provider fixed network.

### SRS (PRTTDCIS-4065)

Radio Access Technology (RAT) shall be understood as the underlying technology, typically operating at the physical and data link layers, which enables the wireless connection between IMT-UEs and the RAN.

### SRS (PRTTDCIS-4066)

IMT Core Network (IMT-CN) shall be understood as the fixed infrastructure, owned and operated by a public MNO or private provider, with the role to provide network functions (control, management, billing ,etc.) and data transport services, connecting the IMT-UE to a data network (usually the Public Internet).

**SRS (PRTTDCIS-4067)**

UMTS shall be understood as 3GPP's Universal Mobile Telecommunications System (UMTS) family of technologies with:

- UMTS Terrestrial Radio Access Network (UTRAN) being the radio interface technology of the UMTS system; and,
- UMTS Core Network being the infrastructure providing the network functions and data transport services of the UMTS system.

**SRS (PRTTDCIS-4068)**

LTE shall be understood as the 3GPP's Long-Term Evolution (LTE) family of technologies with:

- Evolved Universal Terrestrial Radio Access (E-UTRA) being the radio interface technology of the LTE system; and,
- Evolved Packet Core (EPC) being the infrastructure providing the network functions and data transport services of the LTE system.

**SRS (PRTTDCIS-4069)**

A 5G system shall be understood as 3GPP's technologies superseding LTE technologies with:

- 5G New Radio (5G NR) being the radio interface technology of the 5G system; and,
- 5G Core (5GC) being the infrastructure providing the network functions and data transport services of the 5G system.

**SRS (PRTTDCIS-4070)**

3G shall be understood as the 3rd generation technologies meeting the IMT2000 standards from ITU, from UMTS-family of 3GPP releases (3GPP Release 99 to 7) up to early LTE-family of releases (3GPP Release 8 and 9) .

**SRS (PRTTDCIS-4071)**

4G shall be understood as the 4th generation technologies meeting the IMT-Advanced standards from ITU, from LTE-family of 3GPP Release 10 onwards.

**SRS (PRTTDCIS-4072)**

5G (as a generation) shall be understood as the 5th generation technologies meeting the IMT-2020 standards from ITU, by LTE-family of 3GPP releases and by 5G family of 3GPP releases from Release 15 onwards.

## 2.11 Timing

**SRS (PRTTDCIS-1157)**

Elements requiring timing shall primarily rely on the Network Time Protocol (NTP) feed from the static infrastructure when available.



**SRS** (PRTTDCIS-4074)

The Contractor shall design the (D)POP in such a way that its Elements will continue to operate without performance degradation even if NTP feed becomes unavailable.

## 2.12 Electricity

### 2.12.1 General

**SRS** (PRTTDCIS-2310)

Electrical design and installation shall be compliant with following publications:

- Directive 2014/35/EU of The European Parliament and of The Council of 26 February 2014 – ‘low voltage directive’ ; and,
- EN 50110-1:2013 Operation of electrical installations. General requirements ; and,
- IEC 60364 series - Low-voltage electrical installations ; and,
- IEC 60309 series - Plugs, socket-outlets and couplers for industrial purposes ; and,
- IEC 61508:2010 - Functional safety of electrical/electronic/programmable electronic safety-related systems – Parts 1 to 7.

**SRS** (PRTTDCIS-3106)

Trailer electrical design and installation shall comply with STANAG 2601 edition 4 and associated Allied Engineering Publication (AEP) – 2601 Edition A, version 1.

**SRS** (PRTTDCIS-3829)

230VAC shall be understood as per IEC 60038 standard.

**SRS** (PRTTDCIS-3818)

All 230VAC power plugs shall be of CEE 7/7 type, compatible with both type E (French) and type F (Schuko) power sockets.

**SRS** (PRTTDCIS-2149)

Electrical distribution shall be in accordance to Portuguese National Regulations.

### 2.12.2 Electrical Grounding

**SRS** (PRTTDCIS-4082)

The power distribution and conditioning shall implement a grounding and potential equalization system, which shall provide effective protection for personnel.

**SRS** (PRTTDCIS-4083)

All metallic frames, transformers and electrical apparatus shall be connected to the frame ground.

**SRS** (PRTTDCIS-4084)

All metallic panels and covers shall be fastened or connected to the associated frame, in a manner that ensures that they are securely grounded.

**SRS** (PRTTDCIS-4085)

Safety grounding and potential equalization shall be implemented in accordance with safety regulations, including IEC 60364-5-54:2011 and AMD1:2021 CSV.

**2.12.3 Uninterruptible Power Supply****SRS** (PRTTDCIS-1792)

Uninterruptible Power Supply (UPS) shall provide protection against data loss and CIS components damage due to power failures, voltage dips, voltage spikes, under voltage, overvoltage, switching spikes, interference voltages, frequency changes and harmonic distortion.

**SRS** (PRTTDCIS-4075)

UPS shall be compliant with:

- 1) IEC 62040-1:2017/COR1:2019 Corrigendum 1 - Uninterruptible power systems (UPS) - Part 1: Safety requirements; and,
- 2) IEC 62040-2:2016 Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements; and,
- 3) IEC 62040-3:2011 Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements; and,
- 4) IEC 62040-4:2013 Uninterruptible power systems (UPS) - Part 4: Environmental aspects - Requirements and reporting.

**SRS** (PRTTDCIS-4076)

UPS shall meet following requirements:

- 1) On line, double conversion type; and,
- 2) Power factor: 0.9; and,
- 3) Total Harmonic Distortion (THD): < 5% in accordance with IEC TS 61000-3-4; and,
- 4) System efficiency: > 90% at full load; and,
- 5) Soft start; and,
- 6) Zero transfer time; and,
- 7) Surge suppressor; and,
- 8) Static bypass for overload; and,
- 9) Manual bypass for maintenance; and,
- 10) Battery monitoring; and,
- 11) Protection against deep discharge of batteries; and,
- 12) Hot swappable (replacement of the batteries shall be possible without powering down the UPS), rechargeable and user replaceable batteries; and,
- 13) The sound pressure level shall not exceed 65 dB(A) at 1 meter distance in accordance with ISO 3746:2010.

**SRS** (PRTTDCIS-4077)

UPS batteries shall be provided with Material Safety Data Sheet (MSDS) as required by International Civil Aviation Organization (ICAO), and International Air Transportation Association (IATA) for air transportation of dangerous goods.

**SRS** (PRTTDCIS-4078)

The battery MSDS shall confirm the batteries testing and certification according to United Nations publication: *Manual of Tests and Criteria for Transportation of Dangerous Goods, part III, subsection 38.3, transport class 9.*

**SRS** (PRTTDCIS-4079)

UPS batteries shall be capable of operating safely in a low ventilation environment.

**SRS** (PRTTDCIS-4080)

Minimum operating life-time of UPS batteries shall be FIVE (05) years.

**SRS** (PRTTDCIS-4081)

UPS shall take single phase Mains/Generator TN-S Supply in accordance with the International Electrotechnical Commission, (IEC) 60038 standard, to power and operate Elements.

**NOTE** (PRTTDCIS-4509)

In architecture diagrams, UPS are shown as included in housing elements. However, UPS implementations are Design Driven. e.g. it may be implemented as a single system supporting multiple elements in the same housing solution, as an embedded or extension of a single element or any combination of those, as long as the UPS implementation does not impact any Functional and Technical Requirements, Implementation Constraints and Performance Targets.

## 2.13 Lightning Protection

**SRS** (PRTTDCIS-2198)

The contractor shall design the most suitable solution for the (D)POP to ensure lightning protection of (D)POP Elements and human life.

**SRS** (PRTTDCIS-2202)

The Elements shall not be damaged and shall continue to operate without degradation when subjected to the lightning waveforms conforming to STANAG 4370 edition 7, AECTP 250 - leaflet 254 atmospheric electricity and lightning.

**SRS (PRTTDCIS-2203)**

Appropriate Surge Protection Devices (SPD) and other lightning protection measures shall be compliant with following publications:

- IEC 61643-11:2011 ; and,
- IEC 62305:2022 SER ; and,
- IEC 61643-21:2000+AMD1:2008+AMD2:2012 CSV ; and,
- IEC 61643-22:2015.

**SRS (PRTTDCIS-2204)**

Where applicable, the earth electrode (e.g. wire and penetration rods) system shall be able to handle the lightning current for dispersal into the ground.

**SRS (PRTTDCIS-2199)**

The Lighting Protection System and Grounding System shall be in in compliance with IEC 62305:2022 SER and IEC 60364 series.

**SRS (PRTTDCIS-3212)**

SPD shall be provided of at least T1+T2 class for Alternating Current (AC) supply systems and T3 for sensitive communication systems.

**SRS (PRTTDCIS-4632)**

SPD shall be provided of at least T2 class for Direct Current (DC) supply systems.

**SRS (PRTTDCIS-4086)**

The (D)POP Lightning Protection and EMI/EMC measures shall be compatible with each other.

**SRS (PRTTDCIS-4087)**

The grounding cable for Lightning Protection, where applicable, shall be minimum 10 meters long.

## 2.14 Environmental Control

**SRS (PRTTDCIS-3101)**

Environmental Control Units (ECU) design and implementation shall be compliant with following publications:

- Regulation (EC) No 1005/2009 of the European Parliament and of the Council of 16 September 2009 (on substances that deplete the ozone layer); and,
- Pressure Equipment Directive 2014/68/EU, CE marked and provided with EC Declaration of Conformity; and,
- Regulation (EU) No 517/2014 of the European Parliament and of the Council of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006; and,
- EN – 378 series: Refrigerating systems and heat pumps. Safety and environmental requirements.

**SRS (PRTTDCIS-3102)**

The ECU shall be of so called "on/off"-design avoiding use of inverter.

**SRS (PRTTDCIS-3103)**

The ECU refrigerant shall be NON-flammable according to EN 378-3:2016+A1:2020.

**SRS (PRTTDCIS-3104)**

Hydrofluoroolefines (HFO) refrigerants shall not be used.

## 2.15 Road Regulation

**SRS (PRTTDCIS-2264)**

Trailers shall comply with all applicable regulations of Portugal.

**SRS (PRTTDCIS-2483)**

Trailer shall be designed and manufactured to comply with applicable European Union (EU) safety regulations, standards and requirements.

**SRS (PRTTDCIS-3118)**

Trailer shall be compliant with the following publications:

- Regulation (EC) No 661/2009 of the European Parliament and of the Council of 13 July 2009 concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor; and,
- Regulation (EU) 2018/858 of the European Parliament and of the Council of 30 May 2018 on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, amending Regulations (EC) No 715/2007 and (EC) No 595/2009 and repealing Directive 2007/46/EC.

**SRS (PRTTDCIS-2490)**

With its delivery each trailer shall be provided with expert reports by competent test organizations to prove the compliance with public road traffic and public road traffic licensing regulations, safety regulations and accident preventing regulations in accordance with EU Directives mentioned below.

**SRS (PRTTDCIS-2491)**

Trailers shall be supplied with the necessary documents required for its registration in Portugal.

**SRS (PRTTDCIS-2493)**

Trailers shall be provided with:

- EU Type-approval Certificate, EU Certificate of Conformity in accordance with Regulation (EU) 2018/858 of the European Parliament and of the Council of 30 May 2018 on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, amending Regulations (EC) No 715/2007 and (EC) No 595/2009 and repealing Directive 2007/46/EC; and,
- Roadworthiness Certificate in accordance with Directive 2014/45/EU of the European Parliament and of the Council of 3 April 2014 on periodic roadworthiness tests for motor vehicles and their trailers and repealing Directive 2009/40/EC; and,
- ADR Certificate in accordance with Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR) applicable as from 1 January 2021.

## 2.16 Transportation

**SRS (PRTTDCIS-2265)**

When in the Storage/Transportation mode, the trailer and the shelter weight with all the equipment it carries shall be distributed as evenly as possible over the trailer frame in accordance with STANAG 2236 Multimodal Transport Issues - AMovP-5.

**SRS (PRTTDCIS-2494)**

Trailers and shelters shall be designed and manufactured to be towed and transported by road (paved and unpaved), rough terrain, railway, sea (on and under deck of merchant or navy vessels), and air (e.g. C130H, KC 390).

**SRS (PRTTDCIS-2498)**

All equipment and components shall be sufficiently robust to remain undamaged when correctly secured and transported across country on trailers and vehicles, on board of vessels or aircraft.

**SRS (PRTTDCIS-2492)**

An authorized technical surveillance authority shall approve the mechanical and electrical safety of Trailers. This includes the allowance for transport of the fully equipped trailer (with Power Generators, Antenna...) on public roads, aircrafts, trains and ships.

**SRS (PRTTDCIS-2495)**

Trailer equipped with its payload (Power Generators, Antenna ...) shall be capable to Roll On/Roll-Off (RO-RO) during loading/off-loading a C-130 and KC 390 for air transportation.

**SRS (PRTTDCIS-2497)**

In order to meet RO-RO requirements, the trailer equipped with its payload (Power Generators, Antenna ...), shall be able to negotiate the maximum required ramp angle and shall comply with the applicable weight, dimensions and stowage criteria.

**SRS** (PRTTDCIS-2496)

The preparations of the trailer before loading on the aircraft shall be limited to activities that can be executed in not more than 60 minutes by a trained crew of two (2) without any specialized equipment. This stipulated time limit includes preparation activities for RO-RO of complete configuration of the trailer equipped with its payload (Power Generators, Antenna, etc.).

## 2.17 Supportability

### 2.17.1 General

**NOTE** (PRTTDCIS-3308)

The system will represent the simplest design consistent with functional requirements and expected operational conditions and will be capable of being operated and maintained in its operational environment by personnel with a minimum of training.

**NOTE** (PRTTDCIS-3309)

For Reliability, Maintainability, Testability and Availability definitions and methods please refer to:

- MIL-HDBK-338B : Electronic Reliability Design; and,
- IEC 61078:2006 : Analysis techniques for dependability - Reliability block diagram and Boolean methods; and,
- MIL-STD-756B : Reliability Modelling and Prediction; and,
- SR-332 : Reliability Prediction Procedure for Electronic Equipment; and,
- MIL-HDBK-781 : Reliability test methods, plan and environments for engineering development, qualification and production; and,
- MIL-HDBK-470A : Design and developing of maintainable systems; and,
- IEC 60812:2018 : Failure modes and effects analysis (FMEA and FMECA); and,
- MIL-STD-1629A : Failure Mode Effect and Criticality Analysis.

**NOTE** (PRTTDCIS-3310)

For Maintenance Level definitions please refer to the *Maintenance and Support Concepts* Annex of the SOW.

**NOTE** (PRTTDCIS-3311)

For Human Engineering design criteria for supportability please refer to MIL-STD-1472G.

### 2.17.2 Reliability

**SRS** (PRTTDCIS-3312)

The system shall be designed such that a failure or removal of a component or item in the entities equipment does not cause a physical and, or functional failure of another component or item.

**SRS** (PRTTDCIS-3313)

The TDCIS Mean Time Between Failures (MTBF) shall be greater than 800 hours in Ground Fixed environment (ref. MIL-HDBK-338B) using certified failure rates data at component level.

**SRS** (PRTTDCIS-3314)

The TDCIS Mean Time Between Critical Failures (MTBCF) shall be greater than 1200 hours in Ground Fixed environment (ref. MIL-HDBK-338B) using certified failure rates data at component level.

**2.17.3 Maintainability****SRS** (PRTTDCIS-3315)

Mean Time To Repair (MTTR) per relevant Maintenance Levels both Hardware (HLs) and Software including Firmware (SLs) shall be:

- 1) MTTR for HL/SL1 and HL/SL2 < 30 min; and,
- 2) MTTR for HL/SL3 < 120 min.

**SRS** (PRTTDCIS-3316)

Mean Time To Restore Service (MTTRS) per relevant Maintenance Levels both Hardware (HLs) and Software including Firmware (SLs) shall be:

- 1) MTTRS for HL/SL1 and HL/SL2 < 20 min
- 2) MTTRS for HL/SL3 < 60 min

**2.17.4 Testability****SRS** (PRTTDCIS-3317)

Fault Detection (FD) rate shall be greater than 95% through Built-In Test (BIT) capable of on-line detection of failure modes.

**SRS** (PRTTDCIS-3318)

Fault Isolation (FI) rate without ambiguity shall be greater than 90% through Built-In Test (BIT) capable to isolate the detected internal function/component in failure.

**SRS** (PRTTDCIS-3319)

The Built-in-Test (BIT) shall give a fault indication down to at least the level of Line Replaceable Unit (LRU).

**SRS** (PRTTDCIS-3320)

BIT fault detection and isolation resultant information shall be recorded in electronic logs.



## 2.17.5 Product Support

### SRS (PRTTDCIS-3321)

Maintenance Levels apportionment for hardware and software including firmware for corrective and unscheduled maintenance tasks weighted with the relevant failure rate shall be:

- 1) (Critical + Non-Critical) Failures for HL1-2/SL1-2 > 80%; and,
- 2) Critical Failures for HL1-2/SL1-2 > 94%; and,
- 3) (Critical + Non-Critical) Failures for HL3/SL3 < 15%; and,
- 4) Critical Failures for HL3/SL3 < 6%; and,
- 5) (Critical + Non-Critical) failures HL4/SL4 < 5%; and,
- 6) Critical Failures for HL4/SL4 = 0%.

### SRS (PRTTDCIS-3322)

The annual average hours workload for preventive and scheduled maintenance (up to HL3/SL3) shall not exceed (x10) 10 times the relevant annual average hours workload for corrective and unscheduled maintenance (up to HL3/SL3). To be considered for critical and non-critical failures.

### SRS (PRTTDCIS-3323)

Maintenance tasks shall not involve more than TWO (02) persons for Organizational Maintenance (Level 2) HL/SL2 or lower.

### SRS (PRTTDCIS-3324)

The SW updates and setting shall be Software Organizational Maintenance (Level 2) SL2 or lower.

### SRS (PRTTDCIS-3325)

Removable items shall weigh:

- 1) less than 16.8 kilograms (37 pounds) for more than 99% of LRUs with direct accessibility; and,
- 2) less than 11.3 kilograms (25 pounds) for more than 99% of LRUs accessible through removal of part or component that is functioning.

### SRS (PRTTDCIS-3326)

Items over 16.8 kilograms (37 pounds) shall be designed for two-person handling.

### SRS (PRTTDCIS-3327)

The combination of BIT and troubleshooting in Technical Publications shall allow for the fault isolation of 100% of detected failures.

### SRS (PRTTDCIS-3512)

The maximum allowable down time when the equipment is deployed shall not exceed 8 hours to fix a fault (i.e. Unscheduled/Corrective Maintenance due to one critical failure or sequence of non-critical failures that lead to a loss of critical function).

**SRS** (PRTTDCIS-3513)

The maintenance plan shall consider ad hoc pre deployment and post deployment maintenance actions to allow no down time (i.e. zero hours) due to scheduled maintenance and preventive maintenance during deployment.

**2.17.6 Parts Obsolescence****SRS** (PRTTDCIS-3328)

The system shall be designed for a service life of at least 15 years with mid-life upgrade to allow enhancements and obsolescence removal activities with relevant design change with a planned and controlled level of risk and cost.

**SRS** (PRTTDCIS-3329)

The system design shall permit to change a specific functional block while maintaining the overall architecture unchanged.

**2.18 Availability****NOTE** (PRTTDCIS-1507)

Services are organised as follow:

- 1) Communications Services, consisting of:
  - 1) Transmission Services;
  - 2) Transport Services;
  - 3) Protected Core Access (PCA) Services;
  - 4) Coloured Cloud Access (CCA) Services, at xU, xR and xS levels, including interworking with Mission Network Participants (MNP) (on xU and xS);
  - 5) Multimedia Access (MMA) Services, at xU, xR and xS level, including interworking with MNP (on xU and xS).
- 2) Infrastructure Services, in turn enabling:
  - 1) Business Support Services, including Local Cross-Domain Services;
  - 2) Community Of Interest (COI) Services;
  - 3) Service Management and Control (SMC) Services;
  - 4) CIS Security Services.

**NOTE** (PRTTDCIS-2923)

DPOP Availability Targets are formulated for Communications Services and Infrastructure Services provided by the various CIS elements of the DPOP.

**NOTE** (PRTTDCIS-2924)

Intrinsic availability calculation methods are taken into consideration for the assigned system availability targets.

**NOTE** (PRTTDCIS-2925)

Availability Targets assume the following:

- 1) No outages related to misconfiguration or misuse of the systems concerned; and
- 2) Mean logistics delay time is zero; and
- 3) Availability targets of the enabling services, as formulated here.

**NOTE** (PRTTDCIS-2926)

Availability Targets for Service Management and Control and CIS Security are not separately specified. Instead, they are subsumed into Communications services, as they are enabling/transversal to them.

**NOTE** (PRTTDCIS-2927)

From the assumptions above, service continuity and recovery from outages are solely contingent upon the intrinsic availability of the hardware and firmware supporting those systems, including any non-CIS elements related to the integration and operation of the integrated hardware.

**SRS** (PRTTDCIS-2928)

The design shall be driven by the intrinsic availability targets for the hardware and firmware, in order to achieve the stated minimum DPOP availability levels.

## 2.19 Paint and Corrosion

**SRS** (PRTTDCIS-1367)

All external visible surfaces of outdoor assemblies and subassemblies of Housing Elements, Nodes, Modules and Components (e.g. Shelters, Trailers, Cases, Antenna, Mast, ODU ...) shall be painted in RAL 840R 6014, non-gloss or equivalent.

**SRS** (PRTTDCIS-1368)

The exterior paint finish shall be guaranteed for a minimum of ten (10) years without signs of deterioration.

**SRS** (PRTTDCIS-3845)

The exterior paint finish shall ensure an anti-corrosion protection of a minimum C5I (Very High) as per ISO 12944-5:2019.

**SRS** (PRTTDCIS-3182)

There shall be no shiny, reflective, bright color or light visible on the equipment, this applies during transit, transport and operation. When surfaces cannot be treated by painting, an alternative solution shall be provided (i.e. protection by a specific cover).

**SRS** (PRTTDCIS-3183)

Paint of all external surfaces for all outdoor assemblies and sub-assemblies (Housing Elements, CIS Components (e.g. Antenna, Mast, ODU, etc.) shall meet requirements of STANAG 4360, Edition 3 and its associated AEPs:

- AEP-64, Edition A, Version 1: Performance requirements for paint systems resistant to chemical agents and decontaminants, for the protection of land military equipment; and,
- AEP-65, Edition A, Version 1: Performance requirements and test method for paint systems resistant to chemical warfare agents.

**SRS** (PRTTDCIS-4088)

Elements shall be made of non-corroding metallic materials.

**SRS** (PRTTDCIS-4089)

Dissimilar metals shall not be used in intimate contact unless suitably protected against electrolytic corrosion.

## 3 High Level Specification

### 3.1 General

#### NOTE (PRTTDCIS-1213)

The TDCIS is a modular system that can support operations up to Brigade level. It can also support smaller deployments with a subset of the full system, to both Battalion or Company level operations.

#### NOTE (PRTTDCIS-1216)

The TDCIS will not support any deployment larger than a full Brigade.

#### NOTE (PRTTDCIS-1214)

The operations to be supported are either within the National or Multi-national environment, in response to an agreed level of support with NATO or other allied countries.

#### NOTE (PRTTDCIS-1217)

The TDCIS is layered in following meshes:

- Brigade level (highest tactical command) to National Defence Network (NDN) over SATCOM with an HF fallback capability;
- Internal Brigade and Brigade towards Battalion over the tactical backbone mesh network;
- Internal Battalion over the tactical backbone mesh network;
- Battalion to Company and Company to Company over direct radio based connection;
- Company to Platoons over tactical radios.

#### NOTE (PRTTDCIS-1218)

Each echelon will have typical Functional Application Services (FAS) relative to their Information Exchange Requirements (IER).

#### NOTE (PRTTDCIS-1445)

The TDCIS will be configured with an initial mission data set prior to the deployment. This will be done in the garrison Mission Preparation Center (MPC).

#### NOTE (PRTTDCIS-1188)

The TDCIS is composed of different Nodes installed in shelters. The shelters are mounted on all-terrain vehicles so that they can be located in the operational scenario as per the mission requirements. Vehicles are not in scope of this project.

#### NOTE (PRTTDCIS-1189)

The TDCIS operates as a stand-alone system, as a NDN extension or any combination of both.

**NOTE** (PRTTDCIS-1200)

The TDCIS can work either as a whole system, or in smaller subsets; e.g. a subset that supports a Battalion deployment, in this latter case the required nodes for the Battalion being a subset of the full TDCIS.

**NOTE** (PRTTDCIS-3248)

The TDCIS, or some of its sub-elements, will be configured with a Mission Data Set, specific to the mission and prior to the deployment. This will be performed by PRT staff in the Mission Preparation Centre (MPC). MPC is not a deliverable of this project.

**NOTE** (PRTTDCIS-1201)

As illustrated on the following figure, six different node variants build up the full system capability. These nodes are:

- **Access Node (AN):** Provides Brigade echelon users with a set of communications and information systems required to support the command and control action of the respective Commander;
- **Battalion Communication Centre (BCC):** Provides Battalion echelon users with the set of communications and information systems required to support the command and control action of the respective Commander;
- **Company Communication Centre (CCC):** Provides Company echelon users with the set of communications and information systems required to support the command and control action of the respective Commander;
- **Transit Node (TN):** Provides a backbone network node. Assures the automatic routing of information through a set of redundant connections and different types of physical media in order to create the tactical network backbone;
- **Radio Access Point (RAP):** Provides full integration of tactical mobile user in TDCIS communications infrastructure;
- **Rear Link (RL):** Provides reach-back capability to the static infrastructure.

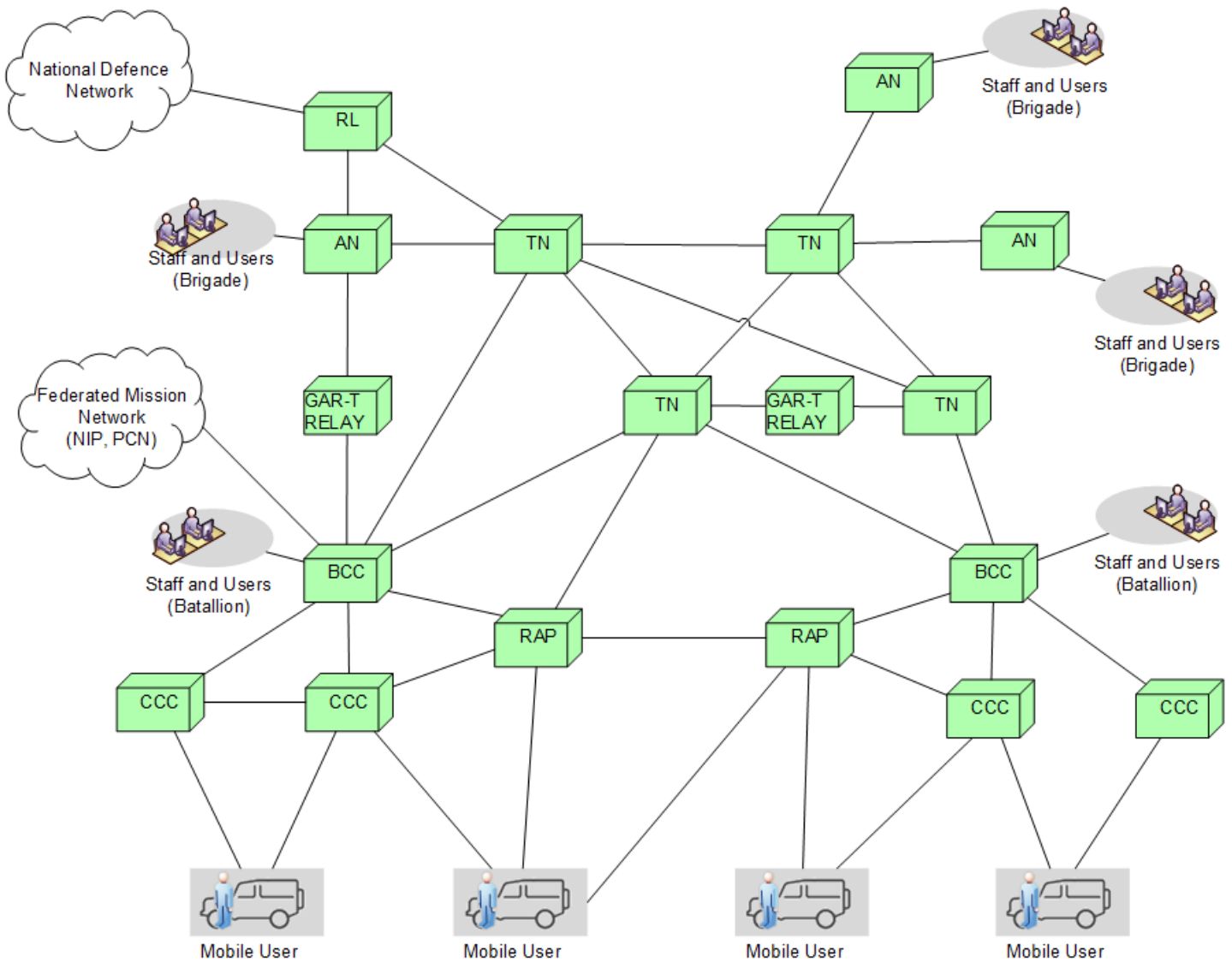


Figure 5 - TDCIS Nodes in context

**NOTE (PRTTDCIS-1190)**

The backbone of the TDCIS is composed of TN that create an independent wireless and/or wired network infrastructure that interconnects AN, BCC, RAP, CCC and RL nodes.

**NOTE (PRTTDCIS-1191)**

In the lower level backbone of the network, the BCC connects to the CCC and to the RAP over direct wireless and/or wired links.

**NOTE (PRTTDCIS-1192)**

Side-standing CCC can connect with each other through wired or wireless links.

**NOTE** (PRTTDCIS-1443)

The wireless node to node connection is ensured by

- The High Capacity Line Of Sight (HCLOS) radio system between AN, BCC, TN, RAP and RL; and,
- The Mini-Line of Sight (Mini-LOS) radio system between BCC and CCC; and,
- The Broadband IP Radio system for AN, BCC, CCC and RAP nodes.

**NOTE** (PRTTDCIS-1193)

Mobile Users (vehicles other than the TDCIS vehicles) and dis-mounted soldiers are connected to the TDCIS through the RAP or through the CCC, using the Combat Net Radio (CNR) or The Broadband IP Radio System.

**NOTE** (PRTTDCIS-1194)

The reach back to the NDN of Portugal from TDCIS is achieved through the RL node, which can be wire-connected to either an AN, TN, BCC, RAP or CCC. This will allow PRT to deploy standalone Battalions and Companies. The RL connects to the NDN through SATCOM or HF Transmission Systems.

**NOTE** (PRTTDCIS-4633)

The connectivity concept described in this section is not meant to be limitative. Ultimately, any TDCIS Node can connect to any other TDCIS Node as long as they share compatible Transmission Systems.

**NOTE** (PRTTDCIS-1204)

AN, BCC and CCC are nodes supporting users directly connected to them. TN, RAP and RL are nodes which create the required TDCIS network connectivity.

**NOTE** (PRTTDCIS-1202)

Besides the nodes, the TDCIS also includes a pool of GAR-T HCLOS Relay variant trailers that can either:

- be assigned to any node to enable or augment its HCLOS capacity; or
- be used to extend the reach of a HCLOS links.

**NOTE** (PRTTDCIS-4467)

Besides the nodes, the TDCIS also includes a NS Kit which extends the TDCIS and its Nodes with access to NS services hosted in the Theatre but also from the Federation with Mission Partners.

**NOTE** (PRTTDCIS-4386)

The TDCIS includes Pooled Elements to be used by the Customer to augment, upgrade or enable TDCIS Nodes with more functionalities.



**NOTE** (PRTTDCIS-2932)

The breakdown of the TDCIS is illustrated in the following figure.

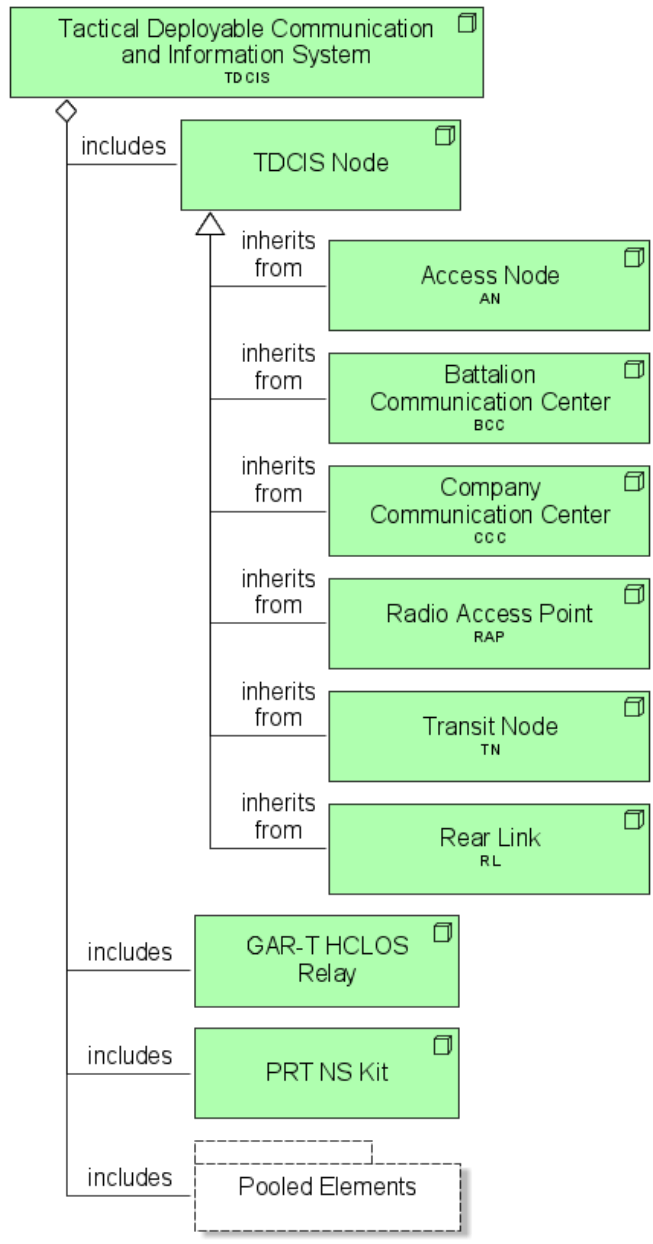


Figure 6 - TDCIS breakdown

## 3.2 TDCIS Nodes

### 3.2.1 General

#### **SRS** (PRTTDCIS-1239)

Each TDCIS node architecture shall adhere to the architecture depicted on following figure:

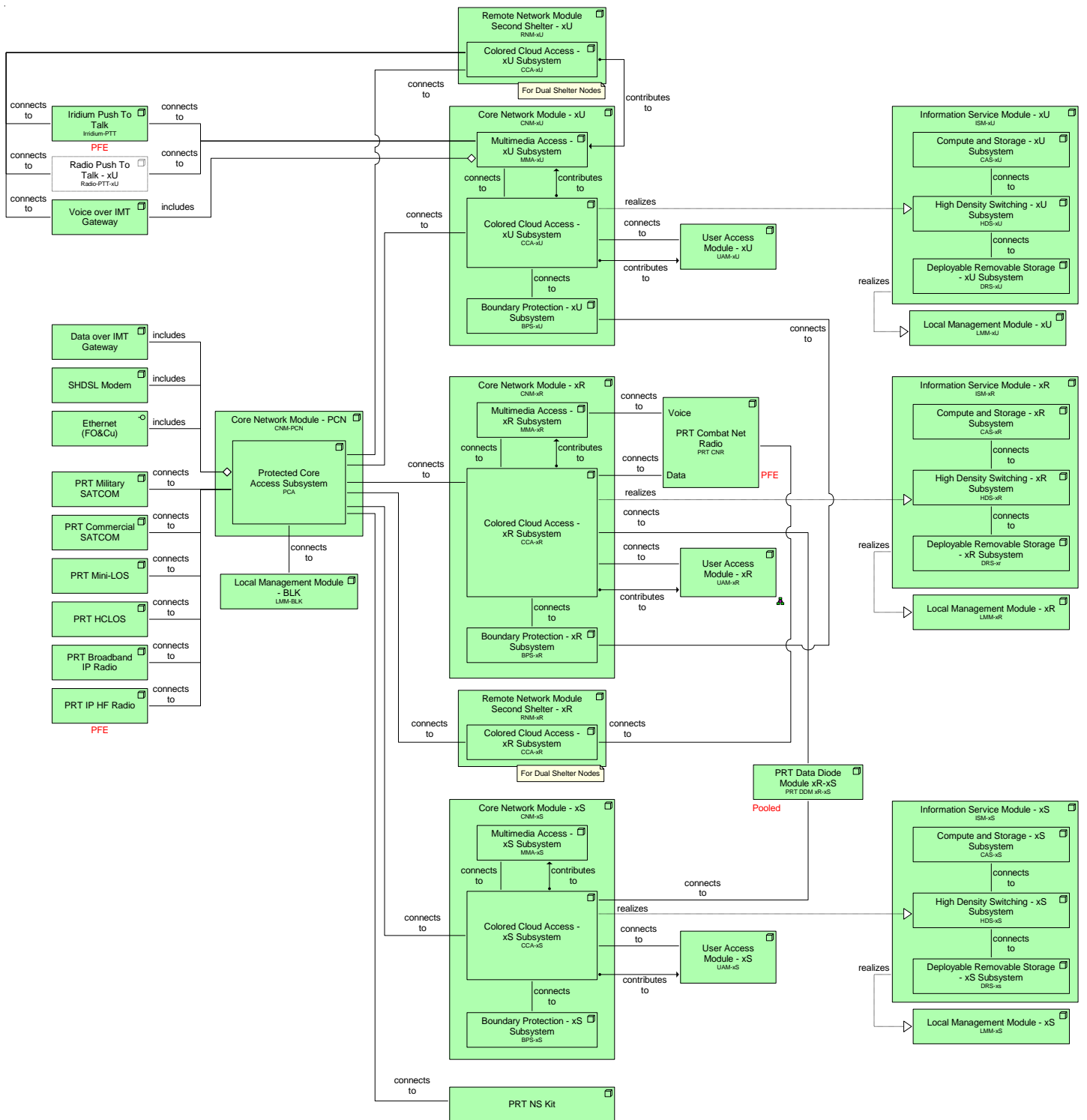


Figure 7 - Generic Node Architecture

**SRS** (PRTTDCIS-1195)

The TDCIS shall supports three (3) security domains, each with variants as follow:

- UNCLASSIFIED (xU) with National UNCLASSIFIED (Nat-U) as the single variant; and,
- RESTRICTED (xR) with the National RESTRICTED (Nat-R) as the single variant; and,
- SECRET (xS) with MISSION SECRET (MS) and National SECRET (Nat-S) as variants.

**SRS** (PRTTDCIS-3021)

Each security domain shall be prepared and configured specific for the mission prior to the deployment.

**SRS** (PRTTDCIS-3022)

When a security domain is configured in a Nat-X variant, it shall act as a PRT NDN extension and integrate with it.

**SRS** (PRTTDCIS-2548)

TDCIS subsets planned for different missions shall be isolated from each other. Therefore, the subsets shall not share any configuration parameters nor exchange any data with each other, not even between domains of same classification level.

**SRS** (PRTTDCIS-1206)

At the end of each mission, data will be archived and the TDCIS will be returned to the non-configured-state, ready for a new deployment configuration. This de-configuration shall be performed in accordance with national and/or NATO regulations.

**SRS** (PRTTDCIS-1209)

The TDCIS shall have Protected Core Network (PCN) capabilities as per *STANAG 5637*, namely PCN-1 and PCN-2 Interfaces as well as E-Node and P-Function functionalities.

**SRS** (PRTTDCIS-1450)

The breakdown of the AN is illustrated in the following figure. It identifies the required Modules, Transmission Systems and housing elements it is composed of. Each AN shall be built upon the building blocks as identified in this AN Breakdown.

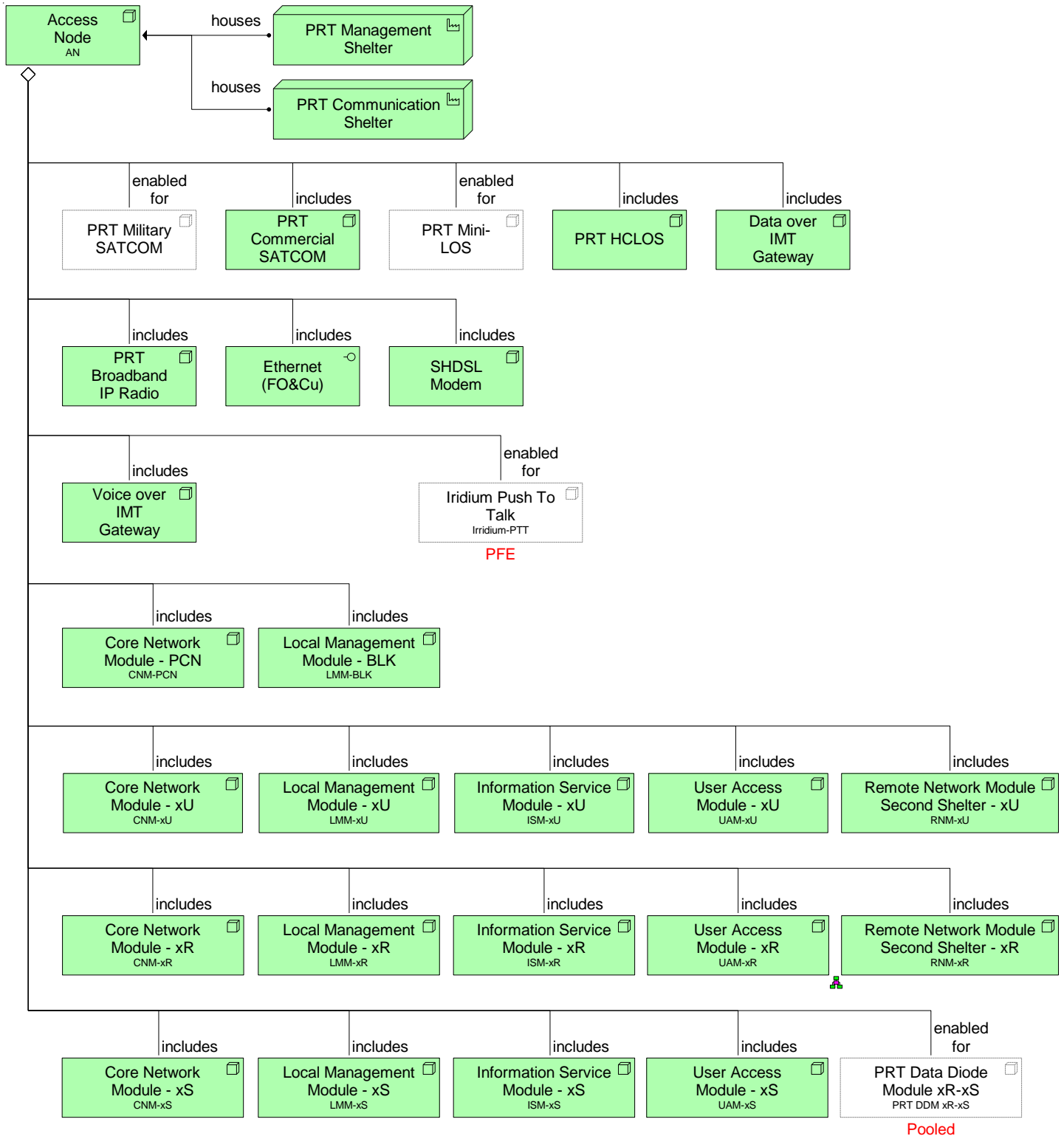


Figure 8 - Access Node breakdown

**SRS (PRTTDCIS-1451)**

The breakdown of the BCC is illustrated in the following figure. It identifies the required Modules, Transmission Systems and housing elements it is composed of. Each BCC shall be built upon the building blocks as identified in this figure.

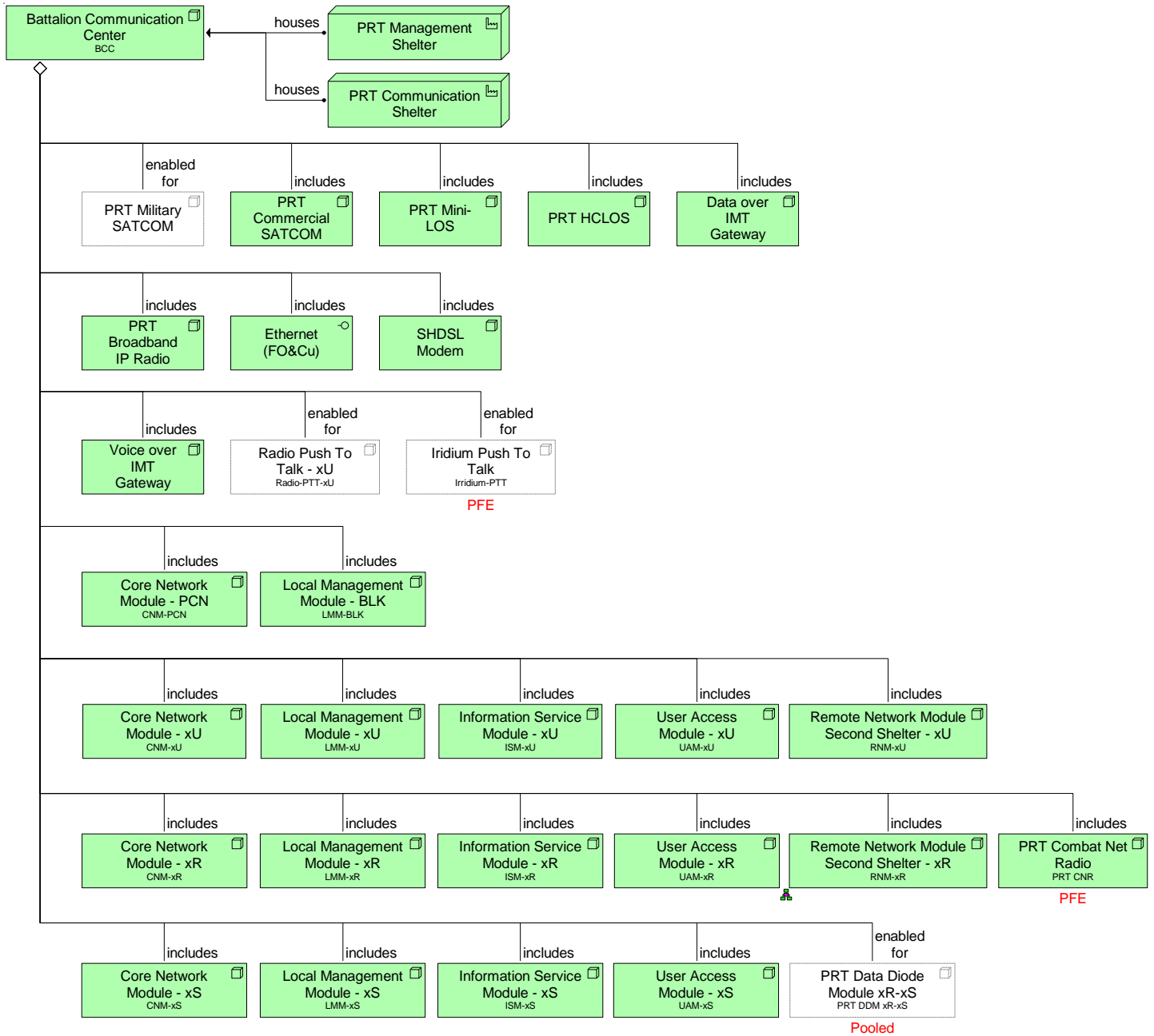


Figure 9 - Battalion Communication Center breakdown

**SRS** (PRTTDCIS-1452)

The breakdown of the CCC is illustrated in the following figure. It identifies the required Modules, Transmission Systems and housing elements it is composed of. Each CCC shall be built upon the building blocks as identified in this figure.

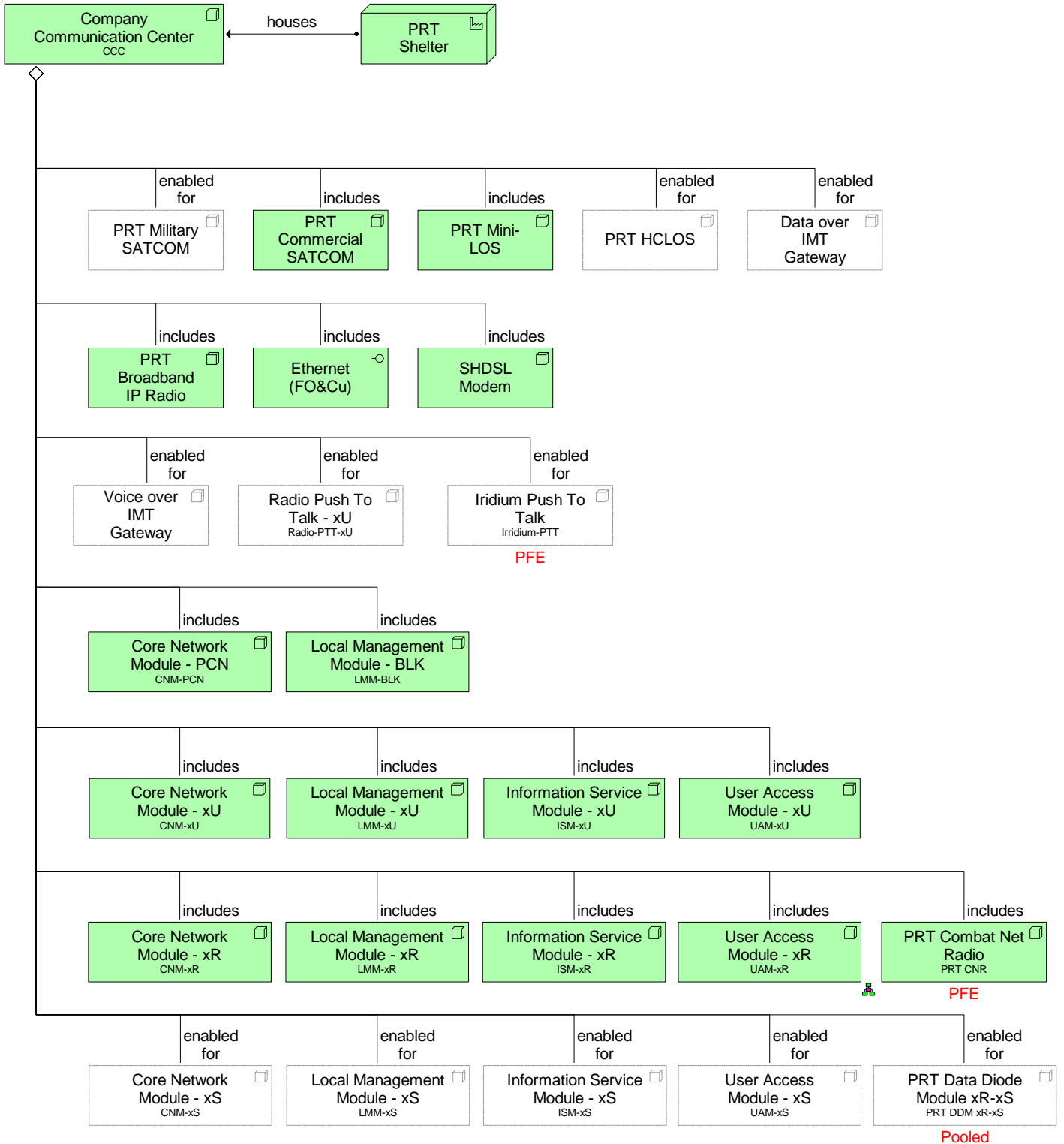


Figure 10 - Company Communication Center breakdown

**SRS (PRTTDCIS-1453)**

The breakdown of the TN is illustrated in the following figure. It identifies the required Modules, Transmission Systems and housing elements it is composed of. Each TN shall be built upon the building blocks as identified in this reference.

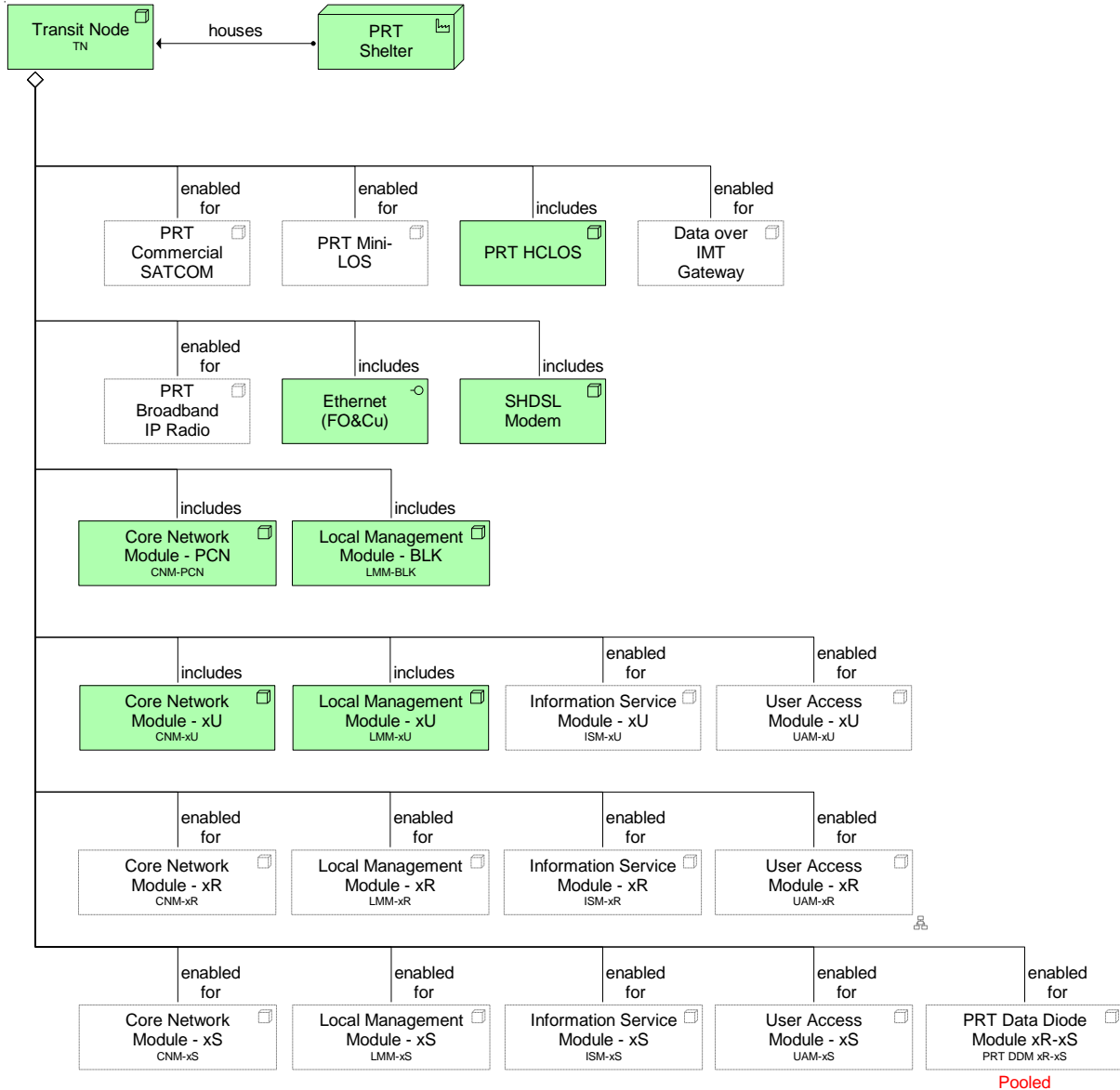


Figure 11 - Transit Node breakdown



**SRS (PRTTDCIS-1454)**

The breakdown of the RAP is illustrated in the following figure. It identifies the required Modules, Transmission Systems and housing elements it is composed of. Each RAP shall be built upon the building blocks as identified in this reference.

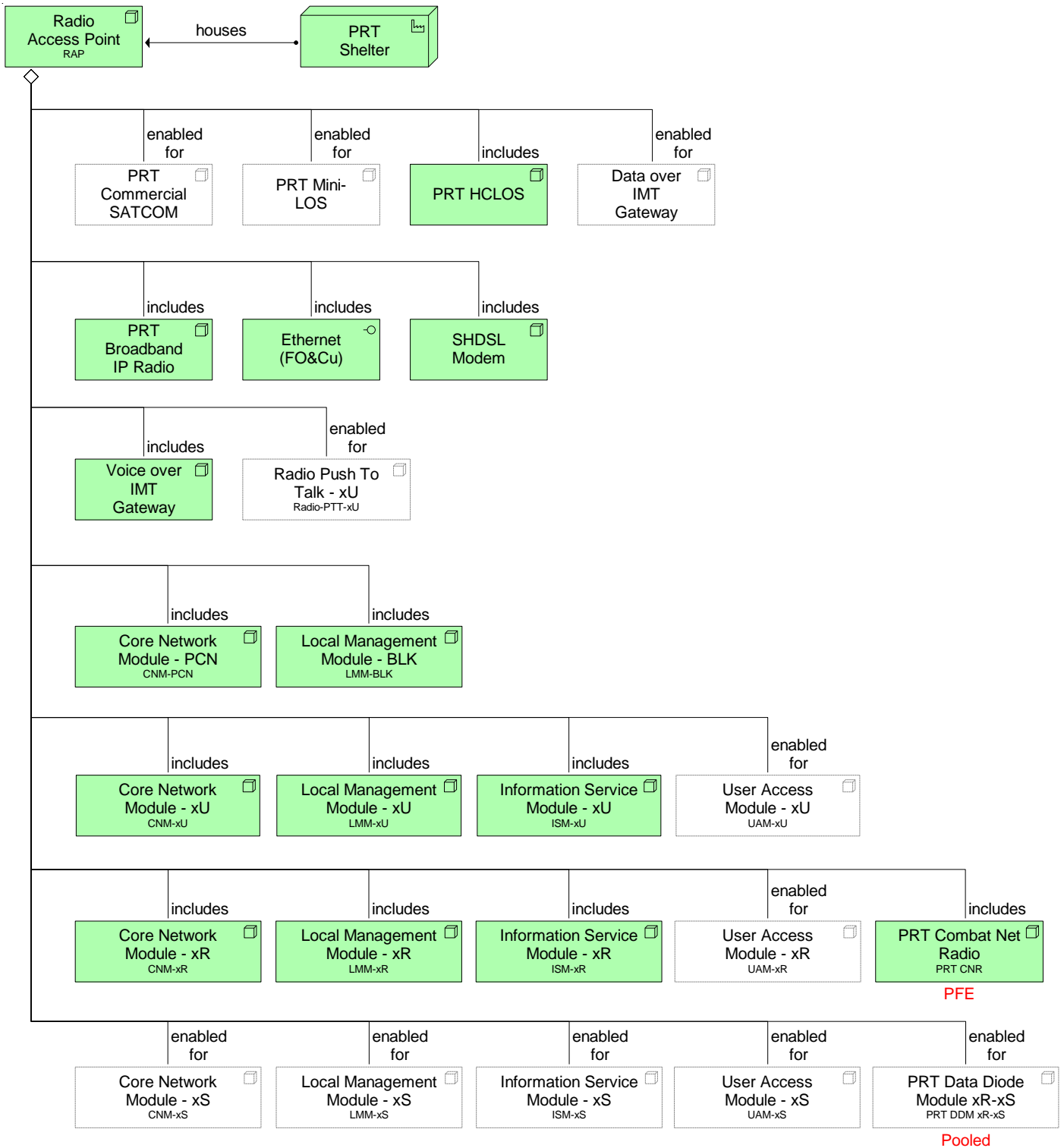


Figure 12 - Radio Access Point breakdown

**SRS (PRTTDCIS-1455)**

The breakdown of the RL is illustrated in the following figure. It identifies the required Modules, Transmission Systems and housing elements it is composed of. Each RL shall be built upon the building blocks as identified in this reference.

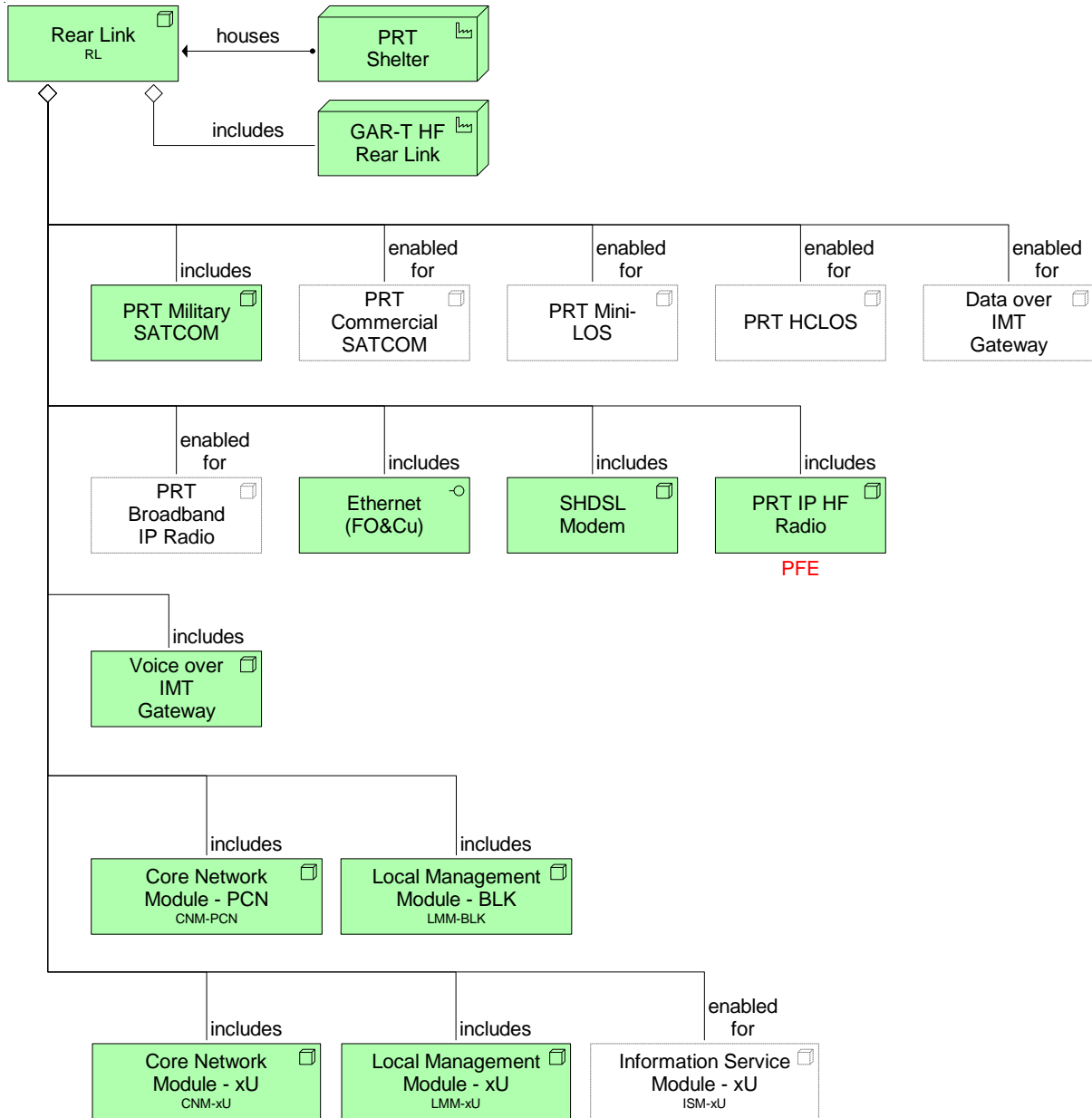


Figure 13 - Rear Link breakdown

### 3.2.2 Services

**NOTE** (PRTTDCIS-2921)

TDCIS Nodes host:

- 1) Communications Services; and
- 2) CIS Security Services; and
- 3) Infrastructure Service and
- 4) Business Support Services; and
- 5) COI Services; and
- 6) Service Management and Control Service.

**SRS** (PRTTDCIS-2461)

TDCIS Nodes shall provide following services on xU to their directly connected End Users and System Administrators as per following table:

Legend:

- *Local*: Service is locally hosted in the Node
- *Remote*: Service is remotely consumed from another deployed TDCIS Node (AN, BCC or CCC)
- *NDN*: Service is remotely consumed from the PRT NDN.

Service	Service Category	AN	BCC	CCC	RAP	TN	RL
Functional Area Services	Community of Interest	Local	Local	Local	Local	-	-
Email	Business Support	NDN	NDN	NDN	NDN	NDN	NDN
Collaborative Information Portal	Business Support	NDN	NDN	NDN	NDN	NDN	NDN
Video Teleconference	Business Support	NDN	NDN	NDN	NDN	NDN	NDN
Voice Collaboration (IP)	Business Support	Local	Local	Local	Local	Remote	Remote
Voice Collaboration (Analogue)	Business Support	Local	Local	Local	Local	Local	Local
Printing and Scanning	Business Support	Local	Local	Local	-	-	-
Interconnection to Nations	N/A	-	Local	-	-	-	-
Antivirus	CIS Security	Local	Local	Local	Local	Local	Local
Network Access Control	CIS Security	Local	Local	Local	Local	Remote	Remote
Encryption	CIS Security	Local	Local	Local	Local	Local	Local
Log Aggregation	CIS Security	-	-	-	-	-	-
Online Vulnerability Assessment	CIS Security	-	-	-	-	-	-

Table 1 - Services per Node on xU

**SRS** (PRTTDCIS-4234)

TDCIS Nodes shall provide following services on xR to their directly connected End Users and System Administrators as per following table:

Legend:

- *Local*: Service is locally hosted in the Node
- *Remote*: Service is remotely consumed from another deployed TDCIS Node (AN, BCC or CCC)
- *NDN*: Service is remotely consumed from the PRT NDN.

Service	Service Category	AN	BCC	CCC	RAP	TN	RL
Functional Area Services	Community of Interest	Local	Local	Local	Local	-	-
Email	Business Support	Local	Local	Local	Remote	-	-
Collaborative Information Portal	Business Support	Local	Local	Local	Remote	-	-
Video Teleconference	Business Support	Local	Local	Remote	Remote	-	-
Voice Collaboration (IP)	Business Support	Local	Local	Local	Local	-	-
Printing and Scanning	Business Support	Local	Local	Local	-	-	-
Interconnection to Nations	N/A	-	-	-	-	-	-
Antivirus	CIS Security	Local	Local	Local	Local	-	-
Network Access Control	CIS Security	Local	Local	Local	Local	-	-
Encryption	CIS Security	Local	Local	Local	Local	-	-
Log Aggregation	CIS Security	-	-	-	-	-	-
Online Vulnerability Assessment	CIS Security	-	-	-	-	-	-

Table 2 - Services per Node on xR

**SRS** (PRTTDCIS-4235)

TDCIS Nodes shall provide following services on xS to their directly connected End Users and System Administrators as per following table:

Legend:

- *Local*: Service is locally hosted in the Node
- *Remote*: Service is remotely consumed from another deployed TDCIS Node (AN, BCC or CCC)
- *NDN*: Service is remotely consumed from the PRT NDN.

Service	Service Category	AN	BCC	CCC	RAP	TN	RL
Functional Area Services	Community of Interest	Local	Local	-	-	-	-
Email	Business Support	Local	Local	-	-	-	-
Collaborative Information Portal	Business Support	Local	Local	-	-	-	-
Video Teleconference	Business Support	Local	Local	-	-	-	-
Voice Collaboration (IP)	Business Support	Local	Local	-	-	-	-
Printing and Scanning	Business Support	Local	Local	-	-	-	-
Interconnection to Nations	N/A	-	Local	-	-	-	-
Antivirus	CIS Security	Local	Local	-	-	-	-
Network Access Control	CIS Security	Local	Local	-	-	-	-
Encryption	CIS Security	Local	Local	-	-	-	-
Log Aggregation	CIS Security	-	-	-	-	-	-
Online Vulnerability Assessment	CIS Security	-	-	-	-	-	-

Table 3 - Services per Node on xS

**SRS** (PRTTDCIS-4368)

TDCIS Nodes shall provide following Cross Domain Services to their directly connected End Users and System Administrators as per following table:

Legend:

- *Implemented:* Service is implemented in the Node
- *Pooled:* Service is ready to be deployed using pooled appliances.

Service	Service Category	AN	BCC	CCC	RAP	TN	RL
Cross Domain xU-xR	CIS Security	Implemented	Implemented	Implemented	Implemented	-	-
Cross Domain xR-xS	CIS Security	Pooled	Pooled	-	-	-	-

Table 4 - Cross Domain Services per Node

**NOTE** (PRTTDCIS-1526)

TDCIS Nodes will have multiple Voice service integration options by means of following gateways:

- On the xU security domain:
  - **Voice over IMT** for integration with the telephony of an IMT network; and,
  - **Iridium PTT** for integration to the Iridium Satellite Phone Service; and,
  - **Radio PTT - xU** for integration with a PTT based radio transmitter; and,
- On the xR security domain:
  - **Radio PTT - xR** for integration of the PTT based Voice functionality of the CNR.

**SRS** (PRTTDCIS-1435)

TDCIS nodes shall be equipped or enabled with Voice Gateways quantities, as per the table below:

	AN	BCC	CCC	RAP	TN	RL
Voice over IMT	1	1	Enabled	1	-	1
Iridium PTT	Enabled	Enabled	Enabled	-	-	-
Radio PTT - xU	-	Enabled	Enabled	Enabled	-	-
Radio PTT - xR	-	Enabled	Enabled	1	-	-

Table 5 - xU Voice Gateways quantities

**SRS** (PRTTDCIS-1528)

The Voice over IMT gateway functionality shall be integrated in the MMA-xU of each node equipped with this Voice Gateway.

**NOTE** (PRTTDCIS-2244)

The Satphone terminal is an Iridium 9575 PTT Extreme terminal, which is PFE.

**NOTE** (PRTTDCIS-2678)

Any Radio PTT integration on xU and xR will be IP based and the Radio over IP gateway will be provided together with the radio to connect to.

**NOTE** (PRTTDCIS-1207)

A dismounted soldier uses situational awareness software (called DSS) that is connected to the vehicle's situational awareness software (called BMS) and to the TDCIS xR security domain over an integrated CNR. The TDCIS situational awareness software running in the xR security domain will merge information coming from the Mobile Users and xU data (i.e. meteo) fed from the xU security domain over the xU-xR cross domain solution. The BMS/DSS in the xR security domain will feed over the xR-xS DDM the NATO situational awareness software (LC2IS) with all the situational awareness data. Information from the LC2IS that needs to be fed into the BMS/DSS has to be transferred over an air-gap.

**3.2.3 Users**

**SRS** (PRTTDCIS-1431)

TDCIS Nodes shall support End Users, as per the table below:

Security Domain	AN	BCC	CCC	RAP	TN	RL
xU	34	16	4	-	-	-
xR	34	16	4	-	-	-
xS	22	10	-	-	-	-

Table 6 - End Users per security domain and node type

**SRS** (PRTTDCIS-2555)

TDCIS Nodes shall support System Administrators, as per the table below:

Security Domain	AN	BCC	CCC	RAP	TN	RL
BLK	2	2	2	2	2	2
xU	2	2	2	2	2	2
xR	2	2	2	2	-	-
xS	2	2	-	-	-	-

Table 7 - System Administrators per security domain and node type

**NOTE** (PRTTDCIS-1817)

End-User Devices (e.g. Phones, Workstations, Printer/Scanners, VTC appliances), are PFE at the exception of System Administrator devices.



**SRS (PRTTDCIS-1440)**

The TDCIS nodes shall be equipped with xU Wireless VoIP Telephone for System Administrator as listed in following table:

	AN	BCC	CCC	RAP	TN	RL
Wireless VoIP Telephone	3	3	1	1	1	4

Table 8 - System administrator Devices quantities per node

**SRS (PRTTDCIS-2683)**

Each TDCIS Node shall be equipped with two (2) System Administrator Workstations per security domain present in the Node.

**SRS (PRTTDCIS-3119)**

Each TDCIS Node shall be equipped with two (2) System Administrator Workstations dedicated to the management of the BLK.

**SRS (PRTTDCIS-4469)**

The composition of System Administrator Workstations shall comply with the breakdown illustrated in the following figure.

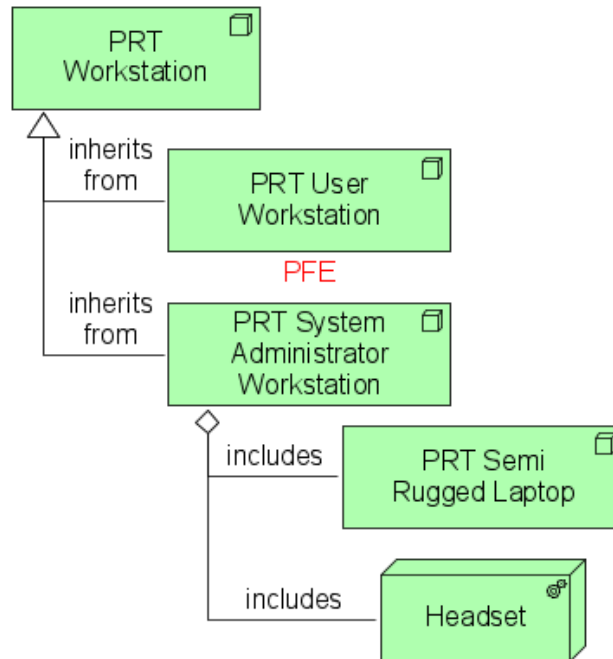


Figure 14 - System Administrator Workstation Breakdown

**SRS (PRTTDCIS-2684)**

Each TDCIS shelter shall be equipped with TWO (02) System Administrator wired VoIP Phones per security domain present in the Node.

**SRS** (PRTTDCIS-1810)

The TDCIS nodes shall be equipped with a number of UAM as listed in following table:

	AN	BCC	CCC	RAP	TN	RL
Medium UAM-xU	2	1	1	-	-	-
Small UAM-xU	4	4	2	2	2	2
Medium UAM-xR	2	1	1	-	-	-
Small UAM-xR	4	4	2	2	-	-
Medium UAM-xS	2	2	-	-	-	-
Small UAM-xS	2	2	-	-	-	-

Table 9 - UAM quantities per node

**SRS** (PRTTDCIS-2462)

Beside any other tools as specified in other sections and emerging from the design, all Workstations shall be installed with latest available version of following software:

- Adobe Acrobat Reader; and,
- Microsoft Windows; and,
- Microsoft Office.

**3.2.4 Transmissions**

**NOTE** (PRTTDCIS-1525)

TDCIS Nodes will be equipped with different Transmission Systems:

- On the BLK, connected to the PCA Subsystem:
  - **Mini LOS** as Point-to-Point Line of Sight transmission between BCC and CCC; and,
  - **HCLOS** as Point-to-Point Line of Sight transmission to build the Tactical backbone (TN, AN, BCC, RAP); and,
  - **Broadband IP Radio**, as radio network for AN, BCC, CCC and RAP; and,
  - **Commercial SATCOM** as fallback mean of communication; and,
  - **Military SATCOM** as rear-link transmission to PRT static infrastructure; and,
  - **Ethernet (FO and Cu)** as primary mean of interconnection between node; and,
  - **SHDSL** as an alternative mean of connection between node; and,
  - **Data over IMT** as a fallback mean of communication by connecting to an International Mobile Telecommunication (IMT) network (GSM/UMTS/LTE (4G)); and,
  - **IP HF Radio** as a fallback mean of communication for the rear-link transmission to PRT static infrastructure and for intra-theatre transmissions; and,
- On the xR security domain, connected to the CCA-xR Subsystem:
  - **Combat Net Radio** as a Mobile Tactical Forces (Vehicles and Soldiers) integration mean of communication.

**NOTE** (PRTTDCIS-4634)

Node to Node connectivity concept is illustrated on following diagram:

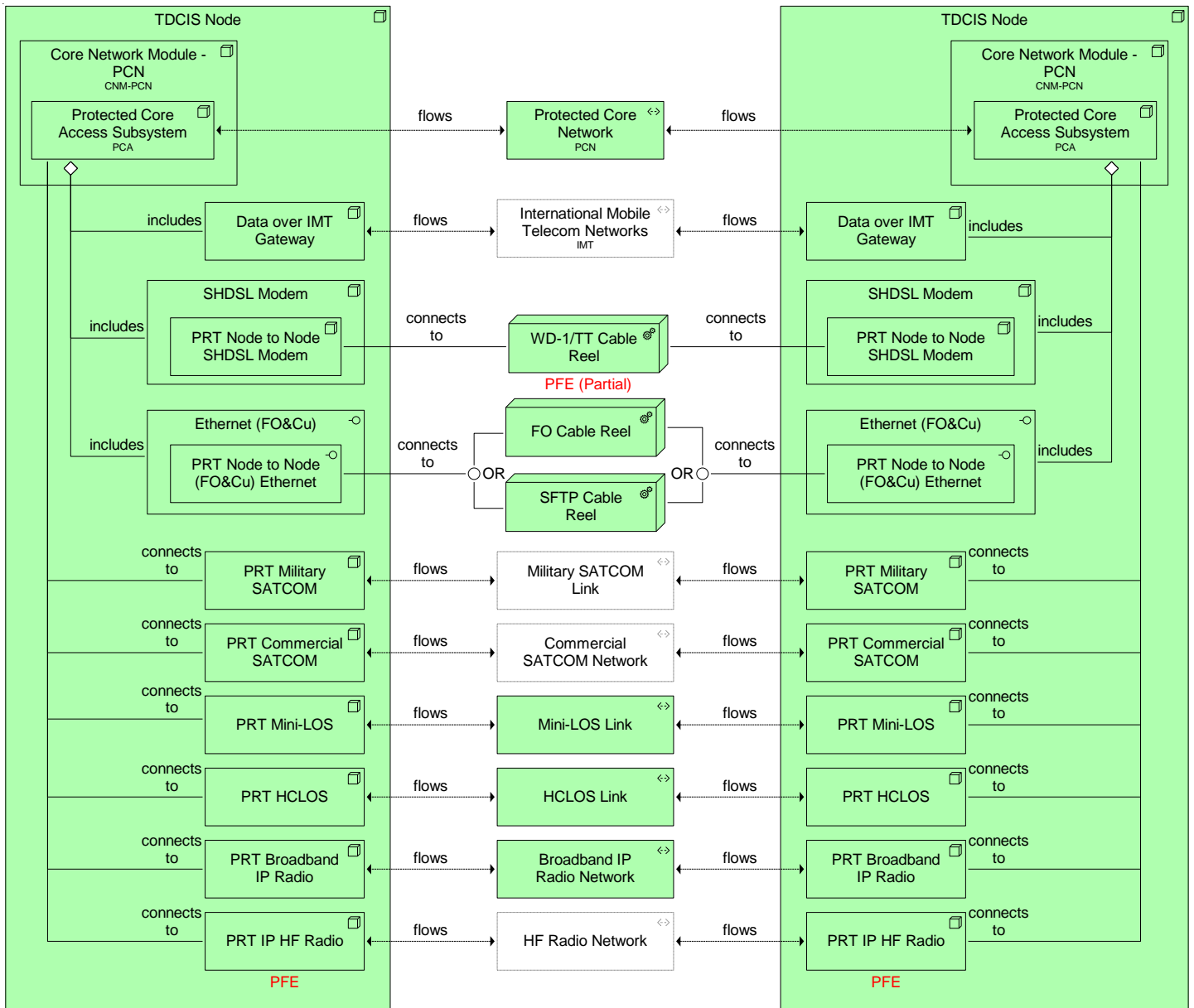


Figure 15 - Node to Node connectivity concept

**SRS** (PRTTDCIS-1527)

The Data over IMT functionality shall be integrated in the PCA of each node equipped with this Transmission System.

**NOTE** (PRTTDCIS-3074)

The HCLOS datalink will establish a High bandwidth and long distance wireless backbone network infrastructure connecting Access nodes, BCC nodes and RAP nodes through TN nodes.

**SRS (PRTTDCIS-1434)**

TDCIS nodes shall be equipped or enabled with Transmission Systems quantities, as per the table below:

	AN	BCC	CCC	RAP	TN	RL	GAR-T HCLOS
Mini LOS	Enabled	3	1	Enabled	Enabled	Enabled	Enabled
HCLOS	3	1	Enabled	2	4	Enabled	2
Broadband IP Radio	1	1	1	1	Enabled	Enabled	-
Commercial SATCOM	1	1	1	Enabled	Enabled	Enabled	-
Military SATCOM	Enabled	Enabled	Enabled	-	-	1	-
Ethernet (FO and Cu)	8	8	4	4	4	4	-
SHDSL	4	4	2	2	2	2	-
Data over IMT	1	1	Enabled	Enabled	Enabled	Enabled	-
IP HF	-	-	-	-	-	1	-

Table 10 - Transmission Systems quantities per Node

**SRS (PRTTDCIS-2563)**

All Nodes identified as Enabled shall be ready (mechanical, wiring...) to accommodate the associated Transmission System.

**3.2.5 Housing**

**SRS (PRTTDCIS-1499)**

The physical configuration of a TDCIS node shall comprise of:

- a single shelter; or,
- a single shelter and a trailer; or,
- a combination of two shelters.

**SRS** (PRTTDCIS-1365)

The TDCIS Nodes shall each be composed as in following table:

Node	Composition
Access Node	1 Management Shelter 1 Communication Shelter
Battalion Communications Centre	1 Management Shelter 1 Communication Shelter
Company Communications Centre	1 Shelter
Radio Access Point	1 Shelter
Transit Nodes	1 Shelter
Rear Links	1 Shelter 1 GAR-T Trailer - Rear Link HF Variant
GAR-T HCLOS Relay	1 GAR-T Trailer - HCLOS Relay Variant

Table 11 - TDCIS Nodes Shelter and Trailer composition

**SRS** (PRTTDCIS-1500)

In the case of dual shelter Nodes, the first shelter (Management Shelter) shall contain the Colour Clouds Elements and the second shelter (Communication Shelter) shall contain the Transmission Elements.

**SRS (PRTTDCIS-4635)**

The distribution of Node Elements between the Management and the Communication Shelter and the connectivity between those shelters shall adhere to the concept illustrated on the following diagram:

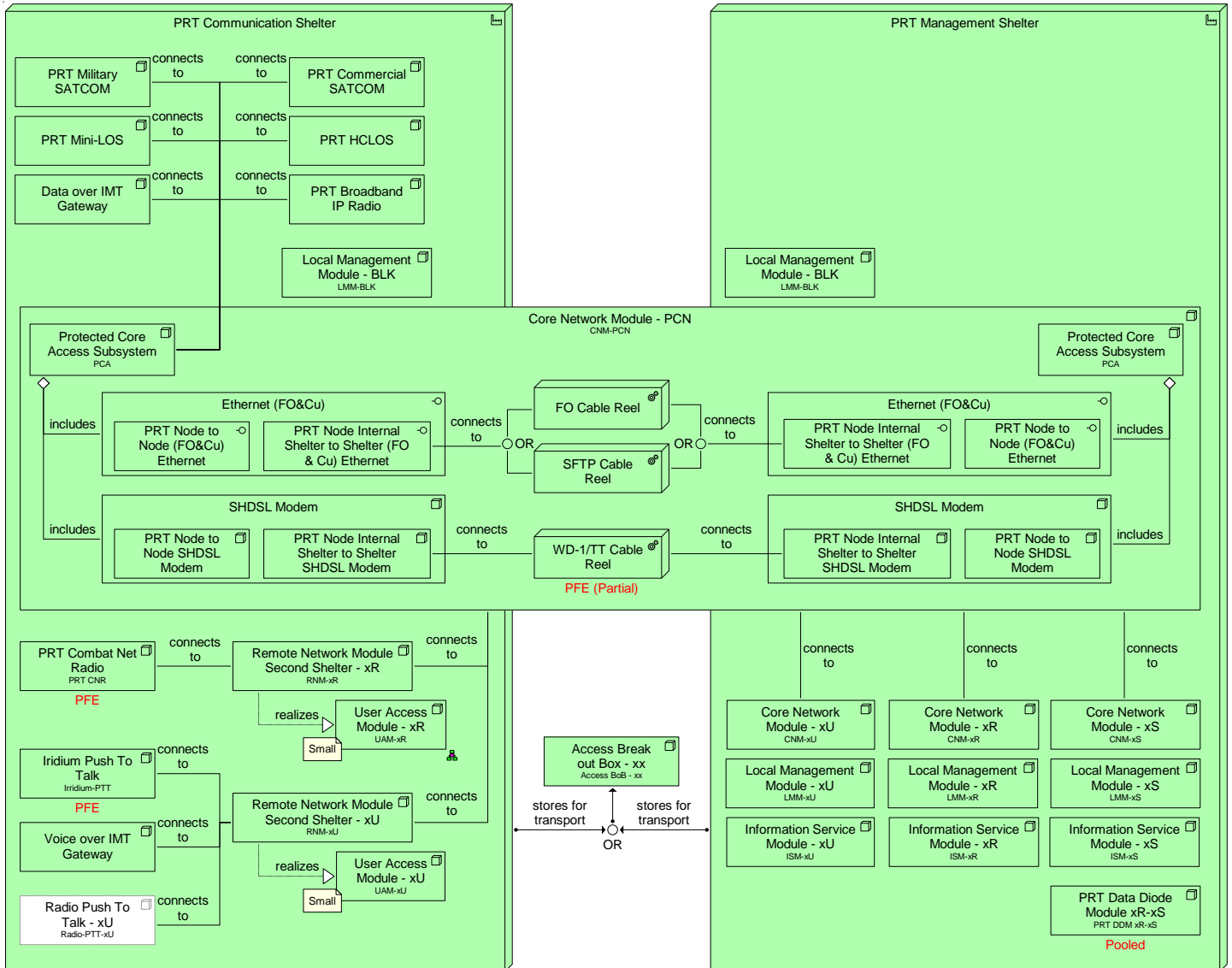


Figure 16 – Elements distribution and Shelter connectivity concept in dual shelter Nodes

**NOTE (PRTTDCIS-2261)**

The Tactical Towable Support Group trailer (GAR-T), provides support to the TDCIS Nodes Shelters.

**NOTE (PRTTDCIS-2262)**

The GAR-T forms the basis for the TDCIS two trailer variants, namely the “GAR-T HCLOS Relay” and “GAR-T Rear Link”

**SRS (PRTTDCIS-1505)**

Transit cases shall be used to host and support CIS assets built in it.

**SRS (PRTTDCIS-1506)**

Transport cases shall be used to store and transport non-PFE EUD and ancillaries.

**SRS (PRTTDCIS-3091)**

Transit and Transport Cases shall be fixed inside the Node Shelter for transport.

**SRS (PRTTDCIS-2158)**

Beyond the Cable reels specifically mentioned in element breakdowns, TDCIS Nodes shall include additional cable reels as per following table.

	AN	BCC	CCC	RAP	TN	RL
FO cable reel	4	4	2	2	2	2
SFTP cable reel	2	2	1	1	1	1
WD-1/TT cable reel	2	2	1	1	1	1
Backpack harness	2	2	1	1	1	1

Table 12 - Additional Cable Reels per node

**SRS (PRTTDCIS-4636)**

Cable reels and Backpack harnesses quantities shall be evenly distributed between shelters for dual shelters Nodes.

**3.2.6 Purchaser Furnished Equipment**

**SRS (PRTTDCIS-1522)**

The table below contains Crypto Purchaser Furnished Equipment (PFE) assets quantities that shall be considered for integration in the TDCIS nodes

Asset	AN	BCC	CCC	RAP	TN	RL
TCE 621B Crypto	1	1	-	-	-	-

Table 13 - Crypto PFE Quantities for TDCIS Nodes

**SRS (PRTTDCIS-2679)**

The table below contains CNR PFE assets quantities that shall be considered for integration in the nodes

Asset	AN	BCC	CCC	RAP	TN	RL
CNR Double Vehicle Module	-	2	1	3	-	-
CNR Single Vehicle Module	-	-	1	-	-	-
CNR Transceiver TR-525AH	-	2	1	2	-	-
CNR Transceiver TR-525AU	-	1	1	3	-	-
CNR Transceiver TR-525AU HQII	-	1	1	1	-	-
CNR 150W HF Power Amplifier	-	1	1	1	-	-
CNR 150W Antenna Tuning Unit	-	1	1	1	-	-
CNR 50W V/UHF Power Amplifier	-	1	1	1	-	-
CNR RoIP Gateway	-	-	-	1	-	-

Table 14 - CNR PFE Quantities

**SRS (PRTTDCIS-2680)**

The table below contains PFE CIS assets quantities that shall be considered for integration in the nodes

Asset	AN	BCC	CCC	RAP	TN	RL
IP HF Radio Rack - Single	-	-	-	-	-	1
IP HF Transceiver TR-525AH	-	-	-	-	-	1
IP HF 500W Power Amplifier and Antenna Tuning Unit	-	-	-	-	-	1
IP HF Log-Periodic HF Antenna	-	-	-	-	-	1
IP HF Whip Antenna	-	-	-	-	-	1

Table 15 - IP HF Radio PFE Quantities

**NOTE (PRTTDCIS-4637)**

The HF Whip Antenna will not be mounted nor used at the same time as the Military SATCOM Terminal in the RL Node.

**NOTE (PRTTDCIS-1524)**

TN has no CIS PFE to be integrated.



**SRS** (PRTTDCIS-1437)

The table below contains the characteristics of the different PFE CIS assets that shall be taken into consideration for integration in the different nodes and modules.

Asset	Estimated Rack Space (RU)	Estimated Depth (mm) excluding cable connectors and bending	Weight (kg)	Power Supply	Electrical Power (Watt)	Estimated Heat dissipation (Watt)
TCE 621B Crypto	1	250	4.1	230VAC	25	-
CNR Double Vehicle Module	5	400	21.4	24VDC	672	550
CNR Single Vehicle Module	3	400	18.1	24VDC	360	286
CNR 150W HF Power amplifier	5	250	14.5	24VDC	960	810
CNR 50W V/UHF Power Amplifier	5	250	12.5	24VDC	450	360
CNR RoIP Gateway	3	350	10	24VDC	20	-
HF Radio Rack - Single	3	550	14	28VDC (Powered from Amplifier assembly)	120	100
HF 500W Power Amplifier and Antenna Tuning Unit	17	600	200	230VAC	2520	2000

Table 16 - PFE Characteristics

**NOTE** (PRTTDCIS-2682)

All other PFE assets listed in previous tables are taking place inside the modules for which characteristics are provided. Therefore, these are not considered as additional physical, environmental and electrical integration constraints.

**NOTE** (PRTTDCIS-3220)

PFE detailed specifications will be shared with the Contractor after Contract Award.

**NOTE** (PRTTDCIS-3222)

CNR 150W HF Antenna Tuning Unit is

- not rack mounted but outdoor installed (close to the ERFP) in a location as close as possible from the Antenna, therefore it does not require any rack mounting units; and,
- in-line powered from the CNR 150W HF Power Amplifier over the RF connection, therefore its Estimated Heat Dissipation and Power Consumption are included in the characteristics of the CNR 150W HF Power Amplifier.

**NOTE** (PRTTDCIS-3221)

CNR 150W HF Power amplifier and CNR 50W V/UHF Power Amplifier have the same form fit factor and are rack mounted on a plate which can accommodate up to two (2) of these amplifiers next to each other. Therefore, a single 5U rack space has to be considered for every 2 of these power amplifier units.

**NOTE** (PRTTDCIS-4737)

The PFE HF Log Periodic antenna will be an ALARIS RA10-118-01 mounted on a YAESU G-2800DXC Rotator.

**NOTE** (PRTTDCIS-4468)

Following licenses are PFE to this project:

- Microsoft Windows; and,
- Microsoft SharePoint (not Microsoft SQL); and,
- Microsoft Exchange; and,
- Antivirus Software.

**NOTE** (PRTTDCIS-4638)

WD-1/TT cable to be rolled on WD-1/TT cable reels is PFE.

### 3.3 GAR-T HCLOS Relay

#### SRS (PRTTDCIS-1363)

The GAR-T HCLOS Relay design shall adhere to the design concept presented in following figure:

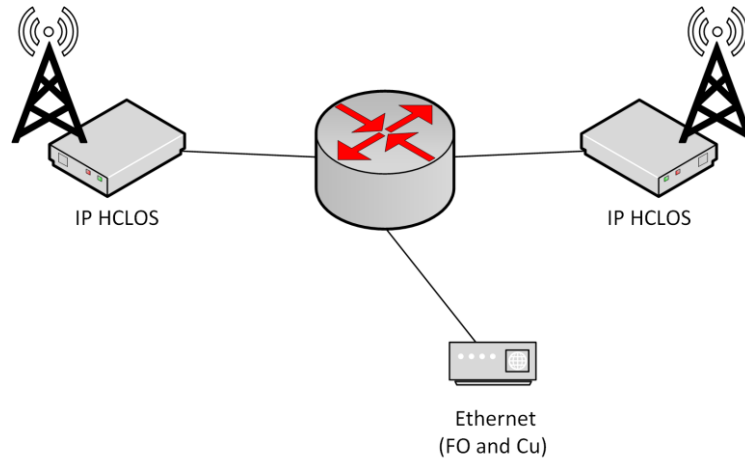


Figure 17 - GAR-T HCLOS Relay design concept.

#### SRS (PRTTDCIS-2302)

The GAR-T HCLOS Relay shall be built by TWO (02) HCLOS radios systems, mounted on a GAR-T autonomous trailer.

#### SRS (PRTTDCIS-2303)

The GAR-T HCLOS Relay shall route the IP traffic from one (receiving) HCLOS radio to the other (relaying) HCLOS radio when used as a relay.

#### SRS (PRTTDCIS-2304)

The GAR-T HCLOS Relay shall route the IP traffic from nodes to nodes over a maximum of two HCLOS links when used in Enabling or Augmenting Node HCLOS capacity configuration.

#### SRS (PRTTDCIS-2305)

The HCLOS routing function shall provide basic connectivity to the TDCIS Nodes through:

- TWO (02) 1 Gbps *Eth-FO* interfaces, and
- TWO (02) 1 Gbps *Eth-Cu* interfaces.

#### SRS (PRTTDCIS-2301)

The GAR-T HCLOS Relay telescopic mast shall support two HCLOS Radio Systems.

**SRS** (PRTTDCIS-2297)

In addition to those specified in the GAR-T Common Base, the HCLOS relay shall support compartments to accommodate the following;

- Two HCLOS Radio systems (antennas, radios, rotors, fixing/installing equipment); and,
- Associated installation cable reels (power, data) for two HCLOS radio systems.

**SRS** (PRTTDCIS-3039)

The GAR-T HCLOS Relay, when used as a relay, shall support working in isolation of any TDCIS Node.

### 3.4 NS Kit

**SRS** (PRTTDCIS-2549)

TDCIS shall include a NATO SECRET (NS) Kit.

**SRS** (PRTTDCIS-2550)

The NS Kit shall include:

- **Core Node lite** providing NS Services, end-user access and federating with other MNP in the NS security domain; and,
- **Remote Node lite** providing network extension and end-user access to NS Services.

**SRS** (PRTTDCIS-2931)

The NS Kit is a group of nodes and, unless specified otherwise, shall be considered as a TDCIS Node for all its Functional and Technical Requirements, Performances, Implementation Constraints and Service and Module implementation concepts.

**SRS** (PRTTDCIS-2551)

NS Kit being reserved only to NATO led missions, the NS Kit (and all of its composing elements) shall be considered a pooled resource and therefore shall not be assigned to any TDCIS node in particular.

**SRS** (PRTTDCIS-2552)

The NS Kit Nodes quantities shall adhere to following table:

	Quantities
NS Kit - Core Node lite	3
NS Kit - Remote Node lite	7

Table 17 - NS Kit Nodes quantities

**SRS** (PRTTDCIS-2697)

The NS Kit Nodes per node maximum collocated connected end users quantities shall adhere to following table:

	End User Quantities
NS Kit - Core Node lite	8
NS Kit - Remote Node lite	10

Table 18 - NS Kit Nodes End User quantities

**SRS** (PRTTDCIS-2920)

The NS Kit Core Nodes shall support TWO (02) System Administrators.

**SRS** (PRTTDCIS-2919)

Each NS Kit Core Nodes shall include System Administrator devices as per following table:

	Quantities
System Administrator Workstations	2
System Administrator VoIP phones	2

Table 19 - NS Kit System Administrator quantities per Core Node

**SRS (PRTTDCIS-2553)**

The breakdown and housing concept of the NS Kit Nodes are illustrated in the following figure. It identifies the required Modules it is composed of. Each NS Kit Node shall be built upon the building blocks and integrated in housing elements as identified in this reference.

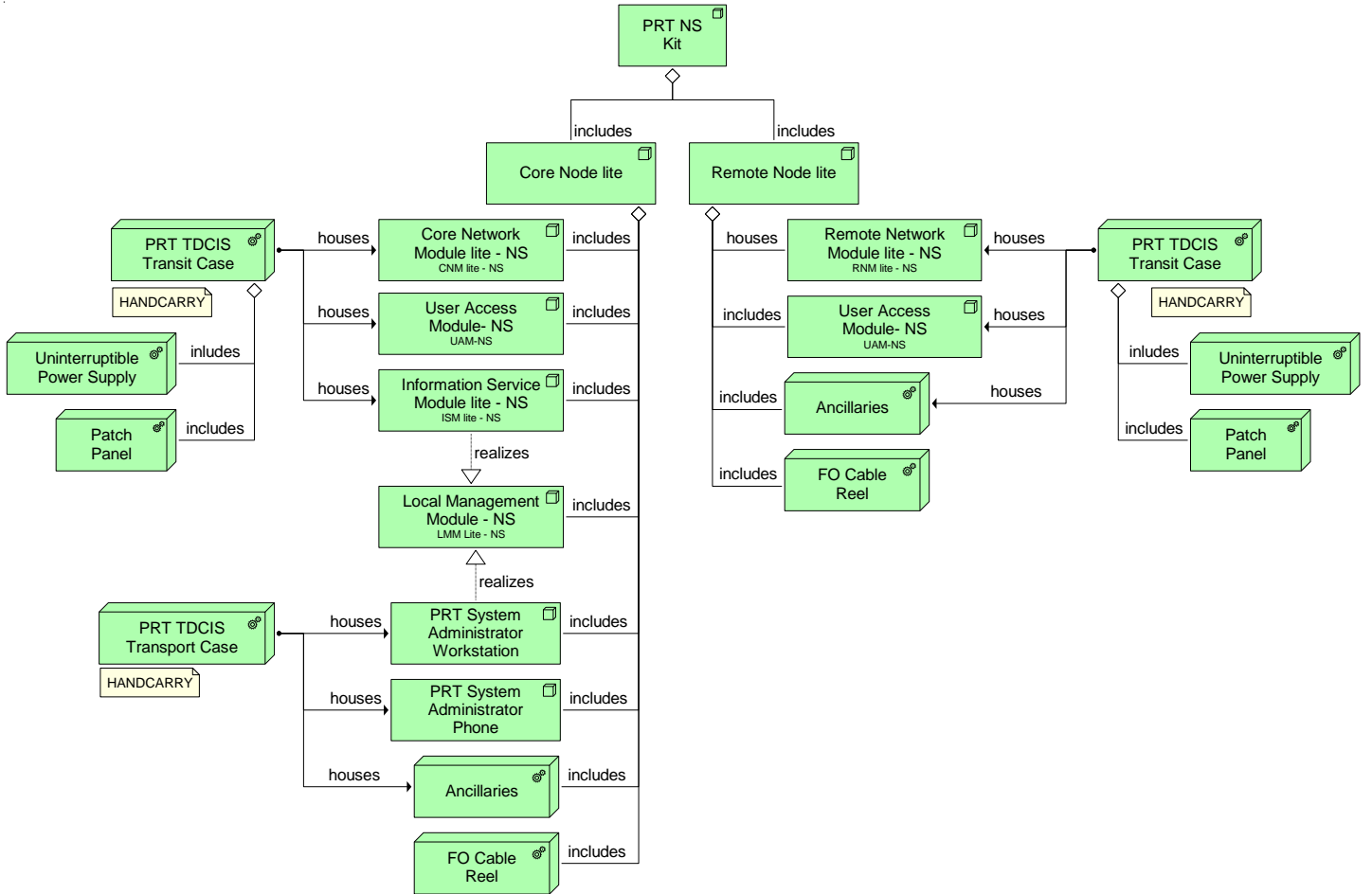


Figure 18- NS Kit breakdown

**SRS (PRTTDCIS-2745)**

The NS Kit Core Node lite shall contain ONE (01) CNM lite, ONE (01) medium UAM-NS and ONE (01) ISM lite.

**SRS (PRTTDCIS-2746)**

The NS Kit Remote Node lite shall contain ONE (01) RNM lite and ONE (01) medium UAM-NS.

**SRS (PRTTDCIS-4371)**

Each NS Kit Node shall be housed in cases profiles as per following table

	Quantities	Case Profile	Remark
Core Node lite	1	HANDCARRY	Single transit case housing all Core Node lite Modules
Core Node lite - Ancillaries	N	HANDCARRY	For Sys Admin appliances, cabling, etc. N is Design Driven
Remote Node lite	1	HANDCARRY	Single transit case housing all Remote Node lite Modules, including ancillaries (cables, etc.)

Table 20 - NS Kit housing cases integration profiles

**NOTE (PRTTDCIS-2687)**

The NS Kit Nodes in context is illustrated on the following picture.

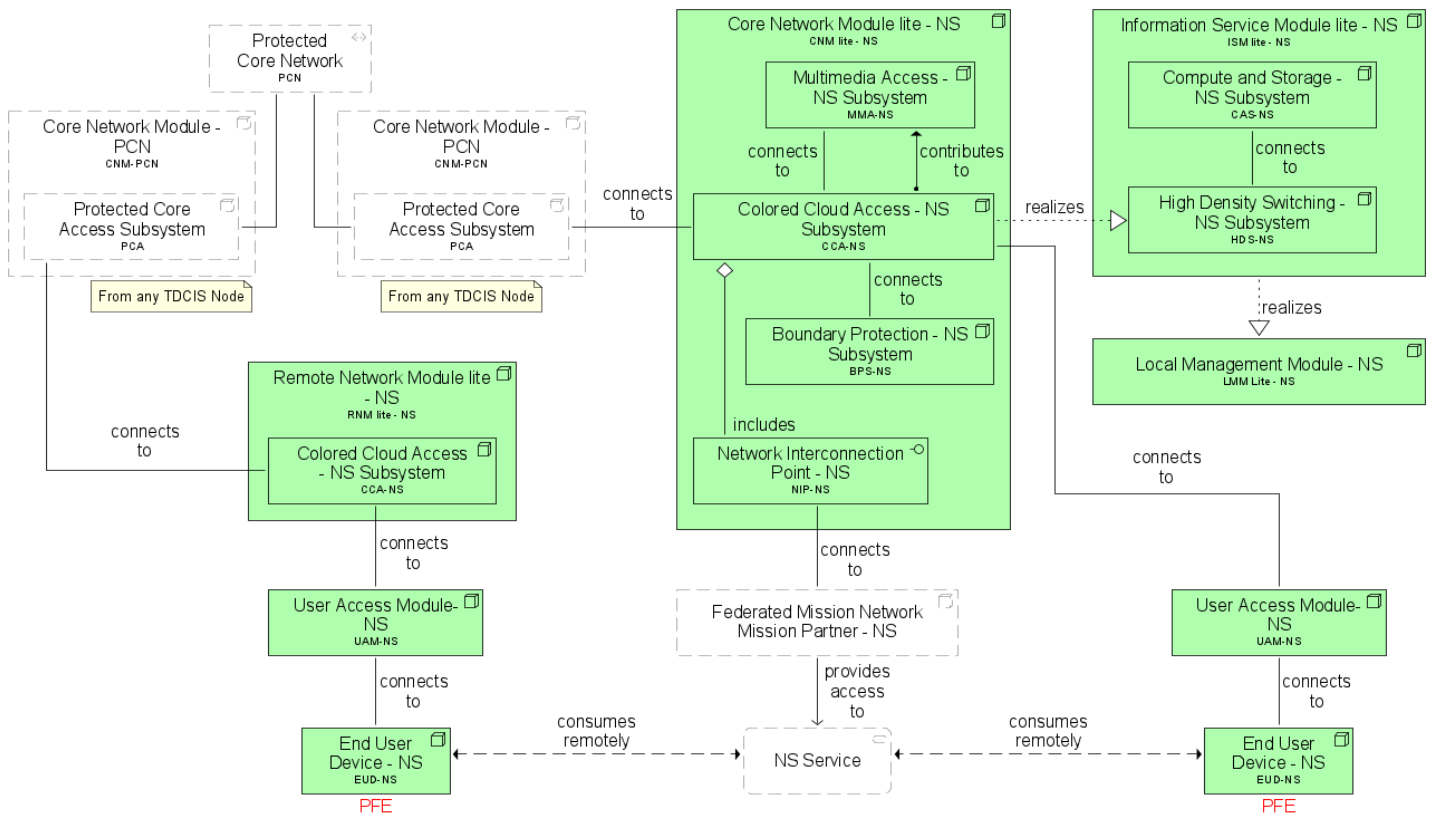


Figure 19 - NS Kit in context

**SRS (PRTTDCIS-2747)**

NS Kit CNM lite and RNM lite shall interconnect their respective CCA through the PCA of any TDCIS Node and benefit from the PCN as a transport network.

**SRS (PRTTDCIS-2695)**

The table below contains Crypto PFE assets quantities that shall be considered for integration in the NS Kit.

Asset	NS Kit
TCE 621M Crypto	10

Table 21 - Crypto PFE Quantities for NS Kit

**SRS (PRTTDCIS-2688)**

Where and when possible, the contractor shall aim for an identical design and hardware for NS Kit modules as for the TDCIS Node modules.

**SRS (PRTTDCIS-2691)**

If necessary, the contractor shall prioritize small footprint and reduced size and weight of the NS Kit over hardware commonality with TDCIS Node modules.

**SRS (PRTTDCIS-3003)**

Each TDCIS Node Shelter shall have a storage and transport position for ONE (01) NS Kit Core Node and ONE (01) NS Kit Remote Node.

**SRS (PRTTDCIS-3004)**

NS Kit elements shall primarily rely on the Node Shelter power supply for a distance of minimum 25m though the Shelter Termination Panel.

**SRS (PRTTDCIS-4639)**

NS Kit elements shall support being powered from other 220VAC power sources (e.g. Mains, Power Generators, etc.)

**SRS (PRTTDCIS-3006)**

Each NS Kit Core Node shall be delivered with ONE (01) FO cable reel of 250m.

**SRS (PRTTDCIS-3007)**

Each NS Kit Remote Node shall be delivered with ONE (01) FO cable reel of 250m.



**SRS** (PRTTDCIS-4238)

The NS Kit shall provide following services on NS to their directly connected End Users and System Administrators as per following table:

Legend:

- *Local:* Service is locally hosted in the Core Node lite
- *Remote:* Service is remotely consumed from the federation

Service	Service Category	NS Kit
Functional Area Services	Community of Interest	Remote
Email	Business Support	Local
Collaborative Information Portal	Business Support	Remote
Voice Collaboration (IP)	Business Support	Local
Interconnection to Nations	N/A	Local
Antivirus	CIS Security	Local
Network Access Control	CIS Security	Remote
Encryption	CIS Security	Local
Log Aggregation	CIS Security	Remote
Online Vulnerability Assessment	CIS Security	Remote

Table 22 - End-users Services on NS

### 3.5 Pooled Elements

**NOTE** (PRTTDCIS-4387)

The TDCIS Pooled Elements are not to be used for the NS Kit.

NOTE (PRTTDCIS-4384)

The TDCIS Pooled Elements in context are illustrated on following figure:

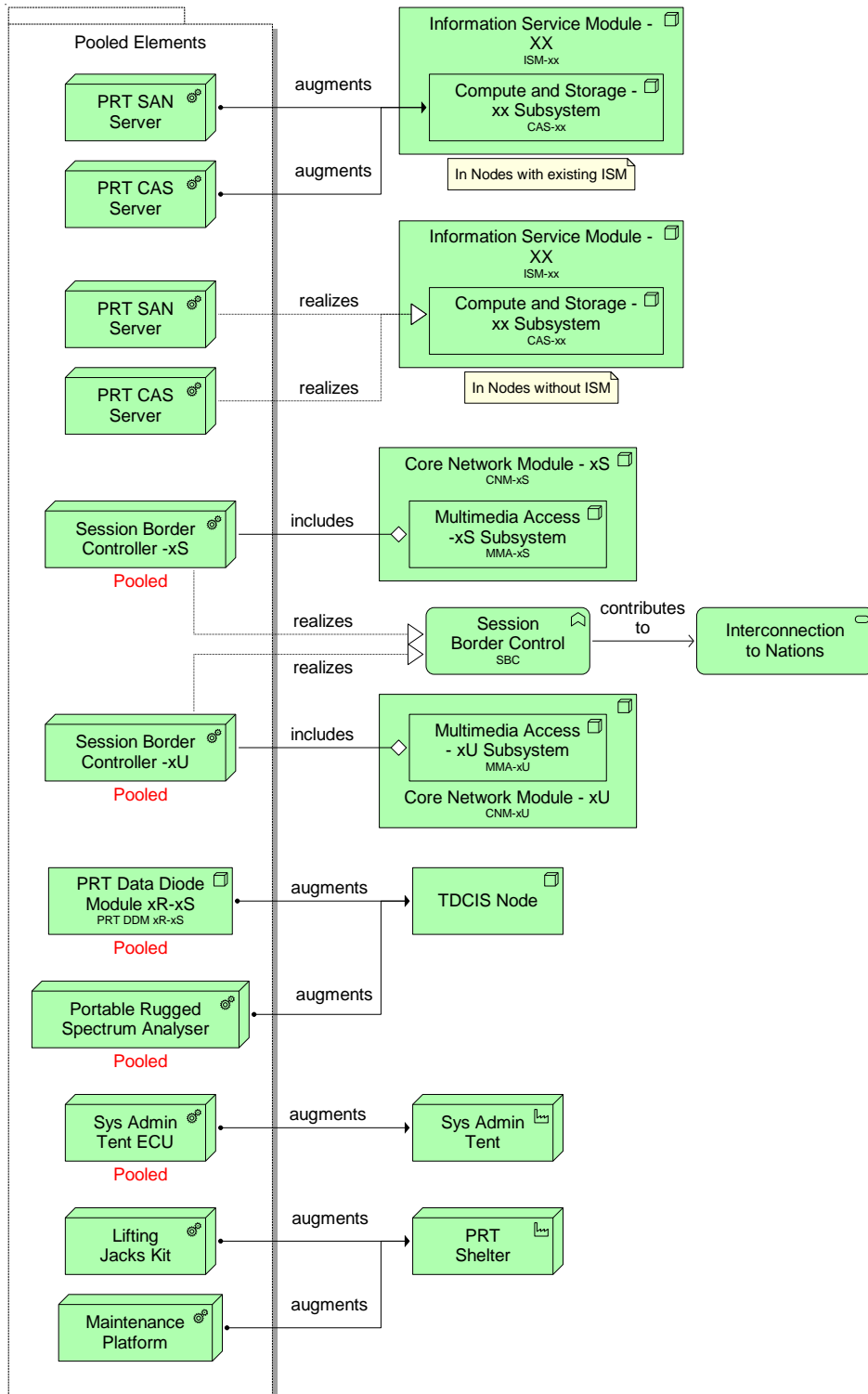


Figure 20 - Pooled Elements in context.

**SRS** (PRTTDCIS-4385)

The TDCIS Pooled Elements shall be delivered in quantities as per following table:

Elements	Quantities
PRT CAS Server	20
PRT SAN Server	2
Session Border Controller (SBC) - xU	6
Session Border Controller (SBC) - xS	6
DDM xR-xS	9
Rugged Portable Spectrum Analyser	6
Sys Admin Tent ECU	15
Lifting Jacks Kits	6
Maintenance Platforms	2

Table 23 - Pooled Elements quantities

**SRS** (PRTTDCIS-4388)

The Pooled CAS and SAN Servers shall support:

- Increasing an existing CAS variant with more Compute and Storage capacity in any Security Domain; and,
- Upgrading an existing CAS variant to another CAS variants such as converting a SAN based CAS into a Software Defined CAS and any other possible combinations in any Security Domain; and,
- Enabling a TDCIS Node with no pre-existing ISM with an ISM containing any possible CAS variant in any Security Domain.

**NOTE** (PRTTDCIS-4392)

Any potential licenses required for Increasing, Upgrading or Enabling a Node with Pooled CAS and SAN Servers are not deliverables of this project.

**SRS** (PRTTDCIS-4575)

The Pooled Session Border Controllers (SBC) for xU and xS shall support integration in any BCC to enable the federation of Voice and Video Teleconference parts of the Interconnection to Nations service.

**SRS** (PRTTDCIS-4389)

The Pooled DDM xR-xS shall support integration in any AN and in any BCC to enable the Cross Domain Service between xU and xS in that Node.

**SRS** (PRTTDCIS-3037)

Pooled Portable Rugged Spectrum Analyser shall be suited to all TDCIS Transmission Systems specifications to perform trouble shooting activities.

**SRS** (PRTTDCIS-4640)

Pooled Portable Rugged Spectrum Analyzer elements shall be composed of software and hardware components supporting physical troubleshooting on all Transmission Systems hardware components in base band and in Radio Frequency (RF) band.

**SRS** (PRTTDCIS-4641)

All Sys Admin Tent shall support the installation of a Pooled Tent ECU.

**SRS** (PRTTDCIS-4390)

All TDCIS Shelters shall support the installation of a Pooled Lifting Jacks Kit.

**SRS** (PRTTDCIS-4391)

The Pooled Maintenance Platforms shall be compatible with all PRT Shelters variants.

### 3.6 Implementation Constraints

**SRS** (PRTTDCIS-1222)

The TDCIS node design shall be modular and generic, built in common building blocks.

**SRS** (PRTTDCIS-1223)

Nodes shall be fitted only with those elements that are required.

**NOTE** (PRTTDCIS-1840)

The Voice End User PFE baseline is composed of following models:

- Cisco 7942; and,
- Cisco 8865; and,
- Cisco 7861 (SIP); and,
- Cisco 8821 (Wireless IP Phone).

**SRS (PRTTDCIS-4270)**

The Contractor shall implement CAS variants as per following table:

Node	Security Domain	CAS Variant
AN	xU	Single Server
AN	xR	Software Defined
AN	xS	Software Defined
BCC	xU	Single Server
BCC	xR	SAN Based
BCC	xS	SAN Based
CCC	xU	Single Server
CCC	xR	Single Server
RAP	xU	Single Server
RAP	xR	Single Server
NS Kit	NS	Single Server

Table 24 - CAS variant per Node and Security Domain

**SRS (PRTTDCIS-4515)**

There shall be no DRS-xU implemented in RAP.

**SRS (PRTTDCIS-3016)**

On top of all services identified in the Contractor Design, the Contractor shall include the following PFE workload for COI Services to the CAS Subsystem design:

Node	Security Domain	vCPU	vRAM (GB)	Storage (GB)
AN	xU	20	56	1300
AN	xR	108	284	6800
AN	xS	112	292	7000
BCC	xU	20	56	1300
BCC	xR	108	284	6800
BCC	xS	112	292	7000
CCC	xU	12	24	300
CCC	xR	12	24	300
RAP	xU	12	40	1100
RAP	xR	20	56	1300

Table 25 - PFE Payload per Node and Security Domain

**NOTE** (PRTTDCIS-4269)

The PFE workload to the CAS Subsystem does not include oversubscription nor provision for growth.

**SRS** (PRTTDCIS-4404)

The Contractor shall implement LMM as per following table:

Node	Security Domain	LMM as an ISM Workload	LMM as a Sys Admin Workstation Workload
AN	BLK	-	Yes
AN	xU	Yes	Yes
AN	xR	Yes	Yes
AN	xS	Yes	Yes
BCC	BLK	-	Yes
BCC	xU	Yes	Yes
BCC	xR	Yes	Yes
BCC	xS	Yes	Yes
CCC	BLK	-	Yes
CCC	xU	Yes	Yes
CCC	xR	Yes	Yes
RAP	BLK	-	Yes
RAP	xU	Yes	Yes
RAP	xR	Yes	Yes
TN	BLK	-	Yes
TN	xU	-	Yes
RL	BLK	-	Yes
RL	xU	-	Yes
NS Kit	NS	Yes	Yes

Table 26 - CAS variant per Node and Security Domain

**SRS** (PRTTDCIS-4512)

Any TCE621 integration in rack shall include an opaque plate hiding the front panel of the TCE621 making any screen, LED, etc. invisible.

**SRS** (PRTTDCIS-4541)

TDCIS shall not implement TEMPEST inline power filters on BLK, xU and xR security domains.

## 3.7 Performance Targets

### 3.7.1 General

#### SRS (PRTTDCIS-2627)

Unless stated otherwise, all Performance Targets shall be met with TWO (02) trained System Administrators per Shelter.

#### SRS (PRTTDCIS-4090)

All TDCIS Elements shall survive a hard shut-down.

### 3.7.2 Deployability

#### SRS (PRTTDCIS-1947)

Any Node shall be teared-down in less than 30 minutes.

#### SRS (PRTTDCIS-2628)

Node Tear-down status shall be understood as all services and Transmission links properly shutdown.

#### SRS (PRTTDCIS-1948)

Any Node shall re-deploy in less than 90 minutes.

#### SRS (PRTTDCIS-2629)

Node re-deploy status shall be understood as ready for departure: all components are properly packed and stored for transport, Shelter is closed and securely mounted on the Vehicle, trailer is attached to the vehicle, vehicle motor running and people sitting in the cabin ready to take the road.

#### SRS (PRTTDCIS-1949)

Any Node shall be self-sustainable during 72 hours of regular operations without Logistic Supply Run.

#### SRS (PRTTDCIS-2622)

Radio Based xR Voice service shall be operational in less than 15 minutes after arrival on site.

#### SRS (PRTTDCIS-2623)

All services locally hosted in the Node shall be operational in less than 30 minutes after arrival on site.

**SRS** (PRTTDCIS-2625)

All Radio and SATCOM links (including mast and antenna raising) shall be operational in less than 45 minutes after arrival on site.

**SRS** (PRTTDCIS-2081)

The Military SATCOM Terminal shall deploy in no more than 15 minutes.

**SRS** (PRTTDCIS-4460)

Military SATCOM Terminal deployment time shall start from the moment antenna started to move from stowed position within line of sight of the satellite.

**SRS** (PRTTDCIS-2624)

All Inter-Node services (e.g. those hosted in or interconnecting with other nodes) shall be operational in less than 60 minutes after arrival on site.

**SRS** (PRTTDCIS-2626)

Any node shall have reached Full Operational Capability in less than 75 minutes after arrival on site.

**NOTE** (PRTTDCIS-4738)

The maximum duration any Node will run in isolation (i.e. without connectivity to NDN nor to another TDCIS Node) will not exceed 72hr.

### 3.7.3 Interoperability

**SRS** (PRTTDCIS-1215)

The TDCIS shall be compliant with the FMN Spiral 3 specification.

### 3.7.4 Power Supply

**SRS** (PRTTDCIS-2814)

The shelter UPS shall implement ability for all housed Elements in all security domains to continue to operate through:

- 1) Mains or generator power blackout for at least 30 minutes;
- 2) Mains or generator power brownouts indefinitely.

**SRS** (PRTTDCIS-2795)

The UPS in the NS Kit shall implement ability for the Core Node lite to continue to operate through:

- 1) Mains or generator power blackout for at least 20 minutes; and,
- 2) Mains or generator power brownouts indefinitely.



**SRS** (PRTTDCIS-4372)

The UPS in the NS Kit shall implement ability for the Remote Node lite to continue to operate through:

- 1) Mains or generator power blackout for at least 20 minutes; and,
- 2) Mains or generator power brownouts indefinitely.

**SRS** (PRTTDCIS-2282)

The GAR-T HCLOS relay variant UPS battery system shall be capable of providing sufficient power to operate all the equipment (i.e. radio system, masts, lighting, auxiliary equipment, etc.) for a period of 12 hours.

**SRS** (PRTTDCIS-2276)

The GAR-T HCLOS relay variant PGU shall be capable of providing sufficient power to all the GAR-T HCLOS relay variant systems including the electrical generator starter battery and GAR-T UPS battery banks for a minimum period of up to 24 hours on one full fuel tank.

### 3.7.5 Modularity

**SRS** (PRTTDCIS-1444)

The TDCIS shall be modular to allow the PRT Army to choose the operating capability for the deployment they are undertaking, by identify and configuring only the assets required for the specific mission.

**SRS** (PRTTDCIS-4239)

The CCC shall support conversion into a CCC Plus, hosting the full scale of services like in an AN and a BCC (only on xU and xR) though hardware augmentation from Pooled Elements and through configuration.

### 3.7.6 Environmental

**SRS** (PRTTDCIS-1366)

All TDCIS outdoor assemblies and sub-assemblies; such as, but not limited to, Housing Elements, CIS Elements (e.g. Antenna, Mast, ODU...)...; under full operational configuration, shall be capable of withstanding climatic and environmental conditions, without suffering degradation of system performance (gain, pattern type, sensitivity) and without suffering permanent mechanical damages, as stipulated operate under in TN-1078 for OPE-1a environmental conditions.

**SRS** (PRTTDCIS-2379)

All Access Breakout Box (BoB) shall operate in OPE-1c conditions.

**SRS** (PRTTDCIS-4642)

Shelter mounted Wireless Access Points shall operate in OPE-1a conditions.

**SRS** (PRTTDCIS-4268)

NS Kit shall operate in OPE-1c conditions.

**NOTE** (PRTTDCIS-3219)

All indoor PFE components (Radio, Amplifier...) to be integrated in Housing Elements are OPE-3 compliant and all outdoor PFE components (Antennas...) are OPE-1a compliant.

**SRS** (PRTTDCIS-4465)

End User Devices shall operate in OPE-1c conditions.

**SRS** (PRTTDCIS-4543)

System Administrator Helpdesk tool kit shall operate in OPE-1c conditions.

**3.7.7 Security**

**SRS** (PRTTDCIS-1149)

All CIS Nodes and Modules including electronic components processing classified information at SECRET level shall, as a minimum, be certified to TEMPEST Level B.

**SRS** (PRTTDCIS-1805)

TDCIS Elements shall, as a minimum, comply with TEMPEST requirements as per following table.

	Minimum TEMPEST
NS Kit - Core Node Lite	Level B
NS Kit - Remote Node Lite	Level B
Access BoB-xS	Level B
EUD - xS	Level B

Table 27 - TDCIS Elements TEMPEST levels

**SRS** (PRTTDCIS-4643)

Contractor shall privilege commonality of hardware in all Security Domains. Therefore, TEMPEST performances shall be met through the housing solution (Racks in Shelter and Transit Case).

**SRS** (PRTTDCIS-4644)

At the exception of AN, BCC and CCC, all Nodes marked as *Enabled* for xS Elements shall be delivered with standard racks (i.e. not providing required protection to meet TEMPEST performances).

**NOTE** (PRTTDCIS-4645)

Customer will take care of installing appropriate racks in those Nodes if they decide to install xS Elements in the future.

## 4 Services

### 4.1 Business Support Services

#### 4.1.1 General

##### **SRS** (PRTTDCIS-1231)

The contractor shall design, implement, configure and deliver all necessary Network (e.g. DHCP, etc.), Infrastructure (e.g. AD, DC, DNS, etc.) and Platform (e.g. hypervisor, etc.) services necessary to support Business Support Services in line with industry best practices and compliant with security measures.

##### **SRS** (PRTTDCIS-2700)

Multiple services are linked to the Unified Communication and Collaboration (UCC) solution. The exact product reference to fulfill the role of the UCC tool which is interfacing to the user, here after named the *Collaboration Application*, is design driven.

##### **SRS** (PRTTDCIS-2887)

The *Collaboration Application* shall be a single software providing all functionalities specified for the services it supports.

##### **SRS** (PRTTDCIS-4646)

The Contractor shall deliver all necessary components (including licenses if any) for the *Collaboration Application* to be installed on every End User Workstation, for all Nodes and in all Security Domains applicable.

##### **SRS** (PRTTDCIS-2876)

Following Services shall rely on a common Global Address List (GAL) of users:

- Email Service; and,
- Collaboration Information Portal Service; and,
- Printing and Scanning Services; and,
- Video Teleconference Service; and,
- Voice Collaboration Service.

4.1.2 Email

**SRS** (PRTTDCIS-2897)

The Email Service design shall adhere to the implementation concept illustrated on the following figure for service instances hosted in a TDCIS Node and the NS Kit.

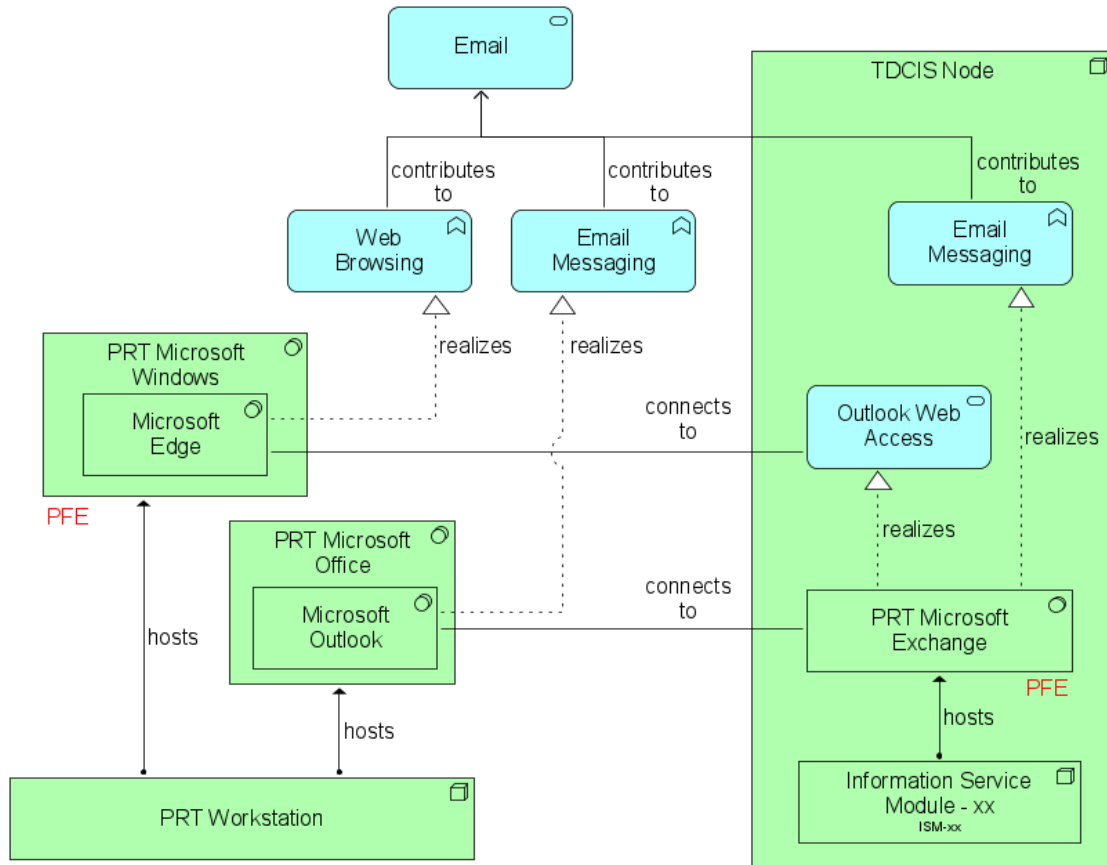


Figure 21 - Email Service implementation concept (TDCIS Node hosted)

**SRS (PRTTDCIS-4272)**

The Email Service design shall adhere to the implementation concept illustrated on the following figure for service instances hosted in PRT NDN.

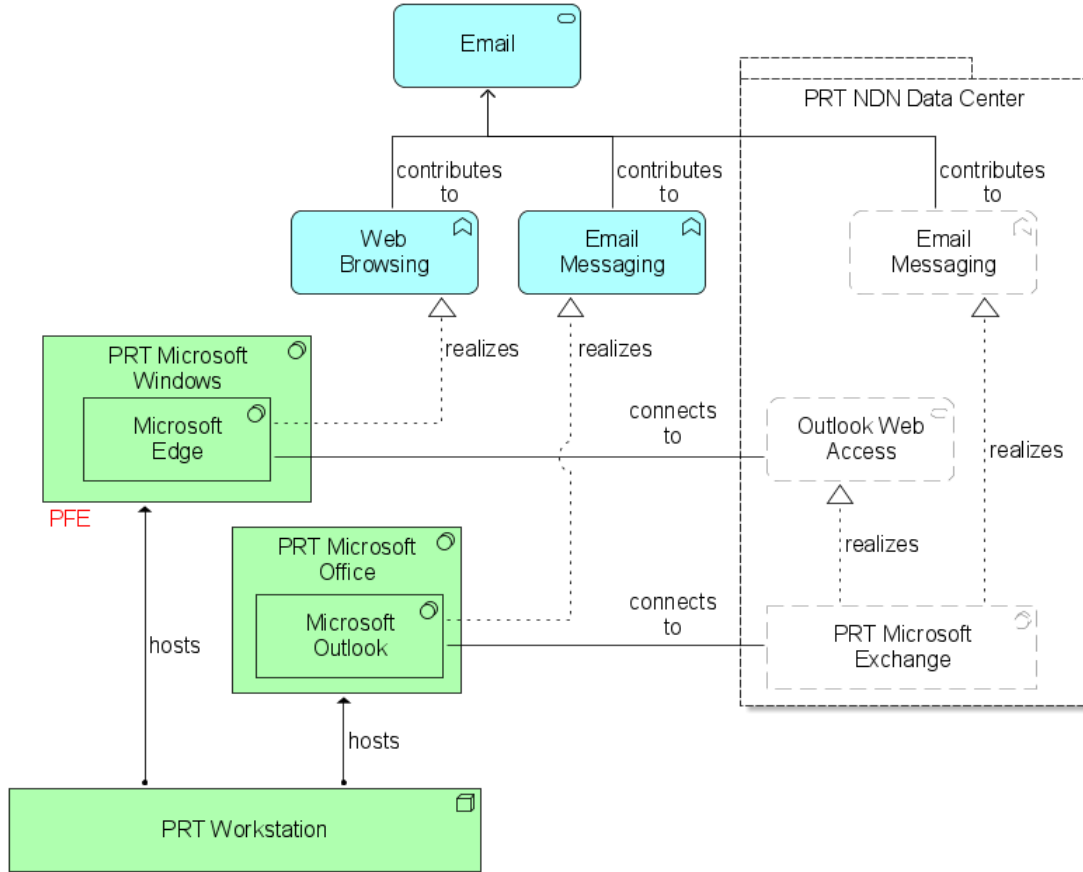


Figure 22 - Email Service implementation concept (PRT NDN hosted)

**SRS (PRTTDCIS-4273)**

Email Service shall be implemented using Microsoft Email solution as follow:

- Email Server implemented by Microsoft Exchange with Outlook Web Access; and,
- Email Client implemented by Microsoft Outlook.

**NOTE (PRTTDCIS-4274)**

Microsoft Exchange Licenses for TDCIS Nodes implementation are PFE.

**SRS (PRTTDCIS-2911)**

Each node user shall have a personal mailbox in each security domain present in the Node.

**SRS (PRTTDCIS-2912)**

Each TDCIS Nodes shall support up to 10 functional mailboxes per security domain present in the Node.

**SRS** (PRTTDCIS-2913)

Each Mailbox shall support up to 2.5GB of storage with an additional 10% of reserve.

**4.1.3 Collaboration Information Portal Service**

**SRS** (PRTTDCIS-2894)

The Collaborative Information Portal Service design shall adhere to the implementation concept illustrated on the following figure for service instances hosted in a TDCIS Node.

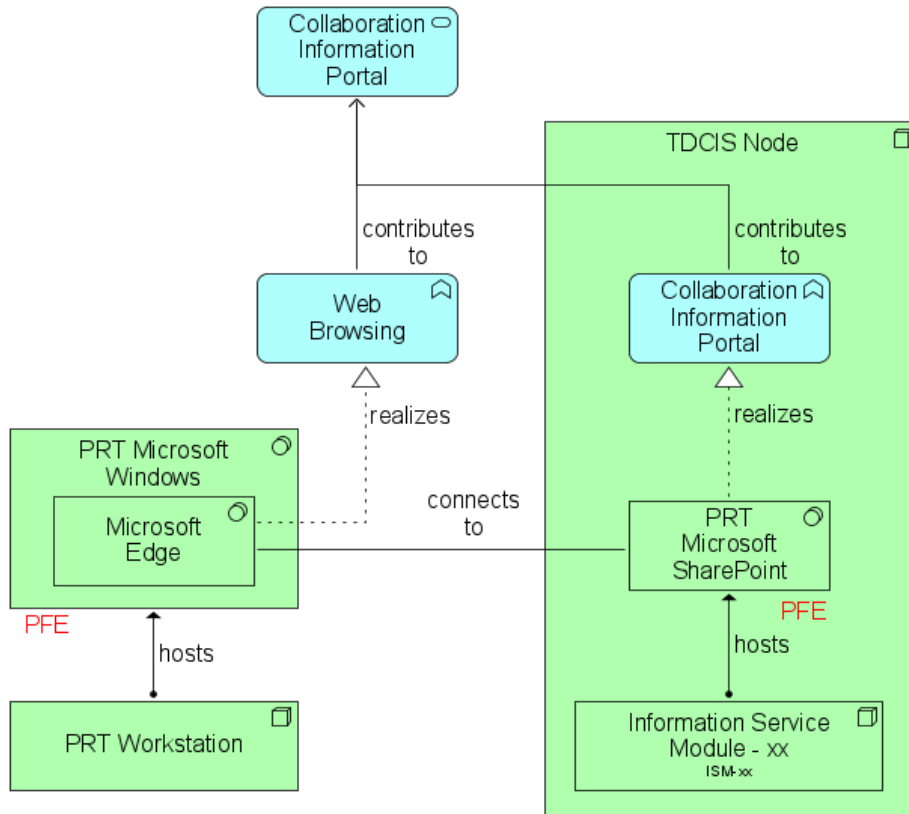


Figure 23 - Collaborative Information Portal Service implementation concept (TDCIS Node hosted)

**SRS (PRTTDCIS-4275)**

The Collaborative Information Portal Service design shall adhere to the implementation concept illustrated on the following figure for service instances hosted in PRT NDN.

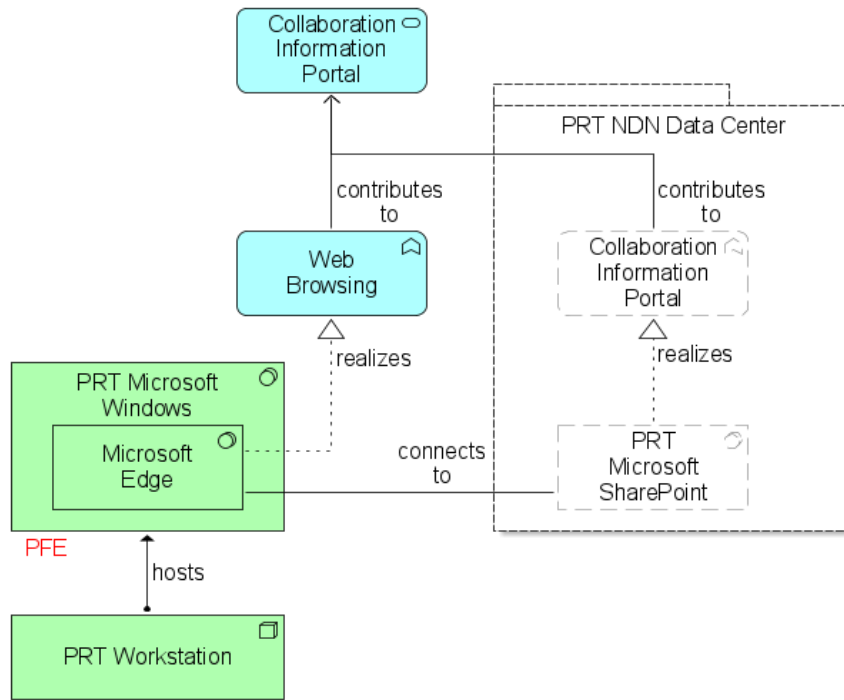


Figure 24 - Collaborative Information Portal Service implementation concept (PRT NDN hosted)

**SRS (PRTTDCIS-4276)**

The Collaborative Information Portal Service shall be implemented using Microsoft SharePoint.

**NOTE (PRTTDCIS-4277)**

Microsoft SharePoint Licenses for TDCIS Nodes implementation are PFE.

**NOTE (PRTTDCIS-4278)**

Microsoft SQL Licenses for TDCIS Nodes implementation are not PFE.

**SRS (PRTTDCIS-2905)**

The Collaboration Information Portal Service shall provide:

- 1TB of common storage; and,
- 2GB of personal storage for each user; and,
- 10% of reserve on the total.



### 4.1.4 Printing and Scanning Service

**SRS (PRTTDCIS-2895)**

The Printing and Scanning Service design shall adhere to the implementation concept illustrated on the following figure.

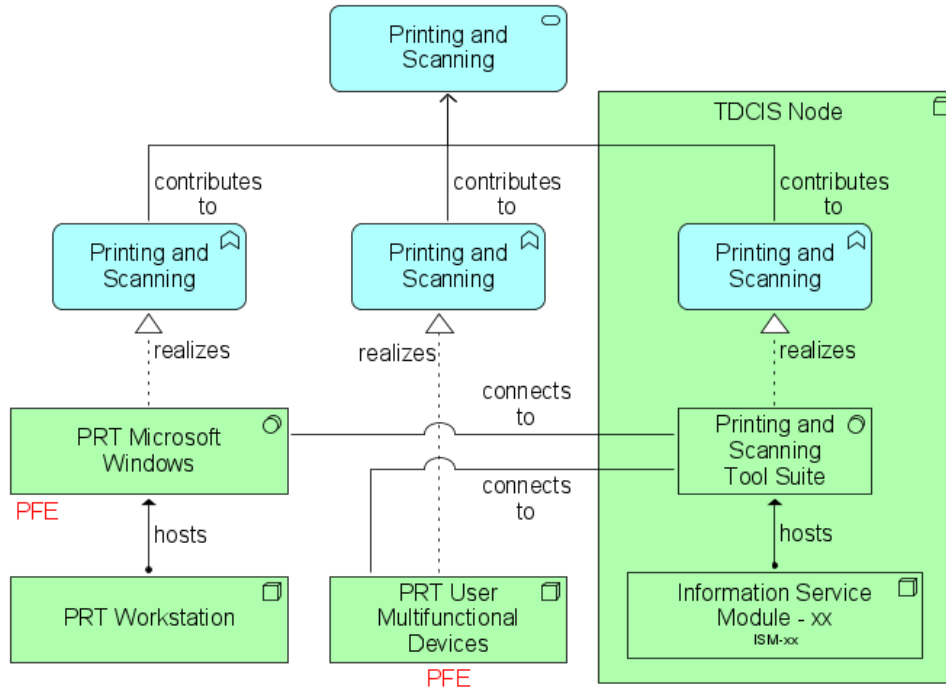


Figure 25 - Printing and Scanning Service implementation concept

**SRS (PRTTDCIS-2907)**

The Printing and Scanning Tool Suite shall allow users to:

- Print to paper hard copies on PFE Multifunctional Devices (MFD); and,
- Print to PDF file format; and,
- Scan from PFE Multifunctional Devices (MFD); and,
  - Send the scanned document via email to any user listed in the GAL; and,
  - Store the scanned document in a library provided by the Collaborative Information Portal Service.

### 4.1.5 Voice Collaboration Service

**SRS (PRTTDCIS-2885)**

The IP Voice Collaboration Service design shall adhere to the implementation concept illustrated on the following figure.

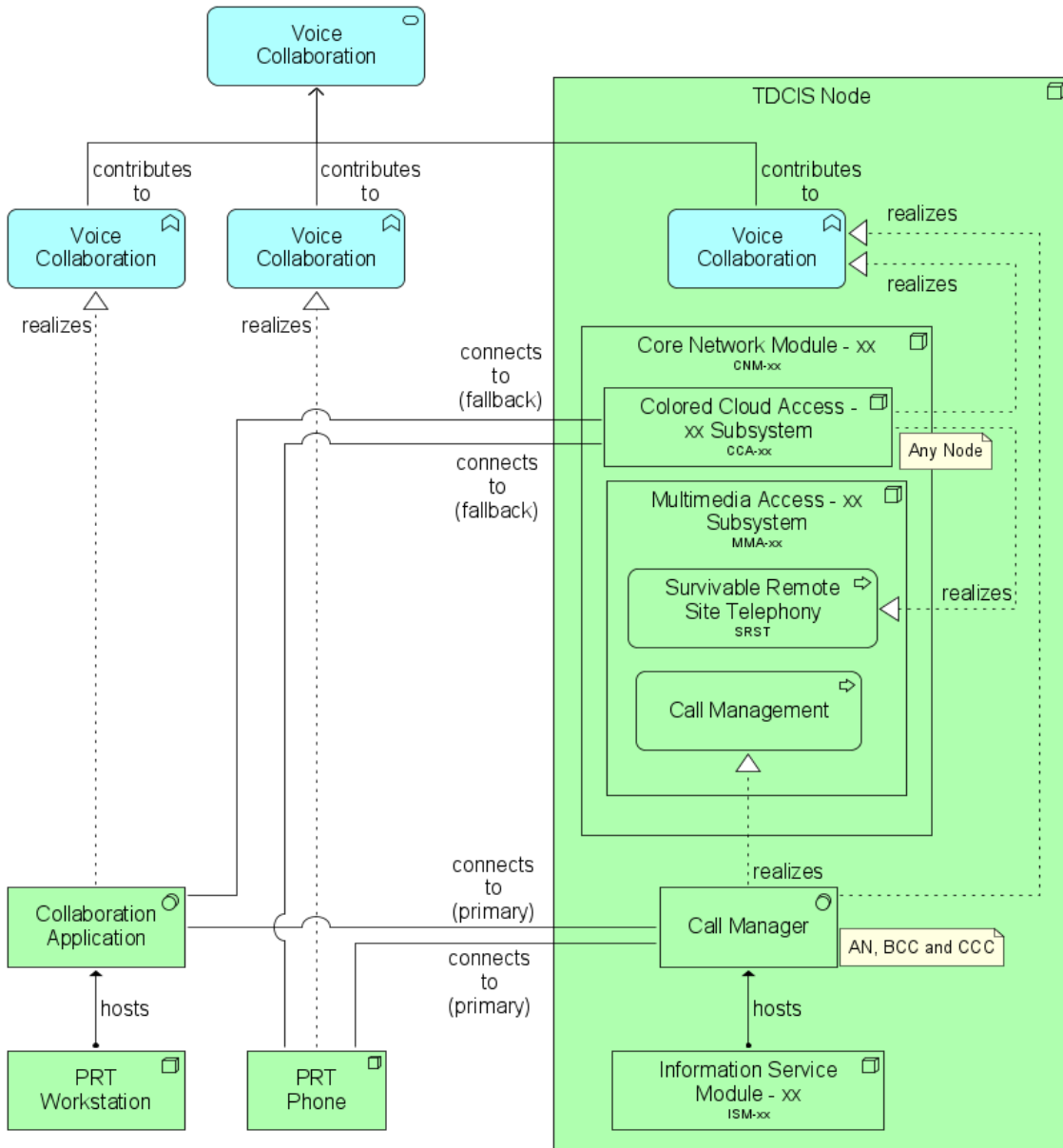


Figure 26 – IP Voice Collaboration Service implementation concept.

**SRS (PRTTDCIS-4304)**

The IP Voice Collaboration Service federation with mission partners design shall adhere to the implementation concept illustrated on the following figure.

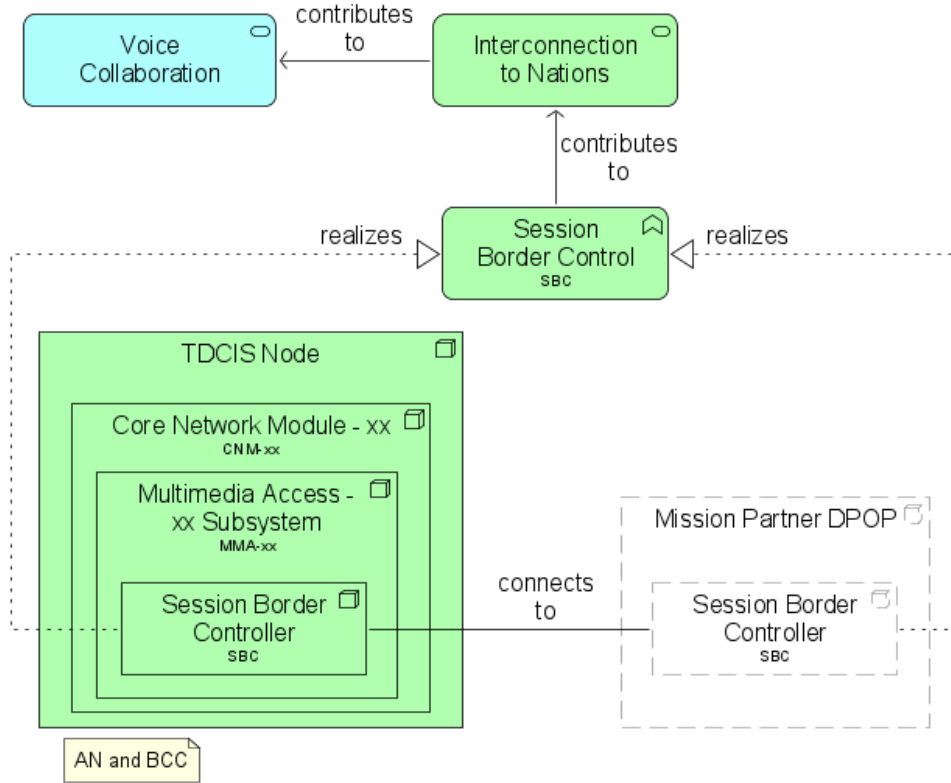


Figure 27 – IP Voice Collaboration Service federation implementation concept.

**SRS (PRTTDCIS-2888)**

Each user shall be associated with one physical (hardware) and one virtual (software) IP phone, both configured on the collaboration solution.

**SRS (PRTTDCIS-2889)**

The virtual (software) IP phone shall be realized by the Collaboration Application.

**SRS (PRTTDCIS-2901)**

On top of the user community based dimensioning constraint, the Contractor shall include an additional 10% provision of IP phones capacity.

**SRS (PRTTDCIS-1266)**

IP Voice service shall be provided in xU and xS security domains, in accordance to FMN specifications.

**SRS** (PRTTDCIS-4585)

The Analogue Voice Collaboration Service design shall adhere to the implementation concept illustrated on the following figure.

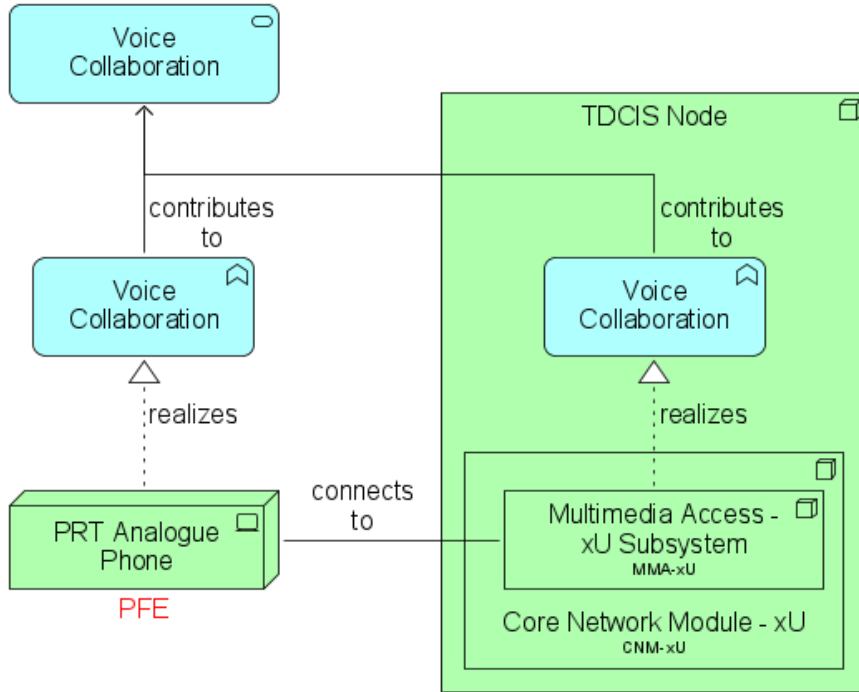


Figure 28 – Analogue Voice Collaboration Service federation implementation concept.

### 4.1.6 Video Teleconference Service

**SRS** (PRTTDCIS-2893)

The Video Teleconference Service design shall adhere to the implementation concept illustrated on the following figure for service instances hosted in a TDCIS Node.

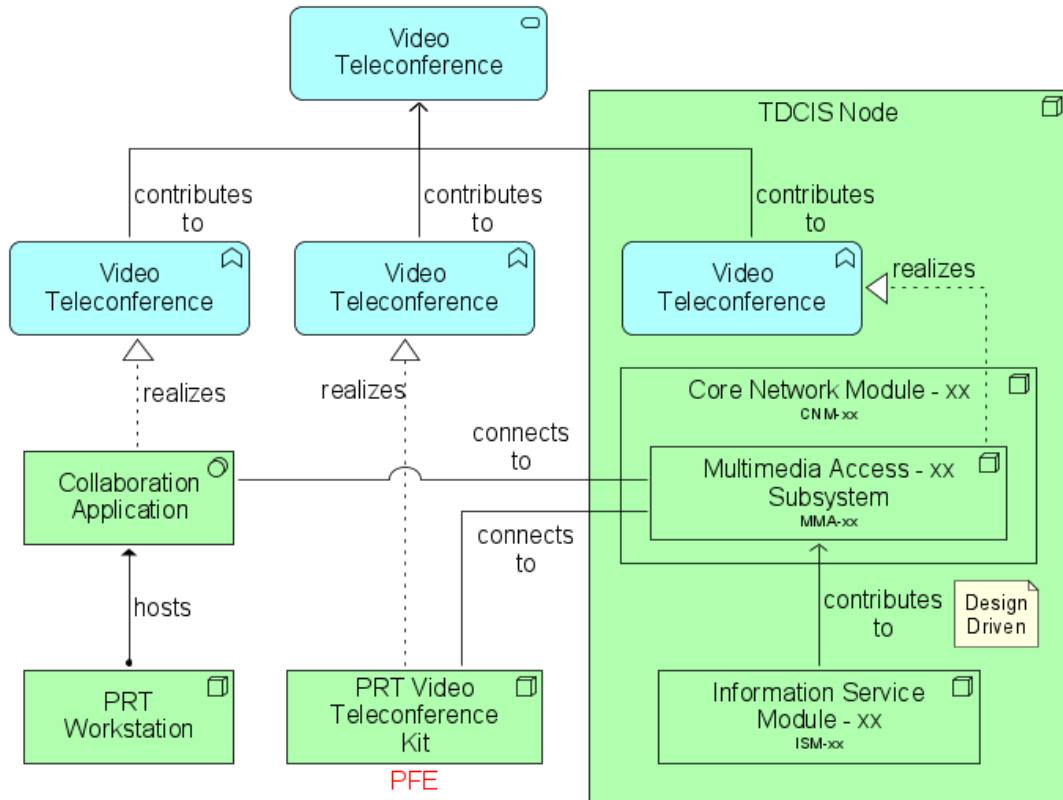


Figure 29 - Video Teleconference Service implementation concept (TDCIS Node hosted).

**SRS** (PRTTDCIS-4308)

The Video Teleconference Service design shall adhere to the implementation concept illustrated on the following figure for service instances hosted in PRT NDN.

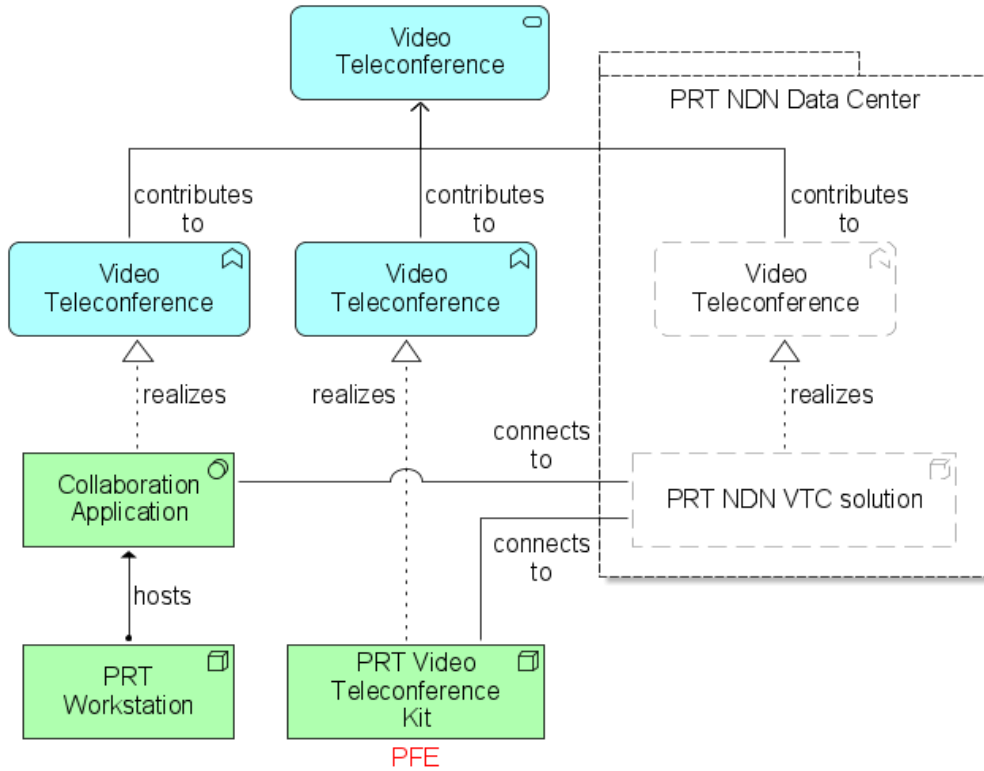


Figure 30 - Video Teleconference Service implementation concept (PRT NDN hosted).

**SRS (PRTTDCIS-4305)**

The Video Teleconference Service federation with mission partners design shall adhere to the implementation concept illustrated in the following figure.

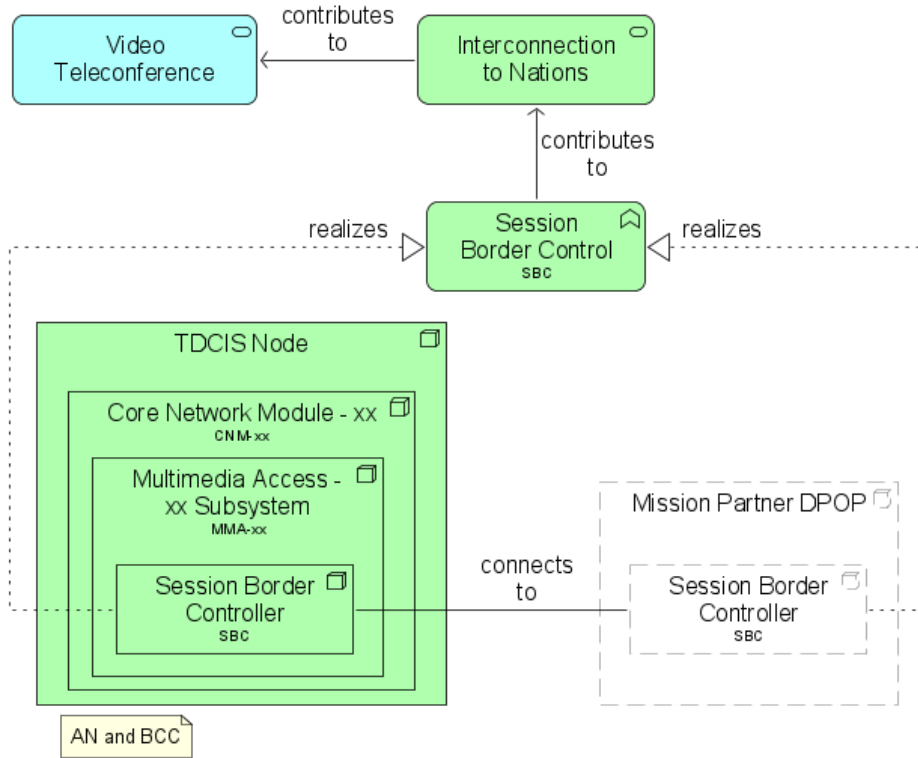


Figure 31 - Video Teleconference Service federation implementation concept.

**SRS (PRTTDCIS-2899)**

The Video Teleconference Service shall support:

- ONE (01) Video Teleconference Kit for each AN; and,
- ONE (01) Video Teleconference Kit for each BCC.

**SRS (PRTTDCIS-2902)**

Each user shall have a soft-VTC client realized by the Collaboration Application.

**SRS (PRTTDCIS-4463)**

The VTC Service shall provide Content Sharing allowing the users to share their Desktop or Applications (e.g. Microsoft PowerPoint, etc.).

**SRS (PRTTDCIS-2900)**

On top of the user community based dimensioning constraint, the Contractor shall include an additional 10% provision.

**SRS** (PRTTDCIS-2903)

The exact PFE product reference to fulfill the role of the *VTC Kit* is design driven. The Contractor shall provide the exact brand and model to the Purchaser for provisioning of this PFE.

**SRS** (PRTTDCIS-4107)

VTC Service shall be provided in xU and xS security domains, in accordance to FMN specifications.

**NOTE** (PRTTDCIS-4576)

VTC Solution implemented in PRT NDN is Cisco Meeting Server.

## 4.2 Community of Interest Services

**SRS** (PRTTDCIS-2882)

The Community of Interest Service design shall adhere to the implementation concept illustrated on the following figure.

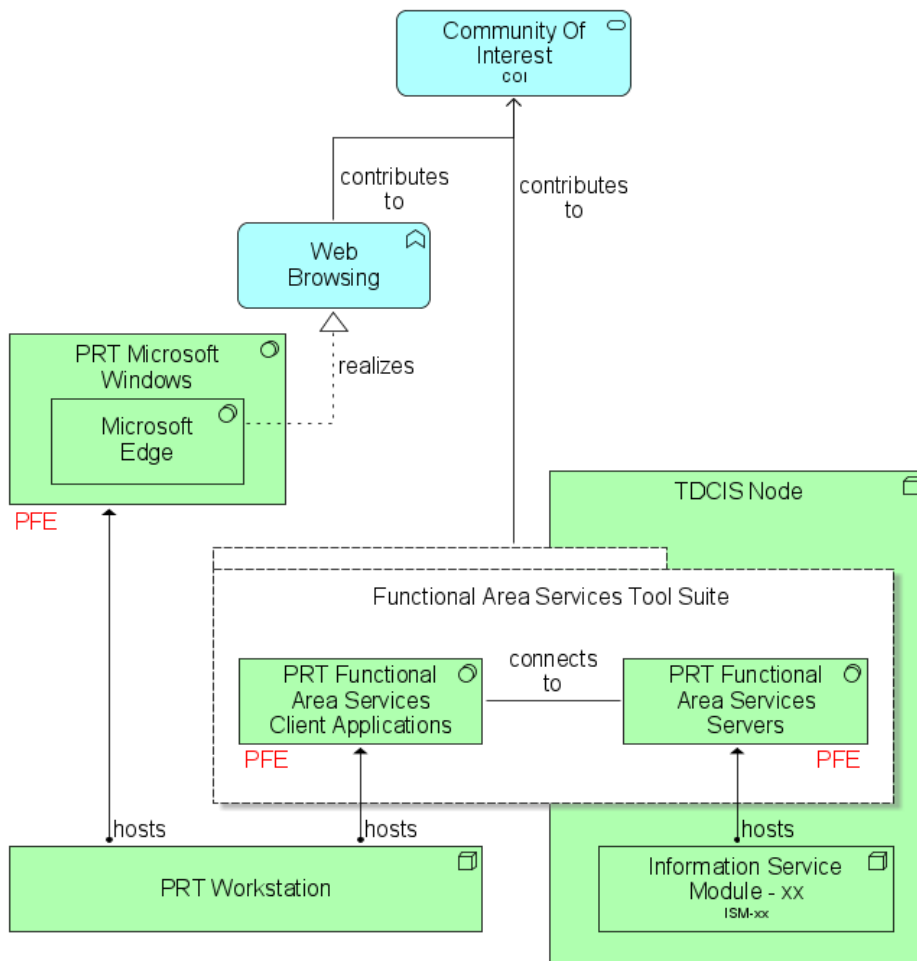


Figure 32 - Community of Interest Service implementation concept.



**NOTE** (PRTTDCIS-1233)

TDCIS is designed to be a tactical deployable CIS system. Over this system, PRT Army is intending to run their own Mission-specific Software (known as Functional Area Services) which composes the PFE workload to the CAS subsystem.

**NOTE** (PRTTDCIS-2881)

The Functional Area Services (FAS) Tool Suite is PFE.

**SRS** (PRTTDCIS-2883)

The Contractor shall create and configure the Virtual Machine (VM) as instructed by the Purchaser.

**NOTE** (PRTTDCIS-2884)

FAS software will be installed and configured by the Purchaser on the VM provided by the Contractor.

### 4.3 CIS Security Services

#### 4.3.1 Antivirus Service

**SRS** (PRTTDCIS-2875)

The Antivirus Service design shall adhere to the implementation concept illustrated on the following figure.

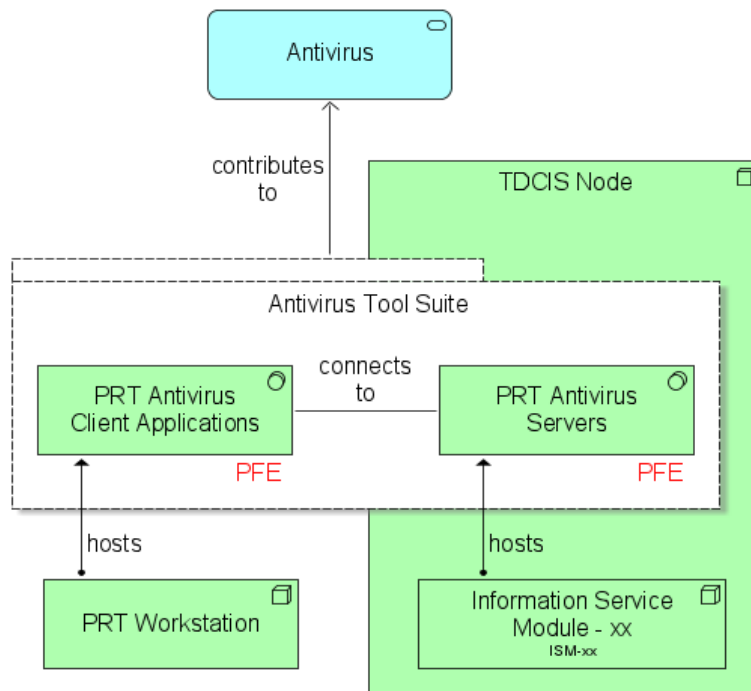


Figure 33 - Antivirus Service implementation concept.

**NOTE** (PRTTDCIS-2873)

The Antivirus Service provides CIS Security Service.

**NOTE** (PRTTDCIS-2874)

The Antivirus Tool Suite is PFE and is:

- a BitDefender product on xU and xR; and,
- McAfee ePO solution on xS.

**SRS** (PRTTDCIS-2877)

Applicable Antivirus Tool Suite components shall be installed and configured by the Contractor on all servers.

**SRS** (PRTTDCIS-2886)

Applicable Antivirus Tool Suite components shall be installed and configured by the Contractor on all System Administrator Workstations.

### 4.3.2 Network Access Control

**SRS** (PRTTDCIS-4242)

The Network Access Control (NAC) Service design in TDCIS Nodes shall adhere to the concept illustrated on following diagram.

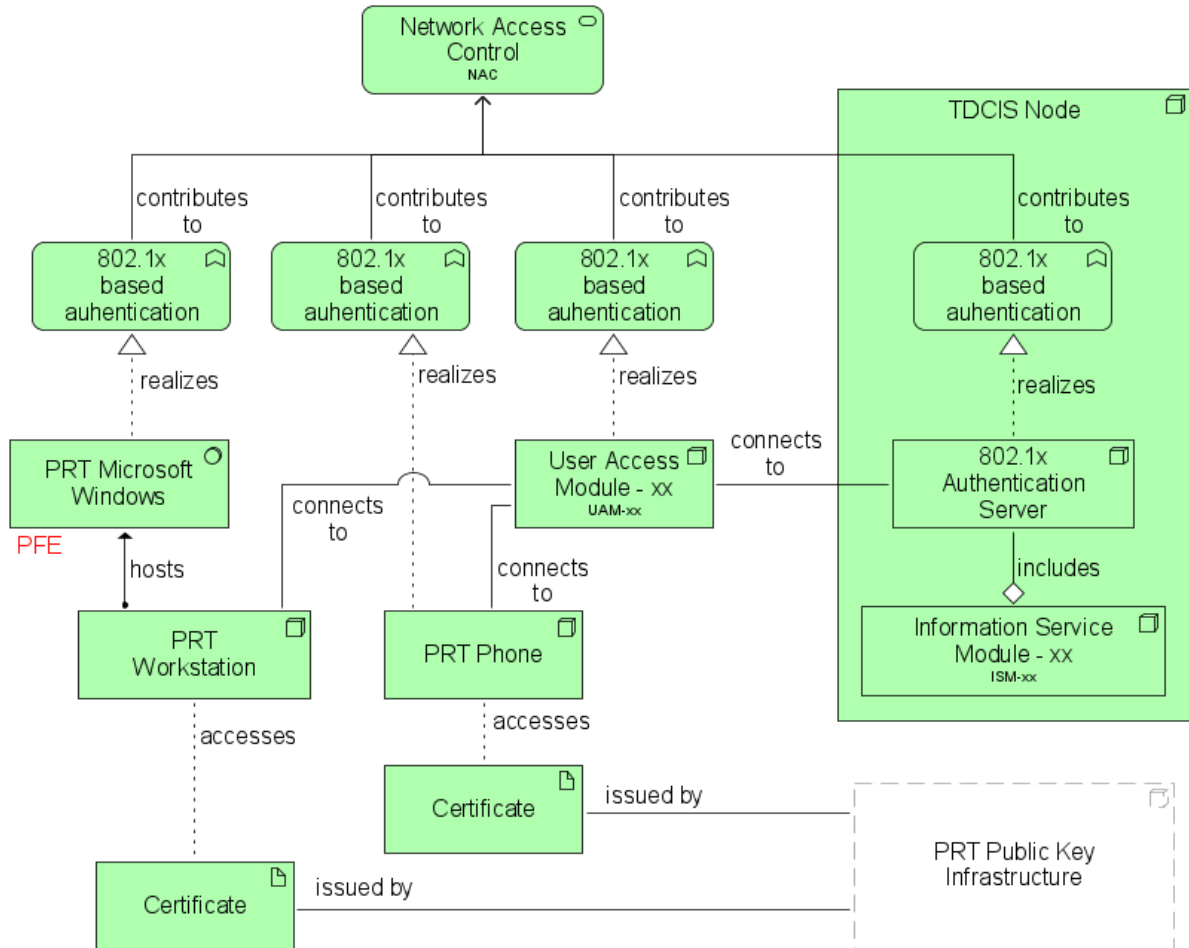


Figure 34- NAC service implementation concept in TDCIS Nodes

**SRS (PRTTDCIS-4316)**

The Network Access Control (NAC) Service design in the NS Kit shall adhere to the concept illustrated on following diagram.

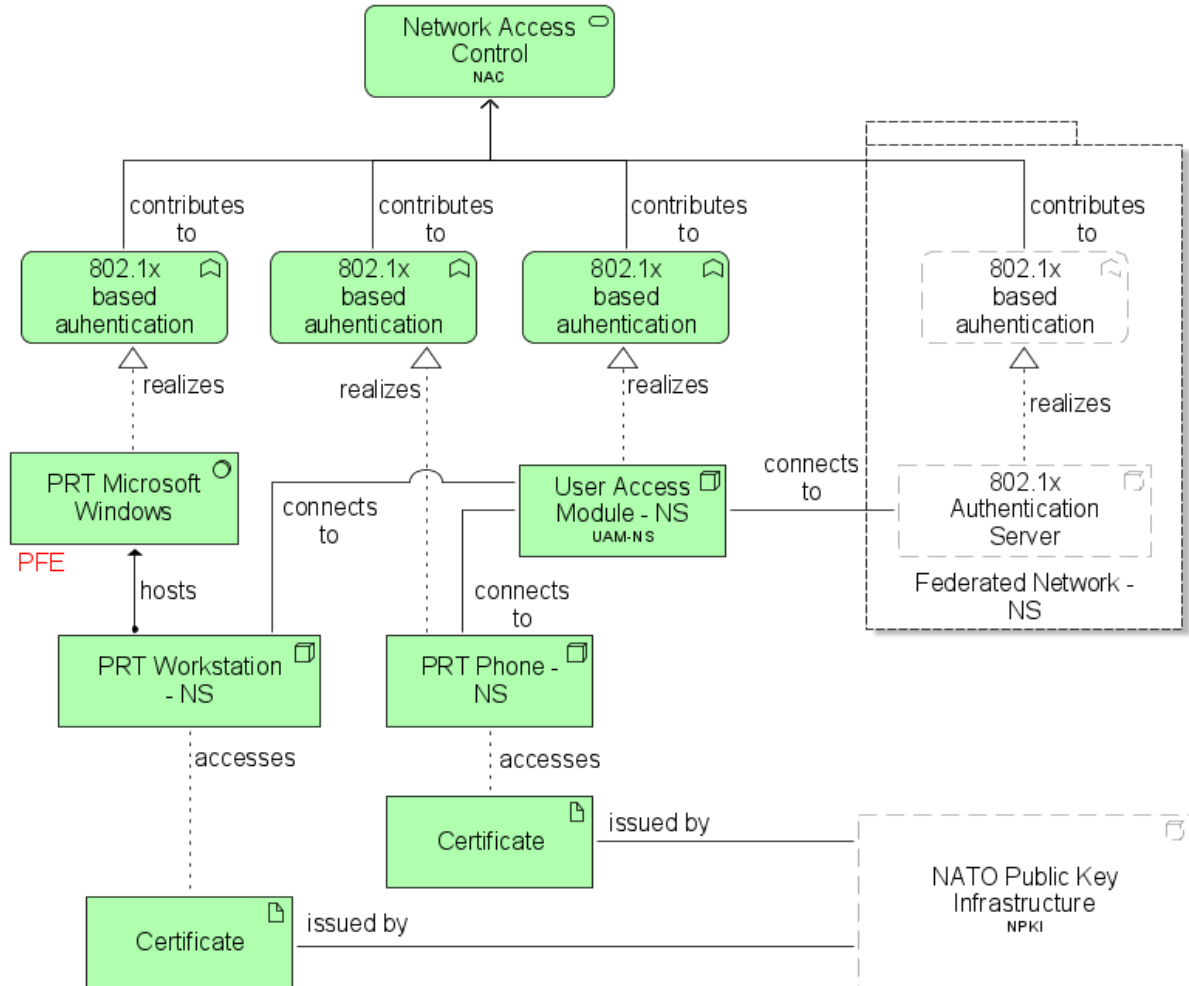


Figure 35 - NAC service implementation concept in the NS Kit

**SRS (PRTTDCIS-4243)**

The NAC Service shall be implemented with IEEE 802.1x protocol

**SRS (PRTTDCIS-4244)**

The NAC Service shall be implemented over wired and wireless connectivity between EUD and UAM.

**SRS (PRTTDCIS-4245)**

The NAC Service for TDCIS Nodes shall be implemented with certificates delivered by the PRT Public Key Infrastructure.

**SRS** (PRTTDCIS-4317)

The NAC Service for the NS Kit shall be implemented with certificates delivered by the NATO Public Key Infrastructure (NPKI).

**4.3.3 Encryption**

**4.3.3.1 General**

**NOTE** (PRTTDCIS-4246)

The Encryption Service variants are illustrated on following diagram.

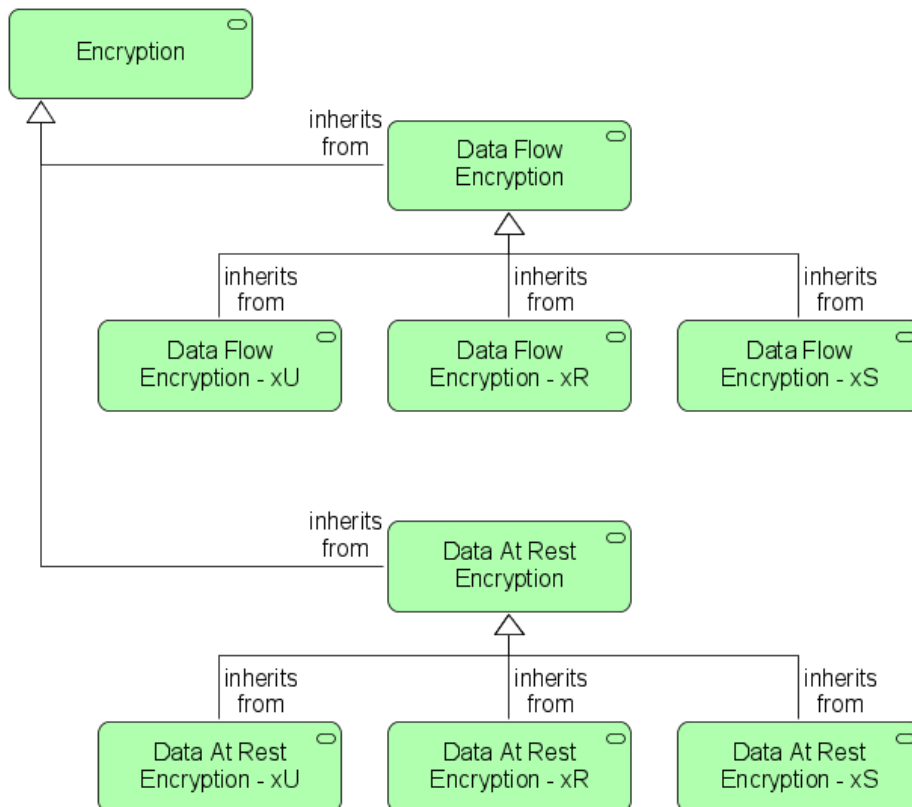


Figure 36 - Encryption service variants

4.3.3.2 Data Flow Encryption

**SRS (PRTTDCIS-4247)**

The Data Flow Encryption Service design shall adhere to the concept illustrated on following diagram.

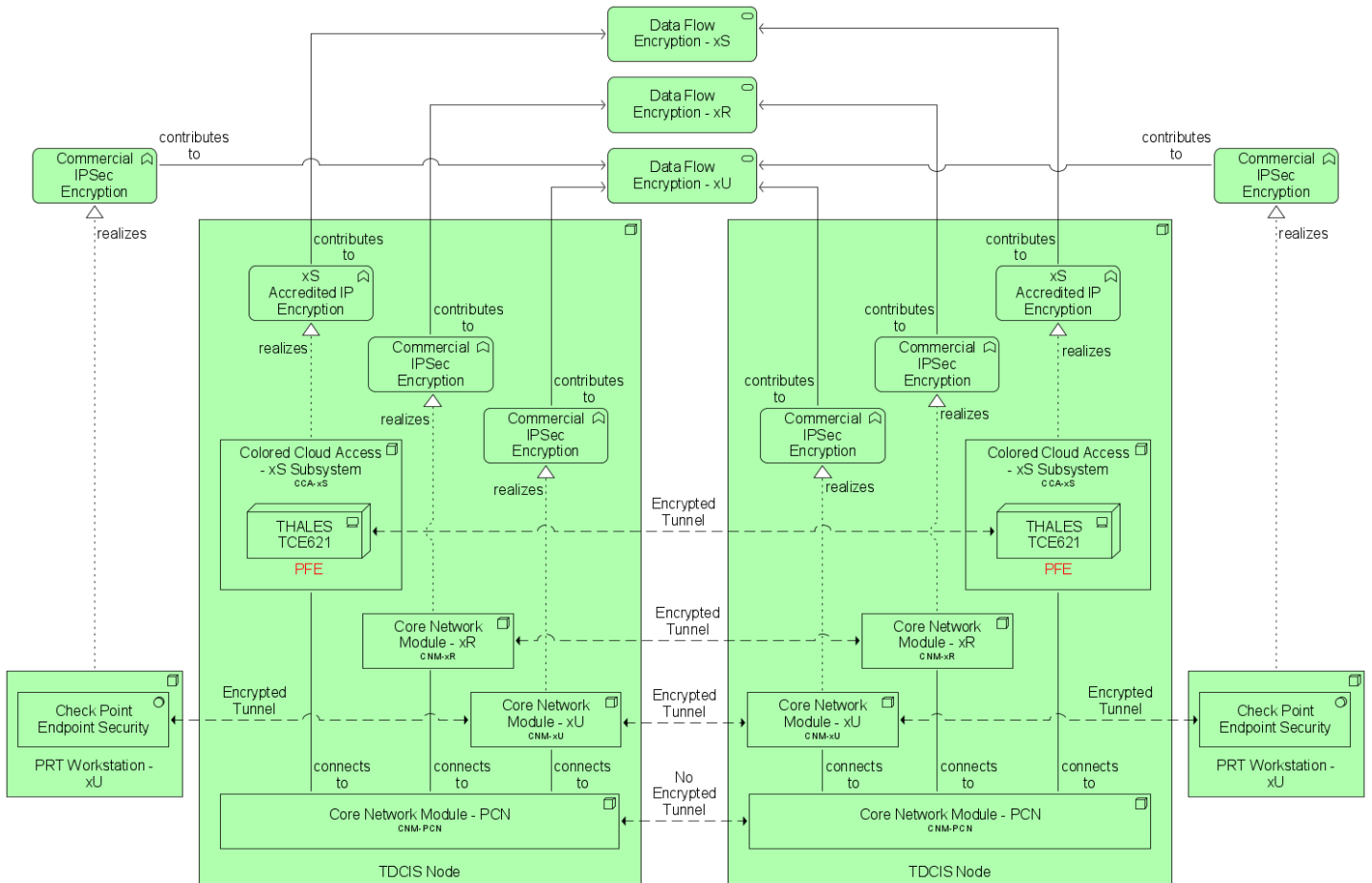


Figure 37 - Data Flow Encryption service implementation concept

**SRS (PRTTDCIS-4248)**

The TDCIS Nodes Data Flow Encryption Service on xS shall be implemented with THALES TCE621B IP cryptos.

**SRS (PRTTDCIS-4249)**

The NS Kit Data Flow Encryption Service on NS shall be implemented with THALES TCE621M IP cryptos.

**SRS (PRTTDCIS-4310)**

The Data Flow Encryption Service on xR shall be implemented with Commercial IPsec encryption embedded in the CCA-xR.

**SRS** (PRTTDCIS-4250)

The Data Flow Encryption Service on xU shall be implemented with Commercial IPsec encryption embedded in the CCA-xU.

**NOTE** (PRTTDCIS-4251)

No encrypted tunnels will be implemented at PCN level.

**SRS** (PRTTDCIS-4312)

The Data Flow Encryption Service on xU shall be implemented with Check Point Endpoint Security software between the PRT Workstation and the CCA-xU.

**SRS** (PRTTDCIS-4313)

The CCA-xU shall act as the VPN concentrator for all users of the TDCIS Node.

**4.3.3.3 Data At Rest Encryption**

**SRS** (PRTTDCIS-4253)

The Data At Rest Encryption Service design shall adhere to the concept illustrated on following diagram.

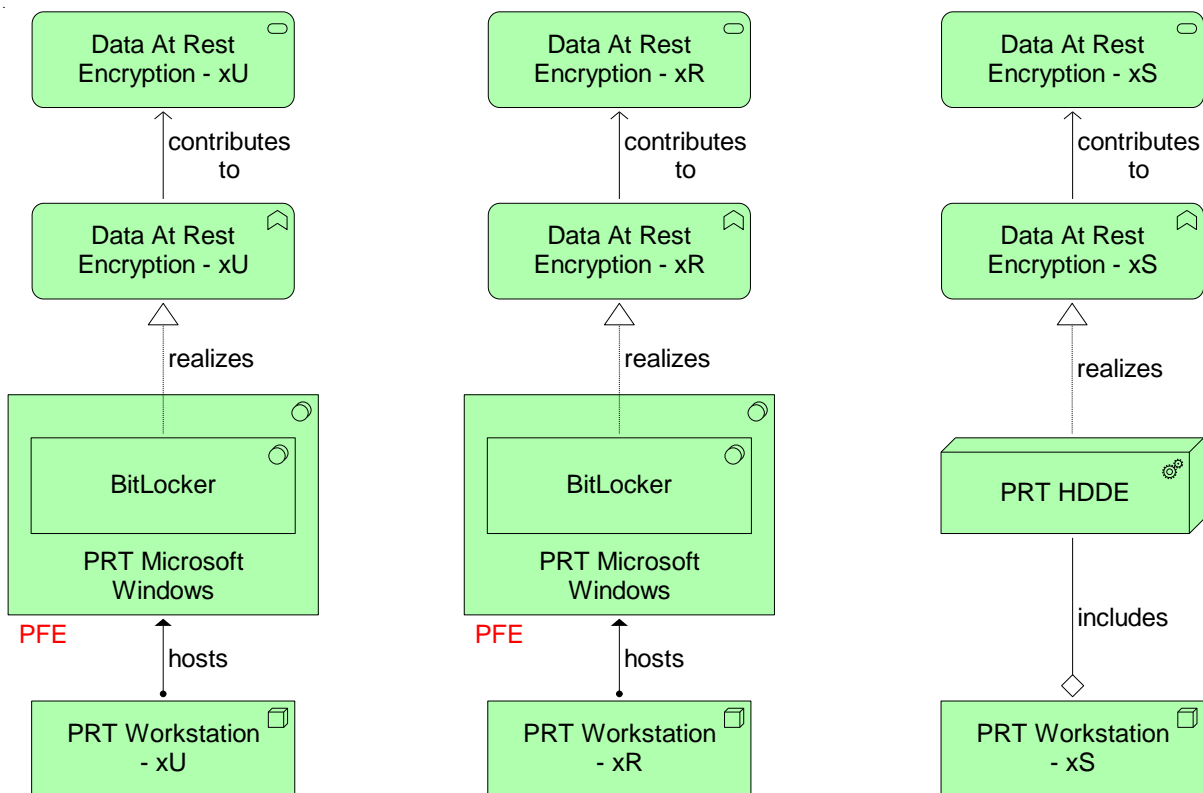


Figure 38 - Data At Rest Encryption service implementation concept

**SRS (PRTTDCIS-4254)**

The TDCIS Data At Rest Encryption Service on xS shall be implemented with HDDE sourced from non-archived appliances listed in the NIAPC and certified for SECRET.

**SRS (PRTTDCIS-4311)**

The TDCIS Node Data At Rest Encryption Service on xR shall be implemented with the BitLocker functionality embedded in Microsoft Windows Operating System.

**SRS (PRTTDCIS-4255)**

The TDCIS Node Data At Rest Encryption Service on xU shall be implemented with the BitLocker functionality embedded in Microsoft Windows Operating System.

**4.3.4 Log Aggregation**

**SRS (PRTTDCIS-4257)**

TDCIS Nodes shall support future integration in a Log Aggregation Services as illustrated on following picture.

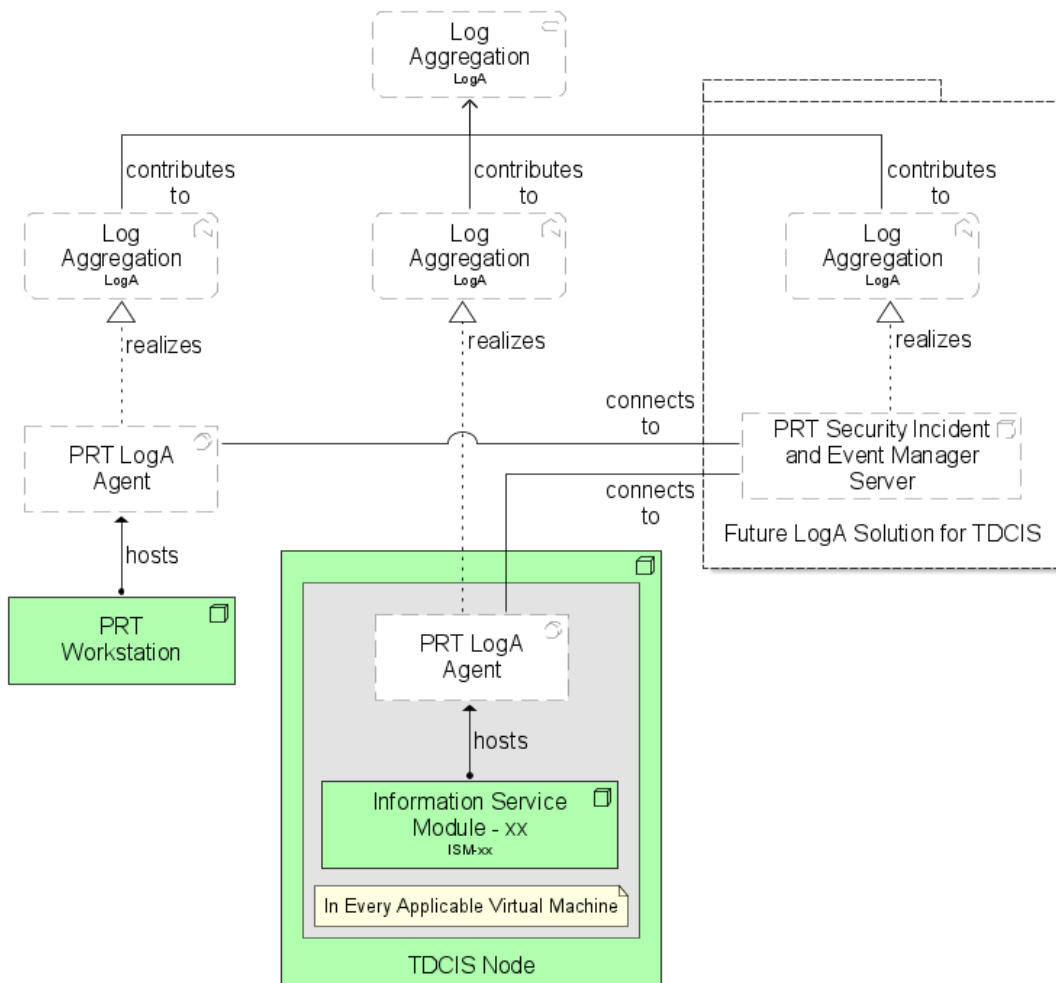


Figure 39 - LogA service integration concept



**SRS (PRTTDCIS-4314)**

The Log Aggregation (LogA) Service design in the NS Kit shall adhere to the concept illustrated on following diagram.

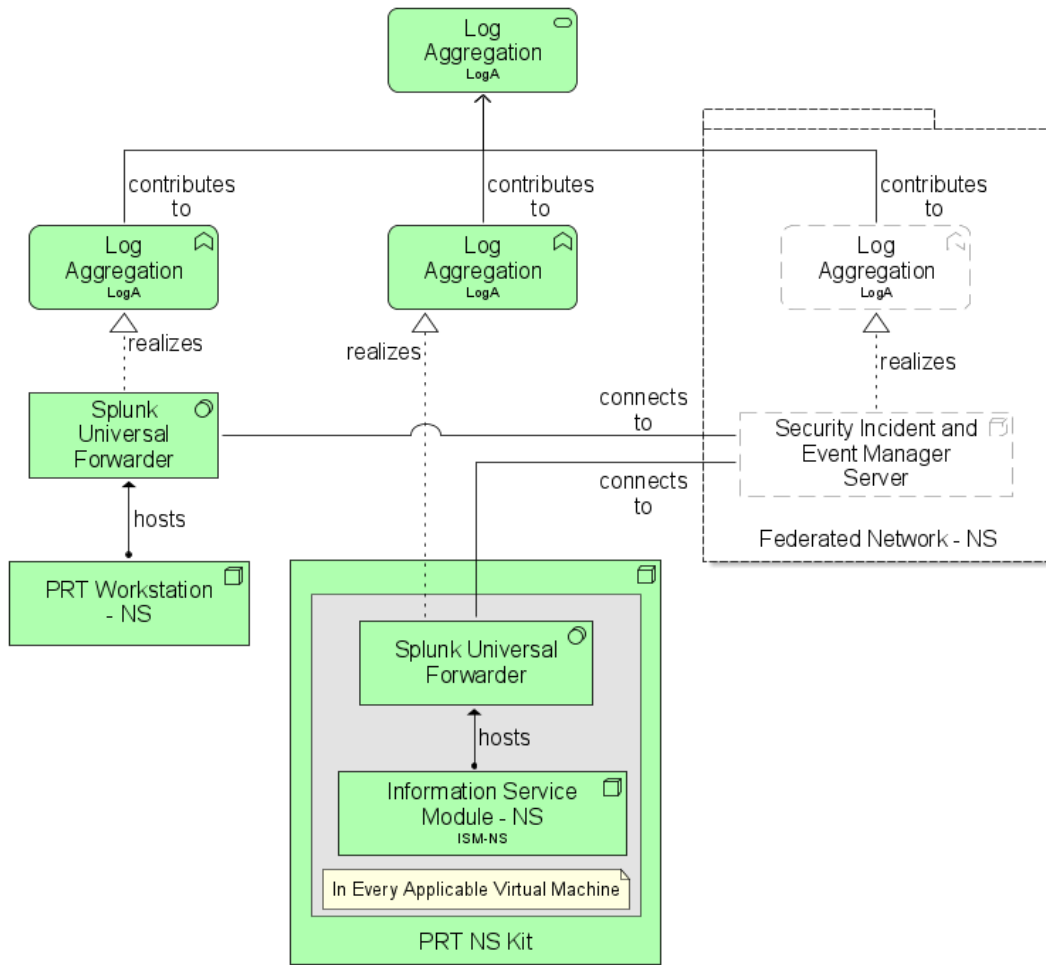


Figure 40 - LogA service implementation concept in NS Kit

**SRS (PRTTDCIS-4258)**

The LogA Service in the NS Kit shall be implemented with Splunk Universal Forwarder application installed on the Workstation.

### 4.3.5 Online Vulnerability Assessment

**SRS** (PRTTDCIS-4260)

TDCIS Nodes shall support future integration in an Online Vulnerability Assessment Services as illustrated on following picture.

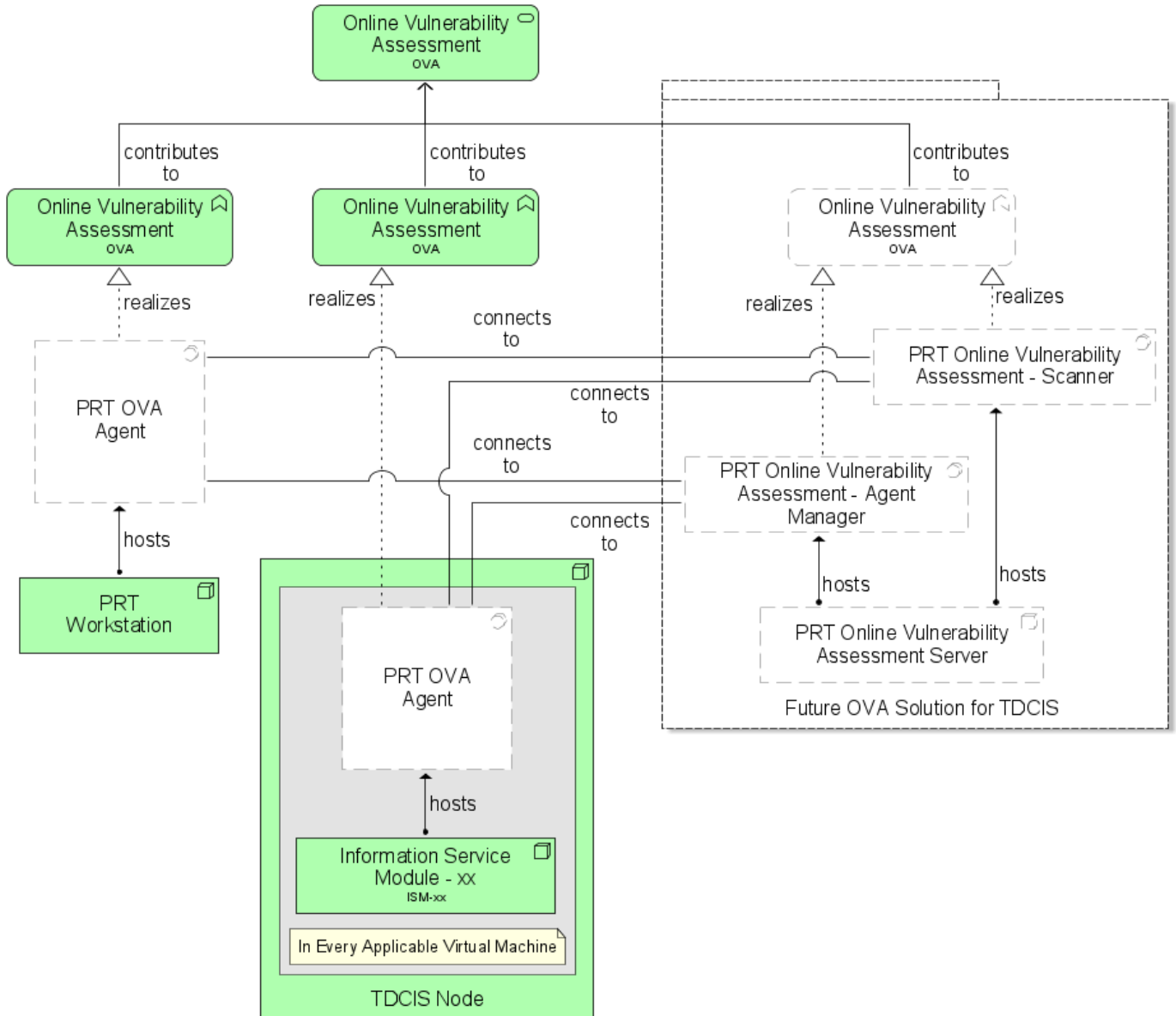


Figure 41 - OVA service integration concept for TDCIS Nodes

**SRS (PRTTDCIS-4315)**

The Online Vulnerability Assessment (OVA) Service design in the NS Kit shall adhere to the concept illustrated on following diagram.

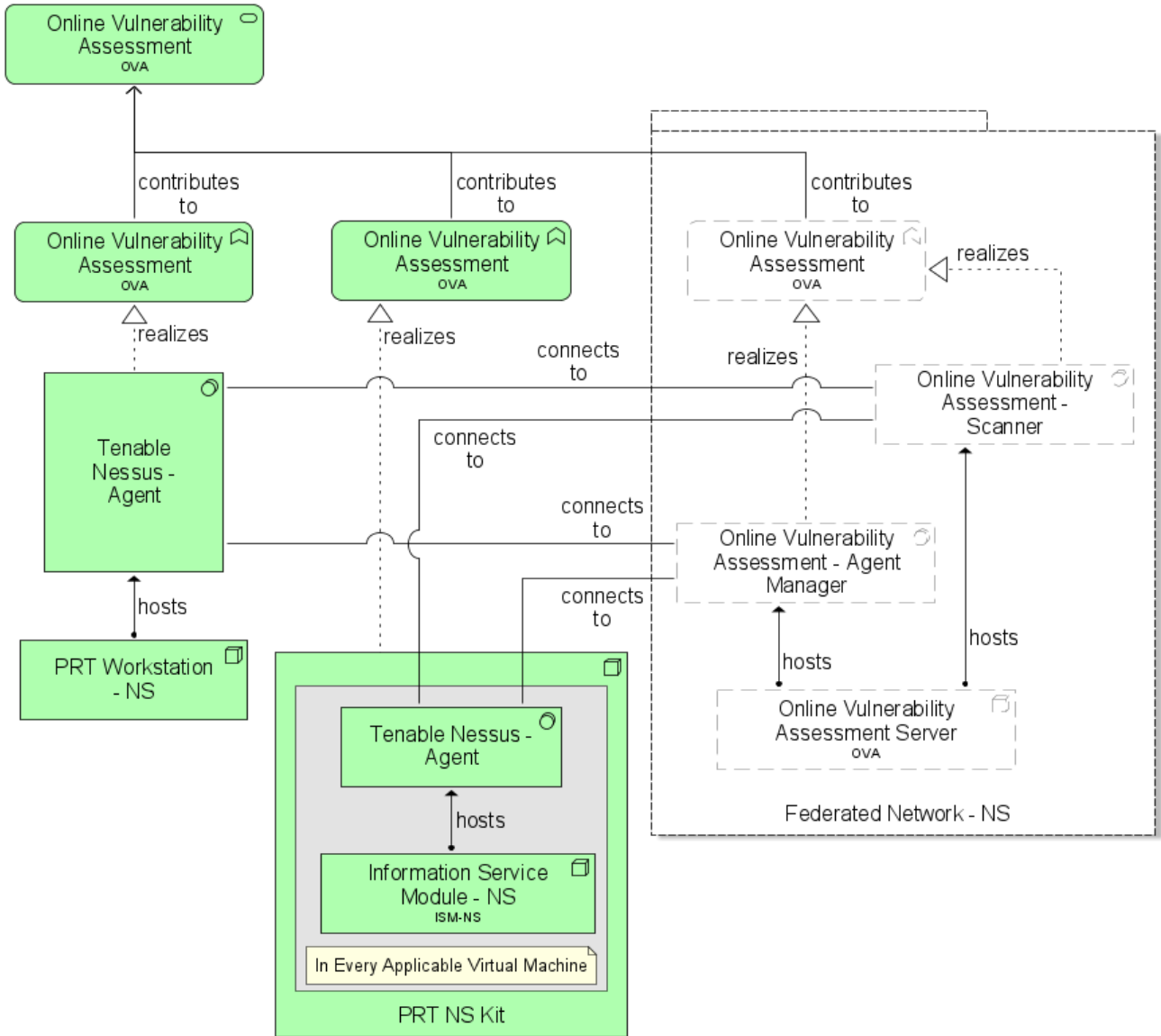


Figure 42 - OVA service implementation concept in the NS Kit

**SRS (PRTTDCIS-4261)**

The OVA Service in the NS Kit shall be implemented with Tenable Nexus Agent application installed on the Workstation.

### 4.3.6 Cross Domain

**NOTE** (PRTTDCIS-4360)

The Cross Domain Service variants are illustrated on following diagram.

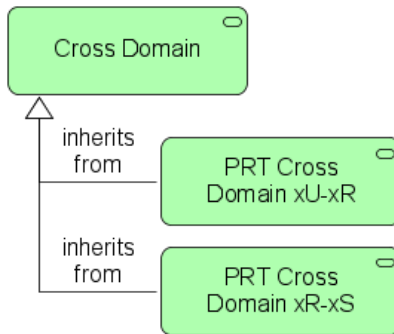


Figure 43 - Cross Domain service variants

**SRS** (PRTTDCIS-4361)

The xU-xR Cross Domain Service design shall adhere to the concept illustrated on following diagram.

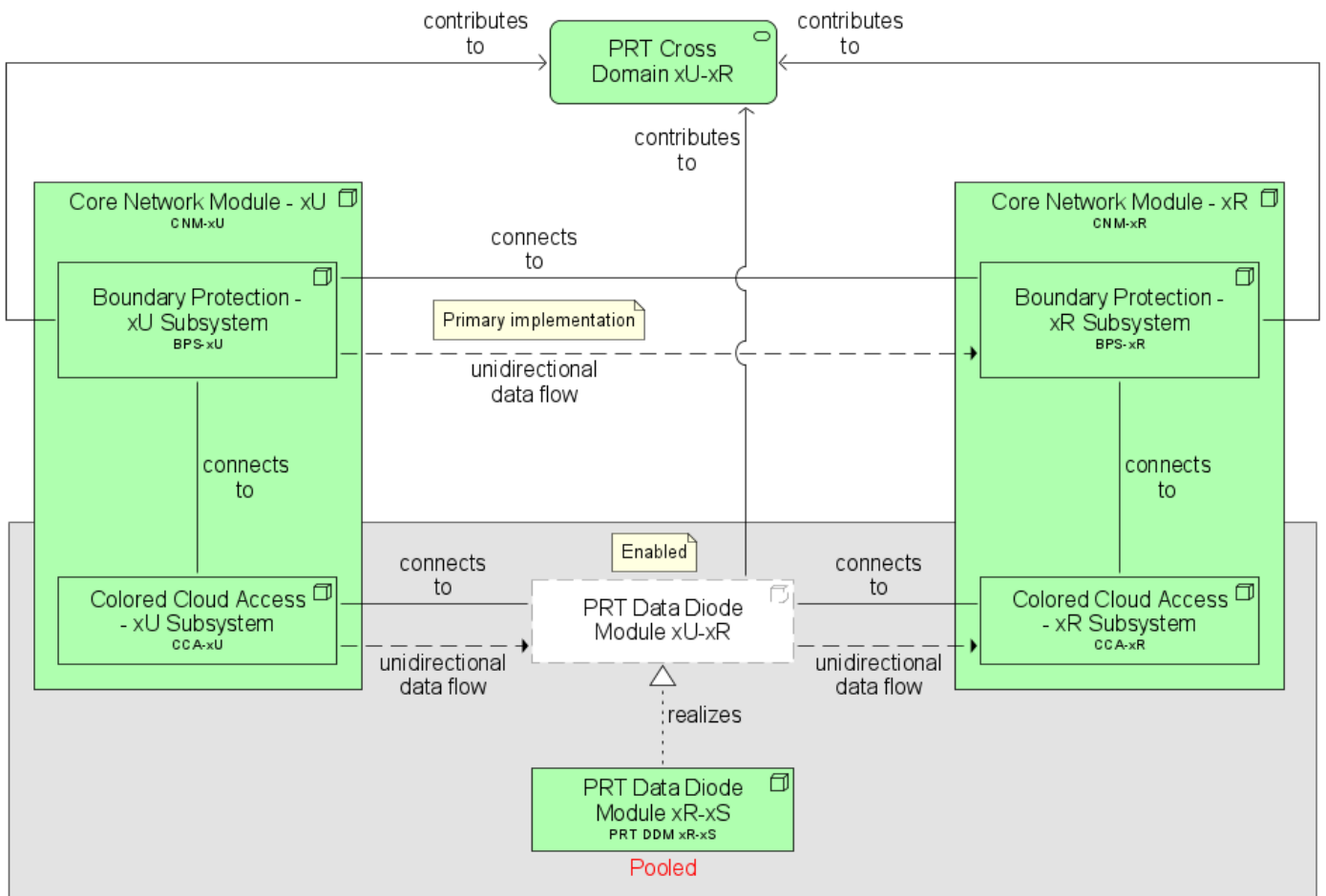


Figure 44 - xU-xR Cross Domain service implementation concept

**SRS (PRTTDCIS-4363)**

The xU-xR Cross Domain Service shall be implemented through a direct link between BPS-xU and BPS-xR.

**SRS (PRTTDCIS-4367)**

The xU-xR Cross Domain Service realized through BPS-xU and xR shall meet the same functional and technical requirements as the DDM xR-xS.

**SRS (PRTTDCIS-4365)**

The xU-xR Cross Domain Service shall support to be realized by re-purposing pooled DDM xR-xS to this purpose. This realization shall only require physical installation of hardware in racks and configuration.

**SRS (PRTTDCIS-4362)**

The xR-xS Cross Domain Service design shall adhere to the concept illustrated on following diagram.

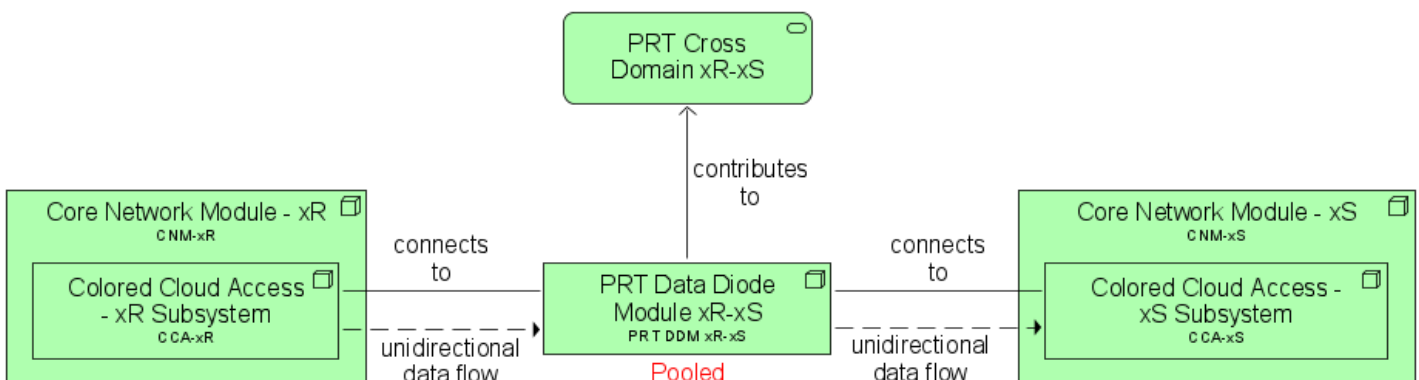


Figure 45 - xR-xS Cross Domain service implementation concept

**SRS (PRTTDCIS-4364)**

The xR-xS Cross Domain Service shall be implemented by the DDM xR-xS.

**4.4 Interconnection to Nations**

**NOTE (PRTTDCIS-2977)**

The Interconnection to Nations Service is composed by elements belonging to other Services in order to enable federation with Mission Partners under the FMN Framework.

**SRS** (PRTTDCIS-2978)

The Interconnection to Nations Service design shall adhere to the implementation concept illustrated on the following figure.

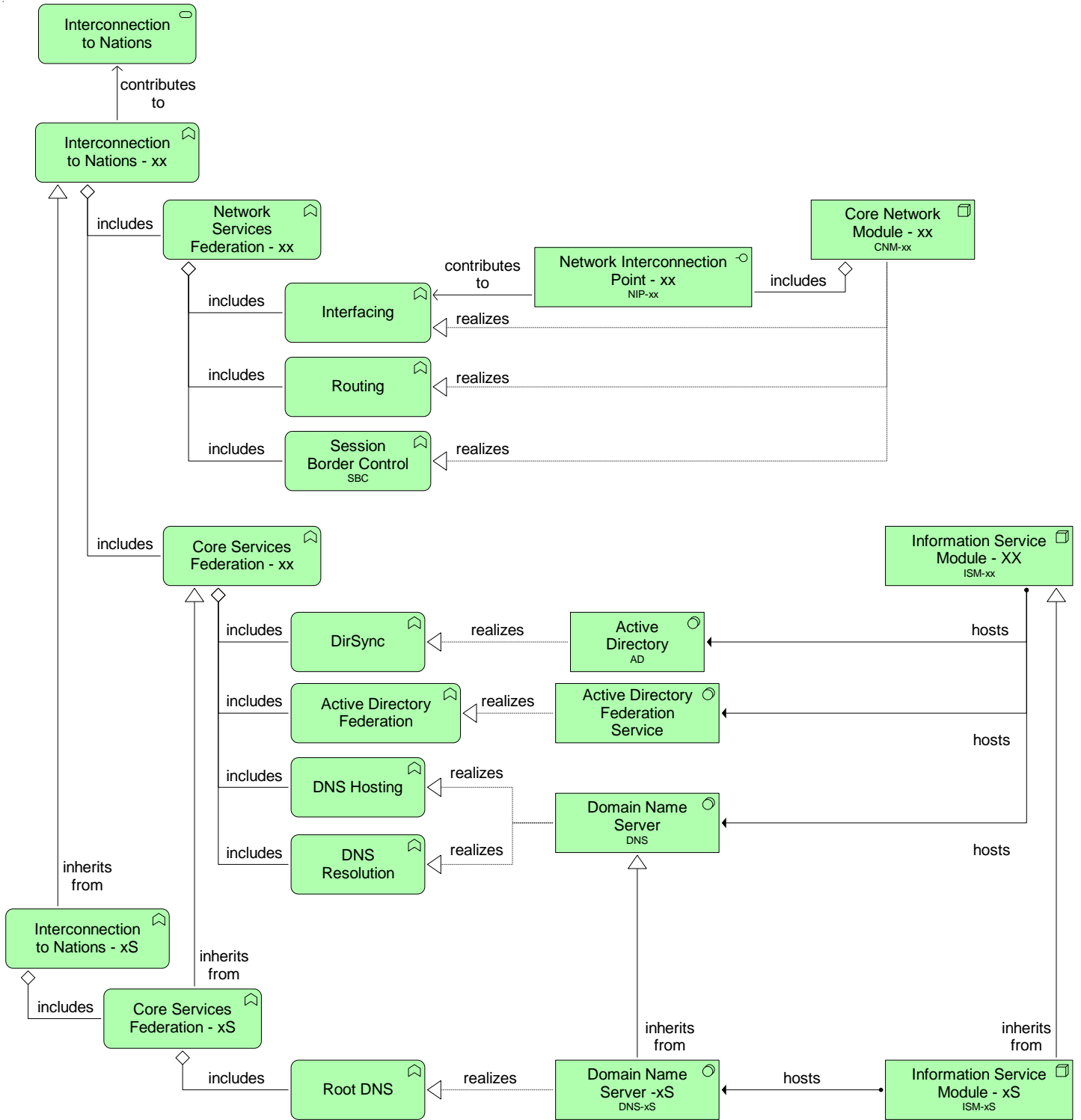


Figure 46 - Interconnection to Nations Service implementation concept.

**NOTE** (PRTTDCIS-2979)

The Interconnection to Nations Services relies on the Interconnection to Nations Function which contains:

- **Network Services Federation** which combines Network and Communication Services; and
- **Core Services Federation** which combines Infrastructure and Business Support Services.

**SRS** (PRTTDCIS-2980)

The Interconnection to Nations Service shall rely on following elements:

- From the CNM:
  - The Network Interconnection Point (NIP) interface which physically and logically connects Mission Partners; and
  - Routing functions to federate at network layer; and,
  - Session Border Control (SBC) functions to federate Communication Services; and
- From the ISM:
  - The Active Directory (AD) for DirSync to enable the federation; and
  - The Email software to federate Informal Messaging Service (IMS); and
  - The Active Directory Federation Service (ADFS); and
  - The Domain Name Server (DNS) to enable DNS hosting and Resolver for the federation.

**SRS** (PRTTDCIS-2981)

The DNS Server for the xS implementation of the Interconnection to Nations Service shall also enable Root DNS.

## 4.5 Service Management and Control

### 4.5.1 General

**NOTE** (PRTTDCIS-2937)

Service Management and Control (SMC) is divided in following levels:

- 1) **Enterprise** level SMC is the level providing Management and Monitoring at the highest level possible within an organization (e.g. TDCIS as a whole or a mission or exercise specific TDCIS subset, PRT NDN, etc.) and their associated processes; and,
- 2) **Domain** level SMC is the level providing Management and Monitoring over a certain community or subset (e.g. Network elements, a TDCIS Node, etc.) and their associated specialization of the Enterprise level processes; and,
- 3) **Element** level SMC is the lowest level and contains all tools and instructions to perform layer-, technology- or even product-centric Management and Configuration activities (e.g. SCCM, Cisco Prime, etc.).

**SRS** (PRTTDCIS-2938)

This project shall implement TDCIS Node-centric (i.e. providing SMC for the Node and its composing elements only) Element and Domain SMC.

**SRS** (PRTTDCIS-2939)

The integration of TDCIS SMC at mission or exercise layer (e.g. Monitoring of all nodes from a Theatre Operation Center, etc.) or with PRT NDN at Enterprise level is not in scope of this project. However, the Contractor shall aim to provide a TDCIS SMC solution which supports these integrations in the future.

**SRS** (PRTTDCIS-4398)

The TDCIS SMC shall provide following functions:

- **Capture and Manage Configurations:** Capture, manage and control the configuration, status, and relationships of services, service components, and service resources; and,
- **Discovery:** The automatic finding, identification, and relationship mapping of service components. Used to automatically feed a Configuration Management Data Base (CMDB); and,
- **Monitor:** Automatically observe and record the consumption and performance of services, service components and related resources within the context of an agreed scope and set of constraints. Includes the ability to provide awareness (alerts, notifications, triggers) when predefined thresholds may be, or are being, breached; and,
- **Manage Systems:** Respond to changes in a system's operating state. Perform configuration changes on one or more systems with the intention to change the existing operating configuration; and,
- **Report:** Consume raw data, aggregate, transform, analyse, and provide useful summary and detailed output based on a point in time or specified timeframe view of service related metrics.

**SRS** (PRTTDCIS-4525)

When referring to "Configuration" in the SMC context, it shall include and implement its two dimensions in support of the Configuration Management process:

- 1) Visibility of configurations from the view of a set of service elements (with attributes) and the relationships between service elements of the same service and different services; and,
- 2) The contents of key configuration files, e.g. the configuration of a switch or router.

**SRS** (PRTTDCIS-4399)

TDCIS SMC Capture and Manage Configurations function shall:

- Enable the identification, configuration, control and location of every Configuration Item (CI) over the management network.
- Automatically capture CI configurations; and,
- Backup configurations to support configuration Recovery; and,
- Support Configurations Import from and Export to files.



**SRS (PRTTDCIS-4401)**

TDCIS SMC Report function shall:

- Present Node Elements Status using the format of maps and dashboards; and,
- Support export to common Office file formats (e.g. Microsoft Word, Microsoft Excel, PDF, etc.) and Picture file formats (e.g. JPEG, PNG, etc.).

**SRS (PRTTDCIS-1235)**

The TDCIS SMC shall consist of a set of computer tools to provide across all layers of the TDCIS architecture:

- **Element Management:** Element level of SMC which provides:
  - Management and Configuration of Elements; and,
  - Discovery and Inventory to support populating the Node CMDB with CIs; and,
  - Events to the Node Monitoring layer; and,
- **Node Monitoring:** Domain level of SMC which:
  - Collects Events to report the impacted services status; and,
  - Monitor Service performances; and,
  - Report Service Situation Awareness (including all Service Subsets).

**SRS (PRTTDCIS-2940)**

The following picture illustrates the relationships between Element Management and Node Monitoring layers and with which their associated Tool Suites shall comply. Flow relationships illustrate the logical flow of information between the different elements. e.g. nothing prevents the Node Monitoring Tool Suite to interact directly with Configuration Items (radio, router, server, etc.) to populate the Node CMDB.

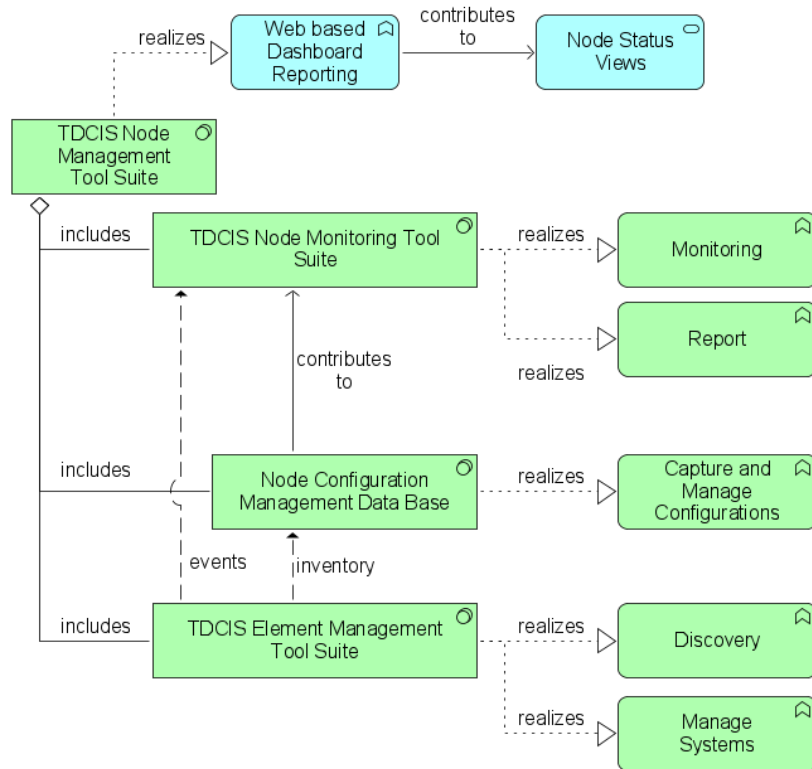


Figure 47 - SMC Tool Suites in Context

**NOTE** (PRTTDCIS-2934)

The existing Monitoring Tool in use in PRT NDN is Zabbix.

**SRS** (PRTTDCIS-2935)

The TDCIS SMC shall encompass the provision of the following:

- 1) Deployable management Account Administration tooling, running locally on the ISM, synchronized with the extant centralized account management capability when TDCIS is configured as NDN extension (Nat-x security domains variants); and
- 2) The implementation of Virtual Machines as required, to run local instances of the SMC tools; and
- 3) The ability to perform all SMC functions for all Node subsystems locally.

**SRS** (PRTTDCIS-2933)

SMC elements implemented as part of the DPOP, shall support Role Based Access Control via integration with Active Directory.

**SRS** (PRTTDCIS-1357)

The Role Based Access Control shall log all action carried out within the scope of the management of TDCIS to enable audits and forensics.

**SRS** (PRTTDCIS-1356)

The Role Based Access Control shall enable application of access policies to management platforms. To this end, it shall include functionalities for creation, removal and control of users, together with their associated level of management services. It shall also include the distribution of relevant security information.

**SRS** (PRTTDCIS-2967)

Every TDCIS component shall be managed via a dedicated physical or logical Management Interface.

**SRS (PRTTDCIS-2966)**

TDCIS Components (with the exception of PFE items) Management Interface shall be managed using:

- As a minimum:
  - Simple Network Management Protocol version 3 (SNMP v3) (IETF RFC 3410 – 3418, 2002); and,
  - RESTful API based configuration; and,
- Additionally one or multiple of the following:
  - HTTPS, TLS (as a minimum version 1.2 and 1.3):
    - RFC2616:1999, Hypertext Transfer Protocol – HTTP/1.1; and,
    - RFC2818:2000, HTTP Over TLS; and,
    - RFC5246:2008, the Transport Layer Security (TLS) Protocol Version 1.2; and,
    - RFC8446:2018, the Transport Layer Security (TLS) Protocol Version 1.3; and,
  - Secure Shell Protocol (SSH) (IETF RFC 4251, 2006); and,
  - Windows Remote Management (WinRM); and,
  - Remote Desktop Protocol (RDP); and,
  - Keyboard, Video and Mouse (KVM) over Ethernet.

**SRS (PRTTDCIS-3040)**

Should it be required, use of SNMPv1 shall be solely limited to the integration of some PFE elements.

**SRS (PRTTDCIS-1358)**

TDCIS SMC shall include an Automatic system for startup and shut down functions to allow the coordinated start up, reboot or shut down of the system.

**SRS (PRTTDCIS-2968)**

The command signals for the automatic system startup, shut down and reboot actions shall be triggered whether by the System Administrator or automatically from other elements (e.g. Element Management Tool Suite for UPS, ECU, etc.).

**SRS (PRTTDCIS-1349)**

The TDCIS SMC shall monitor and control the temperature of all elements of the system and trigger a graceful system shutdown when the temperature is above the maximum acceptable system limit and the ECU is not providing enough cooling capacity.

**SRS (PRTTDCIS-4400)**

It shall be possible for the System Administrator to disable independently any TDCIS SMC automated graceful system shutdown feature.

**SRS (PRTTDCIS-1351)**

The TDCIS SMC shall implement logically separated management networks isolated from the operational data network.

**SRS (PRTTDCIS-1353)**

The TDCIS SMC shall allow the detection, analysis, isolation and the possibility to perform correction measures of faulty or malfunctioning components, modules or services.

**4.5.2 Element Management**

**SRS (PRTTDCIS-2942)**

The following figure illustrates the Element Management Tool Suite in context with which it shall comply.

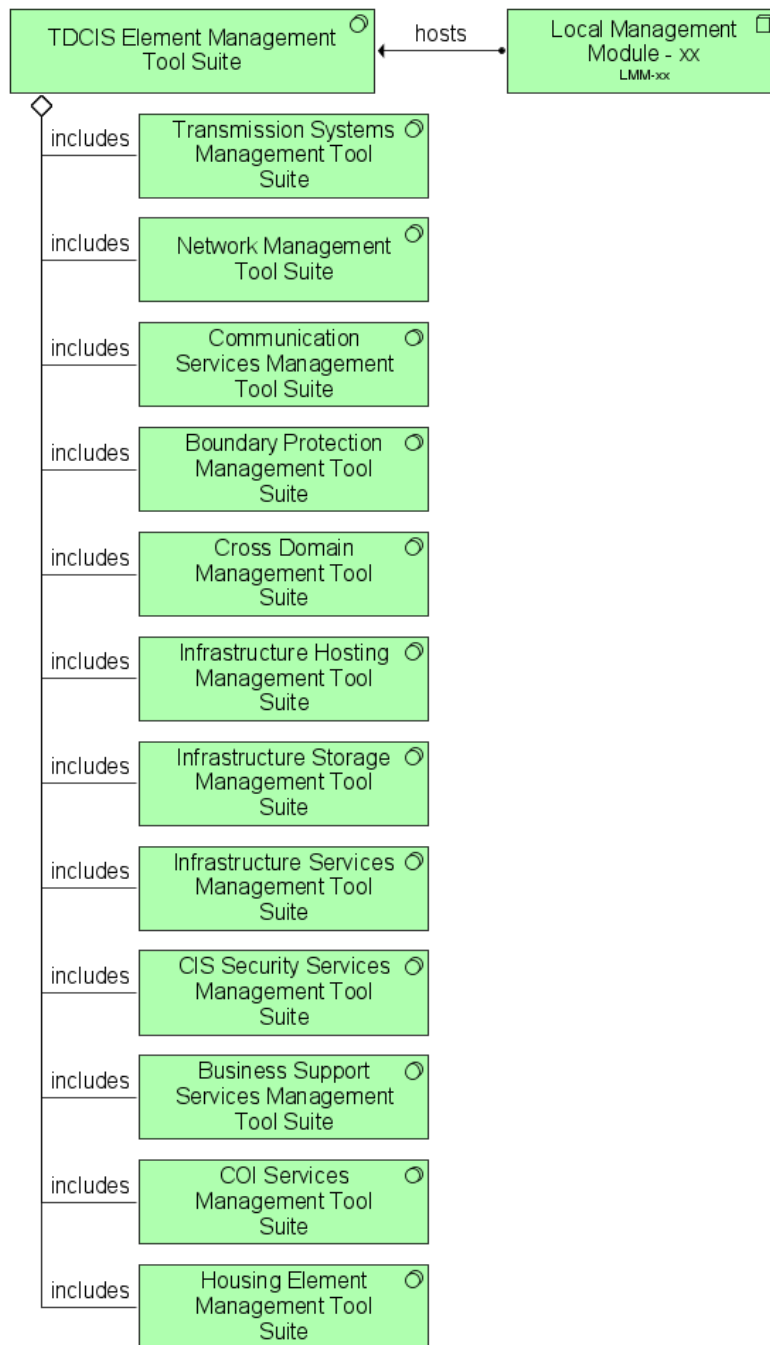


Figure 48 - Element Management Tool Suite in context

**SRS (PRTTDCIS-2943)**

The Element Management Tool Suite shall contain all tools and software to Manage, Monitor and Configure:

- 1) Transmission System Elements; and
- 2) Network Elements; and
- 3) Communication Services Elements; and
- 4) Boundary Protection Elements; and
- 5) Cross Domain Elements; and
- 6) Infrastructure Hosting Elements; and
- 7) Infrastructure Storage Elements; and
- 8) Infrastructure Services Elements; and
- 9) CIS Security Services Elements; and,
- 10) Business Support Services Elements; and,
- 11) COI Services Elements; and,
- 12) Housing Elements.

**SRS (PRTTDCIS-2944)**

The Element Management Tool Suite shall integrate PFE Management and Configuration tools related to PFE components.

**SRS (PRTTDCIS-2945)**

The Local Management Module (LMM) shall host security domain specific components of the Element Management Tool Suite.

**SRS (PRTTDCIS-2947)**

Access to Element Management Tool Suite components (with the exception PFE elements) shall preferably be implemented as a web-based service, accessed through a standard web browser, as a minimum Microsoft Edge (latest version in use in PRT MOD) without the need of special browser add-ons. Any special functionality shall be provided through HTML5.

**SRS** (PRTTDCIS-2960)

The LMM-BLK shall host Element Management Tool Suite components related to TDCIS elements as illustrated on following picture.

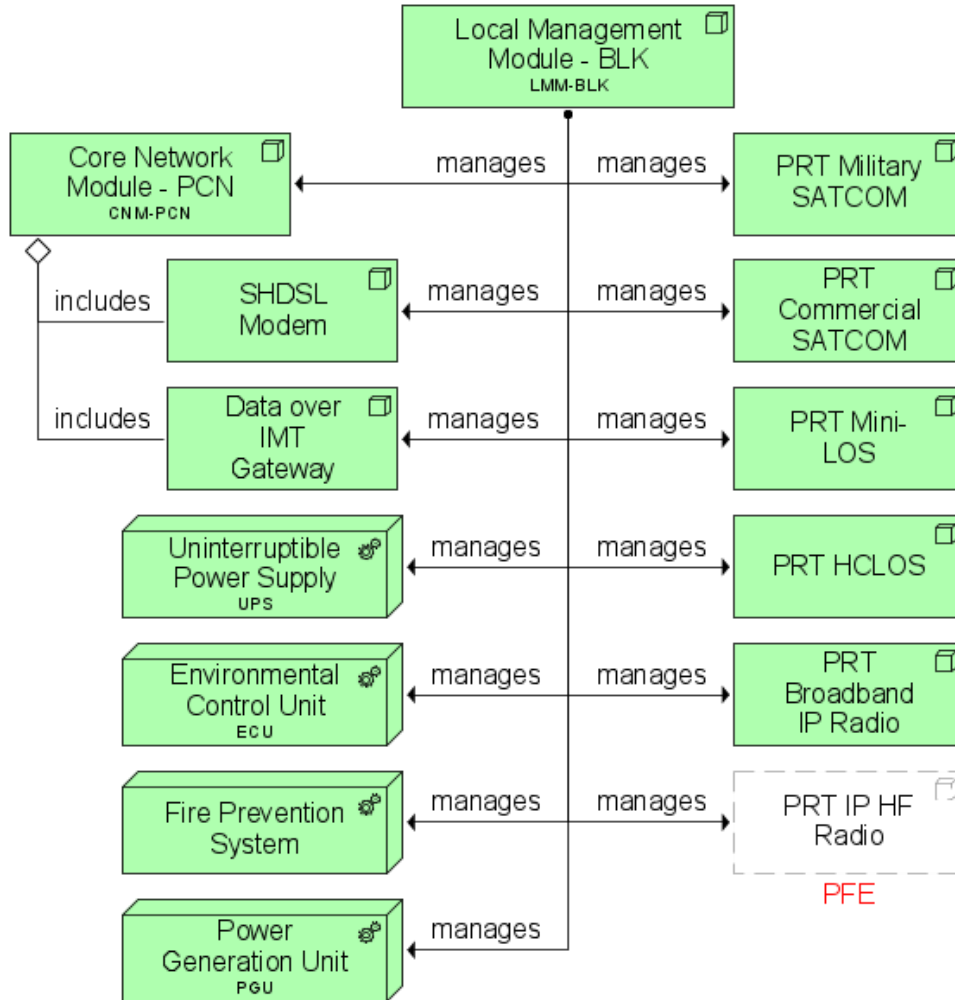


Figure 49 - LMM-BLK Element Management scope.

**SRS** (PRTTDCIS-2963)

The LMM-xU shall host Element Management Tool Suite components related to TDCIS elements as illustrated on following picture.

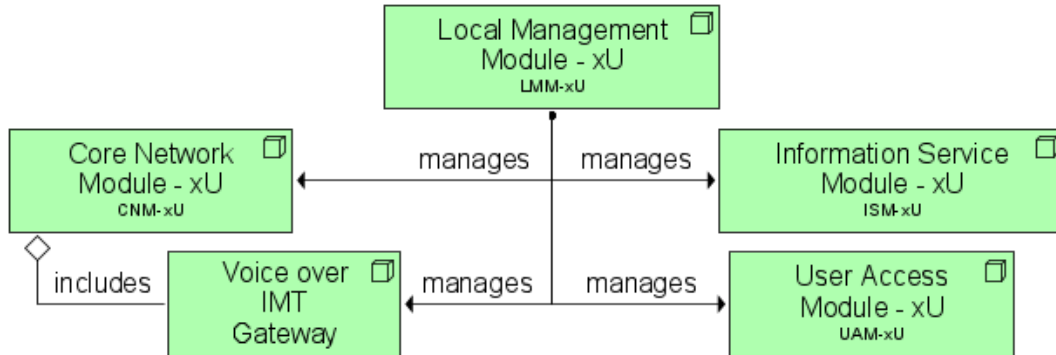


Figure 50 - LMM-xU Element Management scope.

**SRS** (PRTTDCIS-2964)

The LMM-xR shall host Element Management Tool Suite components related to TDCIS elements as illustrated on following picture.

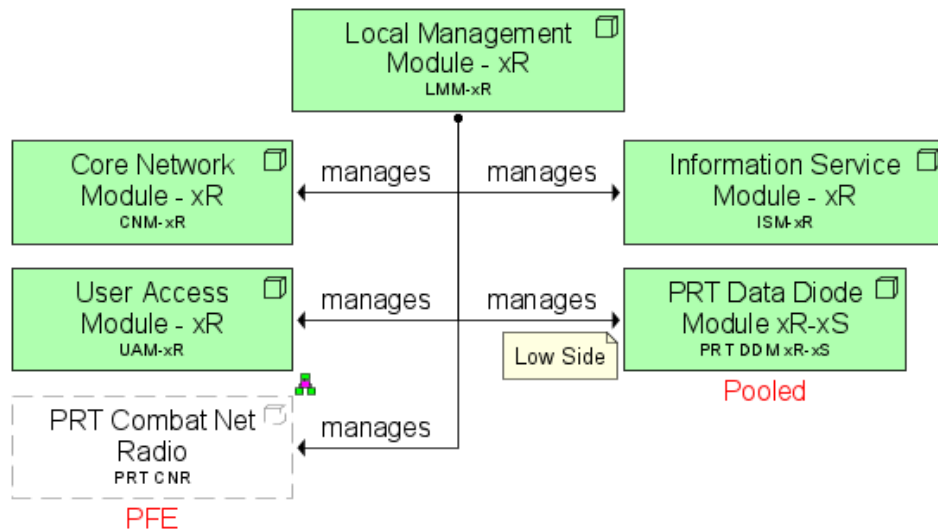


Figure 51 - LMM-xR Element Management scope.

**SRS (PRTTDCIS-2965)**

The LMM-xS shall host Element Management Tool Suite components related to TDCIS elements as illustrated on following picture.

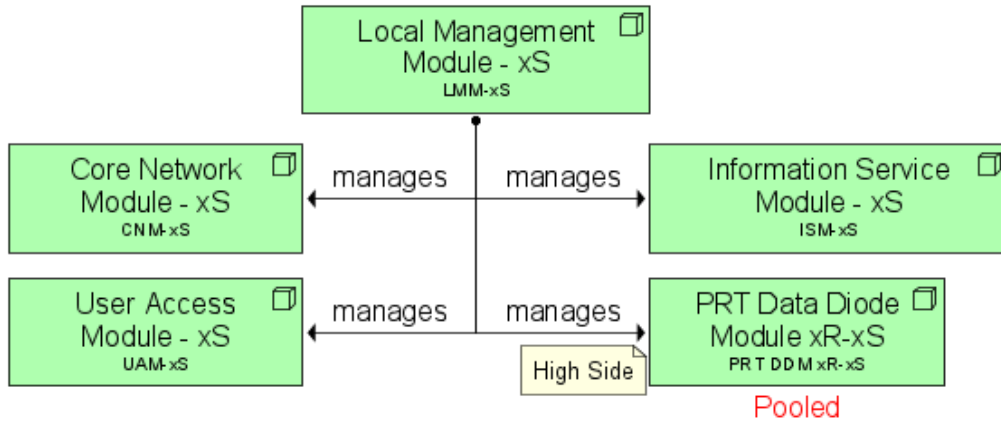


Figure 52 - LMM-xS Element Management scope.

**SRS (PRTTDCIS-2972)**

The LMM-NS shall host Element Management Tool Suite components related to TDCIS elements as illustrated on following picture.

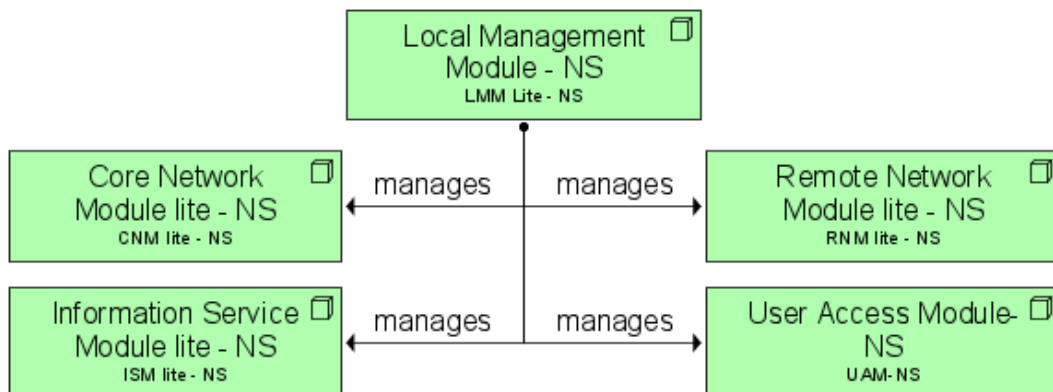


Figure 53 - LMM-NS Element Management scope.

**SRS (PRTTDCIS-3036)**

Element Management Tool Suite shall support integration with the pooled Portable Rugged Spectrum Analyzer.

**SRS (PRTTDCIS-4647)**

Element Management Tool Suite shall integrate with the Military SATCOM Terminal Embedded Spectrum Analyser.



**SRS (PRTTDCIS-2974)**

The Element Management Tool suite implementation in a Node shall be limited to the sole components and services hosted in this Node.

**4.5.3 Node Monitoring**

**SRS (PRTTDCIS-2955)**

The following figure illustrates the Node Monitoring Tool Suite per security domains in context with which it shall comply.

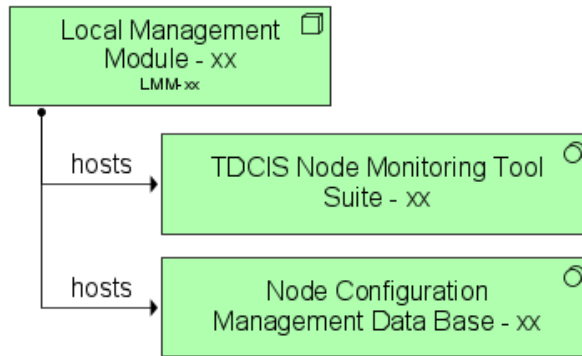


Figure 54 - Node Monitoring Tool Suite in context

**SRS (PRTTDCIS-2956)**

The Node Monitoring Tool Suite shall contain all tools and software to:

- 1) Visualize all services health status for the Node; and
- 2) Alert System Administrator of Service outages; and
- 3) Allow System administrator to Identify and Isolate Service outage root cause; and
- 4) Report Service Performance live (i.e. near real-time) and using time filtered reports based on stored historical data.

**SRS (PRTTDCIS-2958)**

The Node Monitoring Tool Suite shall automatically pre-populate a set of views based on the information available in the CMDB.

**SRS (PRTTDCIS-2959)**

The Node Monitoring Tool Suite shall allow System Administrator to create custom views.

**SRS (PRTTDCIS-2961)**

Where and when possible, the Node Monitoring Tool Suite shall integrate with the Element Management Tool Suite, without any custom development other than software configuration, to quickly and easily access component-specific tools and software.

**SRS (PRTTDCIS-1360)**

Node Monitoring Tool Suite shall inform about the actual State of Charge (SOC) of the battery, the Estimated Time to Empty (ETE) of the battery and other relevant data of the Shelter UPS.

**SRS** (PRTTDCIS-2950)

Access to Node Monitoring Tool Suite components shall be implemented as a web-based service, accessed through a standard web browser, as a minimum Microsoft Edge (latest version in use in PRT MOD) without the need of special browser add-ons. Any special functionality shall be provided through HTML5.

**SRS** (PRTTDCIS-2975)

The Node Monitoring Tool Suite implementation in a Node shall be limited to the sole components and services hosted in this Node.

## 5 Modules

### 5.1 General

#### NOTE (PRTTDCIS-2560)

Where not specified explicitly, xU, xR and xS variants of modules will be fiber-based wired.

#### SRS (PRTTDCIS-2561)

xU and xR variants of modules connections to EUD shall be Eth-Cu.

#### SRS (PRTTDCIS-4745)

xS variants of modules connections to EUD shall be ~~Eth-FO-SR~~Ethernet Fiber Optic 100BASE-FX.

#### SRS (PRTTDCIS-2559)

NS Kit modules shall be fiber-based wired, including the connections to EUD.

#### SRS (PRTTDCIS-2698)

All module components storage media (e.g. Hard Drives, Flash Drives...) shall be easily accessible and quickly removable from their hosting parent without having to remove or dismount any asset.

## 5.2 Core Network Module

### 5.2.1 Functional Requirements

#### SRS (PRTTDCIS-1666)

Each Core Network Module (CNM) shall provide wide area network connectivity to:

- 1) The PRT static infrastructure, via terrestrial lines or over Military SATCOM (from RL), anchoring the links at the PRT Satellite Ground Stations (SGS); and simultaneously,
- 2) The Core Network Modules of other TDCIS Nodes.

#### SRS (PRTTDCIS-1665)

Each Core Network Module shall provide local area and Metro-Area Network (MAN) connectivity to:

- 1) Information Services Module (ISM); and,
- 2) Data Diode Module (DDM) connecting two CNM-xx from two different security domains; and,
- 3) User Access Module (UAM), where local users connect; and,
- 4) Points of Presence (PoP) of collocated Mission Partner nations in the mission network environment as per FMN framework; and,
- 5) Protected Core Network (PCN) connectivity to other PCN participants.

**NOTE** (PRTTDCIS-1529)

The CNM implements the following functions in support of deployable instances of Communications Services:

- 1) Protected Core Access function; and,
- 2) Coloured Cloud Access function; and,
- 3) Multimedia Access function; and,
- 4) Boundary Protection function.

**SRS** (PRTTDCIS-1639)

The detailed system design of the CNM shall map each of the functions specified into subsystems (or functional building blocks) by the same name (i.e. PCA, CCA, MMA and BPS) and adhere to the subsystems breakdown presented on the following picture:

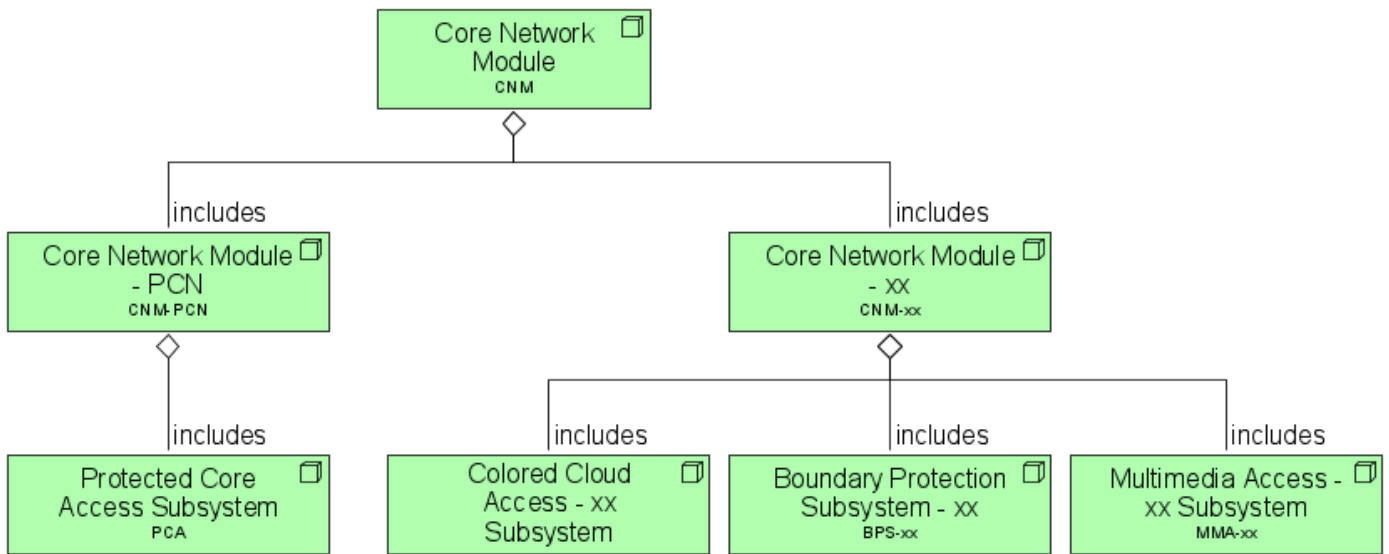


Figure 55 - CNM breakdown

**SRS** (PRTTDCIS-3121)

Colour Clouds encrypted traffic shall be transported by the Protected Core Network (PCN).

**NOTE** (PRTTDCIS-4091)

PCN is a specific implementation of the BLK Network.

**SRS** (PRTTDCIS-1530)

The **Protected Core Access (PCA)** function of the CNM shall:

- 1) Aggregate and distribute traffic across the diverse Transmission Systems on the DCIS Protected Core (e.g. SATCOM, HCLOS radio, fiber, etc. where available), using IP unicast and IP multicast routing; and,
- 2) Implement the DCIS Protected Core, providing wide-area transport services in support of the Coloured Cloud Access (CCA) function, both intra-theatre towards other TDCIS Nodes, as well as into the PRT static infrastructure (via the RL); and,
- 3) Implement Multiprotocol Label Switching - Traffic Engineering (MPLS-TE) in order to assure end-to-end Quality and Class of Service across the WAN, for the flows of CCA functions of different classifications, and for the flows within each CCA function and security classification.

**SRS** (PRTTDCIS-1531)

The **Coloured Cloud Access (CCA)** function of the CNM shall, for each security domain:

- 1) Connect to the PCA function using a Security accredited commercial grade IPsec function (for the CCA-xU and CCA-xR); and,
- 2) Connect to the PCA function using a PRT Nationally accredited high-grade IP Crypto function (for the CCA-Nat-S); and,
- 3) Connect to the PCA function using a NATO accredited high-grade IP Crypto function (for the CCA-MS and CCA-NS); and,
- 4) Provide the core switching capability, acting as a hub for the MMA, DDM and BPS functions; and,
- 5) Provide the HDS function for the ISMs; and,
- 6) Use an Interior Gateway Protocol (IGP) to converge routing information within the Coloured Cloud; and,
- 7) Provide IP access (LAN) and IP transport (WAN) to the Multimedia Access function of the CNM, Information Services modules (ISM) and User Access Modules (UAM) within the TDCIS Node; and,
- 8) Provide IP access (LAN) to the Boundary Protection function in the CNM, such that IP flows from/to the local ISM, UAM and MMA, as well as the flows from/to the WAN (other TDCIS Nodes) can be routed through it and protected accordingly; and,
- 9) Implement traffic classification and marking, traffic conditioning and dynamic IP routing at the edges of the network; and,
- 10) Support IP interworking with collocated Mission Network Participants (MNP), over a Network Interconnection Point (NIP), compliant with FMN framework.

**SRS** (PRTTDCIS-1532)

The **Multimedia Access (MMA)** function of the CNM shall, for each security domain:

- 1) Provide local users with multimedia access for IP Telephony, voice mail and secure voice conferencing support, at xU, xR and xS levels, using the CCA function for transport; and,
- 2) Implement an IP telephony service that enables users at a TDCIS Node to intercommunicate with other users in other TDCIS Nodes, MNP nodes, or in the PRT static infrastructure, within the same security domain; and,
- 3) Support multi-protocol signaling (i.e. SIP, H.323) and media (i.e. DTMF, fax) interworking, codec transcoding, voice and video conferencing; and,
- 4) Terminate and relay media streams, address and port translations (Topology Hiding); and,
- 5) Feature a Session Border Controller (SBC) capability to enable voice and video (V2) services federation with third party V2 network at xU and xS levels, over the NIP of the CCA function; and,
- 6) Use Call Admission Control (CAC) to prevent oversubscription of bandwidth across the WAN trunks that would degrade voice quality; and,
- 7) Support Multi-Level Precedence Pre-emption (MLPP) across the WAN trunks to ensure best use of the available bandwidth, with four levels of priority (Flash Override, Flash, Intermediate, Priority, Routine); and,
- 8) Support user-initiated subscriber extension mobility; and,
- 9) Implement a Gateway for IMT networks Voice service integration with IP Telephony service in the xU security domain; and,
- 10) Implement a Gateway for IRIDIUM Push To Talk integration in the xU security domain; and,
- 11) Implement a Gateway for Radio over IP integration, enabling Push To Talk (PTT) analogue audio communication through the VoIP network in the xU security domain; and,
- 12) Implement a Gateway for Radio over IP integration, enabling PTT communication through the xR-VoIP network and the CNR Voice network in the xR security domain; and,
- 13) Implement an Analogue Telephony service integrated with the TDCIS IP Telephony service in the xU security domain; and,
- 14) Federation to MNP according to FMN framework; and,
- 15) Unified Communication and Collaboration (UCC) capabilities in the form of integrated Video, Audio and Content Sharing; and,
- 16) Provide Auto attendant and contact center features with multiple greetings and structured menu functionality; and,
- 17) Provide Call Detail Record (CDR) reports; and,
- 18) Provide survivable remote node IP telephony service in case the main call processing device; i.e. Communication server is not reachable or down.

**SRS** (PRTTDCIS-1533)

The **Boundary Protection (BPS)** function of the CNM shall, for each security domain:

- 1) Implement the Self-protecting Node principle and protect the following LAN, WAN and MAN traffic flows using port-based or/and AppID inspection on the flows:
  - 1) UAM to local ISM (LAN); and,
  - 2) UAM to local MMA function (LAN); and,
  - 3) ISM to remote ISM or to PRT static infrastructure, over the CCA and PCA functions (WAN); and,
  - 4) UAM to remote ISM, over the CCA and PCA functions (WAN); and,
  - 5) NIP to ISM; and,
  - 6) ISM to DDM (LAN); and,
- 2) Be able to detect malicious activity by implementing a Network Intrusion Detection System (NIDS) functionality; and,
- 3) Implement the cross domain service between xU and xR.

**NOTE** (PRTTDCIS-3330)

As defined in D48Rev3 , a Self-Protecting CIS is to be understood as each CIS treating other CIS as un-trusted and implementing protection measures to control the exchange of information with other CIS.

## 5.2.2 Technical Requirements

### 5.2.2.1 PCA subsystem

#### 5.2.2.1.1 General

**NOTE** (PRTTDCIS-3049)

The following picture illustrates the PCA in context.

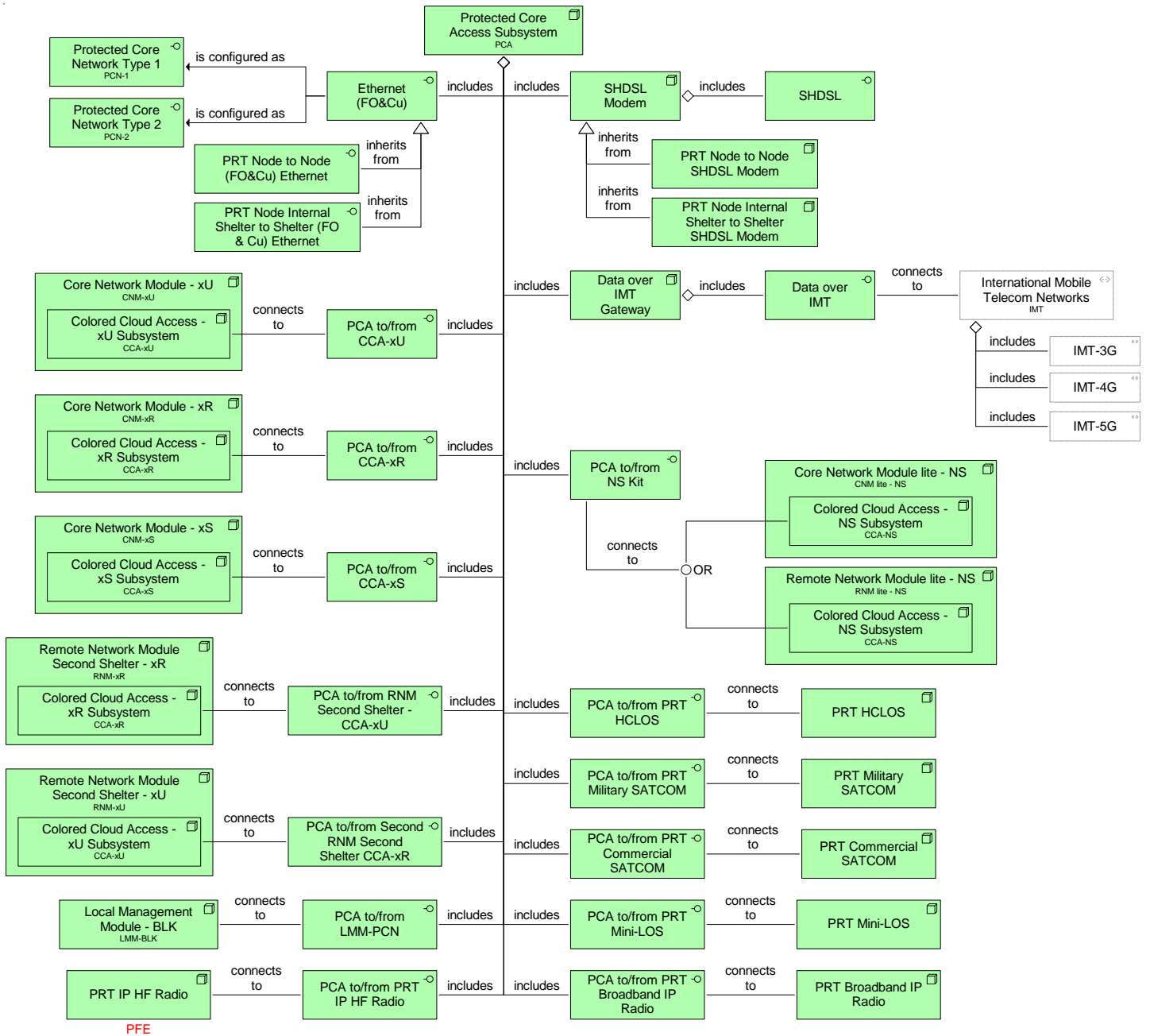


Figure 56 - PCA in context



**SRS (PRTTDCIS-1535)**

The PCA subsystem shall implement the PCA functions.

**SRS (PRTTDCIS-1289)**

The PCA shall include a data gateway to International Mobile Telecommunication (IMT) Networks.

**SRS (PRTTDCIS-2097)**

The PCA shall include Symmetric High speed Digital Subscriber Line (SHDSL) modems that enable high speed communications over single unloaded and unconditioned twisted copper pairs, of the type used in the local telephone distribution plant.

**SRS (PRTTDCIS-2098)**

The SHDSL shall be compliant with ITU-T G.991.2 Annexes B, F and G.

**SRS (PRTTDCIS-1536)**

The PCA subsystem shall deliver MPLS-based IP transport services to the xS, xR and xU IP routed security domains (implemented by the respective CCA subsystems).

**SRS (PRTTDCIS-1537)**

The PCA subsystem shall perform the Provider Edge (PE) function of the MPLS WAN, and support MP-BGP.

**SRS (PRTTDCIS-1538)**

The PCA subsystem shall forward packets to and from each CCA subsystems based on labels.

**SRS (PRTTDCIS-1539)**

The PCA subsystem shall use MPLS to implement Traffic Engineering through Label-Switched Paths (LSP). LSP are logical paths established over multiple transmission media. A given logical path may involve one or more Transmission Systems.

**SRS (PRTTDCIS-1540)**

The PCA subsystem shall use an internal routing protocol which shall be configured in all WAN interfaces in support of the exchange of control-plane information. This includes:

- 1) IP reachability information; and,
- 2) MPLS traffic engineering metrics; and,
- 3) BGP next-hop reach ability.

**SRS (PRTTDCIS-1542)**

Label Distribution Protocol (LDP) shall be used within the MPLS core to facilitate MPLS VPN services.

**SRS (PRTTDCIS-1543)**

The PCA subsystem shall use its IGP to carry topology information for the WAN links, its loopback interfaces (which are the end-points for MPLS LSPs), its physical interfaces, used for the IPsec tunnels for the xU, xR and xS access networks (e.g. the interfaces facing the black IP port of the TCE-621B).

**SRS (PRTTDCIS-1544)**

The PCA subsystem shall implement different LSPs to carry traffic internal, amongst TDCIS Nodes and towards the PRT static infrastructure, and FMN traffic transiting between NIPs.

**SRS (PRTTDCIS-1545)**

The PCA subsystem interfaces for IPsec tunnel end-points shall be set as "passive" in the IGP as they are Protected Core Edge connections.

**SRS (PRTTDCIS-2312)**

There shall be no IP routing exchange between the Protected Core and the xU, xR and xS networks.

**SRS (PRTTDCIS-1546)**

The PCA subsystem shall implement IPv4 and IPv6 multicast routing through PIM-SM, PIM-SSM and MLDv2.

**SRS (PRTTDCIS-1547)**

Rendezvous points shall be anycasted in accordance with RFC4610. Geographically RP redundancy shall be implemented.

**SRS (PRTTDCIS-1548)**

For IPv4 multicast, the anycasted rendezvous points shall use Multicast Source Discovery Protocol (MSDP).

**SRS (PRTTDCIS-1549)**

For IPv4 multicast, when BGP-4 is used across interoperability interfaces, MSDP shall peer using the same source and destination addresses as the external BGP peering session.

**SRS (PRTTDCIS-1550)**

For IPv4 multicast, MSDP shall be configured to source from the loopback addresses on internal BGP peering sessions.

**SRS (PRTTDCIS-1551)**

The PCA subsystem shall support IP throughput performances up to 1 Gbps and 5 Gbps, with and without IPsec encryption, respectively.

**SRS (PRTTDCIS-1552)**

The PCA subsystem shall be able to simultaneously connect to all the Transmission Systems.

**SRS (PRTTDCIS-1555)**

The PCA subsystem shall, as a minimum, implement interfaces to the WAN/MAN and to other subsystems within the CNM, as per the table below. The need for additional interfaces, or interfaces different from those listed below, including internal interfaces within the PCA subsystem, if required, as well as their specification, shall be design-driven and shall be justified, based on component selection and functionality sought.

Interface Name	Qty.	Interface Type	Interface Speed	Remarks
SHDSL	2	N/A	N/A	Same interface can be used for Node to Node as well as for Shelter to Shelter (internal to a dual Shelter Node) connectivity.
Data over IMT	1	N/A	N/A	N/A
Ethernet (FO and Cu)	4	Eth-Cu Eth-FO- LR	100/1000Mbps 1Gbps	SFP based supporting both RJ45 and fibre for 100/1000Mbps Interface is either configured as PCN-1 or PCN-2 Same interface can be used for Node to Node as well as for Shelter to Shelter (internal to a dual Shelter Node) connectivity.
PCA to/from PRT Mini LOS	3	Design Driven	Design Driven	N/A
PCA to/from PRT HCLOS	4	Design Driven	Design Driven	N/A
PCA to/from PRT Broadband IP Radio	1	Design Driven	Design Driven	N/A
PCA to/from PRT Commercial SATCOM	1	Design Driven	Design Driven	N/A
PCA to/from PRT Military SATCOM	1	Design Driven	Design Driven	N/A
PCA to/from PRT IP HF Radio	1	Eth-Cu	10BaseT	N/A
PCA to/from CCA-xS	1	Eth-FO- SR	10/100/1000Mbps	Interface to TCE-621B
PCA to/from CCA-xR	1	Eth-FO- SR	1Gbps	N/A

Interface Name	Qty.	Interface Type	Interface Speed	Remarks
PCA to/from CCA-xU	1	Eth-FO-SR	1Gbps	N/A
PCA to/from RNM Second Shelter -CCA-xU	1	Eth-FO-SR	1Gbps	This Interface may use the same physical port as the PCA to/from CCA-xU
PCA to/from Second RNM Second Shelter CCA-xR	1	Eth-FO-SR	1Gbps	This Interface may use the same physical port as the PCA to/from CCA-xR
PCA to/from NS Kit	2	Eth-FO-LR	1Gbps	Interface can be connected to the TCE621M of the CCA-NS of a Core Node Lite or of a Remote Node Lite
PCA to/from LMM-PCN	N	Eth-Cu	1Gbps	N is Design Driven with a minimum of 2 interfaces to connect Sys Admin Workstations.

Table 28 - PCA subsystem interfaces

**SRS** (PRTTDCIS-1668)

All PCA across TDCIS Nodes shall be identical, therefore, the computation of interface quantities have taken into consideration the largest connections possible.

**SRS** (PRTTDCIS-1556)

The PCA subsystem shall implement additional interfaces, as required and as driven by the design, in support of service management and control functionalities.

**NOTE** (PRTTDCIS-1557)

Additional interfaces may be implemented to accommodate other connections and end-points resulting from the detailed design.

**SRS** (PRTTDCIS-1558)

Any routers and switches in the PCA subsystem shall be duly sized and licensed in order to meet the functional and technical requirements above.

**SRS** (PRTTDCIS-1248)

The PCA shall support the E-Node functionality in support of the Protected Core Network (PCN) specification, in accordance with STANAG-5637.

**SRS** (PRTTDCIS-1244)

In order to be an E-Node in the PCN context, the PCA shall support following services and their federation with other affiliates of the PCN:

- Domain Name Server (DNS); and,
- Authentication, Authorisation & Accounting (AAA); and,
- Network Time Protocol (NTP); and,
- Public Key Infrastructure (PKI); and,
- Interface to the Network Management / Cyber Defence System.

**5.2.2.1.2 Data over IMT Gateway****NOTE** (PRTTDCIS-4111)

The PCA Data IMT Gateway is an IMT-UE.

**NOTE** (PRTTDCIS-4112)

The purpose of the PCA Data IMT Gateway, along with the underlying IMT Network Access Service, is to interconnect the TDCIS with the PRT NDN Infrastructure, primarily via public IMT networks.

**NOTE** (PRTTDCIS-4144)

The IMT Network Access Service (i.e. SIM cards and subscription) is not a project deliverable.

**SRS** (PRTTDCIS-4113)

The PCA Data IMT Gateway shall consist of Outdoor Elements and Indoor Elements.

**SRS** (PRTTDCIS-4114)

The PCA Data IMT Gateway shall support Public and Private IMT networks.

**SRS** (PRTTDCIS-4115)

The PCA Data IMT Gateway shall be compatible with IMT Network Access Service implementing Private Access Point Name (APN).

**SRS** (PRTTDCIS-4135)

The PCA Data IMT Gateway shall implement Multiple Input Multiple Output (MIMO) techniques.

**SRS** (PRTTDCIS-4136)

The PCA Data IMT Gateway shall support a minimum of TWO (02) MIMO layers.

**SRS** (PRTTDCIS-4116)

The PCA Data IMT Gateway shall support a minimum of TWO (02) independent antenna elements.

**SRS** (PRTTDCIS-4117)

The antenna shall be able to operate across all frequency bands specified.

**SRS** (PRTTDCIS-4118)

The antenna elements shall be detachable and replaceable by a System Administrator.

**SRS** (PRTTDCIS-4119)

The PCA Data IMT Gateway antenna shall be mounted outside, on the Shelter.

**SRS** (PRTTDCIS-4123)

The PCA Data IMT Gateway shall support Dual Subscriber Identity Module (SIM) Card.

**SRS** (PRTTDCIS-4124)

SIM-based carrier selection shall be automatic without requiring any System Administrator action.

**SRS** (PRTTDCIS-4125)

The PCA Data IMT Gateway shall support IPv4 and IPv6 dual stack.

**SRS** (PRTTDCIS-4126)

The PCA Data IMT Gateway shall implement 3G/IMT2000 and 4G/IMT-Advanced compliant Radio Access Technology (RAT) including, as a minimum:

- 3GPP's UMTS Release 7 (HSPA+); and,
- 3GPP's LTE Release 11 (LTE Advanced); and,
- LTE IMT-UE Category 11.

**SRS** (PRTTDCIS-4620)

The PCA Data IMT Gateway shall implement 5G/IMT-2020 compliant RAT including, as a minimum:

- 3GPP's LTE Release 13 (LTE Advanced Pro); and,
- 3GPP's 5G Release 15 (5G NR) in Frequency Range 1 (FR1); and,
- 5G+LTE dual connectivity.

**SRS** (PRTTDCIS-4128)

The PCA Data IMT Gateway shall primarily operate with LTE technology and fall back automatically to UMTS technology.

**SRS** (PRTTDCIS-4129)

The fall back to UMTS technology shall depend on the RAN technology propagation and coverage conditions, without requiring any System Administrator action.

**SRS** (PRTTDCIS-4622)

The PCA Data IMT Gateway shall primarily operate with LTE technology and switch automatically to 5G technology when in coverage.

**SRS** (PRTTDCIS-4623)

The switch to 5G technology shall depend on the RAN technology propagation and coverage conditions, without requiring any operator action.

**SRS** (PRTTDCIS-4132)

The PCA Data IMT Gateway shall implement Roaming techniques.

**SRS** (PRTTDCIS-4133)

Any kind of Roaming shall be automatic without requiring any System Administrator action.

**SRS** (PRTTDCIS-4134)

The PCA Data IMT Gateway shall implement Carrier Aggregation (CA) techniques.

**SRS** (PRTTDCIS-4137)

The PCA Data IMT Gateway shall implement global coverage, supporting the adopted bands in the regions of Europe, Africa/Middle East, Asia and Pacific.

**SRS** (PRTTDCIS-4138)

The PCA Data IMT Gateway shall implement a minimum of ONE (01) 3GPP UMTS band per region.

**SRS** (PRTTDCIS-4139)

The PCA Data IMT Gateway shall implement a minimum of TWO (02) 3GPP LTE bands per region.

**SRS** (PRTTDCIS-4626)

The PCA Data IMT Gateway shall implement a minimum of ONE (01) 3GPP 5G NR FR1 band per region.

**SRS** (PRTTDCIS-4142)

The PCA Data IMT Gateway shall implement a Human Machine Interface (HMI) interface that allows monitoring and control of the PCA Data IMT Gateway by a System Administrator.

**SRS** (PRTTDCIS-4143)

The PCA Data IMT Gateway HMI shall provide the minimum following functionalities to System Administrators:

- A clock driven by the IMT Network; and,
- Enabling IMT Gateway parameters configuration; and,
- Collecting, Logging and Reporting Errors, Warnings and Alarms in a Human comprehensive format; and,
- Monitoring and reporting of the IMT Gateway operational status; and,
- MNO currently connected; and,
- Estimated uplink and downlink data rates; and,
- Signal strength.

**5.2.2.2 CCA subsystem****NOTE** (PRTTDCIS-3050)

The following picture illustrates the CCA in context.



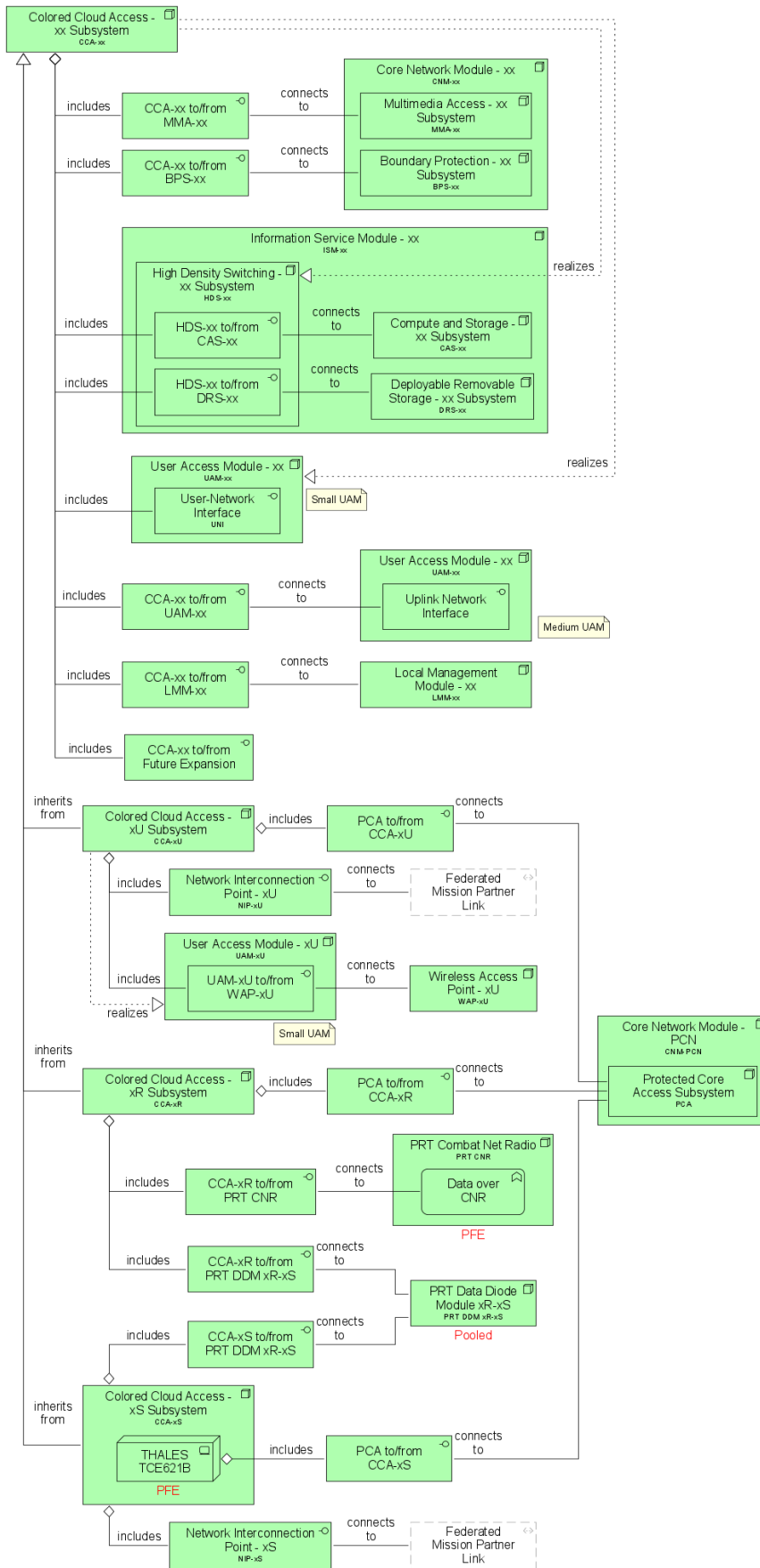


Figure 57 - CCA in context

**NOTE** (PRTTDCIS-1559)

The CCA subsystem exists in three different variants: CCA-xU, CCA-xR and CCA-xS. The xU and xR variants are different from the other one in the sense that the corresponding module will not require dedicated crypto equipment.

**SRS** (PRTTDCIS-1560)

The CCA subsystem shall implement the CCA functions.

**SRS** (PRTTDCIS-1561)

The CCA subsystem shall implement IPv4/IPv6 dual stack.

**SRS** (PRTTDCIS-1563)

All CCA subsystems shall be built and licensed the same, irrespective of the security domain.

**SRS** (PRTTDCIS-1564)

The CCA subsystem shall use OSPFv2 as the IGP for IPv4 and OSPFv3 as the IGP for IPv6.

**SRS** (PRTTDCIS-1575)

The CCA subsystem shall use BGP4 as the EGP to interconnect interior routing domains (iBGP) and to dynamically advertise IP information over the NIP (eBGP).

**SRS** (PRTTDCIS-1565)

The CCA subsystem shall support IP multicast and fulfil all multicast-related requirements stated for the PCA subsystem.

**SRS** (PRTTDCIS-1566)

The CCA subsystem shall implement a tunneling architecture for transporting xS data between TDCIS Nodes. Tunnels shall provide point-to-point IP transport at a given QoS level, in turn determined by the link attributes of the underlying MPLS-TE tunnels (LSP) between the PCA subsystems.

**SRS** (PRTTDCIS-1567)

To allow dynamic routing updates between two connected TDCIS Nodes, a main End-to-End tunnel shall be created between CCAs.

**SRS** (PRTTDCIS-1568)

This tunnel acts as a logical interface to BGP and OSPF, and as the point-to-point transport interface connecting to other networks. All dynamic routing updates shall be sent and received through this tunnel.

**NOTE** (PRTTDCIS-1569)

Quality of Service (QoS) and Anti-Replay methods are performed inside the End-to-End tunnel and are transparent to the dynamic routing protocols. The per-QoS Encapsulating Security Protocol (ESP) between IP crypto equipment correspond to separate Virtual Crypto Units (VCU).

**SRS** (PRTTDCIS-1570)

For each End-to-End (E2E) Generic Routing Encapsulation (GRE) tunnel and for QoS purposes, five additional GRE tunnels shall be configured within the CCA subsystem, one for each QoS class. The routing design shall be implemented as follows:

- 1) QoS tunnels shall be established between CCA subsystem instances; and,
- 2) Traffic shall be first routed into the correct E2E tunnel by the dynamic routing protocol; and,
- 3) Once in the correct E2E tunnel, traffic shall then be routed into one of the associated five QoS-based GRE tunnels via static configuration. As this routing decision is based upon Differentiated Services Code Point (DSCP) and destination IP (with the destination being the tunnel endpoint of the chosen E2E GRE), Policy-Based Routing (PBR) and a separate Virtual Routing and Forwarding (VRF) instances are required; and,
- 4) Each QoS tunnel (mapped to a VCU) shall be associated with one or more (more in case of load balancing across cryptos) cryptographic tunnels and routed across the Protected Core Network accounting for the QoS requirements.

**NOTE** (PRTTDCIS-1571)

Cryptographic tunnels are established:

- between IP encryption equipment of the different CCA-xS; and,
- between Commercial grade crypto instances of the different CCA-xU; and,
- between Commercial grade crypto instances of the different CCA-xR.

**SRS** (PRTTDCIS-1576)

Over the NIP, each CCA subsystem shall transit multicast traffic on behalf of all Mission Network Participants (MNP).

**SRS** (PRTTDCIS-1578)

In order to fulfil end-to-end QoS for higher level services, IP performance within the CCA Subsystem shall be expressed as a maximum IP packet loss rate (IPLR), a maximum IP transfer delay (IPTD) and a maximum jitter (IPDV) and shall comply with parameters are as follows for the Real Time (RT) Voice and Video (V2) traffic:

- Latency  $\leq$  150 ms one-way; and,
- Jitter  $\leq$  30 ms; and,
- Loss  $\leq$  1%.

**SRS** (PRTTDCIS-1579)

The following QoS parameters for Inter-domain Multicast Source Discovery over the CCA subsystem shall be observed or tailored to fit mission-specific requirements: Application Type: Router (multicast source discovery).

**SRS (PRTTDCIS-1580)**

The following QoS parameters for Inter-domain Routing over the CCA subsystem shall be observed or tailored to fit mission-specific requirements: Application Type: Router (inter-domain routing).

**SRS (PRTTDCIS-1581)**

The following QoS parameters for Inter-domain Multicast Signaling over the CCA subsystem shall be observed or tailored to fit mission-specific requirements: Application Type: Router (multicast signaling).

**SRS (PRTTDCIS-1582)**

The following QoS parameters for Key negotiation and keepalives over the CCA subsystem shall be observed or tailored to fit mission-specific requirements: Application Type: Router (IPSec authentication and tunnel management).

**SRS (PRTTDCIS-1583)**

Over the NIP, the CCA subsystem shall provide multicast infrastructure based on PIMv2 Sparse-Mode signaling and Rendezvous points within each MN Communications Services Provider.

**SRS (PRTTDCIS-1586)**

Each individual CCA subsystem shall implement a core switching capability with buffers of minimum 16 MB, in order to prevent frame drops resulting from micro-bursts of traffic.

**SRS (PRTTDCIS-1587)**

Each individual CCA subsystem shall, as a minimum, implement interfaces to other subsystems within the Core Network Module as well as to external elements, as per the table below. The need for additional interfaces, or interfaces different from those listed below, as well as their specification, shall be design-driven and shall be justified, based on component selection and functionality sought.

Interface Name	Qty.	Interface Type	Interface Speed	Remarks
CCA-xx to/from MMA-xx	N	Design Driven	Design Driven	N is Design Driven
CCA-xx to/from BPS-xx	M	Design Driven	Design Driven	M is Design Driven through CCA switching core
HDS-xx to/from CAS-xx	—	—	—	See HDS specifications
HDS-xx to/from DRS-xx	—	—	—	See HDS specifications
User Network Interface	2	—	—	To realize the small UAM See UAM section for specifications
CCA-xx to UAM-xx	2	Eth-FO-LR	Minimum 2Gbps	To connect to Medium UAM

Interface Name	Qty.	Interface Type	Interface Speed	Remarks
CCA-xx to LMM-xx	Q	Design Driven	Design Driven	Q is Design Driven with a minimum of 2 interfaces to connect Sys Admin Workstations.
CCA-xx to Future Expansion	4	Eth-Cu Eth-FO-SR	100/1000Mbps 1Gbps	SFP based supporting both RJ45 and fibre for 100/1000Mbps
PCA to/from CCA-xU	1	Eth-FO-SR	1Gbps	only in CCA-xU direct interface on CCA routing platform
UAM-xU to/from WAP-xU	1	—	—	To realize the small UAM See UAM section for specifications
NIP-xU	1	Eth-FO-LR	1Gbps	only in CCA-xU direct interface on CCA routing platform
PCA to/from CCA-xR	1	Eth-FO-SR	1Gbps	only in CCA-xR direct interface on CCA routing platform
CCA-xR to/from PRT CNR	T	Design Driven	Design Driven	T is Design Driven For Data over CNR direct interface on CCA routing platform
CCA-xR to/from PRT DDM xR-xS	R	Design Driven	Minimum 1Gbps	R is Design Driven
PCA to/from CCA-xS	1	Eth-FO-SR	10/100/1000Mbps	Interface to TCE-621B only in CCA-xS direct interface on CCA routing platform
NIP-xS	1	Eth-FO-LR	1Gbps	only in CCA-xU direct interface on CCA routing platform
CCA-xS to/from PRT DDM xR-xS	S	Design Driven	Minimum 1Gbps	S is Design Driven

Table 29 - CCA subsystem interfaces

**SRS** (PRTTDCIS-1669)

All CCA across TDCIS Nodes shall be identical, therefore, the computation of interface quantities have taken into consideration the largest connections possible.

**SRS** (PRTTDCIS-1588)

Each CCA subsystem shall implement additional interfaces, as required and as driven by the design, in support of service management and control functionalities.

**NOTE** (PRTTDCIS-1590)

Additional interfaces may be implemented to accommodate other connections and end-points resulting from the detailed design.

**SRS** (PRTTDCIS-1591)

Any routers and switches in each CCA subsystem shall be duly sized and licensed in order to meet the functional and technical requirements above.

**SRS** (PRTTDCIS-1584)

Each individual CCA subsystem shall implement IP throughput performances of minimum 1 Gbps with IPsec encryption enabled.

**SRS** (PRTTDCIS-1585)

Each individual CCA subsystem shall support IP throughput performances of minimum 10 Gbps without IPsec encryption enabled.

**SRS** (PRTTDCIS-1562)

The CCA subsystem shall implement a minimum of 10Gbps switching core.

**SRS** (PRTTDCIS-1644)

Core switches in the CCA Subsystem shall implement a minimum of 2 Gbps uplinks towards each UAM Access BoB.

**SRS** (PRTTDCIS-2869)

Crypto devices shall be removable from the racks of the CCA, for storage and transport.

**SRS** (PRTTDCIS-3864)

The removal of the crypto devices shall be compatible with the implementation of TEMPEST requirements in the racks.

**NOTE** (PRTTDCIS-2870)

Foam-padded transport cases able to carry one TCE-621/B will be used for that purpose.

**NOTE** (PRTTDCIS-3865)

TCE-621/B transport cases are PFE and will be transported separately from the Node.

**SRS** (PRTTDCIS-4103)

Core switching function of the CCA in the CNM shall realize the HDS function of the ISM.

**5.2.2.3 MMA subsystem**

**5.2.2.3.1 General**

**NOTE** (PRTTDCIS-3051)

The following picture illustrates the Multi Media Access (MMA) in context.

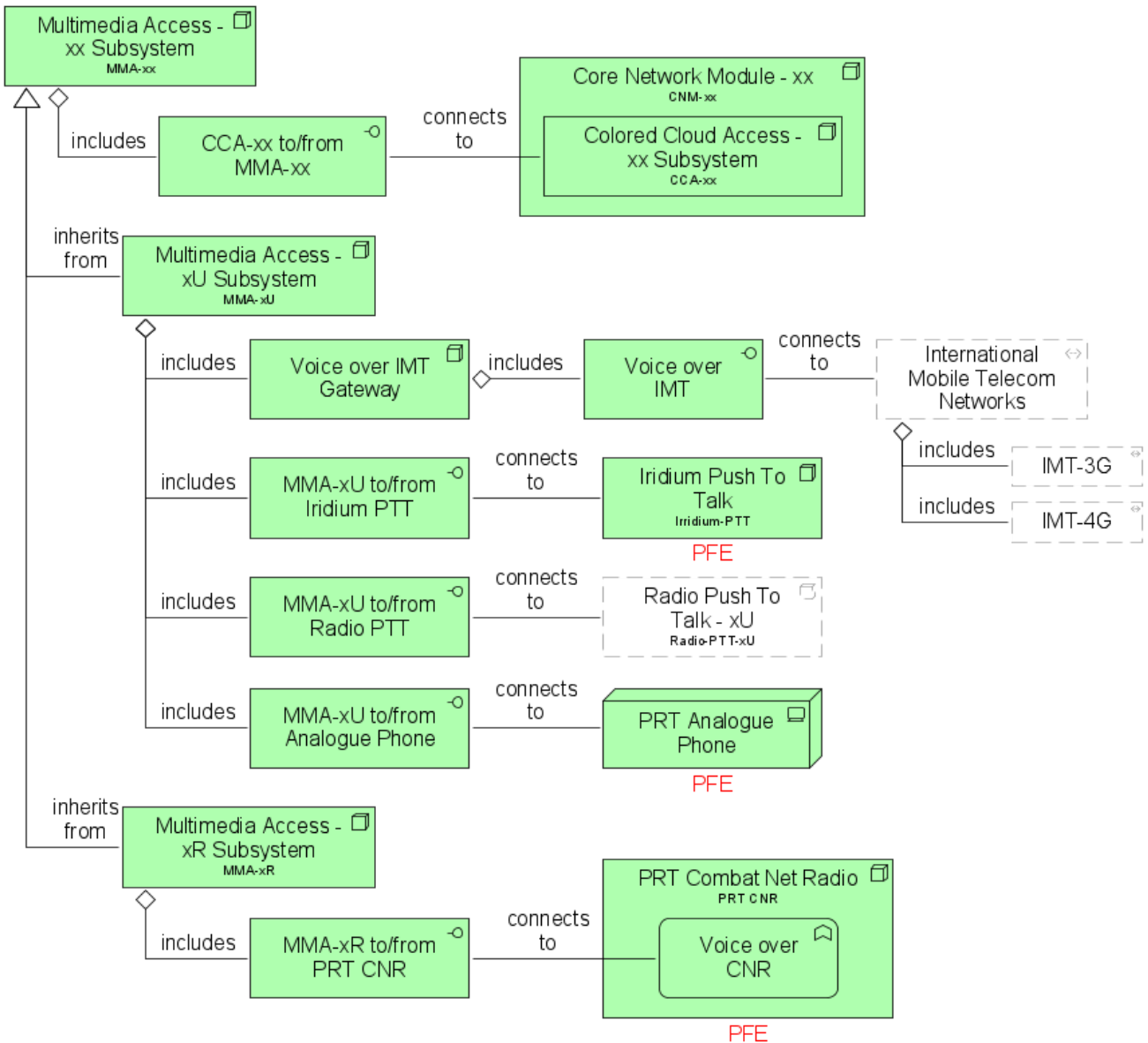


Figure 58 - MMA in context

**SRS** (PRTTDCIS-1592)

The MMA subsystem shall implement the MMA functions.

**SRS (PRTTDCIS-1593)**

There shall be as many instances of the MMA subsystems as CNMs and security domains (xU, xR and xS).

**SRS (PRTTDCIS-1594)**

The MMA subsystem shall implement media stream termination and relay functions using Digital Signal Processing (DSP) hardware acting as Media Termination Point / Trusted Relay Point (MTP/TRP).

**SRS (PRTTDCIS-4109)**

The MMA-xU Subsystem shall implement a Voice over IMT Gateway.

**SRS (PRTTDCIS-1595)**

The MMA subsystem shall perform codec conversion and use TLS to communicate with the call management function.

**SRS (PRTTDCIS-1672)**

The MMA subsystem shall implement the call management function compatible with the specifications of a Cisco Unified Call Manager (CUCM).

**SRS (PRTTDCIS-1597)**

The MMA subsystems shall support Dynamic Host Configuration Protocol (DHCP) towards the user appliances connecting via the UAM.

**SRS (PRTTDCIS-1598)**

The MMA subsystem shall support local Voice Collaboration Service.

**SRS (PRTTDCIS-4307)**

The MMA subsystem shall support local Video Teleconferencing Service in the applicable Nodes.

**SRS (PRTTDCIS-1599)**

The MMA subsystem shall implement a Session Border Controller (SBC) function compatible with the specifications of the Cisco Unified Border Element (CUBE).

**SRS (PRTTDCIS-1601)**

The MMA subsystem shall support concurrent SIP sessions equals to the largest user quantity possible on a node and in a security domain plus 10%.



**NOTE** (PRTTDCIS-1603)

Software versions are the latest approved versions, these might however be higher during the actual implementation, this will be subject to local coordination and approval prior to any deployment.

**SRS** (PRTTDCIS-1604)

All MMA subsystems shall be built and licensed the same, irrespective of the security domain.

**SRS** (PRTTDCIS-1606)

Any software component of the MMA subsystem that is able to run on commodity hardware shall be implemented as a workload on the ISM. This is applicable to all security domain (xS, xR and xU).

**SRS** (PRTTDCIS-1607)

The implementation of MLPP by the MMA subsystem, shall support, on top of routine calls, levels of precedence and pre-emption, as follows (from highest to lowest):

- 1) Flash Override; and,
- 2) Flash; and,
- 3) Intermediate; and,
- 4) Priority; and,
- 5) Routine.

**SRS** (PRTTDCIS-1608)

The MMA subsystem shall implement a dial plan compliant with STANAG 4705.

**SRS** (PRTTDCIS-4464)

The MMA subsystem shall, as a minimum, support following voice codecs:

- G.729 R8; and,
- G.729 BR8; and,
- G.711 A Law; and,
- G.711 u Law.

**SRS** (PRTTDCIS-1609)

The MMA subsystem shall implement a local Call Management instance that refers to the Survivable Remote Site Telephony (SRST) function, this function being a local call processing and management function performed by the CCA subsystem if the node is isolated and loses the connection to a remote Call Manager to ensure intra-node communication.

**NOTE** (PRTTDCIS-1626)

The MTP/RTP instance shall be integrated in the appliance(s) implementing the SBC function.

**SRS (PRTTDCIS-1628)**

Any routers, switches and applications in the MMA subsystem shall be duly sized and licensed in order to meet the functional and technical requirements above.

**SRS (PRTTDCIS-1629)**

Each MMA subsystem shall, as a minimum, implement interfaces to other subsystems within the Core Network Module as well as to external elements, as per the table below. The need for additional interfaces, or interfaces different from those listed below, as well as their specification, shall be design-driven and shall be justified, based on component selection and functionality sought.

Interface Name	Qty.	Interface Type	Interface Speed	Remarks
CCA-xx to/from MMA-xx	N	Design Driven	Design Driven	N is Design Driven
Voice over IMT	M	Design Driven	Design Driven	Only in MMA-xU M is Design Driven
MMA-xU to/from Iridium PTT	P	Design Driven	Design Driven	Only in MMA-xU P is Design Driven
MMA-xU to/from Radio PTT	Q	Design Driven	Design Driven	Only in MMA-xU Q is Design Driven Interface shall support ED-137/B and SIP/RSTP protocols.
MMA-xU to/from Analogue Phone	4	Design Driven	Design Driven	Analogue Phones are connected through 2 wires.
MMA-xR to/from PRT CNR	1	Design Driven	Design Driven	Only in MMA-xR

Table 30 - MMA subsystem interfaces

**SRS (PRTTDCIS-1673)**

All MMA across TDCIS Nodes shall be identical, therefore, the computation of interface quantities have taken into consideration the largest connections possible.

**SRS (PRTTDCIS-1630)**

Each MMA subsystem shall implement additional interfaces, as required and as driven by the design, in support of service management and control functionalities.

**NOTE (PRTTDCIS-1631)**

Additional interfaces may be implemented to accommodate other connections and end-points resulting from the detailed design.

**SRS** (PRTTDCIS-3092)

The Unified Communication and Collaboration (UCC) solution shall conform to Internet Engineering Task Force (IETF) standards for providing the minimum core features, including voice and video calls, conferencing and content sharing.

**NOTE** (PRTTDCIS-2906)

The VTC Multipoint Control Unit (MCU) implementation is design driven and can either be performed with physical appliances or as a virtual workload to the ISM.

**SRS** (PRTTDCIS-3835)

The MMA subsystem shall, as a minimum, support following video codecs:

- H.264 SVC; and,
- H.264 AVC Base Profile.

**SRS** (PRTTDCIS-1839)

The MMA Voice Capability shall be compatible with the Phone baseline.

**SRS** (PRTTDCIS-1596)

The MMA call management function corresponding application shall run as a workload in the ISM.

**SRS** (PRTTDCIS-1625)

The MMA SBC shall be implemented in a dedicated appliance, integrated in the CNM.

**SRS** (PRTTDCIS-4302)

The MMA SBC appliance shall be common for Voice and VTC.

**SRS** (PRTTDCIS-4303)

The MMA SBC appliance shall implement transcoding function for Voice and VTC services for all codecs as per FMN specifications.

**SRS** (PRTTDCIS-1262)

The MMA-xU shall support the integration (mechanical, electrical and logical) of the PFE Iridium terminal.

**SRS** (PRTTDCIS-1264)

The MMA IP telephony service in the xR security domain shall integrate the PFE RoIP gateway that will be connected to the CNR voice interface.

### 5.2.2.3.2 Voice over IMT Gateway

**NOTE** (PRTTDCIS-4145)

The MMA-xU Voice IMT Gateway is an IMT-UE.

**NOTE** (PRTTDCIS-4146)

The purpose of the MMA-xU Voice IMT Gateway, along with the underlying IMT Network Access Service, is to interconnect the TDCIS xU Voice Service with the PRT NDN Infrastructure and the capability to place external calls to public networks, primarily via public IMT networks- by converting the VoIP service into the carrier's voice service.

**NOTE** (PRTTDCIS-4147)

The IMT Network Access Service (i.e. SIM cards and subscription) is not a project deliverable.

**SRS** (PRTTDCIS-4148)

The MMA-xU Voice IMT Gateway shall consist of Outdoor Elements and Indoor Elements.

**SRS** (PRTTDCIS-4149)

The MMA-xU Voice IMT Gateway shall support Public and Private IMT networks.

**SRS** (PRTTDCIS-4150)

The MMA-xU Voice IMT Gateway shall be compatible with IMT Network Access Service implementing Private Access Point Name APN).

~~**SRS** (PRTTDCIS-4164)~~

~~The MMA-xU Voice IMT Gateway shall implement Multiple Input Multiple Output (MIMO) techniques.~~

~~**SRS** (PRTTDCIS-4165)~~

~~The MMA-xU Voice IMT Gateway shall support a minimum of TWO (02) MIMO layers.~~

~~**SRS** (PRTTDCIS-4151)~~

~~The MMA-xU Voice IMT Gateway shall support a minimum of TWO (02) independent antenna elements.~~

**SRS** (PRTTDCIS-4152)

The antenna shall be able to operate across all frequency bands specified.

**SRS** (PRTTDCIS-4153)

The antenna elements shall be detachable and replaceable by a System Administrator.

**SRS** (PRTTDCIS-4154)

The MMA-xU Voice IMT Gateway antenna shall be mounted outside, on the Shelter.

**SRS** (PRTTDCIS-4155)

The MMA-xU Voice IMT Gateway shall support a minimum of TWO (02) Subscriber Identity Module (SIM) Cards.

**SRS** (PRTTDCIS-4156)

SIM-based carrier selection shall be automatic without requiring any System Administrator action.

**SRS** (PRTTDCIS-4157)

The MMA-xU Voice IMT Gateway shall support IPv4 and IPv6 dual stack.

**SRS** (PRTTDCIS-4158)

The MMA-xU Voice IMT Gateway shall implement 3G/IMT2000 and 4G/IMT-Advanced compliant Radio Access Technology (RAT) including, as a minimum:

- 3GPP's UMTS Release 7 (HSPA+); and,
- 3GPP's LTE Release 11 (LTE Advanced); and,
- LTE IMT-UE Category 11.

**SRS** (PRTTDCIS-4621)

The MMA-xU Voice IMT Gateway shall implement 5G/IMT-2020 compliant RAT including, as a minimum:

- 3GPP's LTE Release 13 (LTE Advanced Pro); and,
- 3GPP's 5G Release 15 (5G NR) in Frequency Range 1 (FR1); and,
- 5G+LTE dual connectivity.

**SRS** (PRTTDCIS-4159)

The MMA-xU Voice IMT Gateway shall primarily operate with LTE technology and fall back automatically to UMTS technology.

**SRS** (PRTTDCIS-4160)

The fall back to UMTS technology shall depend on the RAN technology propagation and coverage conditions, without requiring any System Administrator action.

**SRS** (PRTTDCIS-4624)

The MMA-xU Voice IMT Gateway shall primarily operate with LTE technology and switch automatically to 5G technology when in coverage.

**SRS** (PRTTDCIS-4625)

The switch to 5G technology shall depend on the RAN technology propagation and coverage conditions, without requiring any operator action.

**SRS** (PRTTDCIS-4161)

The MMA-xU Voice IMT Gateway shall implement Roaming techniques.

**SRS** (PRTTDCIS-4162)

Any kind of Roaming shall be automatic without requiring any System Administrator action.

~~**SRS** (PRTTDCIS-4163)~~

~~The MMA-xU Voice IMT Gateway shall implement Carrier Aggregation (CA) techniques.~~

**SRS** (PRTTDCIS-4166)

The MMA-xU Voice IMT Gateway shall implement global coverage, supporting the adopted bands in the regions of Europe, Africa/Middle East, Asia and Pacific.

**SRS** (PRTTDCIS-4167)

The MMA-xU Voice IMT Gateway shall implement a minimum of ONE (01) 3GPP UMTS band per region.

**SRS** (PRTTDCIS-4168)

The MMA-xU Voice IMT Gateway shall implement a minimum of TWO (02) 3GPP LTE bands per region.

**SRS** (PRTTDCIS-4627)

The MMA-xU Voice IMT Gateway shall implement a minimum of ONE (01) 3GPP 5G NR FR1 band per region.

**SRS** (PRTTDCIS-4169)

The MMA-xU Voice IMT Gateway shall implement a Human Machine Interface (HMI) interface that allows monitoring and control of the MMA-xU Voice IMT Gateway by a System Administrator.

**SRS (PRTTDCIS-4170)**

The MMA-xU Voice IMT Gateway HMI shall provide the minimum following functionalities to System Administrators:

- A clock driven by the IMT Network; and,
- Enabling IMT Gateway parameters configuration; and,
- Collecting, Logging and Reporting Errors, Warnings and Alarms in a Human comprehensive format; and,
- Monitoring and reporting of the IMT Gateway operational status; and,
- MNO currently connected; and,
- Signal strength.

**SRS (PRTTDCIS-4110)**

The MMA-xU Voice over IMT Gateway shall support a minimum of 10 concurrent calls.

**5.2.2.4 BPS subsystem**

**NOTE (PRTTDCIS-3053)**

The following picture illustrates the BPS in context.

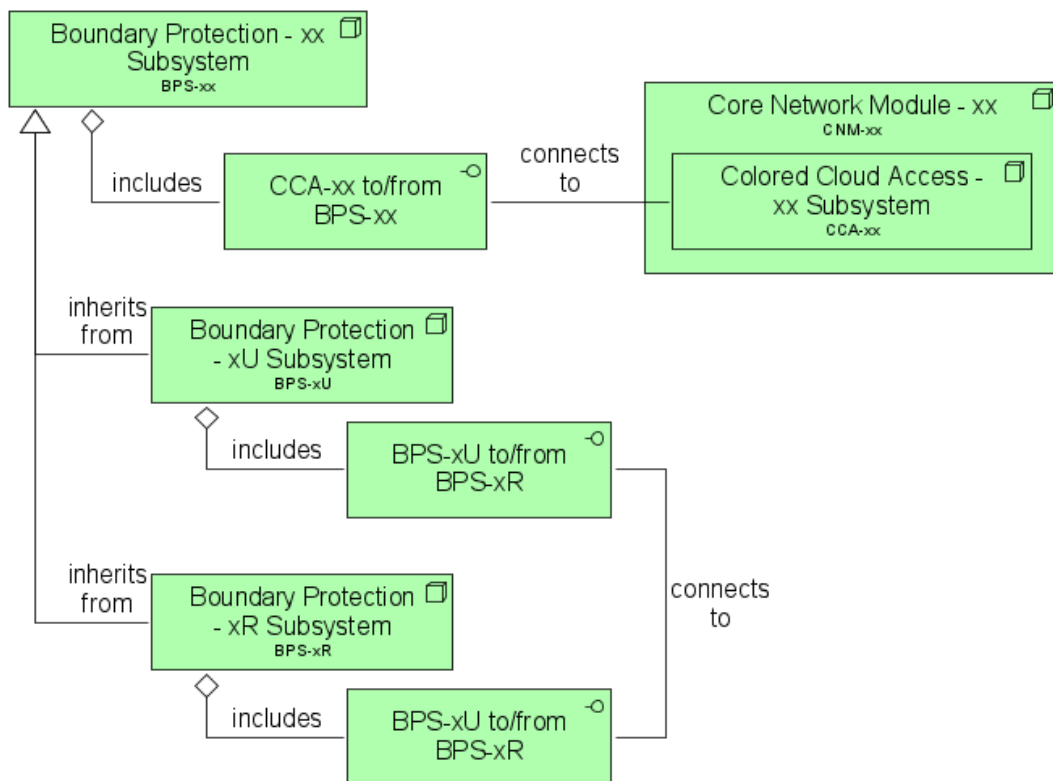


Figure 59 - BPS in context

**SRS (PRTTDCIS-1633)**

The BPS subsystem shall implement the BPS functions.

**SRS** (PRTTDCIS-1634)

Each BPS subsystem shall be directly connected to the core switching element of the corresponding CCA.

**SRS** (PRTTDCIS-1635)

All BPS subsystems shall be built and licensed the same, irrespective of the security domain.

**SRS** (PRTTDCIS-1636)

All BPS subsystems shall support up to 3 Gbps of traffic throughput, with the Intrusion Prevention System (IPS) feature enabled.

**SRS** (PRTTDCIS-1637)

IPS licenses shall be provided with each BPS firewall (1-year subscription). Licenses shall be based on volume (number of hosts).

**SRS** (PRTTDCIS-1638)

The BPS subsystem shall implement interfaces as per the table below.

Interface Name	Qty.	Interface Type	Interface Speed	Remarks
CCA-xx to/from BPS-xx	N	Design Driven	Design Driven	N is Design Driven through CCA switching core
BPS-xU to/from BPS-xR	M	Design Driven	Design Driven	M is Design Driven Only in BPS-xU and BPS-xR to realize xU-xR cross domain function

Table 31 - BPS subsystem interfaces

**SRS** (PRTTDCIS-3122)

BPS shall support network segmentation through its single internal interface to the CCA.

**SRS** (PRTTDCIS-1677)

BPS shall be realized with physical appliances

**5.2.3 Implementation Constraints**

**SRS** (PRTTDCIS-1664)

The hardware of CNM-xS, CNM-xR and CNM-xU shall be physically built the same, such that these modules are interchangeable.



### 5.3 Core Network Module Lite

#### 5.3.1 General

**NOTE** (PRTTDCIS-2858)

The Core Network Module (CNM) lite is a variant of the CNM which shares the same description, functionalities and characteristics.

**SRS** (PRTTDCIS-2861)

The CNM lite shall comply with all CNM specifications unless specifically specified otherwise.

**SRS** (PRTTDCIS-2782)

The design of the CNM lite shall adhere to the architecture presented in following figure.

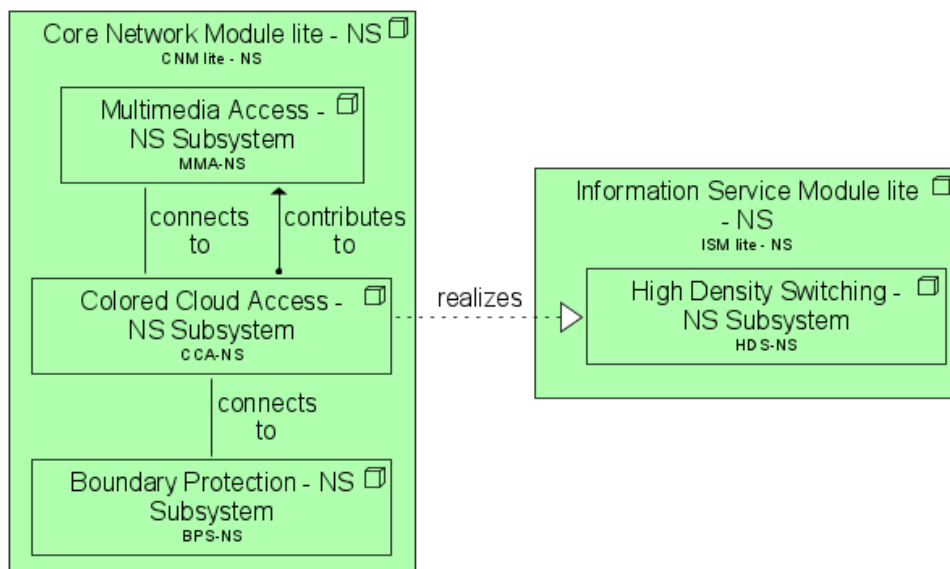


Figure 60 - CNM lite architecture

#### 5.3.2 Functional Requirements

**SRS** (PRTTDCIS-2787)

The CNM lite shall implement the CCA function.

**SRS** (PRTTDCIS-3024)

The CNM lite shall implement the MMA function, including the ISM workload elements, limited to the services specific to the NS Kit.

**SRS** (PRTTDCIS-4375)

The CNM lite shall implement the BPS function.

### 5.3.3 Technical Requirements

#### 5.3.3.1 CCA subsystem

**SRS** (PRTTDCIS-2789)

The CCA subsystem in the CNM lite shall implement the functions listed under the CCA-xS function in the CNM.

**SRS** (PRTTDCIS-2790)

The CCA subsystem in the CNM lite shall meet the same technical requirements formulated for the CCA-xS subsystem of the CNM.

**SRS** (PRTTDCIS-2791)

The CCA subsystem of the CNM lite shall, as a minimum, implement interfaces as per the table below. The need for additional interfaces, or interfaces different from those listed below, as well as their specification, shall be design-driven and shall be justified, based on component selection and functionality sought.

Interface Name	Qty.	Interface Type	Interface Speed	Remarks
CCA-NS to/from MMA-NS	N	Design Driven	Design Driven	N is Design Driven
CCA-NS to/from BPS-NS	M	Design Driven	Design Driven	M is Design Driven
HDS-NS to/from CAS-NS	—	—	—	See ISM lite HDS specifications
CCA-NS to UAM-NS	P	Design Driven	Design Driven	P is Design Driven
CCA-NS to LMM-NS	Q	Design Driven	Design Driven	Q is Design Driven with a minimum of 1 interfaces to connect a Sys Admin Workstation.
PCA to/from NS Kit	1	Eth-FO-LR	1Gbps	Interface can be connected to the TCE621M of the CCA-NS of a Core Node Lite or of a Remote Node Lite
NIP-NS	1	Eth-FO-LR	1Gbps	direct interface on CCA routing platform

Table 32 - CNM lite CCA subsystem interfaces

**SRS** (PRTTDCIS-2792)

The CCA subsystem in the CNM lite shall support IP throughput performances of 4 Gbps as a minimum.

**SRS** (PRTTDCIS-2800)

Crypto devices shall be removable from the transit cases of the CNM lite, for storage and transport.

**SRS** (PRTTDCIS-2801)

The removal of the crypto devices shall be compatible with the implementation of TEMPEST requirements in the transit cases.

**NOTE** (PRTTDCIS-2803)

Foam-padded transport cases able to carry one TCE621M will be used for that purpose.

**NOTE** (PRTTDCIS-3866)

TCE621M transport cases are PFE and will be transported separately from the Node.

**SRS** (PRTTDCIS-4104)

Core switching function of the CCA in the CNM Lite shall realize the HDS function of the ISM Lite.

**5.3.3.2 MMA Subsystem**

**SRS** (PRTTDCIS-4377)

The MMA subsystem in the CNM lite shall implement the functions listed under the MMA-xS function in the CNM.

**SRS** (PRTTDCIS-4378)

The MMA subsystem in the CNM lite shall meet the same technical requirements formulated for the MMA-xS subsystem of the CNM.

**SRS** (PRTTDCIS-4379)

The MMA subsystem of the CNM lite shall, as a minimum, implement interfaces as per the table below. The need for additional interfaces, or interfaces different from those listed below, as well as their specification, shall be design-driven and shall be justified, based on component selection and functionality sought.

Interface Name	Qty.	Interface Type	Interface Speed	Remarks
CCA-NS to/from MMA-NS	N	Design Driven	Design Driven	N is Design Driven

Table 33 - CNM lite MMA subsystem interfaces

**5.3.3.3 BPS Subsystem**

**SRS** (PRTTDCIS-4381)

The BPS subsystem in the CNM lite shall implement the functions listed under the BPS-xS function in the CNM.

**SRS** (PRTTDCIS-4382)

The BPS subsystem in the CNM lite shall meet the same technical requirements formulated for the BPS-xS subsystem of the CNM.

**SRS** (PRTTDCIS-4383)

The BPS subsystem of the CNM lite shall, as a minimum, implement interfaces as per the table below. The need for additional interfaces, or interfaces different from those listed below, as well as their specification, shall be design-driven and shall be justified, based on component selection and functionality sought.

Interface Name	Qty.	Interface Type	Interface Speed	Remarks
CCA-NS to/from BPS-NS	N	Eth-FO-SR	Design Driven	N is Design Driven

Table 34 - CNM lite BPS subsystem interfaces

**5.3.4 Implementation Constraints**

**SRS** (PRTTDCIS-2798)

Routers and/or switches used to implement the CCA subsystems of the CNM lite shall be compatible with the element management system for routing and switching platforms.

**5.4 Information Services Module**

**5.4.1 General**

**NOTE** (PRTTDCIS-1771)

The Information Services Module (ISM) implements a deployable Infrastructure as a Service (IaaS) on which platform services, business applications and Col services run.

**NOTE** (PRTTDCIS-1772)

The deployable IaaS in the ISM provides Virtual Machines (VM) hosting the software that enables Core Enterprise Services (CES) and Functional Area Services (FAS), as well as software supporting Multimedia Access Module, in conjunction with the MMA subsystem of the CNM.

**NOTE** (PRTTDCIS-1773)

Any software running in a VM is hereafter referred to as Workload.

**NOTE** (PRTTDCIS-1774)

In addition to hosting CES, FAS and MMA workloads, the ISM also hosts the Service Management and Control (SMC) applications in support of the Local Management Module (LMM) for its associated Color Cloud.

**NOTE** (PRTTDCIS-1775)

The ISM IaaS is implemented through Compute, Storage and Networking mechanisms.

**SRS** (PRTTDCIS-1776)

The elements inside the ISM have to be identical and interchangeable; noting that the configuration of the ISM defines the security domain.

## 5.4.2 Functional Requirements

### 5.4.2.1 General

#### SRS (PRTTDCIS-4197)

The ISM shall implements functions as depicted on following diagram:

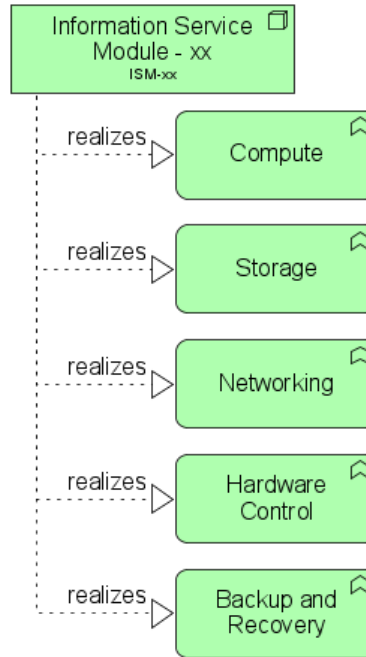


Figure 61 - ISM functions

#### SRS (PRTTDCIS-1707)

The ISM shall implement the following functions in support of deployable instances of Infrastructure Services:

- 1) Compute; and,
- 2) Storage; and,
- 3) Networking; and,
- 4) Hardware Control; and,
- 5) Backup and Recovery.

## 5.4.2.2 Compute

### 5.4.2.2.1 General

#### SRS (PRTTDCIS-4287)

The Compute function variants are as follow and as depicted on following picture:

- Software Defined Compute (SDC) function.

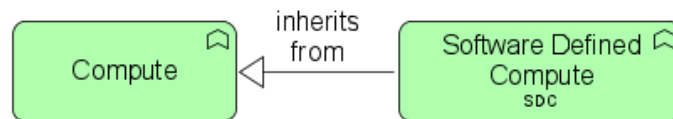


Figure 62 - Compute function variants.

#### SRS (PRTTDCIS-4288)

This project shall only implement Software Defined Compute.

### 5.4.2.2.2 Software Defined Compute

#### NOTE (PRTTDCIS-1681)

The SDC implementation is specified in detail in DCIS CA Annex B.

#### SRS (PRTTDCIS-1682)

The SDC function shall:

- 1) Abstract the physical hardware of the ISM into a VM cluster that shares CPU, memory and peripherals, through the use of virtualization hypervisors; and,
- 2) Establish, change, monitor, power-on, power-off, snapshot and teardown of VMs within the VM cluster established within the ISM; and,
- 3) Assure high availability for VMs, by implementing automatic failover to alternate hosts within the ISM; and,
- 4) Provide a documented and open Application Programming Interface (API) for management and control purposes.

### 5.4.2.3 Storage

#### 5.4.2.3.1 General

##### SRS (PRTTDCIS-4289)

The Storage function variants are as follow and as depicted on following picture:

- Software Define Storage (SDS) function; and,
- Storage Area Network (SAN) function; and,
- Single Server Storage function.

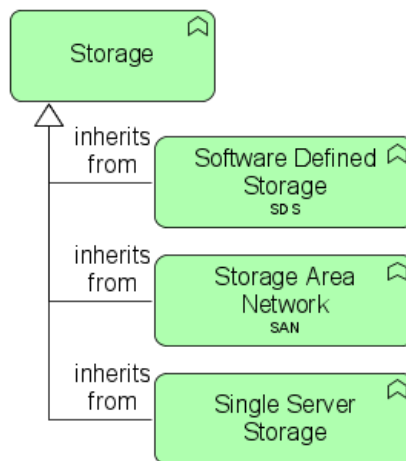


Figure 63 - Storage function variants.

##### SRS (PRTTDCIS-4290)

This project shall implement all THREE (03) variants of the Storage function.

#### 5.4.2.3.2 Software Defined Storage

##### SRS (PRTTDCIS-1684)

The SDS function shall:

- 1) Abstract the physical storage of the ISM, and provide virtual disk access to VMs (or ISM cluster) and to collocated machines external to the ISM; and,
- 2) Support presentation of virtual disks to the VM and networked as a SDS area network through iSCSI. This function is also referred to as Block I/O; and,
- 3) Provide file access to VMs running on the ISM and to collocated machines external to the ISM as virtual network attached storage through NFS and CIFS/SMB. This function is also referred to as File I/O; and,
- 4) Provide object-based storage access to VMs running on the ISM and collocated machines external to the ISM; and,
- 5) Enforce storage quality of service, through configurable limits (maximum) and guarantees (minimum) of storage throughput per VM, per group of VMs, per SDS resource, and per group of SDS resources; and,
- 6) Optimize storage capacity use, though de-duplication and compression; and,
- 7) Cluster physical storage resources across all compute nodes (servers); and,
- 8) Control and monitor the execution of the above described functionalities; and,
- 9) Provide a well-documented and open API for management and control purposes.

**SRS** (PRTTDCIS-4206)

The Software-defined Storage function optimization shall be fully automatic and opaque to the storage consumers.

**SRS** (PRTTDCIS-4207)

The Software-defined Storage function optimization shall, as a minimum, support following configuration methods:

- De-duplication and Compression; and,
- De-duplication only.

**NOTE** (PRTTDCIS-1779)

The Storage Optimization may involve automatic storage tiering of less used data to slower storage resources or to external storage, which may potentially be located in the ISM of another TDCIS Node, in the PRT static infrastructure or cloud service.

**NOTE** (PRTTDCIS-1685)

Depending on the available resources at a deployment, the mission profile and its associated security profile, remote storage resources may be used, including NATO or National private clouds.

**NOTE** (PRTTDCIS-3123)

Depending on the available resources at a deployment, the mission profile and its associated security profile, remote storage resources on commercial public clouds may be used for the xU security domain.

**5.4.2.3.3 Storage Area Network****SRS** (PRTTDCIS-4291)

The Storage Area Network (SAN) function shall:

- 1) Provide physical storage on the ISM, and virtual disk access to VMs of the ISM cluster and to collocated machines external to the ISM; and,
- 2) Provide object-based storage access to VMs running on the ISM and collocated machines external to the ISM; and,
- 3) Enforce storage quality of service, through configurable limits (maximum) and guarantees (minimum) of storage throughput per VM, per group of VMs, per SAN resource, and per group of SAN resources; and,
- 4) Optimize storage capacity use, though de-duplication and compression; and,
- 5) Cluster physical storage resources from the SAN Server; and,
- 6) Control and monitor the execution of the above described functionalities; and,
- 7) Provide a well-documented and open API for management and control purposes.

**SRS** (PRTTDCIS-4280)

The Software-defined Storage function optimization shall be fully automatic and opaque to the storage consumers.



**SRS** (PRTTDCIS-4281)

The Software-defined Storage function optimization shall, as a minimum, support following configuration methods:

- De-duplication and Compression; and,
- De- duplication only.

**NOTE** (PRTTDCIS-4284)

Depending on the available resources at a deployment, the mission profile and its associated security profile, remote storage resources may be used, including NATO or National private clouds.

**NOTE** (PRTTDCIS-4285)

Depending on the available resources at a deployment, the mission profile and its associated security profile, remote storage resources on commercial public clouds may be used for the xU security domain.

**5.4.2.3.4 Single Server Storage****SRS** (PRTTDCIS-4292)

The Single Server Storage function shall:

- 1) Provide physical storage for the Single Server CAS, and virtual disk access to the VMs; and,
- 2) Provide object-based storage access to VMs running on the Single Server CAS; and,
- 3) Implement RAID level redundancy for data protection; and,
- 4) Optimize storage capacity use, though de-duplication and compression; and,
- 5) Cluster physical storage resources from the Single Server; and,
- 6) Control and monitor the execution of the above described functionalities; and,
- 7) Provide a well-documented and open API for management and control purposes.

**SRS** (PRTTDCIS-4282)

The Software-defined Storage function optimization shall be fully automatic and opaque to the storage consumers.

**SRS** (PRTTDCIS-4283)

The Software-defined Storage function optimization shall, as a minimum, support following configuration methods:

- De-duplication and Compression; and,
- De- duplication only.

## 5.4.2.4 Networking

### 5.4.2.4.1 General

#### SRS (PRTTDCIS-4293)

The Networking function variants are as follow and as depicted on following picture:

- Software Define Networking (SDN) function.

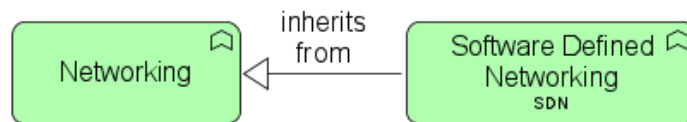


Figure 64 - Networking function variants.

#### SRS (PRTTDCIS-4294)

This project shall implement Software Defined Networking in the CAS subsystem.

### 5.4.2.4.2 Software Defined Networking

#### SRS (PRTTDCIS-1688)

The SDN function shall:

- 1) Establish, change, monitor and teardown virtual Ethernet LAN (VLAN) segments, within the ISM; and,
- 2) Connect and remove external Ethernet interfaces and VMs to those VLAN segments; and,
- 3) Support WAN and LAN interfaces to the CCA function of the CNM, for wide-area communications purposes; and,
- 4) Provide a well-documented and open API for management and control purposes.

## 5.4.2.5 Hardware Control

#### SRS (PRTTDCIS-1690)

The Hardware Control function shall manage the hardware-based Compute, Storage and Networking components, upon which the Compute, Storage and Networking functions and their Software-defined variants run.

#### SRS (PRTTDCIS-1691)

To that end, the Hardware Control function shall combine and abstract the hardware-specific management and control interfaces of the components that make up the ISM, into open, standardized and authenticated interfaces (standard networking API).

**SRS** (PRTTDCIS-1692)

The Hardware Control function shall:

- 1) Operate both local as well as networked (i.e. over the WAN), providing both local and remote console access; and,
- 2) Support the integration with a centralized Hardware Control service in a Deployed TDCIS Node or the PRT static infrastructure, allowing through dashboards the centralized hardware monitoring and control; and,
- 3) Implement power control: power-on, power-off, graceful shutdown, emergency shutdown; and,
- 4) Implement boot control, i.e. setting the boot source, boot and reset; and,
- 5) Implement monitoring of hardware and environmental status; and,
- 6) Support the installation, updating and configuration of BIOS and firmware; and,
- 7) Provide interfaces that enable monitor, control and operation host independent CPU, firmware (BIOS) and operating system, in order to grant direct access to the hardware-based compute, storage and network components; and,
- 8) Interface with the Uninterruptible Power Supply control listening for a "battery low" signal, which shall result in a graceful shutdown and subsequent power-off of the individual compute, storage and networking functions and hosted VMs.

**NOTE** (PRTTDCIS-1780)

Monitoring and Control interfaces are, for example, interfaces to a so-called Baseboard Management Controller (BMC), Intelligent Platform Management Interface (IPMI), Integrated Lights-Out (iLO), terminal/console ports of servers and switches; including access to BIOS, firmware, bootloader, etc.

**5.4.2.6 Backup and Recovery****SRS** (PRTTDCIS-1695)

The Backup and Recovery function shall implement the mechanisms, hardware and software in support of snapshotting, backup of, and the recovery from corruption or loss of:

- 1) a VM realized by the ISM; and,
- 2) a workload served by a VM realized by the ISM; and,
- 3) an ISM.

**SRS** (PRTTDCIS-4739)

For CAS variants where Contractor shall demonstrate that snapshotting mechanism is not possible, then alternative technologies for implementing the Backup and Recovery function may be considered.

**SRS** (PRTTDCIS-3846)

The Backup and Recovery function shall provide snapshots as follow:

- 1) ONE (01) from each month for last year (12); and,
- 2) ONE (01) from each week for last month (4); and,
- 3) ONE (01) from each day from last week (7).

**SRS** (PRTTDCIS-1696)

The Backup and Recovery function shall:

- 1) Be implemented with a deployable backup storage Element, implemented on dedicated hardware, using deployable and networked backup storage hardware, with as many instances available as security domains; and,
- 2) Be able to create and restore (roll-back) multiple snapshots, or point-in-time copies, of any data stored in the ISM, including storage, file system, infrastructure data and application data.

**SRS** (PRTTDCIS-1697)

Snapshots shall include the configuration of compute, networking and storage functions, both at the level of single VMs and clusters of VMs.

**SRS** (PRTTDCIS-1699)

The Backup and Recovery function shall create, restore, optimize and manage the storage of snapshots and backups.

**SRS** (PRTTDCIS-1700)

Automatic optimization shall minimize the use of storage space on the backup media, using deduplication, compression or a combination thereof, while retaining recovery points as defined in a retention policy that can be configured through the administration interface.

**SRS** (PRTTDCIS-1701)

Backup management shall support backups to be automatically tiered to an off-site storage system (not a project deliverable), typically located in the PRT static infrastructure.

**SRS** (PRTTDCIS-1702)

The Backup and Recovery function shall maintain a continuous replica of the storage for quick disaster recovery; i.e. Real Time Replication (RtR).

**SRS** (PRTTDCIS-1703)

The Backup and Recovery function shall implement application-consistent backups and replicas of VMs running applications supporting Microsoft VSS, and of VMs running applications that support so-called quiescing scripts.

**NOTE** (PRTTDCIS-1781)

Quiescing refers to pausing or altering a device or application to achieve a consistent state, usually in preparation for a backup or other maintenance activities.

**SRS** (PRTTDCIS-1704)

The Backup and Recovery function of the ISM shall implement mechanisms to restore and clone an ISM from snapshots, supporting a disaster recovery scenario where an ISM cannot be recovered and is physically replaced with un-configured hardware.

**SRS** (PRTTDCIS-1694)

After any restoration of service, the TDCIS shall revert to a configured working state of all services.

**SRS** (PRTTDCIS-1705)

The Backup and Recovery function of the ISM shall be implemented such that it can be managed and controlled both centrally and locally, as appropriate for the specific deployment, through the static (in PRT static infrastructure) and deployable (local to the ISM) instances of the LMM.

**SRS** (PRTTDCIS-1706)

The Backup and Recovery function of the ISM shall implement a RESTful well-documented and open API (RESTful API), exposing all operations.

**5.4.3 Technical Requirements**

**5.4.3.1 General**

**NOTE** (PRTTDCIS-1743)

The Information Services Module (ISM) shall implement three subsystems, as depicted in the following figure:

- 1) Compute and Storage (CAS) subsystem, providing CPU, RAM and solid state storage, for use by Compute and Storage functions; and,
- 2) High Density Switching (HDS) subsystem, providing the physical means to interconnect and manage all physical components of the CAS and the DRS subsystems, including external interfaces, for use by the ISM-internal Networking function described above; and,
- 3) Deployable Removable Storage (DRS) subsystem, comprising the storage infrastructure that is external to and not dependent on the CAS.

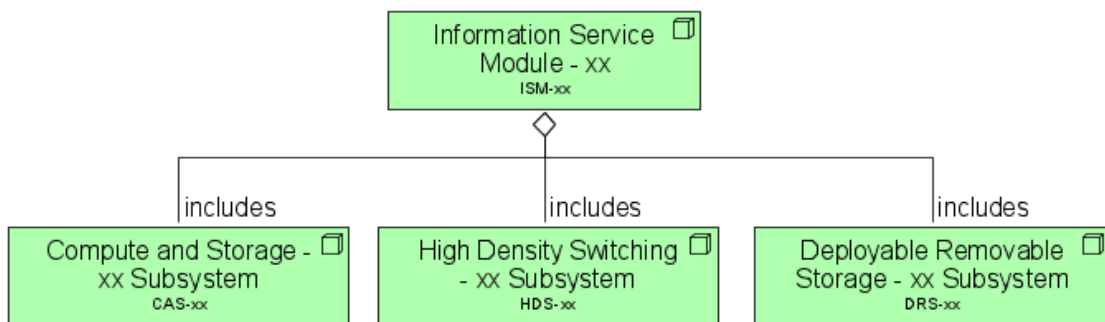


Figure 65 - ISM Breakdown

**SRS** (PRTTDCIS-1750)

It shall be possible to upgrade and/or replace the hardware layer and the virtualization layer of the ISM, in independent cycles. To that end, the hardware and software layers shall be chosen and be validated to support each other's lifecycle. This shall also include the lifecycle of guest OS and workloads.

**SRS** (PRTTDCIS-1751)

The ISM shall implement well-documented and open APIs compliant with the following:

- 1) Representational State Transfer (REST); and,
- 2) HTTPS, TLS (as a minimum version 1.2 and 1.3):
  - o RFC2616:1999, Hypertext Transfer Protocol – HTTP/1.1; and,
  - o RFC2616:1999, Hypertext Transfer Protocol – HTTP/1.1; and,
  - o RFC2818:2000, HTTP Over TLS; and,
  - o RFC5246:2008, the Transport Layer Security (TLS) Protocol Version 1.2; and,
  - o RFC8446:2018, the Transport Layer Security (TLS) Protocol Version 1.3; and,
- 1) IPv4 IETF STD5; and,
- 2) IPv6 RIPE-554; and,
- 3) PowerShell support; and,
- 4) Python support.

**SRS** (PRTTDCIS-1752)

Each operation, carried across the corresponding interfaces of the ISM, shall be implemented through:

- 1) Use of the ISM's hardware and software native RESTful API;
- 2) Use of custom made scripts developed for the ISM;
- 3) Use off-the-shelf scripts; or
- 4) A combination of the native RESTful API, custom made scrips and off-the-shelf scripts.

**SRS** (PRTTDCIS-1753)

The implementation of the API shall:

- 1) Build upon a well-documented and open API framework ; and,
- 2) Include source code and full documentation of any scripts developed for the ISM.

**NOTE** (PRTTDCIS-1782)

RESTful API Modeling Language (RAML) and OpenAPI Specification (OAS) are example of such API.

**SRS** (PRTTDCIS-2449)

In addition to an API, and in support of the Hardware Control function, the ISM shall implement Local console interfaces to hardware components such as servers and switches to provide low level access to the hardware systems (for use by an on-site engineer). These interfaces shall implement authentication.

**SRS** (PRTTDCIS-2450)

In addition to an API, and in support of the Hardware Control function, the ISM shall implement Remote console interfaces to all hardware components, as a minimum, through SSH2 or through a web-based terminal interface over HTTPS. These interfaces shall implement both authentication and encryption.

**SRS** (PRTTDCIS-2451)

In addition to an API, and in support of the Hardware Control function, the ISM shall implement local management interfaces, to bootstrap the ISM on site when no WAN connectivity is available, or for introducing changes during a communications outage, or to involve the Backup and Recovery function.

**5.4.3.2 CAS subsystem**

**5.4.3.2.1 General**

**SRS** (PRTTDCIS-4199)

The TDCIS shall implement THREE (03) variants of the CAS Subsystem as depicted on following picture.

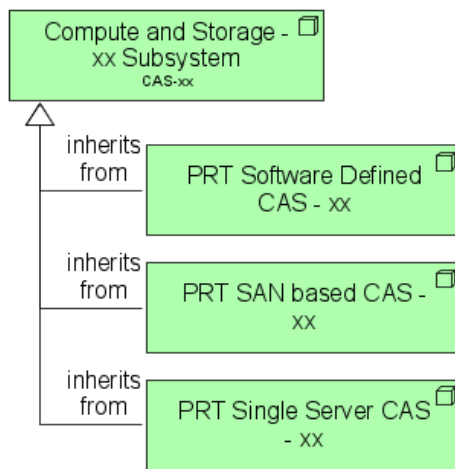


Figure 66 - PRT TDCIS CAS variants

**NOTE** (PRTTDCIS-1713)

The below requirements specify the minimum performance and capacity to be implemented, with respect to CPU, RAM and permanent storage. Neither oversubscription nor any additional capacity necessary to implement resilience, are included in the requirements herein. Any redundancy is considered as additional capacity on top of the minimal capacity required herein.

**SRS** (PRTTDCIS-1715)

The CAS subsystem of a single module shall implement CPU cores, where:

- 1) CPU cores feature as a minimum 16 Cores per processor; and,
- 2) CPU cores implement Hyper-threading with as a minimum 2 threads per core, and operate at a minimum base frequency of 2.1 GHz; and,
- 3) All CPUs shall be 64-bit x86 processors implementing AMD or Intel Virtualization Technology (AMD-V or Intel VT-x).

**SRS** (PRTTDCIS-4295)

Servers implementing the Compute function in all CAS variants shall be identical and only differ in HDD capacity.

**SRS** (PRTTDCIS-1716)

All server hardware realizing the Compute function shall implement:

- 1) Intel Trusted Execution Technology (TXT) or equivalent AMD technology; and,
- 2) Trusted Platform Module (TPM) ; and
- 3) AES New Instructions (AES-NI).

**SRS** (PRTTDCIS-1712)

The servers in all CAS subsystem variants shall support and be agnostic to the corresponding Software-defined Compute (Virtualization Hypervisor), Storage and Software-defined Networking.

**SRS** (PRTTDCIS-1718)

The CAS subsystem shall implement solid-state storage.

**NOTE** (PRTTDCIS-1783)

Solid State is defined as non-volatile computer storage that stores and retrieves digital information using only electronic circuits, without any involvement of moving mechanical parts.

**SRS** (PRTTDCIS-1719)

The CAS subsystem shall rely on storage hardware supporting as 75,000 Input/output Operations Per Second (IOPS) at a mixed random read (70%) and write (30%).

**SRS** (PRTTDCIS-1720)

In addition to the storage requirements above, all compute nodes (servers) shall implement dedicated hypervisor boot storage device with sufficient capacity to store the virtualization hypervisor and all necessary software to boot the computer node, to store core dumps and to store logging, following the guidelines and directions of the supported virtualization hypervisor vendors, with a minimum of 32 GB.

**SRS** (PRTTDCIS-1723)

The CAS subsystem shall implement the Hardware Control function with dedicated Controller software, hereafter referred to as the ISM Controller, running as a VM installed on the System Administrator laptop of each security domain. Once the ISM is in operation, the ISM Controller shall, in addition, be implemented as a workload in a VM running the management domain of the ISM itself. The ISM Controller software on the laptop shall reach the ISM over a network (IP) link.

**SRS** (PRTTDCIS-3015)

The Contractor shall design the CAS subsystem based on all services it has to host.



**SRS (PRTTDCIS-3017)**

The contractor shall include following provision for growth in the design of the each CAS Subsystem:

- 1) 10% for vCPU; and
- 2) 10% for vRAM; and
- 3) 20% for Storage.

**SRS (PRTTDCIS-1759)**

The implementation of the hypervisor may include additional or 3rd party products as add-ons to those specified above or be part of a unified Software-Defined Data Center (SDDC) platform.

**SRS (PRTTDCIS-1763)**

Sufficient software licenses of the virtualization software shall be provided in order to exploit the CPU, storage and RAM capacity of the CAS to their maximum extent.

**5.4.3.2.2 Software Defined CAS**

**SRS (PRTTDCIS-4200)**

The Software Defined variant of the CAS Subsystem shall follow the implementation concept illustrated on following picture.

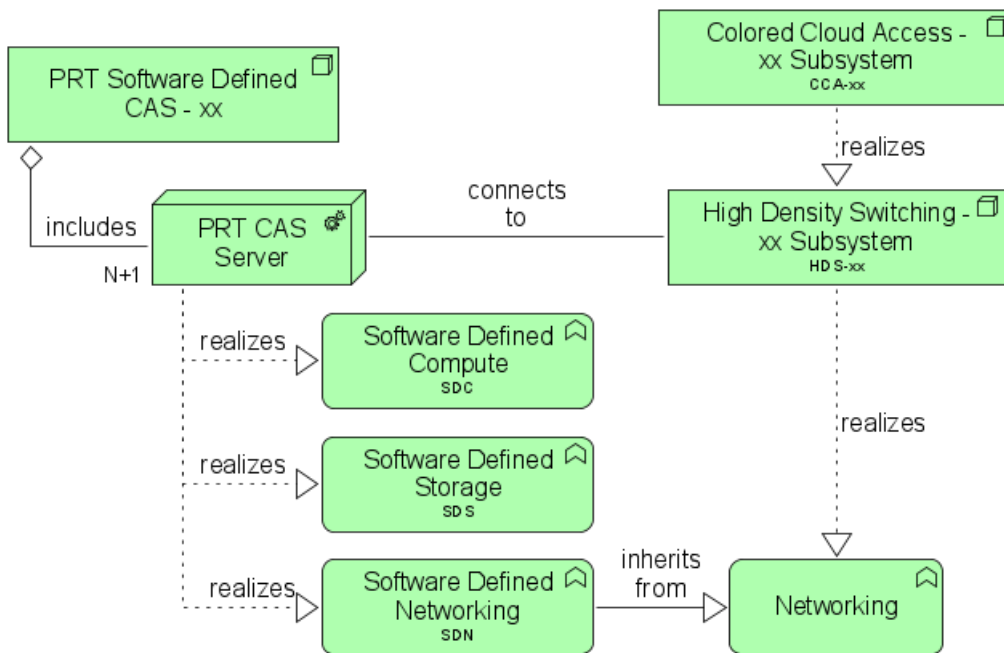


Figure 67 - Software Defined CAS variant implementation concept

**SRS (PRTTDCIS-1749)**

Any single hardware failure shall not degrade the capacity and performance specified for the Software Defined variant of the CAS subsystems. To that end, each CAS instance shall implement the following resilience measures:

- 1) N+1 redundancy for all compute, storage and networking components; and,
- 2) Distributing storage data blocks across:
  - 1) Physical storage devices; and,
  - 2) Physical compute nodes within the VM-cluster.

**SRS (PRTTDCIS-1735)**

The Software Defined variant of the CAS subsystems shall implement Software-defined Networking to interconnect virtualized workloads distributed across multiple Compute and Storage instances, and with physical external Ethernet interfaces of the HDS Subsystem.

**SRS (PRTTDCIS-1761)**

The Software Defined variant of the CAS subsystems shall implement the software-defined storage function including any necessary additional supporting software.

**5.4.3.2.3 SAN based CAS**

**SRS (PRTTDCIS-4201)**

The SAN based variant of the CAS Subsystem shall follow the implementation concept illustrated on following picture.

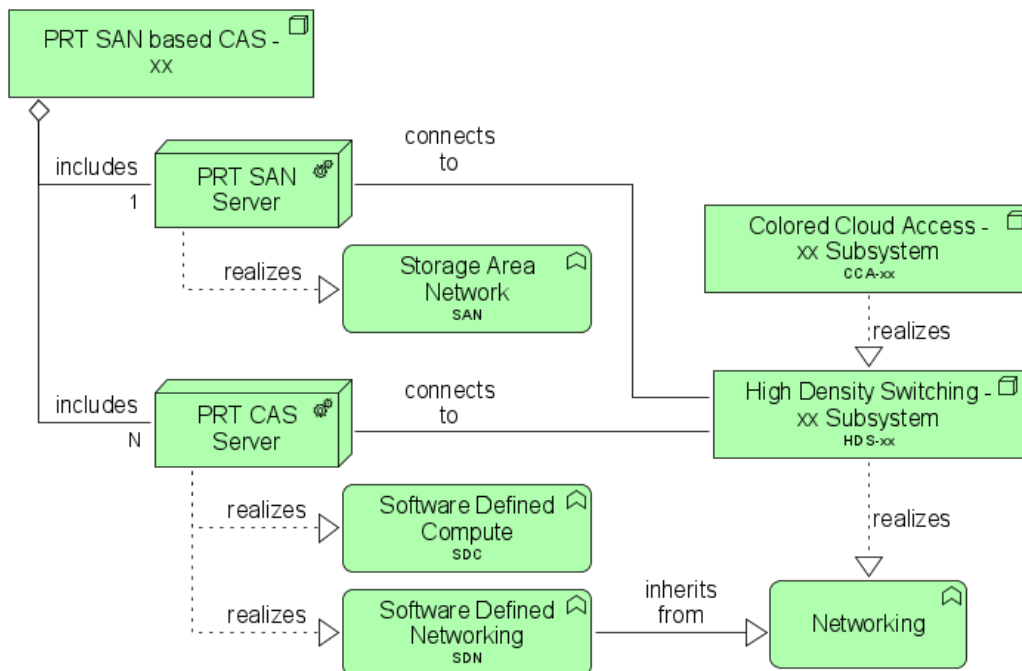


Figure 68 - SAN based CAS variant implementation concept

**SRS (PRTTDCIS-4296)**

The Storage function in the SAN based variant of the CAS subsystem shall be implemented with a dedicated SAN Server.

**SRS (PRTTDCIS-4297)**

The SAN based variant of the CAS subsystems shall not implement N+1 redundancy.

**SRS (PRTTDCIS-4298)**

The SAN based variant of the CAS subsystems shall implement Software-defined Networking to interconnect virtualized workloads distributed across multiple Compute and Storage instances, and with physical external Ethernet interfaces of the HDS Subsystem.

**5.4.3.2.4 Single Server CAS**

**SRS (PRTTDCIS-4202)**

The Single Server variant of the CAS Subsystem shall follow the implementation concept illustrated on following picture.

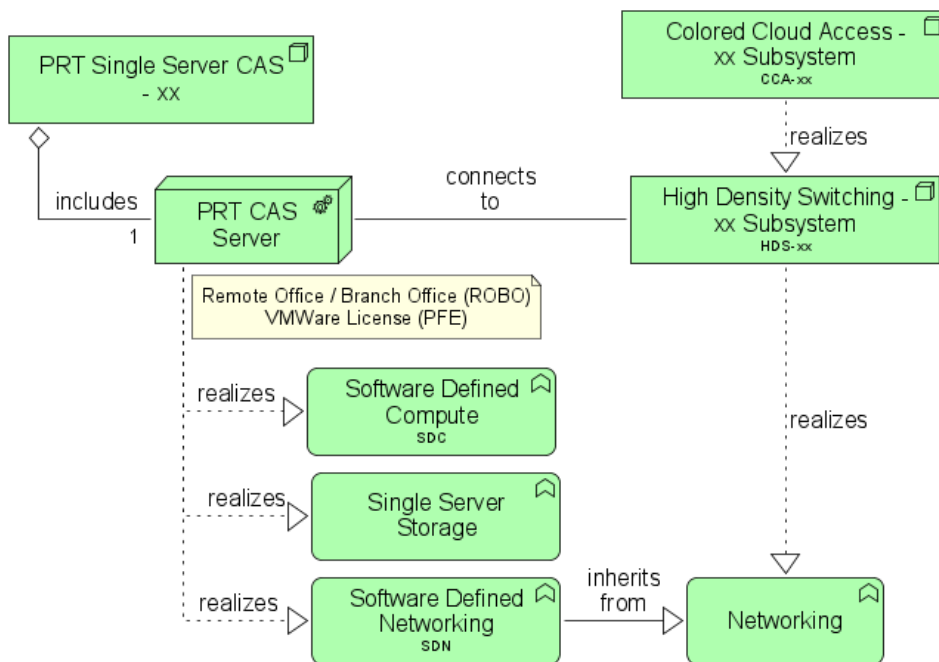


Figure 69 - Single Server CAS variant implementation concept

**SRS (PRTTDCIS-4299)**

The server in the Single Server Variant of the CAS subsystem shall implement the Storage function with RAID level redundancy.

**SRS (PRTTDCIS-4300)**

The Single Server Variant of the CAS subsystem shall implement VMWare as an hypervisor with PFE licenses.

**NOTE** (PRTTDCIS-4301)

The VMWare PFE licenses for the Single Server variant of the CAS subsystem are of Remote Office/Branch Office (ROBO) type with license servers located in PRT NDN.

**SRS** (PRTTDCIS-4578)

AN and BCC Nodes shall support the installation of license servers in order to support Nodes with Single Server variant of the CAS subsystem ROBO licenses in place of PRT NDN.

**SRS** (PRTTDCIS-4579)

AN and BCC Nodes CAS dimensioning shall not include the ROBO license server functionality. Should PRT decide to deploy such servers in those Nodes, the Compute and Storage capacity required for those additional VMs will be taken from the provision for growth included in their original CAS dimensioning.

**SRS** (PRTTDCIS-4580)

If AN and BCC Nodes CAS dimensioning provision for growth is not sufficient to cover the ROBO license server role, the Contractor shall increase the provision for growth, beyond the minimum values specified in this SRS, up to the minimum Compute and Storage capacity required for the additional VMs.

**5.4.3.3 HDS subsystem**

**NOTE** (PRTTDCIS-3087)

The following picture illustrates the HDS in context.

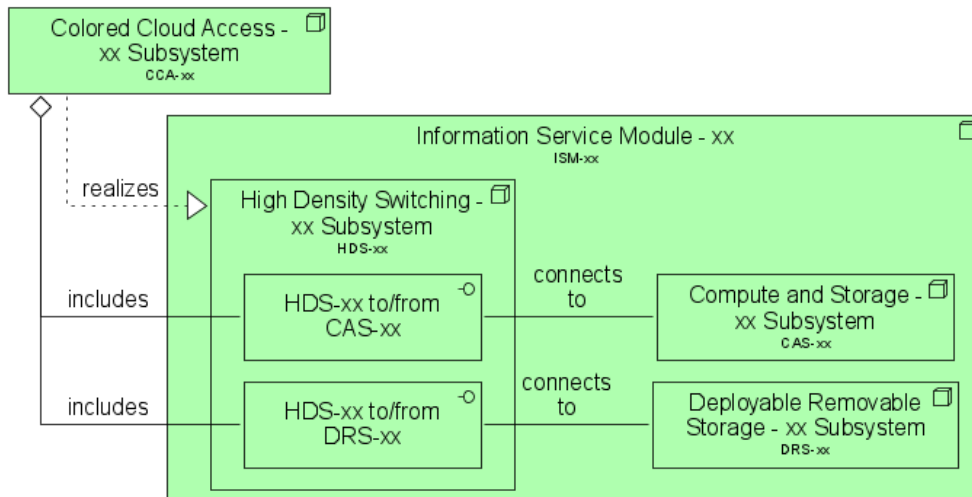


Figure 70 - HDS in context

**SRS (PRTTDCIS-1729)**

Each HDS subsystem shall, as a minimum, implement interfaces to other subsystems within the ISM as well as to external elements, as per the table below. The need for additional interfaces, or interfaces different from those listed below, as well as their specification, shall be design-driven and shall be justified, based on component selection and functionality sought.

Interface Name	Qty.	Interface Type	Interface Speed	Remarks
HDS-xx to/from CAS-xx	P	Eth-FO-SR	Minimum 10Gbps per server	P is Design Driven
HDS-xx to/from DRS-xx	U	Design Driven	Minimum 10Gbps	U is Design Driven

Table 35 - ISM HDS Interfaces

**SRS (PRTTDCIS-1732)**

All external ISM interfaces shall be implemented as general purpose, where the configuration, function, activation, monitoring and tearing down of these interfaces shall occur through the Infrastructure Management Toolsuite part of the LMM.

**SRS (PRTTDCIS-1733)**

The external ISM interfaces "Management" and the interface "DRS" shall be dedicated and accessible all time, independently of the ISM configuration state.

**SRS (PRTTDCIS-1734)**

It shall be possible to identify physical Interfaces (once configured) using removable and reusable tags.

**SRS (PRTTDCIS-1736)**

The hardware realizing the HDS shall be sized to allow all ISM interfaces to be operated at near to line rate, all interfaces at the same time and full-duplex, without introducing significant latency, nor jitter.

**SRS (PRTTDCIS-4105)**

The HDS function of the ISM shall be realized by the Core switching function of the CCA in the CNM.

**5.4.3.4 DRS subsystem**

**SRS (PRTTDCIS-1737)**

The Deployable Removable Storage (DRS) subsystem shall include the deployable backup storage to support the realization of the Backup and Restore function.

**SRS** (PRTTDCIS-1738)

The Contractor shall dimension the DRS subsystem in such a way that its composing Elements shall be identical for all nodes, only the installed total storage shall be adapted to the service specificities of each Node.

**SRS** (PRTTDCIS-4204)

Each Node specific DRS storage shall include a reserve of 20% beyond the dimensioned required capacity.

**SRS** (PRTTDCIS-1739)

The DRS subsystem shall be implemented using solid-state storage only.

**SRS** (PRTTDCIS-1741)

The DRS shall implement the interfaces as per Annex I of the DCIS CA and Annex J of the DCIS CA, logically aggregated to minimize the amount of physical connections with the ISM.

**SRS** (PRTTDCIS-1742)

The DRS subsystem shall be implemented with one physical instance per ISM per security domain.

**SRS** (PRTTDCIS-1740)

When the ISM is being operated, the DRS subsystem shall be integrated in the shelter racks.

**SRS** (PRTTDCIS-4208)

The DRS subsystem shall be readily detachable from the shelter rack and fit in a HANDCARRY transport case.

**SRS** (PRTTDCIS-4209)

The DRS subsystem transport case shall be stored inside the Shelter.

#### 5.4.4 Implementation Constraints

**SRS** (PRTTDCIS-1762)

The storage function shall support and integrate with the backup/recovery function implemented by the Distributed Resource Scheduler with Deployable Removable Storage.

**SRS** (PRTTDCIS-1764)

Licensing, where applicable, shall be implemented according to the licensing model of the selected vendor for each CPU core, each physical server and each ISM as specified herein.

**SRS** (PRTTDCIS-1767)

It shall be possible to connect additional servers, external to the CAS, to the HDS system of the ISM, as PFE (e.g. SPARC servers).

**SRS** (PRTTDCIS-1678)

The hardware of ISM-xS, ISM-xR and ISM-xU shall be physically built the same, such that these modules are interchangeable.

**SRS** (PRTTDCIS-2866)

Hard Disk Drives devices shall be removable from the servers of the ISM, for storage and transport.

**SRS** (PRTTDCIS-2867)

Foam-padded SMALL transport cases able to carry Hard Disk Drives shall be provided for that purpose.

**SRS** (PRTTDCIS-2997)

xR and xU HDD shall be stored in the same Transport Case.

**SRS** (PRTTDCIS-2998)

xS HDD shall be stored in a dedicated Transport Case.

## 5.5 Information Services Module Lite

### 5.5.1 General

**NOTE** (PRTTDCIS-2859)

The Information Service Module (ISM) lite is a variant of the ISM which shares the same description, functionalities and characteristics.

**SRS** (PRTTDCIS-2860)

The ISM lite shall comply with all ISM specifications unless specifically specified otherwise.

**SRS** (PRTTDCIS-2825)

The design of the ISM lite shall adhere to the architecture presented in following figure.

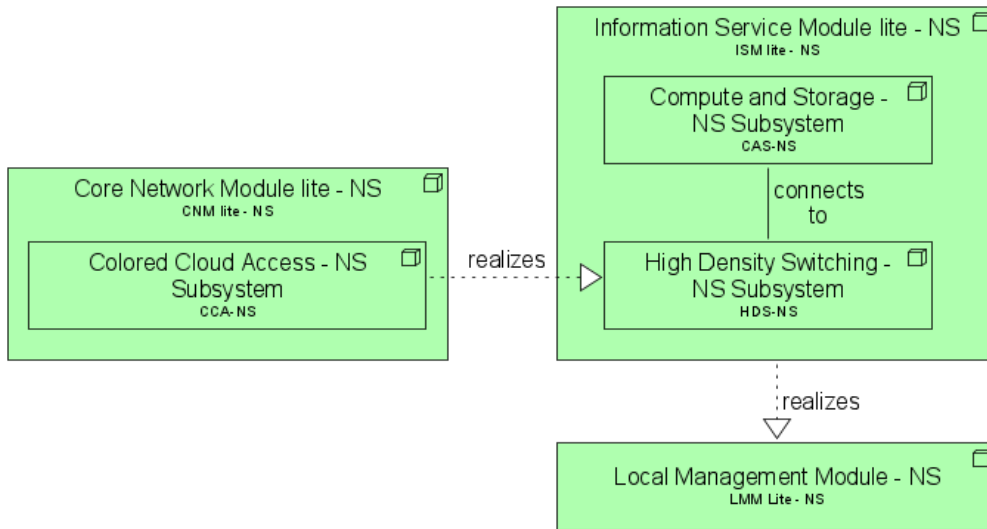


Figure 71 - ISM lite architecture

### 5.5.2 Functional Requirements

**SRS** (PRTTDCIS-2806)

The ISM lite shall implement the Compute And Storage (CAS) function.

**SRS** (PRTTDCIS-2830)

The ISM lite shall implement the High Density Switching (HDS) function.

### 5.5.3 Technical Requirements

#### 5.5.3.1 CAS subsystem

**SRS** (PRTTDCIS-2864)

The CAS subsystem in the ISM lite shall implement the functions listed under the CAS function in the ISM.

**SRS** (PRTTDCIS-2865)

The CAS subsystem in the ISM lite shall meet the same technical requirements formulated for the Single Server CAS subsystem variant of the ISM.

#### 5.5.3.2 HDS subsystem

**SRS** (PRTTDCIS-2862)

The HDS subsystem in the ISM lite shall implement the functions listed under the HDS function in the ISM.



**SRS** (PRTTDCIS-2863)

The HDS subsystem in the ISM lite shall meet the same technical requirements formulated for the HDS subsystem of the ISM.

**SRS** (PRTTDCIS-2851)

The HDS subsystem of the ISM lite shall implement the interfaces as specified in table below.

Interface Name	Qty.	Interface Type	Interface Speed	Remarks
HDS-xx to/from CAS-xx	P	Eth-FO-SR	Minimum 2Gbps per server	P is Design Driven

Table 36 - ISM lite HDS Interfaces

**SRS** (PRTTDCIS-4106)

The HDS function of the ISM Lite shall be realized by the Core switching function of the CCA in the CNM Lite.

**5.5.4 Implementation Constraints**

**SRS** (PRTTDCIS-2819)

Hard Disk Drives devices shall be removable from the servers of the ISM lite, for storage and transport.

**SRS** (PRTTDCIS-2822)

Foam-padded transport cases able to carry Hard Disk Drives shall be provided for that purpose.

**5.6 User Access Module**

**5.6.1 General**

**NOTE** (PRTTDCIS-4212)

This section describes the User Access Module (UAM) to be implemented in PRT TDCIS.

**NOTE (PRTTDCIS-2670)**

The User Access Module (UAM) is an Architectural Building Block (ABB) which enables User Access Connectivity as illustrated on following picture.

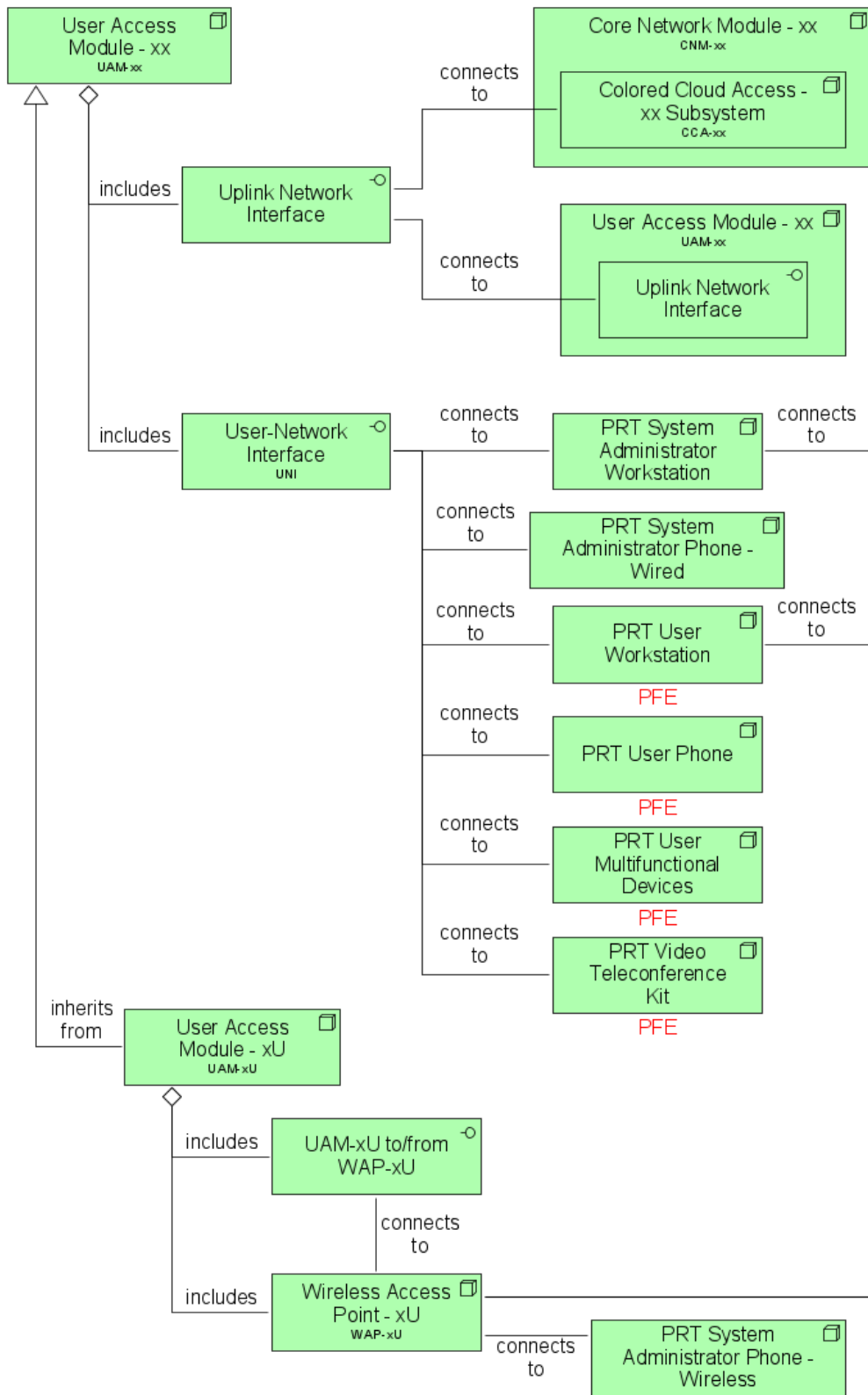


Figure 72 - UAM in context

**NOTE** (PRTTDCIS-2671)

UAM exists in 3 variants:

- 1) **Small:** This variant is realized through the sole usage of network ports available on components of the CCA Subsystem of the CNM;
- 2) **Medium:** This variant is realized through the sole usage of Access Breakout Boxes (BoB);
- 3) **Large:** This variant is realized through the combination of Distribution BoBs and Access BoBs.

**SRS** (PRTTDCIS-2672)

This project shall only implement Small and Medium variants of UAM.

**SRS** (PRTTDCIS-2673)

The Small UAM shall adhere to the implementation concept illustrated on following picture.

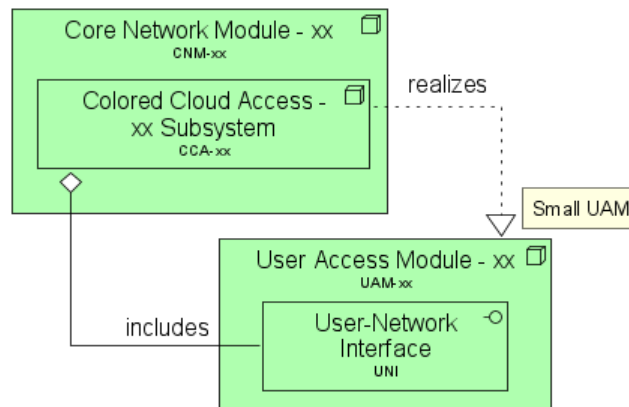


Figure 73 - Small UAM implementation concept

**SRS** (PRTTDCIS-2674)

The Medium UAM shall adhere to the implementation concept illustrated on following picture.

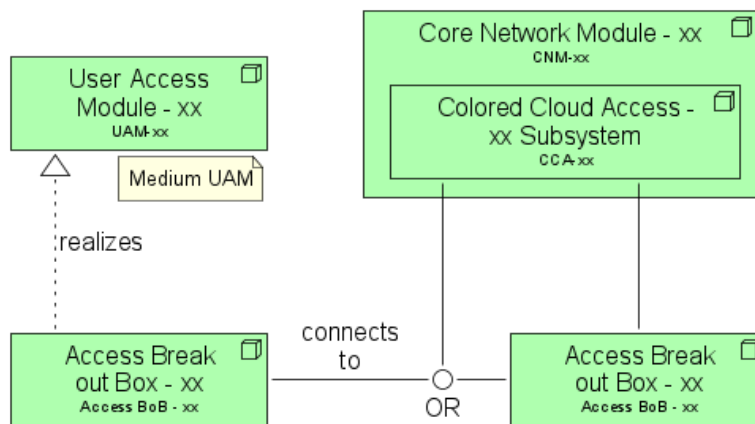


Figure 74 - Medium UAM implementation concept

**SRS** (PRTTDCIS-4213)

The UAM shall deliver Power over Ethernet (PoE) to voice appliances in xU and xR security domains.

**SRS** (PRTTDCIS-4215)

Each UAM subsystem shall implement additional interfaces, as required and as driven by the design, in support of service management and control functionalities.

**NOTE** (PRTTDCIS-4216)

Additional interfaces may be implemented to accommodate other connections and end-points resulting from the detailed design.

**SRS** (PRTTDCIS-4217)

All UAM subsystems component shall be duly sized and licensed in order to meet all functional and technical requirements.

**SRS** (PRTTDCIS-4218)

All UAM subsystems shall be built and licensed the same, irrespective of the security domain.

## 5.6.2 Functional Requirements

**SRS** (PRTTDCIS-1273)

The Access BoB shall be detachable.

**SRS** (PRTTDCIS-2675)

The Access BoB shall support:

- Direct connection to the Core Switching part of the CCA; and,
- Connection via a second Access BoB (Daisy Chaining).

**SRS** (PRTTDCIS-1786)

The UAM shall deliver PoE to xU and xR voice appliances.

**SRS** (PRTTDCIS-4746)

The UAM shall not deliver PoE to xS voice appliances.

**SRS** (PRTTDCIS-2457)

The UAM shall not deliver PoE to NS Kit voice appliances.

**SRS** (PRTTDCIS-1787)

The UAM shall implement a dedicated UPS functionality, giving the UAM the ability to continue to operate through mains power outage and power quality deficiencies, including the PoE power for xU and xR voice appliances, but not including power for client laptops.

**SRS** (PRTTDCIS-1278)

The UAM-xU shall offer both wired and WiFi user access.

**SRS** (PRTTDCIS-1279)

UAM-xR and UAM-xS shall only offer wired user access.

### 5.6.3 Technical Requirements

#### 5.6.3.1 General

**SRS** (PRTTDCIS-1797)

The Access BoB interfaces shall be implemented as follows:

- 1) Interface to the CNM; and,
- 2) Interface to a second UAM; and,
- 3) Interface to the user appliances (laptop, phones, VTC appliances, printer/scanners...), wired; and,
- 4) Interface to the user appliances (laptop, phones, VTC appliances, printer/scanners...), wireless on UAM-xU only.

**SRS** (PRTTDCIS-1799)

Interfaces to the CNM and to a second UAM shall be implemented on bulkhead connectors compatible with the FO Cable Reel.

**SRS** (PRTTDCIS-1814)

The UAM-xU shall include a Wireless Access Point (WAP).

**SRS** (PRTTDCIS-1795)

The UPS element shall implement UPS monitoring signaling changes in status and critical capacity warnings towards the LMM and visual ~~and audio~~ signals from the UPS itself.

**SRS** (PRTTDCIS-1794)

If UAM Elements shutdown require graceful shutdown, the UPS element shall implement this graceful shutdown mechanism.

**SRS (PRTTDCIS-1793)**

The UPS element shall implement ability for the UAM to continue to operate through:

- 1) Mains or generator power blackout for at least 30 minutes for xS, xR and xU not including telephones; and,
- 2) Mains or generator power blackout for at least 10 minutes for xU and xR including 75% of the ports powering a PoE powered VoIP telephone; and,
- 3) Mains or generator power brownouts indefinitely for xS, xR and xU.

**SRS (PRTTDCIS-4211)**

Access BoB shall include patch panels in order to connect End User Devices to patch panel ports instead of connecting directly to Element ports.

**SRS (PRTTDCIS-1800)**

The detailed system design of the Access BoB xU shall adhere to the breakdown depicted on the following figure:

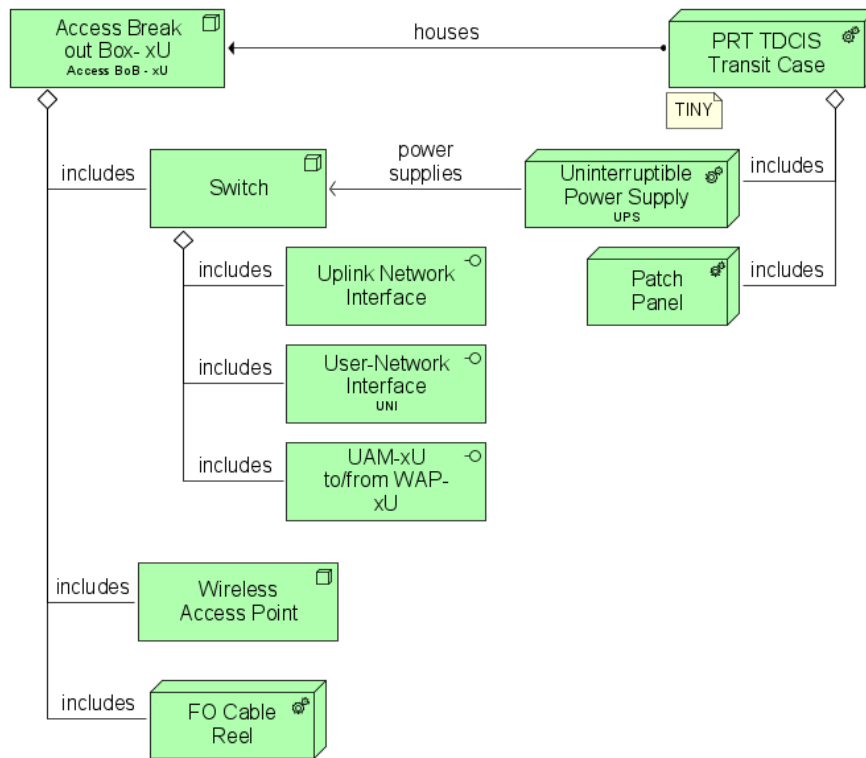


Figure 75 - Access BoB xU breakdown

**SRS (PRTTDCIS-3242)**

The detailed system design of the Access BoB xR shall adhere to the breakdown depicted on the following figure:

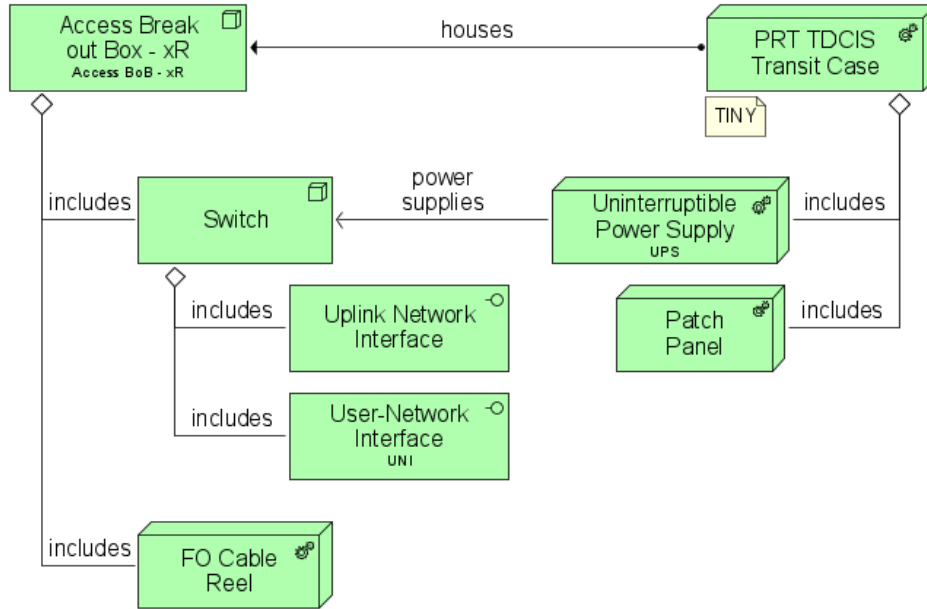


Figure 76 - Access BoB xR breakdown

**SRS (PRTTDCIS-3243)**

The detailed system design of the Access BoB xS shall adhere to the breakdown depicted on the following figure:

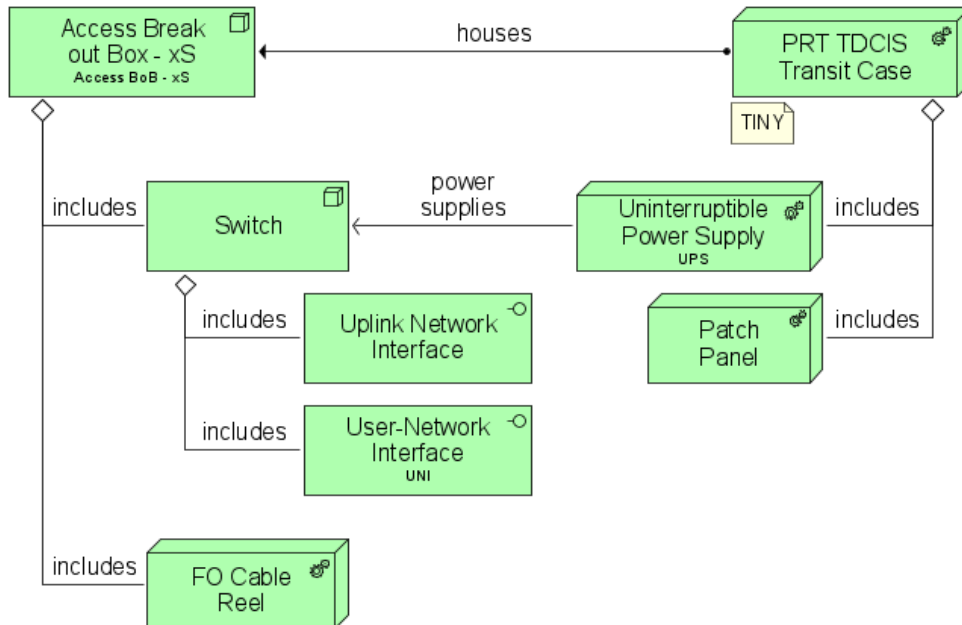


Figure 77 - Access BoB xS breakdown

### 5.6.3.2 Wireless Access Point

**SRS** (PRTTDCIS-3095)

All WAP shall be positioned to provide at least 2m separation from any CIS processing xS information.

**SRS** (PRTTDCIS-3100)

The UAM-xU WAP shall connect to a central Wireless LAN Controller (WLC) located the PRT NDN.

**NOTE** (PRTTDCIS-4210)

The WLC in operation in PRT NDN is a *Cisco WLC 3504* and is PFE to this project.

**SRS** (PRTTDCIS-4226)

The WAP shall support Wifi 6 as defined in IEEE 802.1ax

**SRS** (PRTTDCIS-4227)

The WAP shall include TWO (02) distinct radio.

**SRS** (PRTTDCIS-4228)

Each WAP radio shall operate in both 2.4GHz and 5.8GHz ISM bands.

**SRS** (PRTTDCIS-4229)

It shall be possible for the System Administrator to deploy the WAP away from the UAM-xU Transit Case up to a maximum distance of 5m.

**SRS** (PRTTDCIS-4230)

It shall be possible to mount the WAP on the external surface of the UAM-xU Transit Case in any Use Case.

**SRS** (PRTTDCIS-4231)

It shall be possible to operate the WAP while placed on a horizontal surface (e.g. table) without any additional mounting or mechanical base.

**SRS** (PRTTDCIS-4232)

The WAP shall support WPA2 Enterprise encryption.

**SRS** (PRTTDCIS-4233)

The WAP shall be powered through PoE.



## 5.6.4 Implementation Constraints

### SRS (PRTTDCIS-1789)

The Network element of the Access BoB shall be implemented with 24-port Ethernet switching capability.

### SRS (PRTTDCIS-4748)

Access BoB switches shall feature copper based ports, in support of laptops and ports with PoE for VoIP phones in xU and xR security domains.

### SRS (PRTTDCIS-1801)

Access BoB switches shall support a minimum 2Gbps uplinks to the core switches in the corresponding CNM.

### SRS (PRTTDCIS-1803)

The interface to a second Access BoB shall be of minimum 2Gbps.

### SRS (PRTTDCIS-1804)

The Elements which compose the detachable Access BoB shall be integrated in TINY transit cases.

### SRS (PRTTDCIS-1275)

Each shelter shall also provide wireless xU network access via a WAP installed in the shelter.

### SRS (PRTTDCIS-4648)

The WAP installed in the shelter shall be detachable to be remoted and mounted outside of the shelter.

### SRS (PRTTDCIS-2378)

The Access BoB shall have an electrical connection to 230VAC supply with protection against spikes, surges, overvoltage.

### SRS (PRTTDCIS-3229)

Each Access BoB shall be delivered with ONE (01) FO Cable Reel to be used to connect to the CNM or another Access BoB.

### SRS (PRTTDCIS-3823)

UAM-xU Access BoB Ethernet ports to EUD shall not be of SFP type.

### SRS (PRTTDCIS-3824)

UAM-xR Access BoB Ethernet ports to EUD shall not be of SFP type.

**SRS** (PRTTDCIS-4649)

UAM-xU Access BoB shall primarily use the FO Cable Reel to connect to the Shelter Termination Panel.

**SRS** (PRTTDCIS-4650)

UAM-xU Access BoB shall support the use a SFTP Cable Reel to connect to the Shelter Termination Panel.

**SRS** (PRTTDCIS-4651)

UAM-xR Access BoB shall primarily use the FO Cable Reel to connect to the Shelter Termination Panel.

**SRS** (PRTTDCIS-4652)

UAM-xR Access BoB shall support the use a SFTP Cable Reel to connect to the Shelter Termination Panel.

**SRS** (PRTTDCIS-4653)

UAM-xS Access BoB shall use the FO Cable Reel to connect to the Shelter Termination Panel.

## 5.7 Data Diode Module

### 5.7.1 General

**NOTE** (PRTTDCIS-4318)

This section describes the Data Diode Module (DDM).

**NOTE** (PRTTDCIS-4321)

The DDM is used to maintain physical and electrical separation between networks of a lower classification (The Low Side) and networks of a higher classification (The High Side) while establishing a non-routable, completely closed and secure one-way transfer of data traffic flow from The Low Side to The High Side, preventing data traffic from travelling in the opposite direction.

## 5.7.2 Functional Requirements

### SRS (PRTTDCIS-4322)

The DDM shall fulfil following functions:

- 1) Create a physical barrier or *air gap* between the high side and low side to prevent data leakage from The High Side to The Low Side; and,
- 2) Provide unidirectional traffic flow and securely transmits data one way from The Low Side to The High Side without permitting reverse access to ensure that no leakage returns back; and,
- 3) Allow The High Side networks, that would otherwise be completely isolated for security reasons, to receive data from The Low Side networks without the risk of loss of confidentiality.

### SRS (PRTTDCIS-4323)

The DDM shall support the secure transfer of multiple protocols and data types simultaneously from The Low Side to The High Side without creating bottlenecks.

### SRS (PRTTDCIS-4324)

The DDM shall adhere to the implementation concept illustrated on following picture.

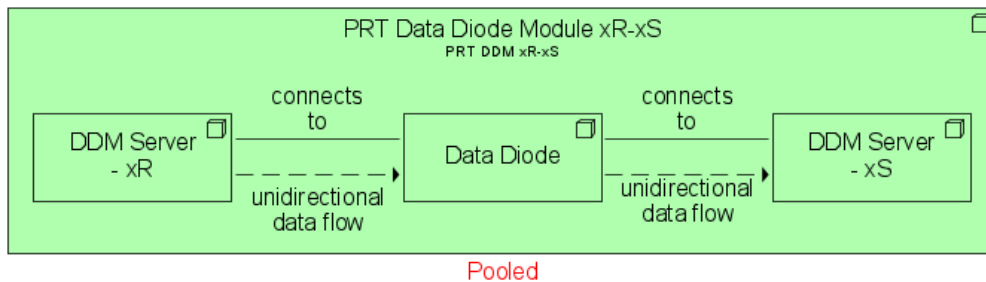


Figure 78 - DDM implementation concept

### SRS (PRTTDCIS-4325)

The DDM shall include:

- a low side server; and,
- a data diode appliance; and,
- a high side server.

### SRS (PRTTDCIS-4326)

This project shall implement a DDM between xR as the The Low Side and xS as The High Side.

### SRS (PRTTDCIS-4327)

The DDM Shall support to be installed with xU as The Low Side and xR as the High Side.

### 5.7.3 Technical Requirements

**NOTE** (PRTTDCIS-4358)

The following picture illustrates the DDM in context.

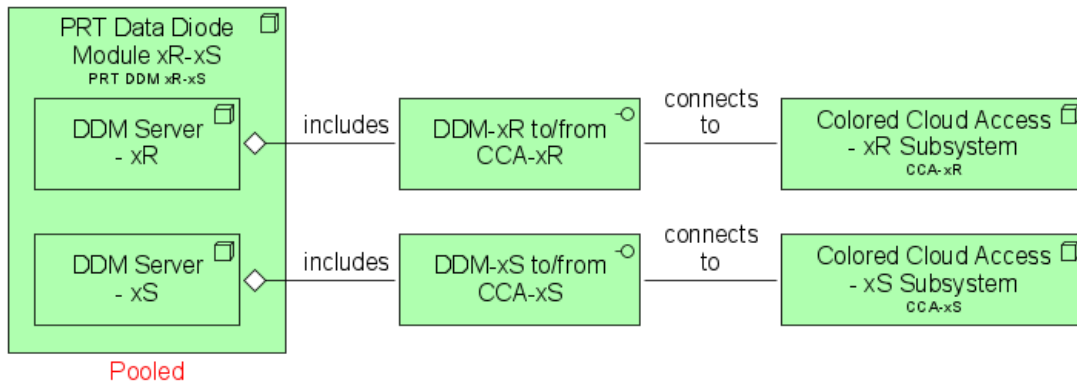


Figure 79 - DDM in context

**SRS** (PRTTDCIS-4359)

Each individual DDM shall, as a minimum, implement interfaces to other modules subsystems as per the table below. The need for additional interfaces, or interfaces different from those listed below, as well as their specification, shall be design-driven and shall be justified, based on component selection and functionality sought.

Interface Name	Qty.	Interface Type	Interface Speed	Remarks
CCA-xR to/from PRT DDM xR-xS	R	Design Driven	Minimum 1Gbps	R is Design Driven
CCA-xS to/from PRT DDM xR-xS	S	Design Driven	Minimum 1Gbps	S is Design Driven

Table 37 - DDM interfaces

**SRS** (PRTTDCIS-4330)

The DDM shall support file transfer across the data diode at a minimum of 1Gbps .

**SRS** (PRTTDCIS-4331)

The Network Interface Cards (NIC) between DDM servers and the diode appliances shall be compatible with the diode software.

**SRS** (PRTTDCIS-4332)

The DDM shall enforce the one-way flow of data from a network of a lower classification to a network of a higher classification through the physical properties of the unidirectional flow of fiber optic connections.

**SRS** (PRTTDCIS-4333)

For the avoidance of doubt, no data stream or signaling shall be returned to The Low Side from The High Side at any time.

**SRS** (PRTTDCIS-4334)

Both low and high side servers shall provide flow control, administration, and inspection capabilities.

**SRS** (PRTTDCIS-4335)

The DDM shall implement following modes of information transfer:

- 1) Files (including but not limited to, plain text and binary data); and,
- 2) E-mail compliant with the relevant IETF RFC standards such as RFC2822 and RFC5321 relating to Simple Mail Transfer Protocol (SMTP); and,
- 3) Network-streamed data transfers using Transmission Control Protocol (TCP) and User Datagram Protocol (UDP).

**SRS** (PRTTDCIS-4336)

The DDM shall implement filtering based on lists of Fully Qualified Domain Names (FQDN), with both blocking and permitting rules.

**SRS** (PRTTDCIS-4337)

The DDM shall implement data filters via file type identification based on the following common data formats as a minimum:

- 1) PDF; and,
- 2) Microsoft Office (binary and Open XML); and,
- 3) HTML; and,
- 4) XML; and,
- 5) RTF; and,
- 6) ZIP; and,
- 7) Common image formats such as JPEG, PNG, BMP; and,
- 8) Every type of executable binaries and script executables.

**SRS** (PRTTDCIS-4338)

The DDM shall support configurable data formats filtering, including but not limited to Portable Document Formats (PDF) and Microsoft Office document formats, to perform inspection on the files and e-mails transferred. This includes content inspections for both message file attachments and message body for e-mails.

**SRS** (PRTTDCIS-4339)

The DDM shall implement data filters on both The Low Side and The High Side.

**SRS** (PRTTDCIS-4340)

The DDM shall inspect the content of all transferred data with the Antivirus Toolsuite.

**SRS** (PRTTDCIS-4341)

The Contractor shall install and configure all DDM rules and policies for enforcement of the Purchaser business rules.

**NOTE** (PRTTDCIS-4342)

The Purchaser business rules will be provided after CAW.

**SRS** (PRTTDCIS-4343)

The Purchaser's list of approved FQDNs shall be implemented for the purpose of filtering email communication between The Low Side and The High Side. This shall include all email domain filtering and FQDNs, file types, content inspection, and handling/quarantine policies.

**SRS** (PRTTDCIS-4344)

The DDM shall integrate with the LMM, including but not limited to:

- domain management; and,
- antivirus toolsuite scan and updates; and,
- vulnerability patching on both the Operating System (OS) and at the middleware levels.

**SRS** (PRTTDCIS-4345)

The DDM shall support file transfer using the Server Message Block (SMB) protocol minimum v3.

**SRS** (PRTTDCIS-4346)

The DDM reporting capability, integrated with the LMM reporting capability, based on file, e-mail and data that are transmitted via the DDM shall include as a minimum:

- 1) E-mail transfers with the sender, recipient, date and size information in a specific period of time; and,
- 2) The status of data transmitted data (successful/rejected); and,
- 3) The name and the path of the file that is transmitted; and,
- 4) Network data stream information.

**SRS** (PRTTDCIS-4347)

The DDM shall support administratively-defined audit policies for the following activities:

- 1) Administrative, data transfer, and system maintenance activity, including but not limited to: system and user activity as well as logging for applications such as file and data transfer agents; and,
- 2) User administration, including the creation, removal, and modification of user accounts; and,
- 3) Privileged user actions, including the modification of security settings; and,
- 4) Transfer of data through the DDM, including the relevant meta-data such as filename, file sizes, and administrative tags; and,
- 5) Interactions with file and data transfer agents, including activity related to content checking and antivirus scanning.

**SRS** (PRTTDCIS-4348)

The DDM shall be enabled to support integration in the future LogA Service Infrastructure.

**SRS** (PRTTDCIS-4349)

It shall be possible to manage the DDM from the LMM.

**SRS** (PRTTDCIS-4350)

It shall be possible to manage the DDM directly from its composing elements.

**SRS** (PRTTDCIS-4351)

The Contractor shall design the DDM in such a way that its elements on

- The Low Side are managed from The Low Side LMM; and
- The High Side are managed from The High Side LMM.

**SRS** (PRTTDCIS-4352)

The DDM shall provide secure remote access functionality to its server elements which are suitable for the operating system of the server. For example, a system based on Linux shall expose a remote management access facility via Secure Shell (SSH) latest version which is considered secure by time of deployment.

**SRS** (PRTTDCIS-4353)

The DDM shall include functionality to generate and alert upon the absence of a heartbeat signal from The Low Side to The High Side, to facilitate awareness of a link or system failure in the DDM transport chain.

**SRS** (PRTTDCIS-4354)

The DDM heartbeat functionality shall integrate with the LMM Monitoring.

**SRS** (PRTTDCIS-4355)

The DDM shall integrate with the Node user authentication and authorization mechanism.

**SRS** (PRTTDCIS-4356)

DDM shall support users authentication based on locally-stored user name and password credentials.

#### 5.7.4 Implementation Constraints

**SRS** (PRTTDCIS-4357)

The DDM shall be implemented with dedicated hardware.

**SRS** (PRTTDCIS-4328)

The DDM shall be sourced from non-archived diodes listed in the NIAPC.

**SRS** (PRTTDCIS-4329)

The diode component of the DDM shall be evaluated to CC EAL 7 or national equivalent by a NATO national security authority as stated in the NIAPC.

## 5.8 Remote Network Module

### 5.8.1 General

**SRS** (PRTTDCIS-2718)

The design of the RNM and its variants shall adhere to the architecture and the breakdown presented in following figure.

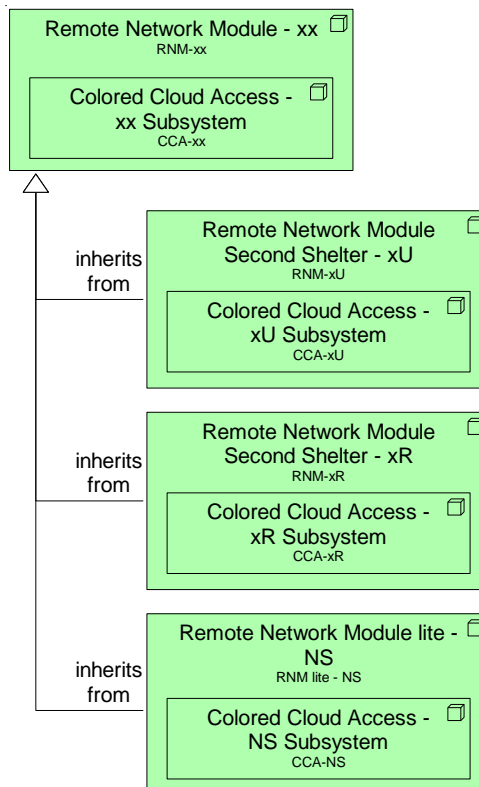


Figure 80 - RNM Architecture Breakdown

### 5.8.2 Functional Requirements

**SRS** (PRTTDCIS-2701)

The RNM shall implement the CCA function.

### 5.8.3 Technical Requirements

#### 5.8.3.1 CCA subsystem

**SRS** (PRTTDCIS-2710)

The CCA subsystem in the RNM shall implement the functions listed under the CCA function in the CNM.



**SRS (PRTTDCIS-2711)**

The CCA subsystem in the RNM shall meet the same technical requirements formulated for the CCA subsystem of the CNM, excluding the 10Gbps Core Switching.

**SRS (PRTTDCIS-2712)**

The CCA subsystem of the RNM lite shall, as a minimum, implement interfaces as per the table below. The need for additional interfaces, or interfaces different from those listed below, as well as their specification, shall be design-driven and shall be justified, based on component selection and functionality sought.

Interface Name	Qty.	Interface Type	Interface Speed	Remarks
CCA-NS to UAM-NS	P	Design Driven	Design Driven	P is Design Driven
PCA to/from NS Kit	1	Eth-FO-SR	1Gbps	Interface can be connected to the TCE621M of the CCA-NS of a Core Node Lite or of a Remote Node Lite

Table 38 - RNM lite CCA subsystem interfaces

**SRS (PRTTDCIS-4654)**

The CCA subsystem of the RNM Second Shelter – xU shall, as a minimum, implement interfaces as per the table below. The need for additional interfaces, or interfaces different from those listed below, as well as their specification, shall be design-driven and shall be justified, based on component selection and functionality sought.

Interface Name	Qty.	Interface Type	Interface Speed	Remarks
CCA-xU to/from Voice over IMT	M	Design Driven	Design Driven	M is Design Driven For transport to MMA-xU
CCA-xU to/from Iridium PTT	P	Design Driven	Design Driven	P is Design Driven For transport to MMA-xU
CCA-xU to/from Radio PTT	Q	Design Driven	Design Driven	Q is Design Driven For transport to MMA-xU
PCA to/from RNM Second Shelter - CCA-xU	1	Eth-FO-SR	1Gbps	N/A
User Network Interface	2	---	---	To realize the small UAM See UAM section for specifications
UAM-xU to/from WAP-xU	1	---	---	To realize the small UAM See UAM section for specifications

Table 39 - RNM Second Shelter – xU CCA subsystem interfaces

**SRS** (PRTTDCIS-4655)

The CCA subsystem of the RNM Second Shelter – xR shall, as a minimum, implement interfaces as per the table below. The need for additional interfaces, or interfaces different from those listed below, as well as their specification, shall be design-driven and shall be justified, based on component selection and functionality sought.

Interface Name	Qty.	Interface Type	Interface Speed	Remarks
CCA-xR to/from PRT CNR	T	Design Driven	Design Driven	T is Design Driven For Data over CNR direct interface on CCA routing platform For Transport of Voice to MMA-xR
PCA to/from Second RNM Second Shelter CCA-xR	1	Eth-FO-SR	1Gbps	N/A
User Network Interface	2	---	---	To realize the small UAM See UAM section for specifications

Table 40 - RNM Second Shelter – xR CCA subsystem interfaces

**SRS** (PRTTDCIS-2720)

Routers and/or switches used to implement the CCA subsystems of the RNM shall be compatible with the element management system for routing and switching platforms.

**5.8.4 Implementation Constraints**

**SRS** (PRTTDCIS-2734)

Crypto devices shall be removable from the transit cases of the RNM lite, for storage and transport.

**SRS** (PRTTDCIS-2742)

The removal of the crypto devices from the RNM lite shall be compatible with the implementation of TEMPEST requirements in the transit cases.

**NOTE** (PRTTDCIS-4374)

Foam-padded transport cases able to carry one TCE621M will be used for that purpose.

**NOTE** (PRTTDCIS-4373)

TCE621M transport cases are PFE and will be transported separately from the Node.

## 5.9 Local Management Module

### SRS (PRTTDCIS-2827)

The LMM shall adhere to the implementation concept illustrated on following picture.

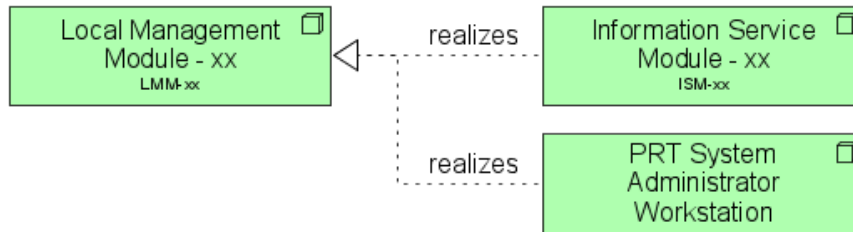


Figure 81 - LMM implementation concept

### SRS (PRTTDCIS-2993)

The LMM shall support TWO (02) implementations variants in each security domain of each Node:

- As a workload to the ISM; and
- As a workload to the System Administrator Workstation.

### SRS (PRTTDCIS-2994)

All LMM instances in the same security domain of a Node shall be independent from each other allowing each to work in isolation from the other and providing the exact same user experience, functionalities and performances.

## 6 Transmission Systems

### 6.1 Datalink

#### 6.1.1 General

**SRS** (PRTTDCIS-3057)

The datalinks shall interface the PCA subsystem of the CNM-PCN as IP Transmission System.

**SRS** (PRTTDCIS-3058)

The datalink Outdoor Units (ODU) shall be deployed on the top of the telescopic masts of Shelter.

**SRS** (PRTTDCIS-3059)

Each mast shall allow the installation of TWO (02) Datalink ODU (e.g. 2 MiniLOS, 2 HCLOS or 1 MiniLOS + 1 HCLOS).

**SRS** (PRTTDCIS-3061)

The datalinks ODUs, once mounted on the telescopic masts and deployed for operation, shall not interfere with, or be interfered by, any other transmission device or antenna of the node.

**SRS** (PRTTDCIS-3062)

The ODU of the datalinks shall be connected through an ad-hoc pass-through connector in the shelter's ELOS RP to the datalink IDU (if required) and from there to the PCA subsystem.

**SRS** (PRTTDCIS-3232)

The ODU of the datalinks power supply shall be Power over Ethernet (PoE).

**SRS** (PRTTDCIS-3063)

The datalink antennae shall be directional in support of a Peer-to-Peer (P2P) connection.

**SRS** (PRTTDCIS-3064)

The datalink antennae shall be equipped with an automatic pointing and alignment system (azimuth and elevation) that automatically establishes the P2P link to the selected remote peer datalink.

**NOTE** (PRTTDCIS-3065)

The aperture of the antenna is a design driven based on the deployment time, throughput, link distance, power, among other characteristics.

**SRS** (PRTTDCIS-3067)

The datalinks shall implement embedded AES-256 data encryption FIPS 197 certified.

**SRS** (PRTTDCIS-3068)

The datalinks shall support Traffic Flow Security (TFS).

**SRS** (PRTTDCIS-3069)

The datalinks shall support interference control and mitigation.

**SRS** (PRTTDCIS-3070)

The datalinks shall implement adaptive modulation.

**SRS** (PRTTDCIS-3071)

The datalinks shall implement Ethernet interfaces supporting IPv4, transparent Ethernet Bridge, Precision Time Protocol (PTP), Dynamic Host Configuration Protocol (DHCP) and IPv6 pass-through

**SRS** (PRTTDCIS-3072)

The datalinks shall be enabled for monitoring and control over Ethernet and Over The Air (OTA).

**SRS** (PRTTDCIS-3073)

The datalinks shall be Field and OTA upgradeable via HTTP/HTTPS.

### 6.1.2 Mini LOS Radio

**SRS** (PRTTDCIS-3081)

The MiniLOS datalink shall enable a Line of Sight (LOS) P2P IP datalink.

**SRS** (PRTTDCIS-3083)

The MiniLOS datalink shall operate in both 2.4GHz and 5.8GHz ISM bands.

**SRS** (PRTTDCIS-3085)

The MiniLOS datalink shall have a minimum LOS range of 40 km, featuring at this distance not less than 2.5 Mbps throughput.

**SRS** (PRTTDCIS-3086)

The MiniLOS datalink shall have a maximum throughput of not less than 50 Mbps.

### 6.1.3 HCLOS Radio

**SRS** (PRTTDCIS-3066)

The HCLOS datalink shall be Federal Information Processing Standards (FIPS) 140-2 Level 2 certified.

**SRS** (PRTTDCIS-3077)

The HCLOS datalink shall operate in NATO Band IV (4.4 - 5 GHz).

**SRS** (PRTTDCIS-3079)

The HCLOS datalink shall have a minimum LOS range of 50 km, featuring at this distance not less than 10 Mbps throughput.

**SRS** (PRTTDCIS-3080)

The HCLOS datalink shall have a maximum throughput of not less than 200 Mbps.

## 6.2 Broadband IP Radio

**SRS** (PRTTDCIS-3045)

The Broadband Radio shall be the Rohde & Schwarz SOVERON VR with following specifications:

- Model Type: VR5000;
- Model Name: VEHICULAR TACTICAL RADIO;
- Year of manufacture: 2022 or after;
- Waveforms:
  - Fixed Frequency; and,
  - Secom-P (voice); and,
  - HDR-WB (UHF WB); and,
  - HDR-AJ-WB (UHF WB-AJ); and,
  - TNW50 (VHF/UHF NB-AJ).

**SRS** (PRTTDCIS-4656)

Each Broadband Radio shall be delivered with, at least, following ancillaries:

- Mission Planner Software; and,
- ONE (01) Broadband Vehicular antenna (30-600 MHz); and,
- ONE (01) Handset; and,
- Mounting frame with quick fastener; and,
- Power Supply cable; and,
- Ethernet cable.

**SRS** (PRTTDCIS-4657)

For the configuration and management of all TDCIS Broadband Radios following ancillaries shall also be delivered:

- FIVE (05) FillGun to install the mission configuration on the VR5000; and,
- FIVE (05) Fill cables for connecting the fill device to the VR5000.

## 6.3 Commercial SATCOM Terminal

### 6.3.1 Functional Requirements

#### SRS (PRTTDCIS-2047)

The Commercial SATCOM shall provide data and voice subscriber access services using the BGAN service of Inmarsat. This shall involve:

- 1) IP connectivity using Background Service, pay per byte, to any location in the Internet; and,
- 2) IP connectivity using Background Services, pay per byte, or Streaming Services, pay per minute, to the PRT Static Infrastructure, without involving any Internet transit; and,
- 3) PSTN connectivity.

### 6.3.2 Technical Requirements

#### SRS (PRTTDCIS-2050)

The Commercial SATCOM terminal shall provide 492 kbps shared standard IP data rate (best effort) and up to 256 kbps streaming IP data rate, with QoS at intermediate data rates of 32 kbps, 64 kbps, 128 kbps and 256 kbps.

#### SRS (PRTTDCIS-2051)

The Commercial SATCOM terminal shall support BGAN X-stream mode up to the service maximum bandwidth of 384 kbps.

#### SRS (PRTTDCIS-2052)

Changes to the mode of operation (standard IP, streaming, X-stream) shall be possible without the use of an external laptop.

#### SRS (PRTTDCIS-2063)

The Commercial SATCOM terminal shall be compatible with future INMARSAT (INMARSAT IV+) constellation; upgradeable to future operations on Wide-Band Streaming L-Band (WiSL and L-MAX).

#### SRS (PRTTDCIS-2053)

The Commercial SATCOM terminal shall support circuit-switched telephony access to the Public Switched Telephone Network (PSTN).

#### SRS (PRTTDCIS-2054)

The Commercial SATCOM terminal shall support the use of PFE SIM cards and connectivity-related specific settings, and use of specific terminal settings including disabling of interfaces, administrator access, allowed services, maximum session duration.

**SRS** (PRTTDCIS-2056)

The Commercial SATCOM terminal shall operate outdoors over a temperature range from -20 deg. C to +55 deg. C

**SRS** (PRTTDCIS-2058)

The Commercial SATCOM terminal shall implement IP 56 protection against water and dust, or higher.

## 6.4 Military SATCOM Terminal

### 6.4.1 General

**NOTE** (PRTTDCIS-2064)

The Military SATCOM Terminal will provide reach-back connectivity to PRT NDN.

**NOTE** (PRTTDCIS-2665)

The Military SATCOM Terminal will only be used in Point-to-Point topology.

**NOTE** (PRTTDCIS-2668)

The Military SATCOM Terminal will provide intra-theatre connectivity.

### 6.4.2 Functional Requirements

**SRS** (PRTTDCIS-2066)

The Military SATCOM Terminal shall enable communications over this bearer.



**SRS** (PRTTDCIS-4407)

The Military SATCOM Terminal shall implement functions as illustrated in the following diagram.

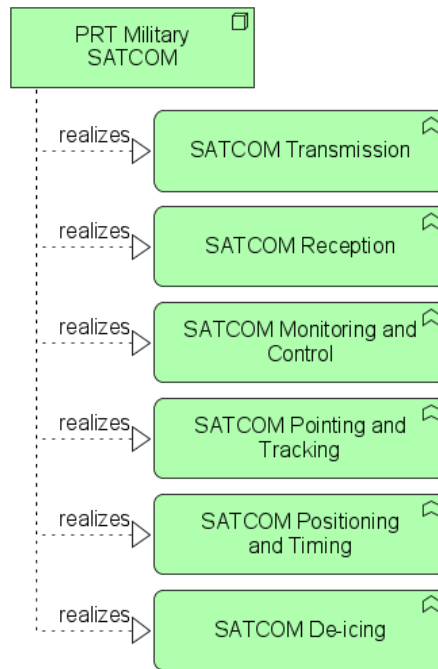


Figure 82 - Military SATCOM Terminal functions

**6.4.3 Technical Requirements**

**6.4.3.1 General**

**SRS (PRTTDCIS-4408)**

The Military SATCOM Terminal design shall adhere to the breakdown concept described in the following diagram.

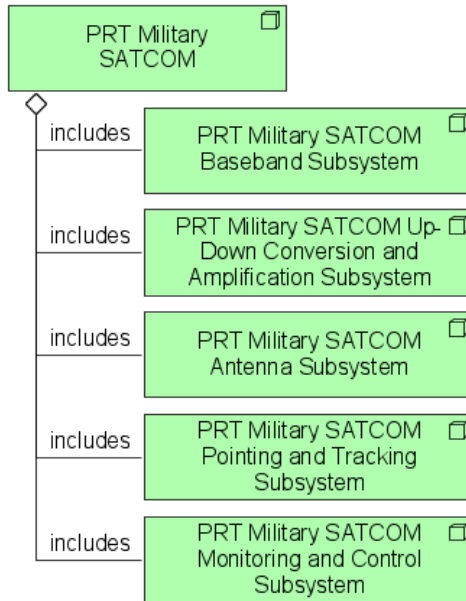


Figure 83 - Military SATCOM Terminal breakdown

**SRS (PRTTDCIS-2065)**

The TDCIS Military SATCOM terminal shall operate in

- X-band (7.9GHz to 8.4GHz Transmission and 7.25GHz to 7.75GHz Reception); and,
- Ka-band (29 to 31GHz Transmission and 19.2 to 21.2GHz Reception).

**SRS (PRTTDCIS-2071)**

The Military SATCOM Terminal shall support links up to 20 Mbps in all bands.

**SRS (PRTTDCIS-2072)**

Should the Contractor, based on Service Designs, conclude that a higher throughput is required, this shall be duly justified and left for the Purchaser to assess and approve.

**6.4.3.2 Baseband Subsystem**

**SRS (PRTTDCIS-2084)**

For compatibility with the extant systems in PRT, the Military SATCOM Terminal shall include:

- 1) ONE (01) iDirect 950 MP series modem; and,
- 2) ONE (01) Comtech SLM5650B (STANAG 4486 Compliant).

**SRS** (PRTTDCIS-2085)

The Military SATCOM Terminal shall include ONE (01) free RU slot with blanking plate, to allow for future addition of new modem (compliant with future STANAG 5646).

**SRS** (PRTTDCIS-2088)

The Military SATCOM Terminal shall include the required elements to allow for switching of modems without the need for re-patching.

**6.4.3.3 Up-Down Conversion and Amplification Subsystem****SRS** (PRTTDCIS-4409)

The Military SATCOM Terminal shall include GaN-based amplifiers.

**SRS** (PRTTDCIS-4410)

The Up and Down Conversion Subsystem shall accept external 10MHz reference input.

**SRS** (PRTTDCIS-4411)

To accommodate any loss of external frequency reference, (block) up and down converters shall have internal 10 MHz frequency reference with an accuracy better than +/- 30 ppb.

**SRS** (PRTTDCIS-4412)

The Voltage Standing-Wave Ratio (VSWR) over the IF band shall be less than 1.5:1

**SRS** (PRTTDCIS-4413)

The Up Conversion part of the Up and Down Conversion Subsystem shall have a transmission output signal sampling port.

**SRS** (PRTTDCIS-4414)

The radiated carrier frequency accuracy shall be within 1 kHz of the intended value for all RF carriers.

**SRS** (PRTTDCIS-4415)

The radiated carrier frequency accuracy shall be maintained for 180 days period or more without calibration.

**SRS** (PRTTDCIS-4416)

Amplitude variations of the transmit (uplink) function when operating at maximum linear power shall not exceed the following:

- 1) +/- 0.5 dB over any 10 MHz segment across the instantaneous bandwidth; and,
- 2) +/- 1.5 dB over any 120 MHz segment, or any smaller segment, across the instantaneous bandwidth (10 MHz < segment < 120 MHz) ; and,
- 3) +/- 1.5 dB for each output frequency band in X and Ka-bands.

**SRS (PRTTDCIS-4417)**

The sum of the fundamental and all harmonic components of the Alternating Current (AC) line frequency shall not exceed -30 dBc in the Transmission Path.

**SRS (PRTTDCIS-4418)**

The single sideband sum (added on a power basis) of all other individual spurious components shall not exceed -36 dBc in the Transmission Path.

**SRS (PRTTDCIS-4419)**

The single sideband Power Spectral Density (PSD) of the continuous phase noise component shall comply with the envelope defined in the following figure (as per STANAG 5648). If specific points associated with the measured phase noise plot exceed the envelope, then the following two conditions shall be met:

- 1) The single sideband phase noise due to the continuous component, when integrated over the bandwidth from 10 Hz to 16 kHz relative to carrier center frequency, shall be less than 3.4 degrees Root Mean Square (RMS) (with a two-sided value of 4.8 degrees RMS); and,
- 2) The single sideband phase noise due to the continuous component, when integrated over the bandwidth from 1 percent of the Symbol Rate ( $R_s$ ) to  $R_s$  Hz relative to the carrier center frequency, shall be less than the value obtained when integrating the following figure plot over the same limits. This requirement shall be verified at the lowest and highest symbol rates. This requirement applies to all operational  $R_s$  values.

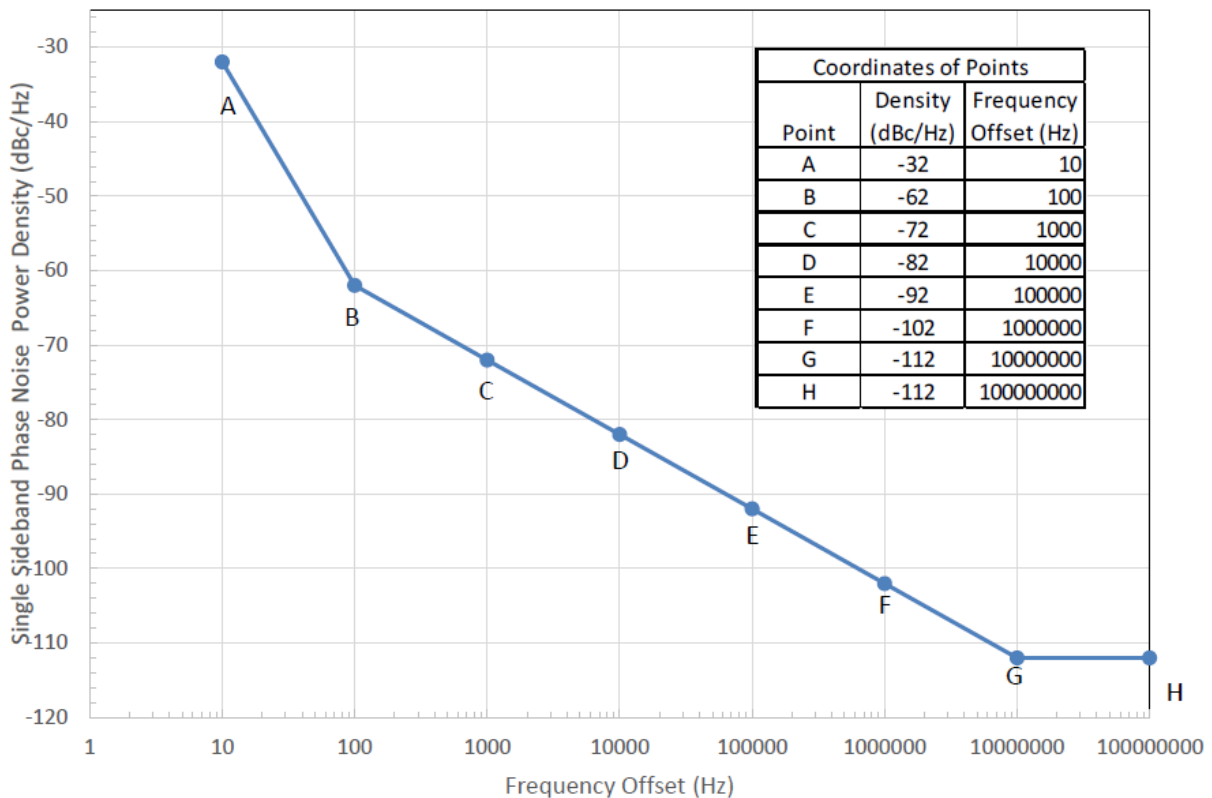


Figure 84 - Military SATCOM Terminal Phase Noise envelope as per STANAG 5648.

**SRS** (PRTTDCIS-4420)

The level of second and third harmonics of the transmit carriers shall not exceed -60 dBc when measured at maximum linear power.

**SRS** (PRTTDCIS-4421)

Transmit-to-receive isolation shall be such that there is less than a 0.1 dB increase, and no decrease, in receive noise density over the applicable frequency range with the transmitter operating at any Effective Isotropic Radiated Power (EIRP) level, compared to the receive performance with the transmitter turned off.

**SRS** (PRTTDCIS-4422)

When pointing to a cold sky at an elevation angle of not less than 30 degrees, the receive chain absolute gain shall be sufficient to raise the IF output noise PSD to a minimum of -113 dBm/Hz.

**SRS** (PRTTDCIS-4423)

The Down Conversion frequency accuracy shall be within 1kHz of the intended value for all received RF carriers.

**SRS** (PRTTDCIS-4424)

The Down Conversion frequency accuracy shall be maintained for 180 days period or more without calibration.

**SRS** (PRTTDCIS-4425)

Amplitude variations as measured at the IF output (demodulator input) shall not exceed the following:

- 1) +/-0.5 dB over any 10 MHz segment across the instantaneous bandwidth; and,
- 2) +/-1.5 dB over any 120 MHz segment or smaller segment across the instantaneous bandwidth (10 MHz < segment < 120 MHz); and,
- 3) +/-1.5 dB for each output frequency band in X and Ka-bands.

**SRS** (PRTTDCIS-4426)

No spectral inversion shall exist between any RF input and the IF output of the system in the Receiving Path.

**SRS** (PRTTDCIS-4427)

For any setting of the receive gain and for a constant Power Spectral Density (PSD) level, the reception function output level shall not vary more than +/-1.5 dB in any 24 hour period.

**SRS** (PRTTDCIS-4428)

The Military SATCOM Terminal shall include all necessary specific adapter (such as Bias-Tee) in order to power and trouble-shoot the Amplifier and Down Conversion Elements,

**SRS** (PRTTDCIS-4429)

The Up and Down Conversion Subsystem Intermediate Frequency (IF) input and output interfaces shall be 50 Ohm N-Type connectors.

**6.4.3.4 Antenna Subsystem****SRS** (PRTTDCIS-2067)

The Military SATCOM Terminal Antenna shall be in the vicinity of 2.4 m foldable antenna, configured for operation for both X-band and Ka-band, without the need to mechanically replace the feed.

**SRS** (PRTTDCIS-3857)

The antenna design shall be capable of simultaneously transmitting Right-Hand Circular Polarization (RHCP) and receiving Left-Hand Circular Polarization (LHCP) in all bands (normal polarization).

**SRS** (PRTTDCIS-3858)

The antenna design shall be capable of simultaneously transmitting LHCP and receiving RHCP in all bands (inverted polarization)

**NOTE** (PRTTDCIS-3859)

Simultaneous normal and inverted polarization is not required.

**SRS** (PRTTDCIS-3860)

The duration required to switch between normal and inverted polarization shall not exceed 20 minutes in any frequency band.

~~**SRS** (PRTTDCIS-2069)~~

~~The antenna design shall support Low Passive Intermodulation (Low-PIM) feed.~~

**SRS** (PRTTDCIS-2070)

The antenna reflector shall fold if needed to not protrude from the allocable area when Node is in Transport configuration.

**SRS** (PRTTDCIS-4430)

The radiation pattern of the antenna while both transmitting and receiving shall be in accordance with ITU-R S.580-6.

**SRS** (PRTTDCIS-4431)

The gain of the antenna,  $G$ , shall be such that at least 90 percent of the side lobe peaks do not exceed:

- $G(\theta) = 29-25 \log_{10}(\theta)$  dBi for  $1^\circ$  or  $100 \lambda / D_e$  (whichever is larger, up to  $2^\circ \leq \theta \leq 20^\circ$ )
- $G(\theta) = -3.5$  dBi for  $20^\circ < \theta \leq 26.3^\circ$
- $G(\theta) = 32-25 \log_{10}(\theta)$  dBi for  $26.3^\circ < \theta \leq 48^\circ$
- $G(\theta) = -10$  dBi for  $48^\circ < \theta \leq 180^\circ$

Where

- $G$  = gain relative to an isotropic antenna,
- $\theta$  = off-axis angle in the direction of the satellite referred to the main-lobe axis,
- $D_e$  = equivalent antenna diameter and  $\lambda$  = wavelength (same units as  $D_e$ ).

**SRS** (PRTTDCIS-4432)

The angular regions and allowed side-lobe peak excess shall be within the limits as defined below:

- 1 dB for  $\theta_{\min} < \theta \leq 7^\circ$ , where  $\theta_{\min} = 1^\circ$  or  $(100 \lambda / D_e)$  degrees, whichever is larger
- 3 dB for  $7^\circ < \theta \leq 9.2^\circ$
- 3 dB for  $9.2^\circ < \theta \leq 48^\circ$
- 10 dB for  $48^\circ < \theta \leq 180^\circ$

Where  $\theta$  = off-axis angle in the direction of the satellite referred to the main-lobe axis

**SRS** (PRTTDCIS-4433)

The Antenna Subsystem shall include a de-icing capability that removes snow and ice.

**SRS** (PRTTDCIS-4434)

The de-icing capability shall not affect RF performance of the Antenna Subsystem.

**6.4.3.5 Pointing and Tracking Subsystem****SRS** (PRTTDCIS-4435)

The Military SATCOM Terminal shall include all the necessary devices needed to ensure appropriate initial pointing, re-pointing and permanent automatic tracking of a satellite.

**SRS (PRTTDCIS-2073)**

The Military SATCOM Terminal shall implement automatic pointing and tracking functionalities and allow a single setting auto-acquisition of selected satellites, including:

- 1) automatic deployment and stowing; and,
- 2) peaking and optimization; and,
- 3) Internal movement detector.

**SRS (PRTTDCIS-2075)**

The Military SATCOM Terminal shall enable an emergency Hand-crank/manual deployment and stowage, on Azimuth and Elevation axis.

**SRS (PRTTDCIS-4436)**

The Military SATCOM Terminal shall support manual pointing.

**SRS (PRTTDCIS-4437)**

The Military SATCOM Terminal shall be capable of tracking satellites by monitoring and maximising the level of a received signal, which can be selectable among the satellite beacon, a similar pseudo-beacon radiated by the satellite, the wide-band signal radiated by the satellite, or the receive signal strength indicator of any modem selected by the System Administrator.

**SRS (PRTTDCIS-2074)**

The Military SATCOM Terminal shall drive to calculated position based on GPS, Flux-Gate Compass (or Internal Reference Unit) data and satellite signal peaking.

**SRS (PRTTDCIS-4438)**

The antenna pointing shall be adjustable in two-axis with the minimum following parameters:

- 1) Azimuth: AZ (120 degrees range); and,
- 2) Elevation: EL (from 5 to 85 degrees) above the horizon.

**SRS (PRTTDCIS-4439)**

The manual pointing shall be adjustable in fine increments in azimuth with minimum 40 degrees range.

**SRS (PRTTDCIS-4440)**

The manual pointing shall be adjustable in fine increments in elevation with minimum 10 degrees range.

**SRS (PRTTDCIS-4441)**

Fine increments shall be such that the pointing loss from boresight does not exceed 0.2 dB in X-band.



**SRS (PRTTDCIS-4442)**

Fine increments shall be such that the pointing loss from boresight does not exceed 0.5 dB in Ka-band.

**SRS (PRTTDCIS-4443)**

The antenna auto-pointing and auto-tracking system shall allow re-pointing of the antenna in two-axis with a continuous range of motion with the following parameters:

- 1) Azimuth: minimum of 60 degrees; and,
- 2) Elevation: from 5 to 85 degrees above the horizon.

**SRS (PRTTDCIS-4444)**

The tracking Element shall consist, as a minimum but not limited to, the following elements:

- 1) Antenna Control Unit (ACU) and Beacon Receiver; and,
- 2) Axis Drive; and,
- 3) Axis control.

**6.4.3.6 Monitoring and Control Subsystem****SRS (PRTTDCIS-2089)**

The SATCOM Terminal shall include a Monitoring and Control Subsystem to fully monitor the system functionality and any performance degradation and perform fault detection and isolation down to LRU level integrated in the LMM-BLK.

**SRS (PRTTDCIS-4445)**

The Military SATCOM Terminal shall be able to be configured, monitored and operated without any third party equipment or software, using the LMM-BLK and its software, locally or remotely connected to the terminal components.

**SRS (PRTTDCIS-4446)**

Using the LMM-BLK, the System Administrator shall be able to fully monitor the system functionality and performance and perform fault detection and isolation down to LRU level.

**SRS (PRTTDCIS-2090)**

The Monitoring and Control Subsystem shall also feature:

- 1) Spectrum Monitoring, as drawn from spectrum analyser; and,
- 2) ON/OFF status of de-icing capability in case it is an active component; and,
- 3) Display of health and status information in a block diagram format, with colours reflecting current health and status of Line replaceable units (LRUs) in the following convention:
  - 1) Green – good acceptable performance within nominal parameters; and,
  - 2) Amber – unacceptable performance outside of nominal parameters; and,
  - 3) Red – element not functional.

**SRS (PRTTDCIS-4447)**

The following parameters shall be automatically acquired by the system and displayed within the Monitoring and Control application or screens:

- 1) The terminal longitude; and,
- 2) The terminal latitude; and,
- 3) Date and time (refreshed every second) in UTC.

**SRS (PRTTDCIS-4448)**

The travel limits of the antenna motion system shall be adjustable by the System Administrator.

**SRS (PRTTDCIS-4449)**

The Military SATCOM Terminal shall be equipped with physical travel limits (hardware limit) to prevent damage to the equipment.

**SRS (PRTTDCIS-4450)**

The Military SATCOM Terminal shall provide an emergency stop function of the antenna motion via the Monitoring and Control Subsystem, implemented as

- ONE (01) emergency button inside the Shelter; and,
- ONE (01) emergency button outside the Shelter; and,
- A software button always visible on the graphical user interface in the Monitoring and Control Tool Suite.

**SRS (PRTTDCIS-2086)**

The Military SATCOM Terminal shall include embedded spectrum analyzers function to monitor IF interfaces.

**SRS (PRTTDCIS-2087)**

The Spectrum analysers function shall integrate with the monitoring and control software Tool suite.

**SRS (PRTTDCIS-4658)**

The elements realizing the Spectrum Analyzer function shall enable live Link monitoring from the Element Management Tool Suite.

**SRS (PRTTDCIS-4451)**

The Military SATCOM Terminal shall allow simultaneous spectrum monitoring of both IF and RF signals while the system is operational.

**SRS (PRTTDCIS-4452)**

The monitoring Light Emitting Diodes (LED), if any, shall be coherent throughout all the subsystems of the system.

#### 6.4.4 Implementation Constraints

**SRS** (PRTTDCIS-4453)

The Military SATCOM Terminal shall have, as a minimum, 21 dB/K G/T at 10 degrees elevation and 23 degrees Celsius ambient temperature in the X-band.

**SRS** (PRTTDCIS-4741)

The Military SATCOM Terminal shall have, as a minimum, 65 dBW of saturated EIRP and 62 dBW of linear EIRP in X-band.

**SRS** (PRTTDCIS-4454)

The Military SATCOM Terminal shall have, as a minimum, 26 dB/K G/T at 10 degrees elevation and 23 degrees Celsius ambient temperature in the Ka-band.

**SRS** (PRTTDCIS-4742)

The Military SATCOM Terminal shall have, as a minimum, 69 dBW of saturated EIRP and 66 dBW of linear EIRP in military Ka-band.

**SRS** (PRTTDCIS-4455)

The Military SATCOM Terminal shall include waveguide equipment that enables rapid (less than 30 seconds) connection and disconnection, when required, without damaging the interconnecting components. No specific tools shall be required for this task.

**SRS** (PRTTDCIS-4456)

The Military SATCOM Terminal shall provide waveguide protection solutions that would prevent humidity inside the waveguides.

**SRS** (PRTTDCIS-4457)

Waveguides shall be sealed with RF conductive foils to prevent air ingress and ensure proper electric continuity.

**SRS** (PRTTDCIS-4458)

The Military SATCOM Terminal shall include sufficient quantities of mating connectors for all connectors, cables, and waveguides.

**SRS** (PRTTDCIS-4459)

The Contractor shall provide all the required information in order to have access authorization to a satellite, in case of need.

**SRS** (PRTTDCIS-2083)

The Military SATCOM Terminal shall withstand following additional wind specifications:

- Antenna deployed and terminal being operated with autotracking: 72 km/h (with gusts up to 95 km/h) with Maximum Pointing Loss of
  - 2 dB peak Ka Band; and,
  - 1.5 dB in X-Band; and,
- Antenna stowed: 161 km/h.

## 6.5 Combat Net Radio

**NOTE** (PRTTDCIS-2105)

The CNR belong to the proprietary PRC-525 ecosystem by EID which englobes the transceivers, power amplifiers, docking stations, remote consoles, etc.

**NOTE** (PRTTDCIS-2106)

The CNR support both voice and data in the xR security domain.

**NOTE** (PRTTDCIS-2107)

The radios are installed in single or double Radio Docking stations that host one or two radios and its associated amplifier respectively.

**NOTE** (PRTTDCIS-2108)

The rear link TR-525AH has a 500 W power amplifier associated.

**NOTE** (PRTTDCIS-1265)

The MMA-xR RoIP integrator is the ICC-204 IP Intercom Systems model, which is PFE.

## 6.6 IP HF Radio

**NOTE** (PRTTDCIS-2100)

The HF link data capability from the RL node operates as a Transmission System both for reach-back and intra-theatre links.

**NOTE** (PRTTDCIS-2101)

The HF link is implemented by

- 1) The EID PRC-525 Combat Net Radio (CNR), supporting IP services and SIP client; and,
- 2) A Rohde & Schwarz VK4150 power amplifier together with the required Rohde & Schwarz IN4150 power source.

**NOTE** (PRTTDCIS-2102)

The software used is the Rohde & Schwarz STANAG 5066.

**NOTE** (PRTTDCIS-2103)

The expected IP service to be employed is e-mail (i.e. using the CFTP client of STANAG 5066).

## 7 Housing Elements

### 7.1 General

#### NOTE (PRTTDCIS-4508)

This section details the Housing Elements (e.g. Cases, Shelters, Trailers, etc.), their composing Elements and their ancillaries.

### 7.2 Common Elements

#### 7.2.1 Power Generator Unit

##### 7.2.1.1 General

#### NOTE (PRTTDCIS-3481)

This section contains all Power Generation Unit (PGU) specifications common to all DPOP PGU. Housing element specific (Shelter, Trailer...) PGU specifications are captured in the section dedicated to this specific housing element.

#### NOTE (PRTTDCIS-4526)

The PGU type is Design Driven. Should the TDCIS PGU be of DC type, PGU specifications specific to AC types are non-applicable.

#### SRS (PRTTDCIS-2168)

The PGU continuous rating shall be established for Voltage, Phase, Frequency and Speed at 230VAC, 50 Hz and 1500 to 1800rpm.

#### SRS (PRTTDCIS-2172)

The refueling port shall accept hose or canister refueling without mechanical obstacles.

#### SRS (PRTTDCIS-2174)

The PGU shall have a full diagnostic and control panel integrated with the LMM.

#### SRS (PRTTDCIS-2175)

The PGU shall be capable of being remotely controlled from the LMM.

#### SRS (PRTTDCIS-2176)

The PGU system noise level (dB) shall be  $\leq 57$  dB(A) at a distance of 7 meters in the outside of the shelter or inside the shelter (with the door closed) under full load.

**SRS (PRTTDCIS-3043)**

ONE (01) dedicated 6 kg portal ABC dry powder fire extinguishers Class ABC and suitable for fires involving electronic equipment up to 1000 V shall be located close to the Power Generator Unit (PGU) and mounted in such a manner that it is easily accessible from the ground.

**SRS (PRTTDCIS-3147)**

The PGU fire extinguisher shall meet requirements as stipulated in following standards:

- EN 3-7:2004+A1:2007 Portable fire extinguishers. Characteristics, performance requirements and test methods; and,
- EN 3-8:2006 Portable fire extinguishers. Additional requirements to EN 3-7 for the construction, resistance to pressure and mechanical tests for extinguishers with a maximum allowable pressure equal to or lower than 30 bar; and,
- EN 3-10:2009 Portable fire extinguishers. Provisions for evaluating the conformity of a portable fire extinguisher to EN 3-7.

**SRS (PRTTDCIS-3337)**

The PGU shall be designed and manufactured to comply with applicable European Union (EU) safety regulations, standards and requirements.

**SRS (PRTTDCIS-3338)**

The PGU shall meet the safety requirements as specified in ISO 8528-13:2016 Reciprocating internal combustion engine driven alternating current generating sets, Part 13: Safety

**SRS (PRTTDCIS-3339)**

PGU shall be designed and provided with equipment to meet requirements for power generators rated as Continuous Operating Power (COP) according to ISO 8528-1:2018.

**SRS (PRTTDCIS-3340)**

The PGU shall be able to provide continuous power on variable loads for minimum of 4000 hours per year.

**SRS (PRTTDCIS-3341)**

If the local power grid is available, the PGU shall be capable and equipped with necessary accessories to operate in standby mode, ready to manually activate, when necessary.

**SRS (PRTTDCIS-3342)**

The sound isolation shall be non-hydroscopic.

**SRS (PRTTDCIS-3343)**

The PGU enclosure shall be equipped with rodent barriers on inlets and outlets.

**SRS (PRTTDCIS-3344)**

The PGU enclosure shall be equipped with appropriate input and output soundproof louvers.

**SRS** (PRTTDCIS-3345)

The PGU shall be removable from the enclosure to support maintenance activities.

**SRS** (PRTTDCIS-3346)

The PGU integration shall not prevent the shelter to be washable with a nozzle.

**SRS** (PRTTDCIS-3347)

The PGU shall be mounted on oil resistant vibration isolation elements.

**SRS** (PRTTDCIS-3348)

The PGU enclosure shall be provided with internal LED lighting with micro-switches.

**SRS** (PRTTDCIS-3349)

The PGU enclosure lighting shall support the same modes as the shelter (Normal, Combat...).

**SRS** (PRTTDCIS-3352)

The enclosure shall be provided with inspection doors.

**SRS** (PRTTDCIS-3353)

The inspection doors shall be equipped with snap handles.

**SRS** (PRTTDCIS-3354)

The inspection doors shall be equipped with padlock.

**SRS** (PRTTDCIS-3355)

At least one of the inspection doors shall be provided with a document holder installed on the inside of the door.

**SRS** (PRTTDCIS-4659)

The document holder shall protect its content against any dirt (e.g. oil, fuel, etc.) and environmental conditions (e.g. humidity, temperature, dust, etc.)

**SRS** (PRTTDCIS-3356)

The PGU and all its components (Air filter, Oil filters...) shall be considered as an outdoor assembly for its environmental conditions compliance.

**SRS** (PRTTDCIS-3357)

The PGU shall be of compact type and easy to maintain.



**SRS (PRTTDCIS-3358)**

The PGU capacity is design driven. The Contractor shall design the PGU with a minimum of an additional 10% of capacity to accommodate future system expansion.

**SRS (PRTTDCIS-3359)**

The engine/generator assembly shall be a standard product of current manufacture, from one company regularly engaged in production of such equipment.

**SRS (PRTTDCIS-3360)**

The contractor shall provide engine manufacturer's recommended lubricants / coolants and data concerning their equivalents, including the manufacturer and supplier details.

**SRS (PRTTDCIS-3361)**

Operation angle for the PGU shall be minimum 20 degrees on any direction.

**SRS (PRTTDCIS-3362)**

An authorised technical surveillance authority, recognized by NATO, shall approve the mechanical and electrical safety. This includes the allowance for transport of the power generator on public roads, aircrafts, trains and ships.

**SRS (PRTTDCIS-3363)**

The PGU shall be supplied with CE mark and EC Declaration of Conformity in compliance with the Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC.

**SRS** (PRTTDCIS-3364)

The PGU shall include at least following components:

- Electrical starter; and,
- Fuel meters to measure the net consumption of fuel by the engine in grams and liters. The meters shall have temperature correcting capability; and,
- Heavy-duty tube oil cooler with the temperature controlled by a thermostat valve; and,
- Lubricating oil pump; and,
- Fuel transfer pump; and,
- Radiator and belt-driven fan with mechanical protection, capable of cooling the engine on full load at all environmental conditions; and,
- Exhaust silencer; and,
- Oil pressure and temperature meters; and,
- Coolant temperature meter; and,
- Hot and moving parts protection; and,
- Anti-vibration, oil resistant shock absorbers; and,
- Reinforced lifting hooks for crane hoisting; and,
- Ground connection of electrical installation with ground spike; and,
- Digital diagnostic control panel; and,
- Supply and spill fuel-lines with fittings and fitted to the fuel tank; and,
- Exterior (piped to the edge of the enclosure) flexible oil and coolant drain lines with interior valves for ease of service; and,
- Fill of suitable lubricating oil, and anti-freeze for cooling system to assure performance at all environmental conditions.

**SRS** (PRTTDCIS-3365)

The PGU shall provide at least following functionalities:

- Safety shutdown system for low oil pressure, high temperature, over-speed and low fuel level with LED, re-settable indicators of the manual reset type; and,
- Dual fuel (fuel and fuel / water), oil and air filters in accordance with the manufacturer's specifications; and,
- Low oil pressure alarm; and,
- Over speed alarm; and,
- Low coolant level alarm; and,
- High coolant temperature alarm.

**SRS** (PRTTDCIS-3480)

PGU Lighting Protection and Grounding shall be integrated with those of the housing element hosting the PGU.

**SRS** (PRTTDCIS-3489)

PGU shall be provided with ONE (01) maintenance tool kit stored in a Stowage box, designed to restrict the entry of water and the tools shall be secured in place.

**SRS** (PRTTDCIS-3492)

Stowage Box shall be provided in the same colour as the PGU enclosure.

**SRS (PRTTDCIS-3490)**

PGU shall be provided with plate or plates (as required), located in convenient position without creating confusion with each other, imprinted on photosensitive anodized aluminium, conforming to type H, MIL-DTL 15024G, with a matt black background with following information printed:

- Operating instructions, emergency procedures, precautionary instructions to avoid personnel injury or equipment damage, servicing instruction, electrical schematics, technical characteristics, nomenclature and serial number; and,
- Centre of gravity marking with matt black colour; and,
- Information pertaining to air (as internal cargo-load and as helicopter external load), land, maritime and railways transportation.

**7.2.1.2 Engine****SRS (PRTTDCIS-3366)**

The engine shall be of a quick start, water-cooled industrial type.

**SRS (PRTTDCIS-3367)**

The engine shall be designed for continuous power rating.

**SRS (PRTTDCIS-3368)**

The engine shall be directly coupled to the synchronous electrical alternator.

**SRS (PRTTDCIS-3369)**

The engine power shall be such to drive the alternator at full load with power factor 0.8 lagging under all environmental conditions.

**SRS (PRTTDCIS-3370)**

The engine shall be capable of operating at light loads for extended periods of time and shall provide means to reduce carbonisation without requiring periodic cleaning of exhaust parts.

**SRS (PRTTDCIS-3371)**

The engine shall meet requirements for performance class G2 or better according to ISO 8528-2:2018 Reciprocating internal combustion engine driven alternating current generating sets, Part 2: Engines.

**SRS (PRTTDCIS-3372)**

De-rating due to extreme operating conditions and high altitude shall be addressed by the Contractor. However, the reduction of available power shall be less or equal than 3.5% per each 300m above 1200m of altitude.

**SRS (PRTTDCIS-3373)**

The declaration of power, fuel and lubricating oil consumption shall be determined in accordance with ISO 3046-1:2002 Reciprocating internal combustion engines, Performance, Part 1: Declarations of power, fuel and lubricating oil consumptions, and test methods, Additional requirements for engines for general use.

**SRS (PRTTDCIS-3374)**

The Specific fuel consumption and power output shall be quoted at standard (ISO) ambient conditions and at 45 degrees Celsius.

**SRS (PRTTDCIS-3375)**

The Contractor shall provide in technical documentation the de-rating curves or correction curves, formulae or calculations applicable to the generator for the power de-ration and fuel consumption for all environmental conditions.

**SRS (PRTTDCIS-3376)**

The engine shall be started electrically using batteries.

**SRS (PRTTDCIS-3377)**

The engine shall be equipped with a preheating system to keep the engine ready to start and take the full load, from 0 to 100%, within 15 seconds from standstill.

**SRS (PRTTDCIS-3378)**

The engine shall be multifuel ready and able to operate with at least the following fuels: diesel, DL-1, DL-2, JP-5 and JP-8.

**SRS (PRTTDCIS-3379)**

The PGU start system shall allow to be operated locally (directly on the next to the PGU) and remotely from inside the shelter (when PGU installed in a Shelter) and from the LMM.

**SRS (PRTTDCIS-3380)**

During each initial start of the engine, the PGU shall include a pre-lube at low idle speed system. When the internal oil pressure reaches the manufacturer predetermined safe value, the engine speed shall then increase to reach the alternator set operating speed.

**SRS (PRTTDCIS-3381)**

Convenient access for maintenance shall be assured. There shall be no need to remove the PGU from its enclosure to access coolant refill gauge, change oil and filters etc.

**SRS (PRTTDCIS-3382)**

Injection pumps and injection valves shall be of a type not requiring adjustment in service and shall be of a design allowing quick and field replacement by technicians without special diesel engine experience.

**SRS (PRTTDCIS-3383)**

The engines shall have an individual electronically controlled injection pump and injection valve for each cylinder, any one of which shall be removable and replaceable from stock parts.

**SRS (PRTTDCIS-3384)**

Fuel lines between injection pumps and valves shall be of heavy seamless tubing.

**SRS (PRTTDCIS-3385)**

Where applicable, air filters including pre-filters and dust traps shall be mounted in such a way to not to restrict the access to rocker covers and fuel injection pump.

**SRS (PRTTDCIS-3386)**

The oil sump shall preferably be equipped with a screw-in type stop that is easily accessible that drained oil can be caught in a vessel under the unit. If not possible, the oil sump shall include a cock with a pipe stopped by a mounted screw-on type stop. The pipe shall be long enough that drained oil can be caught in a vessel beside the unit. If the oil cannot be drained by gravity flow, the engine sump shall be equipped with a hand pump.

**SRS (PRTTDCIS-3387)**

The engine shall meet following characteristics:

- Engine Type: 4-stroke; and,
- Engine speed: 1500/1800 rpm; and,
- Insulation: H class or better; and,
- Protection: IP 23 or better according to IEC 60529: 1989/ AMD2: 2013/ COR1:2019.

**7.2.1.3 Engine Cooling****SRS (PRTTDCIS-3388)**

The engine cooling system shall be capable of adequately cooling the generator engine when it is supporting full load at the specified most extreme hot environmental conditions.

**SRS (PRTTDCIS-3389)**

The on-skid radiator cooling system shall be provided with the following:

- Water pumps for jacket water and turbocharger intercooler cooling complete with thermostatic bypasses; and,
- Water-air heat exchanger(s) for jacket water and turbocharger intercooler cooling complete with all necessary interconnection(s) to the on-board radiator; and,
- Automatic control of radiator fans, including automatic cycling for even running hours; and,
- Alarms and trip sensors for high/low coolant levels and temperatures.

**SRS (PRTTDCIS-3390)**

All cooling system components shall be monitored and alarmed by the control system.

**SRS** (PRTTDCIS-3391)

The cooling system shall include a heavy-duty, tropical-type radiator, constructed for high ambient/engine temperatures and withstanding all environmental conditions.

**SRS** (PRTTDCIS-3392)

The engine shall be provided with a thermostatic valve placed in the jacket water outlet between the engine and the cooling source.

**SRS** (PRTTDCIS-3393)

The thermostatic valve shall maintain the proper jacket water temperature under all load conditions.

**SRS** (PRTTDCIS-3394)

A flexible connecting section shall be provided between the radiator and discharge louver frame.

**SRS** (PRTTDCIS-3395)

The radiator shall be mounted on skid with oil resistant anti vibration mountings.

**7.2.1.4 Engine Heaters****SRS** (PRTTDCIS-3396)

The engine shall be equipped with a thermostat controlled coolant immersion heater to aid engine starting, in most extreme cold environmental conditions.

**SRS** (PRTTDCIS-3397)

The thermostat controlled coolant immersion heater shall be powered from the auxiliary power distribution

**SRS** (PRTTDCIS-3398)

The heater shall be automatically switched off, when the engine is running.

**7.2.1.5 Lubrication System****SRS** (PRTTDCIS-3399)

The lubrication system shall comprise an engine driven pump to circulate lubricating oil under pressure.

**SRS** (PRTTDCIS-3400)

Full flow filters shall be provided together with replaceable elements.

**SRS** (PRTTDCIS-3401)

Lube oil make-up shall be automatic monitored and alarmed by the control system.

**SRS** (PRTTDCIS-3402)

The lubrication system shall be provided with alarms and trip sensors for high/low oil levels and temperatures and fitted with a crankcase heater if required.

**7.2.1.6 Exhaust System****SRS** (PRTTDCIS-3403)

The engine exhaust system shall be composed of:

- 1) The exhaust silencer of a non-spark type, equipped with spark arrestor capable of the following:
  - 1) Low-pressure drop; and,
  - 2) Damping engine pulsations, backfiring and preventing any engine resonance; and,
  - 3) Sound attenuation as required to meet the noise level specified; and,
- 2) The discharge pipe work ; and,
- 3) Flanged flexible stainless steel thermal expansion bellows at the diesel engine exhaust outlet; and,
- 4) Support structures and fixings.

**SRS** (PRTTDCIS-3404)

The exhaust shall be stainless steel

**SRS** (PRTTDCIS-3405)

The exhaust shall be insulated as required.

**SRS** (PRTTDCIS-3406)

The exhaust outlet shall be stainless steel provided with a mechanical closing valve.

**SRS** (PRTTDCIS-3407)

The discharge stack and exhaust systems shall be supplied complete with roof, wall and floor mountings equipped with anti-vibration supports as required.

**SRS** (PRTTDCIS-3408)

Noise control measures including splitter attenuators and acoustic linings shall be considered with regard to reducing the noise levels.

**SRS** (PRTTDCIS-3409)

The complete exhaust system shall be designed such as not to exceed the noise limit of 65 dBA at a distance of about 7 meters from the output of the exhaust (in accordance with ISO 1996-1:2016) at full continuous load.

**SRS** (PRTTDCIS-3410)

The silencer shall be connected to the set through an INOX (stainless steel) compensator.

**SRS** (PRTTDCIS-3411)

Flanges shall help the pipes and the silencer to be easily disconnected.

**SRS** (PRTTDCIS-3412)

Fixation of exhaust pipes and silencer shall take into account thermal expansion and vibration.

**SRS** (PRTTDCIS-3413)

Purge valves shall be foreseen at the low points to evacuate any condensation.

**SRS** (PRTTDCIS-3414)

Exhaust emission shall meet requirements as specified in Regulation (EU) 2016/1628 of the European Parliament and of the Council of 14 September 2016.

**SRS** (PRTTDCIS-3415)

The fuel level emission shall be measured according to ISO 8178-4:2020 Reciprocating internal combustion engines, Exhaust emission measurement, Part 4: Steady-state and transient test cycles for different engine applications.

**7.2.1.7 Insulation****SRS** (PRTTDCIS-3416)

The Contractor shall provide and install thermal insulation on the generator and supplied auxiliaries where required for the efficiency of the works, to meet regulatory requirements and safety of personnel.

**SRS** (PRTTDCIS-3417)

All insulation materials shall not contain any asbestos or asbestos based products.

**SRS** (PRTTDCIS-3418)

No part of the works that can be touched during normal operation shall have a surface temperature in excess of 50 degrees Celsius.

**SRS** (PRTTDCIS-3419)

All insulation applied to pipe work, machinery, works, and ducting shall be clad with aluminium or stainless steel cladding of appropriate thickness not less than that conforming with BS 5970:2012 Thermal insulation of pipework, ductwork, associated equipment and other industrial installations in the temperature range of -100 degrees Celsius to +870 degrees Celsius, Code of practice.



**SRS** (PRTTDCIS-3420)

All insulation exposed to the weather shall be sufficiently clad to be completely weatherproof.

**SRS** (PRTTDCIS-3421)

Insulation and cladding shall be designed and applied with proper allowance for expansion and contraction.

**7.2.1.8 Fuel Supply****SRS** (PRTTDCIS-3430)

The tank shall be provided with the necessary equipment to supply the generator with fuel and as a minimum shall include the following:

- A fuel level indicator; and,
- A pump with in and out pressure gauges and automatic and manual ON/OFF operation; and,
- Low and high level alarms (sound alarms shall be capable of being disabled for tactical reasons) ; and,
- An auxiliary hand pump and associated manual valves; and,
- A fuel strainer on supply pump inlet with water separator; and,
- A vent cap; and,
- A drain valve with locking handle; and,
- Engine return pipes; and,
- A fuel leak detector; and,
- A fuel consumption meter.

**SRS** (PRTTDCIS-3429)

The fuel supply system shall be equipped with an automatic stop system due to lack of fuel.

**SRS** (PRTTDCIS-3428)

A de-fueling system shall be provided to meet commercial and military air transport regulations.

**SRS** (PRTTDCIS-3427)

Refilling by hand from jerry cans or locally from a mobile tank with electric pump shall be possible during operation of the PGU.

**SRS** (PRTTDCIS-3426)

The fuel inlet cap shall be secured with a padlock.

**SRS** (PRTTDCIS-3425)

External fuel inlet with warning light for full tank shall be provided with lockable cap.

**SRS** (PRTTDCIS-3424)

The PGU Fuel Tank shall be reinforced with non-cutting edge bulkheads.

**SRS** (PRTTDCIS-3423)

The PGU Fuel tank shall be compliant with the latest European Safety Regulations.

**SRS** (PRTTDCIS-3422)

PGU shall be provided with an integrated Fuel Tank, housed inside the PGS enclosure, of the capacity assuring at least 12 hours continuous operation under rated continuous power.

**7.2.1.9 Alternator****SRS** (PRTTDCIS-3431)

The alternator shall be a synchronous, regulated, drip proof industrial type.

**SRS** (PRTTDCIS-3432)

The alternator shall be self-excited of a rotating field brushless design.

**SRS** (PRTTDCIS-3433)

The alternator shall be provided with sealed-for-life bearings.

**SRS** (PRTTDCIS-3434)

The alternator shall be rated for a nominal continuous output and overload capacity at the specified environmental conditions

**SRS** (PRTTDCIS-3435)

The alternator shall be capable of delivering rated output (kVA) at rated frequency and power factor, at any voltage not more than 5 per cent above or below rated voltage.

**SRS** (PRTTDCIS-3436)

The instantaneous voltage dip shall not exceed 20% of rated voltage when full load, at rated power factor, is suddenly applied.

**SRS** (PRTTDCIS-3437)

Recovery of stable operation shall occur within 5 seconds. Steady state modulation shall not exceed +0.5%.

**SRS** (PRTTDCIS-3438)

Alternator windings shall be braced for full line ground fault currents, with solidly grounded neutral system.

**SRS** (PRTTDCIS-3439)

The alternator output shall be wired to heavy-duty terminations, via an appropriately rated, moulded case circuit breaker, with overload and short circuit protection.

**SRS** (PRTTDCIS-3440)

The insulation to windings shall have an oil, moisture, salt air, fungus proof finish and epoxy coated with surface which will not retain dust or condensation.

**SRS** (PRTTDCIS-3441)

It shall be possible to put the set in service after long periods in unheated storage without the necessity for drying up insulation.

**SRS** (PRTTDCIS-3442)

The winding insulation shall be minimum Class H according to IEC 60085:2007 Electrical insulation - Thermal evaluation and designation.

**SRS** (PRTTDCIS-3443)

The exciter shall be a fast response type, with a rotating full-wave bridge.

**SRS** (PRTTDCIS-3444)

The exciter shall have a low time constant and large capacity to minimize voltage transients under severe load changes.

**SRS** (PRTTDCIS-3445)

The alternator shall be controlled by a digital Automatic Voltage Regulator (AVR).

**SRS** (PRTTDCIS-3446)

The regulator shall include phase voltage sensing, automatic short circuit protection and shall include automatic under frequency protection to allow the generator to operate at no load at less than synchronous speed for engine start-up and shutdown procedures.

**SRS** (PRTTDCIS-3447)

The AVR shall be capable of maintaining voltage between +1.0% and -1.0% of any value within 10% of the nominal voltage throughout the full range of rated load and power factor conditions.

**SRS** (PRTTDCIS-3448)

Drop, stability and voltage set point adjustments shall be done by operator interface.

**SRS** (PRTTDCIS-3449)

The AVR shall be capable of preventing sustained over voltage during over speed conditions following the loss of load.

**SRS** (PRTTDCIS-3450)

After a sudden load rejection at rated power factor, rated voltage shall be restored within 2 seconds.

**SRS (PRTTDCIS-3451)**

Controls shall be provided to monitor the output current of the generator set and initiate an alarm (over current warning) when load current exceed 110% of the rated current of the generator set on any phase for more than 60 seconds.

**SRS (PRTTDCIS-3452)**

The controls shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (over current shutdown).

**SRS (PRTTDCIS-3453)**

Controls shall be provided to individually monitor phases of the output for short circuit conditions.

**SRS (PRTTDCIS-3454)**

The control/protection system shall monitor the current level and voltage.

**SRS (PRTTDCIS-3455)**

The controls shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (short circuit shutdown).

**SRS (PRTTDCIS-3456)**

Controls shall be provided to monitor the kW load on the generator set, and initiate an alarm condition (overload) when total load on the generator set exceeds the generator set rating for in excess of 5 seconds.

**SRS (PRTTDCIS-3457)**

All software, programming leads and software dongles and the like shall be provided if a computer programmable system is offered.

**SRS (PRTTDCIS-3458)**

The excitation system shall include the following features and facilities as the minimum:

- Voltage setting control; and,
- Power factor control; and,
- Protection against AVR failures (e.g. over/under excitation combined with over/under voltage) ; and,
- Supervised fault detection; and,
- An excitation system which will withstand short circuits and synchronising of the machine up to 90 degree out of phase without failure of the components; and,
- A brushless excitation system.

**SRS (PRTTDCIS-3459)**

The alternator shall have following characteristics:

- Nominal Voltage: 230VAC, single phase; and,
- Nominal frequency: 50 Hz; and,
- Rated output: to be determined by the Contractor; and,
- Power factor: 0.8 lagging; and,
- Efficiency: min 90% at power factor 0.8 lagging.

**7.2.1.10 Coupling****SRS (PRTTDCIS-3460)**

The elastic coupling between the engine and the alternator shall be such as to prevent abnormal wear and overheating of the bearings due to slight misalignment within the specified tolerances.

**SRS (PRTTDCIS-3461)**

Any part of the elastic coupling subject to wear shall be easily accessible for inspection and replacement.

**7.2.1.11 Engine Starting System****SRS (PRTTDCIS-3462)**

The engine shall be provided with an on-skid dual 12/24 VDC electric starting system.

**SRS (PRTTDCIS-3463)**

The engine starting system, as the minimum shall be composed of:

- The electric starting motors; and,
- Low maintenance starting batteries; and,
- Ventilated battery housing; and,
- Vibration-free battery rack/tray; and,
- Interconnection cables; and,
- 230VAC battery chargers.

**SRS (PRTTDCIS-3464)**

The battery chargers shall be capable of re-charging the batteries to full potential within one hour after a cranking cycle and shall be adjustable to compensate for the battery self-discharge rate during standby periods.

**SRS (PRTTDCIS-3465)**

The starting batteries shall be lead acid, maintenance free type with a minimum of 5 years expected life time.

**SRS** (PRTTDCIS-3466)

The batteries and starters shall be capable of TEN (10) starts per hour with a minimum of 5 consecutive start attempts.

**SRS** (PRTTDCIS-3467)

All battery system components shall be monitored and alarmed by the control system.

**SRS** (PRTTDCIS-3468)

The control system provided shall include a cycle cranking system, which allows for user selected crank time, rest time, and number of cycles. Initial settings shall be for 3 cranking periods of 15 seconds each, with 15 second rest period between cranking periods.

**SRS** (PRTTDCIS-3469)

The control system shall include time delay start (adjustable from 0 to 300 seconds) and time delay stop (adjustable from 0 to 600 seconds) functions.

**SRS** (PRTTDCIS-3470)

Lockable battery isolator switch shall be provided for use during maintenance and storage.

**7.2.1.12 Digital Diagnosis Control Panel****SRS** (PRTTDCIS-3471)

The digital Diagnostic Control Panel shall be mounted on the power generator in such a way that it would allow monitoring of basic parameters through a visor without opening any doors or flaps.

**SRS** (PRTTDCIS-3472)

The digital Diagnostic Control Panel shall be behind door mounted.

**SRS** (PRTTDCIS-4660)

The PGU shall include a secondary detachable Digital Diagnostic Control Panel and cable remotable to a minimum distance of 25m from the PGU to the Sys Admin Tent.

**SRS** (PRTTDCIS-4661)

The detachable Digital Diagnostic Control Panel shall provide the same functionalities as the PGU Digital Diagnostic Control Panel.

**SRS** (PRTTDCIS-3473)

The digital Diagnostic Control Panel visor shall be secured with padlock, tampered and weatherproof.

**SRS (PRTTDCIS-3474)**

The digital Diagnostic Control Panel shall contain as the minimum:

- 1) The static battery charger; and,
- 2) The starting procedure; and,
- 3) The command equipment:
  - 1) One 3 position switch: OFF-AUTO-MANUAL; and,
  - 2) Two push-buttons: START - STOP for use in manual position; and,
  - 3) One emergency stop push-button; and,
  - 4) A push button to stop the audible alarm; and,
  - 5) An alarm reset push-button; and,
  - 6) An alarm lamp test button; and,
  - 7) A button to select the enclosure lighting mode; and,
- 4) A Command & Control system able to show the following information:
  - 1) Generator load; and,
  - 2) Generator voltage; and,
  - 3) Generator current; and,
  - 4) DC battery voltage; and,
  - 5) DC battery current; and,
  - 6) Running time meter (engine hour counter); and,
  - 7) Frequency; and,
  - 8) Oil pressure; and,
  - 9) Oil temperature; and,
  - 10) Coolant temperature; and,
  - 11) Engine speed (rpm) ; and,
  - 12) Status indicator for the alarms; and,
  - 13) Audible alarm (10 dB over generator noise) ; and,
- 5) The following displayed digital information and alarms:
  - 1) Coolant high temperature; and,
  - 2) Oil high temperature; and,
  - 3) Low oil pressure; and,
  - 4) High oil pressure; and,
  - 5) Missed start; and,
  - 6) Battery charger failure; and,
  - 7) Over speed; and,
  - 8) Under speed; and,
  - 9) Over voltage; and,
  - 10) Under voltage; and,
  - 11) Low fuel tank level; and,
  - 12) AVE alarms.

**SRS (PRTTDCIS-3475)**

In case of an alarms occurs, the following sequence shall be followed:

- 1) The corresponding alarm appears on the control panel and the audible alarm is activated; and,
- 2) The audible alarm is stopped by means of the related push-button; and,
- 3) After the audible alarm is stopped the visual alarm stays on; and,
- 4) The visual alarm disappears after activation of the reset push-button.

**SRS** (PRTTDCIS-3476)

The Emergency stop push-button shall be a mushroom type push button, red colour.

**SRS** (PRTTDCIS-3477)

The Emergency stop push-button shall be protected to prevent inadvertent operation.

**SRS** (PRTTDCIS-3478)

The Emergency stop push-button activation shall be possible without opening any panels, flaps, doors or any other type of covers with easy access and no obstructions.

**SRS** (PRTTDCIS-3479)

The Emergency stop push-button shall be in conformity with the requirements of following directives and standards: MD 2006/42/EC, LVD 2014/35/EU, IEC 60947-5-1:2016, IEC 60204-1:2016, ISO 13849-1:2015, and IEC 60947-5-5:1997 + AMD1: 2005 +AMD2:2016 CSV.

**7.2.1.13 Circuit Breakers****SRS** (PRTTDCIS-3482)

Main line, moulded case circuit breaker mounted upon and sized to the output of the generator at 50 Hz shall be installed as a load circuit interrupting and protection device.

**SRS** (PRTTDCIS-3483)

It shall operate both manually for normal switching functions and automatically during failure events.

**SRS** (PRTTDCIS-3484)

The breaker shall also include ground fault sensing that will trip the breaker on ground fault conditions.

**SRS** (PRTTDCIS-3485)

The circuit breakers on the generator power supply outlet shall be covered by flex glass internally and externally for protection against electrical hazards.

**SRS** (PRTTDCIS-3486)

The circuit breakers shall be complaint with IEC 60947:2021 series and with IEC 60898.

**7.2.1.14 Fuel Jerry Cans****SRS** (PRTTDCIS-2446)

Jerry Cans (portable petrol storage containers) shall meet the performance requirements for the carriage of petrol under the European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR).



**SRS** (PRTTDCIS-3202)

Jerry Can shall be made of metal (steel sheet or aluminium) with nominal capacity of 20 liters each.

**NOTE** (PRTTDCIS-3203)

The nominal capacity of the container is the maximum volume of liquid the container is intended to hold at 20 degrees Celsius.

**SRS** (PRTTDCIS-3204)

The total capacity of Jerry Can shall be between 10% and 15% more than the nominal capacity (i.e. the maximum volume of liquid that the container would hold if filled to the brim).

**SRS** (PRTTDCIS-3205)

The lids or tops shall be well-fitting and made of suitable material to remain secure and prevent the escape or leakage of liquid or vapor, with the closure providing an effective seal at all times when applied.

**SRS** (PRTTDCIS-3206)

The closure shall not show any visible signs of leaking even if the container is on its side or accidentally tipped over.

**SRS** (PRTTDCIS-3207)

Any opening for filling shall allow for the safe filing of petrol from a petrol pump without using a funnel.

**SRS** (PRTTDCIS-3209)

Any opening shall allow for the safe filing of the PGU without using a funnel.

**SRS** (PRTTDCIS-3210)

Jerry Can shall be delivered with a Petroleum, Oil and Lubricant (POL) compliant foldable bucket to be used when the Jerry can is put on the ground and avoid any potential fuel leak to be release in the environment.

**SRS** (PRTTDCIS-3211)

Jerry Can shall be marked or labelled in a legible and indelible form with:

- the words 'PETROL' and 'HIGHLY FLAMMABLE'; and,
- an appropriate hazard warning sign; and,
- the nominal capacity in liters; and,
- the manufacturer's name and the date and month of manufacture.

**SRS** (PRTTDCIS-3491)

Jerry Cans shall be provided in the same colour as the PGU enclosure.

## 7.2.2 Uninterruptible Power Supply

### SRS (PRTTDCIS-4504)

The UPS shall include a visual alarm, an audio alarm and a contact closure loop to inform locally and remotely loss of mains power and of low battery power to ensure the timely implementation of the graceful shutdown processes and procedures.

### SRS (PRTTDCIS-4505)

As a minimum, the following commands and control operations of the UPS shall be possible and accessible right after the removal of the UPS case lid which protects the UPS unit during transportation, storage and handling:

- 1) System OFF; and,
- 2) System on UPS; and,
- 3) System on Static Bypass; and,
- 4) System on Manual Bypass; and,
- 5) Alarm silence switch; and,
- 6) Measurement of:
  - 1) Input current; and,
  - 2) Input voltage; and,
  - 3) Input power; and,
  - 4) DC voltage; and,
  - 5) DC current; and,
  - 6) Output voltage; and,
  - 7) Output current; and,
  - 8) Output frequency; and,
  - 9) Output power; and,
- 7) As a minimum, visual and audible alarms:
  - 1) Battery at low level and low voltage; and,
  - 2) System on bypass; and,
  - 3) Input supply failure; and,
  - 4) Overload; and,
  - 5) High temperature; and,
  - 6) UPS not answering or communication lost; and,
  - 7) Logging of previous minimum 50 alarms shall be possible; and,
- 8) Automatic battery check-up.

### SRS (PRTTDCIS-4506)

The UPS shall signal changes in status towards the LMM, as well as critical capacity warnings and visual and audio indications from the UPS itself.

### SRS (PRTTDCIS-4507)

The UPS shall support the triggering of a graceful shutdown mechanism of the Elements it power supplies.

## 7.2.3 Cable Reels

### 7.2.3.1 General

#### NOTE (PRTTDCIS-4396)

This section contains all Cable Reels specifications common to all DPOP Elements including those. Element specific (e.g. Shelter, Trailer, etc.) Cable Reels specifications are captured in the section dedicated to this specific element.

#### SRS (PRTTDCIS-3335)

All cable reels (Electrical, FO, SFTP, etc.) shall meet following characteristics:

- Heavy duty, ruggedized for field military applications; and,
- Painted with the same colour (or black) and type of painting as the shelter; and,
- Roll-formed channel frame for heavy-duty applications; and,
- Non-sparking ratchet assembly; and,
- Declutching arbour to prevent damage from reverse winding; and,
- Fold-in swivel handles; and,
- Lightweight aluminium structure with protecting frame; and,
- Easy access to the inner end; and,
- Fixings to secure cable ends for transport, handling and storage.

#### SRS (PRTTDCIS-2161)

Cable Reels shall be painted in RAL 840R 6014, non-gloss or equivalent.

#### SRS (PRTTDCIS-2160)

The cable shall be mounted on a mobile drum with belt strap and drum locking system.

#### SRS (PRTTDCIS-3031)

Each cable reel shall include a cable retention system on both ends to protect connectors from traction.

#### SRS (PRTTDCIS-3034)

The Cable Reel shall include handle to be carried by hand.

#### SRS (PRTTDCIS-4662)

Each Shelter shall include ONE (01) Cable Reel Backpack Harness able to attach ONE (01) Cable reel.

### 7.2.3.2 FO Cable Reels

#### SRS (PRTTDCIS-2159)

The FO Cable Reel shall contain a 250 m long, black color, FO cord suitable for tactical use with mating connectors to the ECP.

### 7.2.3.3 SFTP Cable Reels

**SRS** (PRTTDCIS-2162)

The SFTP Cable Reel shall contain FOUR (04) 50 m long, black color, Cat. 6 or better SFTP cables suitable for tactical use with matting connectors to the ECP.

### 7.2.3.4 WD-1/TT Cable Reels

**SRS** (PRTTDCIS-4663)

The WD-1/TT Cable Reel shall contain ONE (01) 1500 m long WD-1/TT 2-wires PFE cable.

## 7.3 Shelter

### 7.3.1 General

**SRS** (PRTTDCIS-1372)

The Shelter is the housing element for all CIS and non-CIS assets that constitute a node. Following figure illustrates the Shelter breakdown structure. It identifies the elements it is composed of. Each Shelter shall be built upon the building blocks as identified in this reference.

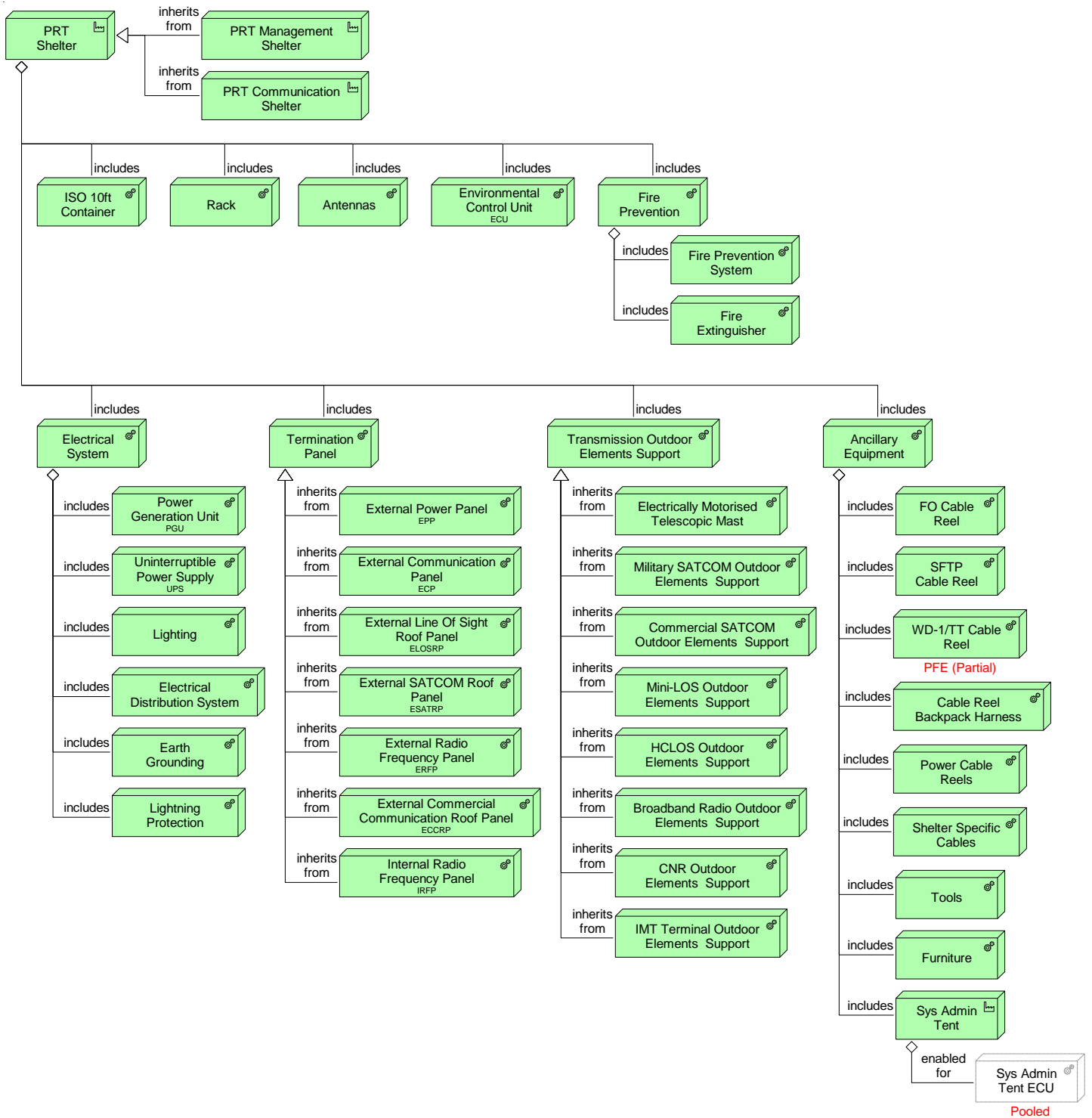


Figure 85 - Shelter Breakdown Structure

**SRS (PRTTDCIS-1241)**

To achieve better maintainability and supportability, all Shelters shall be designed and built the same and share a common baseline to support any Node configuration.

**SRS** (PRTTDCIS-1375)

All Shelters shall have a common base consisting of:

- Structure; (i.e. Container, racks, cabling, etc.); and,
- Electrical Power; and,
- Environmental Control Unit; and,
- External Termination Boards; and,
- Satellite and Antenna Masts Supports; and,
- Ancillary Equipment.

**SRS** (PRTTDCIS-1374)

The node-configured Shelter common base shall only be fitted with those Module and Transmission Systems Elements required for the specific nodal functionalities and services.

**SRS** (PRTTDCIS-4528)

Only Shelters implementing Nodes equipped with Military SATCOM Terminal and implementing Nodes marked as Enabled for Military SATCOM Terminal, shall include the Military SATCOM Terminal Installation Kit (IK) (e.g. mechanical interfaces, cabling, rack space, ESATRP, etc.).

**NOTE** (PRTTDCIS-2111)

TDCIS Nodes are composed of one or two shelters. When a statement refers to the Node Shelter, it refers to all shelters composing the node, without any consideration for quantities.

**SRS** (PRTTDCIS-1369)

The interior surfaces of shelters shall be painted white in accordance with the colour standard mat paint RAL 9010.

**SRS** (PRTTDCIS-2467)

Shelters outdoor surfaces shall be painted with Infra-Red Reflective (IRR) properties, permitting a subsequent application of a top coat with Chemical Agent Resistant Coating (CARC) characteristics, in accordance with Def Stan 80-208 (Issue 3, Amend. 1) and Def Stan 80-215 (Issue 2)

**SRS** (PRTTDCIS-1376)

The shelter shall be capable of being transported on a wheeled 4x4 Medium Tactical Vehicle (MTV) procured by the Portuguese Army, which is designed to transport a 10ft ISO container.

**NOTE** (PRTTDCIS-4544)

The MTV will include stabilization legs.

**SRS** (PRTTDCIS-1377)

All node-configured shelter, when dismounted from the MTV, shall be capable of being transported within a suitable military aircraft (e.g. C-130H, KC-390) currently in service with the Portuguese Army.

**SRS** (PRTTDCIS-1378)

The shelter shall be designed to be lifted and transported, when installed with all necessary elements, by the following means:

- Forklift (from each of its longer sides); and,
- Crane; and,
- Helicopter.

**SRS** (PRTTDCIS-1379)

A shelter total gross weight, in any Node variant, fully equipped and ready for transport, shall not exceed 4250 kilograms.

**NOTE** (PRTTDCIS-3544)

The Contractor will aim for all node-configured shelter variants to be the lighter possible.

**NOTE** (PRTTDCIS-3197)

Shelter will not include a camouflage net and will benefit from the Vehicle Camouflage Net.

**SRS** (PRTTDCIS-4532)

Each shelter shall include a temporary sitting position where a system administrator can take place and use its workstation when performing activities inside the shelter. This temporary working position shall be supported by a wall mounted foldable table.

**SRS** (PRTTDCIS-1813)

Unless stated otherwise, all Node elements (e.g. UAM, HCLOS, Mini-LOS, System Administrator EUD, etc.) shall be fixed and stored in the Shelter (inside or in accommodations installed in the allocable area) for storage and transportation.

## 7.3.2 Structure

### 7.3.2.1 General

**SRS** (PRTTDCIS-3144)

The Shelter shall be designed in accordance with and certified compliant to: 6516/SHCPE/86-88.

**SRS** (PRTTDCIS-1380)

The shelter shall be constructed based on ASTM E1925.

**SRS** (PRTTDCIS-2112)

The shelter wall, ceiling and floor panels shall have a "sandwich structure" (as per 6516/SHCPE/86-88) while remaining compliant with ISO 1496.

**SRS** (PRTTDCIS-1381)

The shelter shall support "ISO corner" mounting in accordance with ISO 1161:2016.

**SRS** (PRTTDCIS-1382)

The shelter external floor base dimensions shall adhere to the ISO 10 feet container type structure in accordance with ISO 668:2013 (i.e. L 10ft x W 8ft).



**SRS** (PRTTDCIS-1387)

The shelter, when ready for transportation (i.e. not deployed), and all its attached parts (e.g. masts, antenna, etc.) shall not protrude outside of the "free area" envelope:

- Laterally, all parts shall be within the external 8ft width limit of an ISO 10ft container; and,
- Longitudinally, attached parts may protrude up to 976 mm (3.2ft) in the front and in the aft of the shelter with a maximum length of a shelter, including protruding parts, shall be 16.4ft (approx. 5m); and,
- Vertically, all parts shall be within the maximum external height of 8ft 6in.

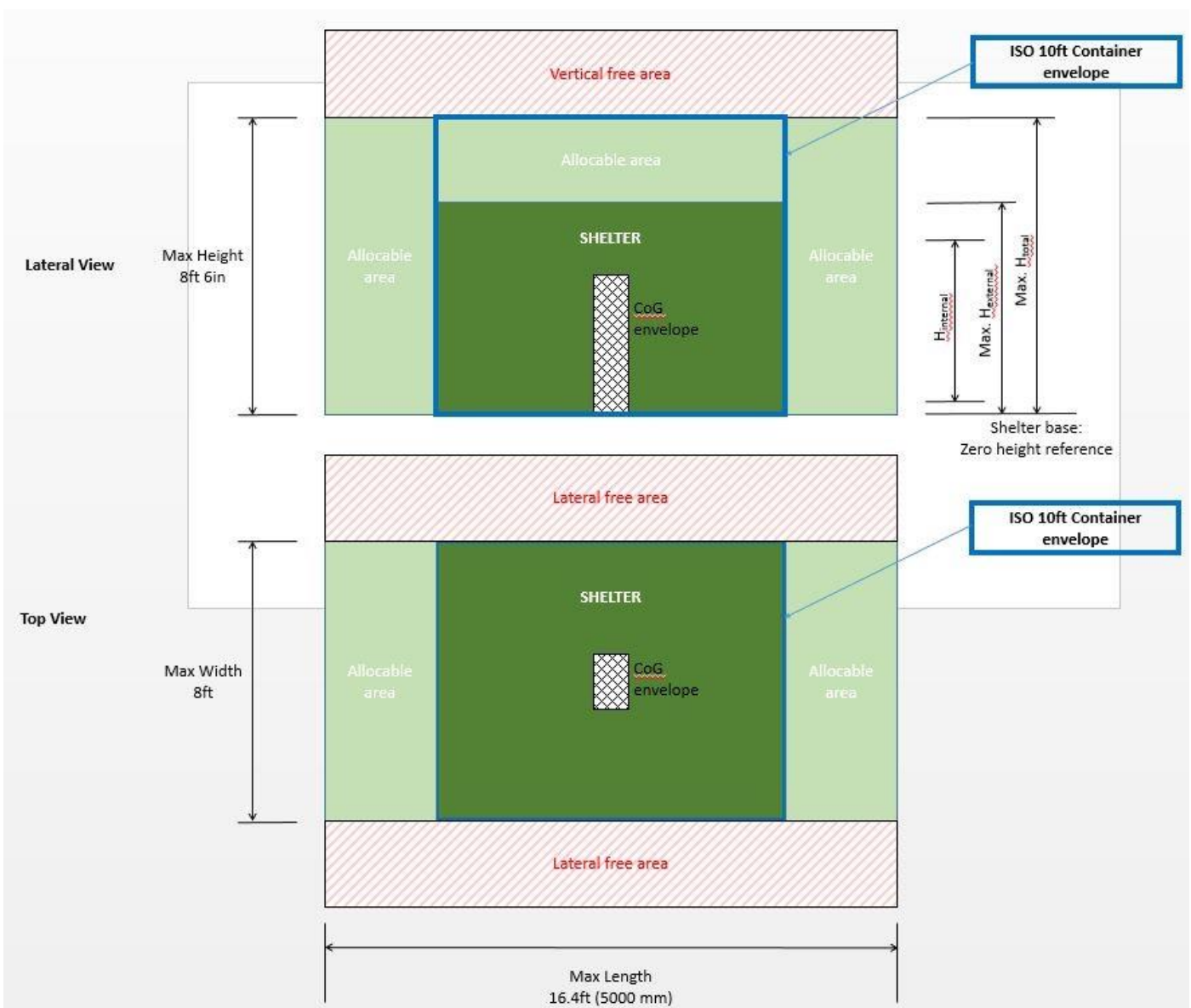


Figure 86 - Shelter Mechanical Envelope

**NOTE** (PRTTDCIS-2114)

Note that when the shelter is operationally deployed, the above specified envelopes are not applicable.

**SRS** (PRTTDCIS-1383)

The maximum external height of the shelter (for all possible shelter configurations) excluding all roof mounted ancillary equipment (e.g. foldable satellite dish) shall not exceed 2000 mm.

**SRS** (PRTTDCIS-2113)

The maximum external envelope height of the shelter (for all possible Node variant) in transport mode including all roof mounted ancillary equipment (e.g. foldable satellite dish) shall not exceed 8ft 6in (i.e. 2590.8mm).

**SRS** (PRTTDCIS-1384)

The shelter minimum internal height when measured from the floor to ceiling shall be 1750mm.

**SRS** (PRTTDCIS-1385)

The shelter external vertical height zero reference measurement point shall be considered the bottom of the shelter base.

**SRS** (PRTTDCIS-1386)

Fully loaded shelter shall have the Center of Gravity (CoG) within the envelope as specified below (extracted from ISO 8323:1985):

- +/- 10% of the external width, measured from the geometric center; and,
- +/- 5% of the external length, measured from the geometric center; and,
- Below a height of 1219 mm (4ft = half height of an ISO 10ft container), measured from the bottom of the base.

**NOTE** (PRTTDCIS-1388)

The shelter accessories will preferably be located within the lateral fore and lateral aft areas.

**NOTE** (PRTTDCIS-2115)

The shelter accessories will preferably not be located on the top of the shelter.

**SRS** (PRTTDCIS-1389)

The shelter walls shall be mechanically robust to support input/output panels and anchorage points for the attachment of equipment racking systems and accessories.

**SRS** (PRTTDCIS-1392)

The shelter internal wall structure, floor and ceiling shall implement NATO C-profile railing (as per 6516/SHCPE/86-88) to support the attachment and installation of equipment, railing and ancillary items, etc. to be installed inside the shelter.

**SRS (PRTTDCIS-1395)**

The shelter back wall shall have a door for easy access of personnel and equipment to the shelter interior. The door shall:

- Support a 6 point locking mechanism; and,
- Support an opening system operable from the outside and inside; and,
- It shall be possible to open the door from the inside in 3 seconds, even when closed from the outside; and,
- Have the maximum possible height possible, depending on the overall height of the shelter and a width between 800 mm and 860 mm; and,
- Have a locking device (e.g. padlock, with min 4 digit security code).

**7.3.2.2 Roof****SRS (PRTTDCIS-1390)**

The shelter external roof panel shall be mechanically robust and covered with an "anti-slip" to support the presence and movement of military personnel.

**SRS (PRTTDCIS-3125)**

The "anti-slip" coating shall meet requirements as stipulated in STANAG 4698, Edition1 and its associated AEP-63, Edition 1: Performance requirements for non-skid coating systems.

**SRS (PRTTDCIS-3126)**

The shelter roof assembly shall be able to withstand a static load of 300 kg/m<sup>2</sup>.

**SRS (PRTTDCIS-3127)**

The shelter roof assembly shall allow for personnel to walk on its surface without introducing any deformation or damage to the surface or paint coatings.

**7.3.2.3 Floor****SRS (PRTTDCIS-1391)**

The shelter interior floor panel shall be mechanically robust to support the weight of the internally installed equipment, ancillary items and the presence of military personnel.

**SRS (PRTTDCIS-3128)**

The shelter floor panels shall be capable of supporting a uniform load of 320 kg/m<sup>2</sup> in accordance with ASTM E1925-18.

**SRS (PRTTDCIS-3129)**

The shelter floor panels shall be capable of supporting a concentrated load of 900 kg over a 0.37m<sup>2</sup> area at the center of the floor.

**SRS (PRTTDCIS-3130)**

The shelter floor panels shall be capable of supporting a point load of 57 kg over a 650mm<sup>2</sup> area.

**SRS (PRTTDCIS-3131)**

The loads shall not cause any permanent deformation of the shelter floor panels or cause any deflections that interferes with proper shelter operation.

**SRS (PRTTDCIS-3132)**

The shelter floors shall be horizontal and flat, with only a minimal sill at the doorframes.

**SRS (PRTTDCIS-3133)**

The shelter floor panels shall have water drains that shall be closed by default, but capable of being opened without tools.

**SRS (PRTTDCIS-3134)**

The shelter floor panel water drains shall be located at accessible points.

**SRS (PRTTDCIS-3135)**

The shelter floor panel water drains shall have EMI shielded closing covers/lids, and ant-insect mesh.

**SRS (PRTTDCIS-3136)**

The floors shall be of heavy-duty industrial type with surface finish.

**SRS (PRTTDCIS-3137)**

The floor surfaces shall be non-reflecting.

**SRS (PRTTDCIS-3138)**

The floor surfaces shall be fire-resistant to Fire class A1, according to EN 13501-1:2018.

**SRS (PRTTDCIS-3139)**

The floor surfaces shall be non-toxic.

**SRS (PRTTDCIS-3140)**

The floor shall neither attract nor harbour dust and be easy to clean. Therefore, no carpeting material shall be used.

**SRS (PRTTDCIS-3141)**

The floor shall be anti-slip resistant to damp and commercial disinfectants and detergents.

**SRS (PRTTDCIS-3142)**

The floors shall maintain electrostatic dissipative (ESD) and conductive coating performance without the need for special ESD waxes or polishes.

**SRS (PRTTDCIS-3143)**

The floor shall meet requirements stipulated in:

- 1) EN 61340-5-1:2016 Electrostatics, Protection of electronic devices from electrostatic phenomena; and,
- 2) EN 61340-4-1:2004+A1:2015 Electrostatics, Standard test methods for specific applications and Electrical resistance of floor coverings and installed floors.

**7.3.2.4 Cable trunking****SRS (PRTTDCIS-2117)**

The cable trunking shall provide, where necessary, for physical and/or electrical isolation/separation of the different internal cable harnesses.

**SRS (PRTTDCIS-3145)**

Metallic information technology cabling and electrical power cabling shall be separated as specified in EN 50174-2:2018 - Information technology, Cabling installation, Installation planning and practices inside buildings.

**SRS (PRTTDCIS-3146)**

The cable trunking shall be composed of a metallic reinforced frame for robustness.

**SRS (PRTTDCIS-1394)**

The shelter internal wall structure shall support cable trunking mechanisms to support internal cable harnesses.

**7.3.2.5 Cable aperture****SRS (PRTTDCIS-1396)**

The shelter back wall shall support a 100mm cable aperture providing a minimum of 100mm diameter free space for the insertion of cabling between the inside/outside of the shelter.

**SRS (PRTTDCIS-4520)**

When not in use, the 100mm cable aperture shall be sealed with a caps ensuring Shelter Environmental Endurance (e.g., water, dust, etc.), EMC and EMSEC specifications.

**SRS (PRTTDCIS-4521)**

When in use, the 100mm cable aperture design shall prevent water (e.g. direct rain, cable following flow, etc.) to enter the shelter.

### 7.3.3 Racks

**SRS** (PRTTDCIS-2118)

The shelter shall employ a 19in racking system for the installation of all the CIS equipment (e.g. power, radios, CIS, etc.) inside the shelter.

**SRS** (PRTTDCIS-2120)

The racking system shall accommodate project deliverable components and integrate PFE elements.

**SRS** (PRTTDCIS-4584)

Elements integration in racks shall be realized in such a way that:

- Elements can be removed without the need of removing other Elements; and,
- Elements can be pulled out of the rack while they are being operated (e.g. to control backside cables, LEDs, etc.).

**SRS** (PRTTDCIS-2121)

Racks shall provide a minimum of additional room for future equipment per Security Domain as follow:

- BLK: FIVE (05) Rack Units (RU); and,
- xU: THREE (03) RU; and,
- xR: FIVE (05) RU; and,
- xS: THREE (03) RU.

**SRS** (PRTTDCIS-4583)

Racks additional room for future equipment shall not be spread across racks but be grouped per Security Domain (i.e. One time five RU and not five times one RU spread across the rack)

**SRS** (PRTTDCIS-2122)

The racking systems location in shelter shall be designed to minimize the shelter internal cable lengths.

**SRS** (PRTTDCIS-2123)

The racking system shall support shock and damping systems to protect the mounted CIS equipment from the shock and vibration levels to which the shelter is exposed.

**SRS** (PRTTDCIS-2125)

Racks shall be equipped with removable meshed panels covering rack fronts and all exposed rack backs and sides, without impacting air-flow and cooling performances of Elements mounted in the rack.

**SRS (PRTTDCIS-4581)**

Racks removable meshed panels shall support the addition of padlocks.

**SRS (PRTTDCIS-4582)**

Racks removable meshed panels shall be removable without the need of any key or tools.

**SRS (PRTTDCIS-4533)**

Racks shall include patch panels to support, as a minimum, patching to Termination Panel, patching between racks and remote component ports which are not accessible when integrated in racks.

**7.3.4 Electrical System**

**7.3.4.1 General**

**NOTE (PRTTDCIS-1406)**

The shelter electrical power concept is illustrated on the following picture:

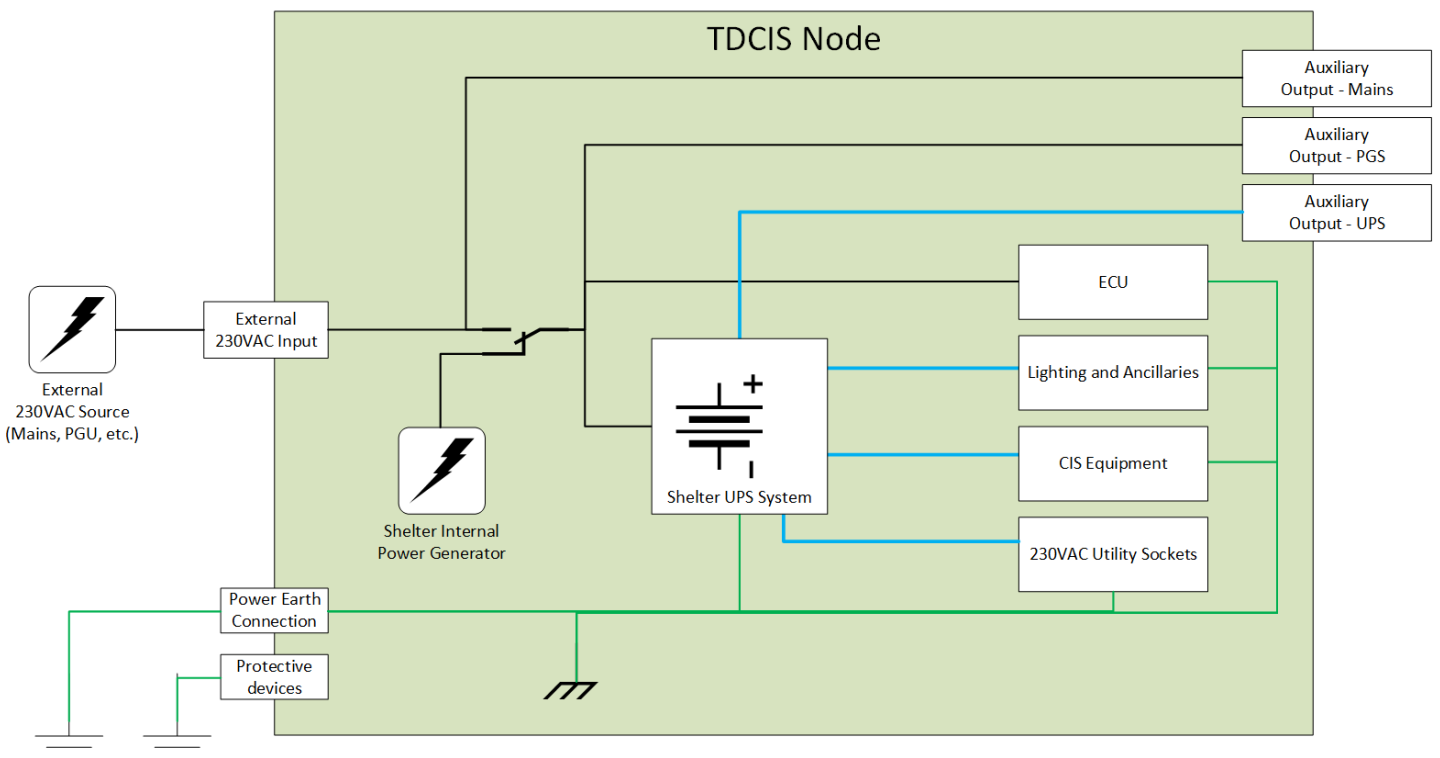


Figure 87 - Shelter Electrical Concept

**SRS (PRTTDCIS-2144)**

It shall be possible to power the TDCIS Node electrical system by an external AC Power Source (Mains).

**SRS** (PRTTDCIS-3246)

The Shelter main power input shall be of 230VAC single phase type.

**NOTE** (PRTTDCIS-4524)

The Power distribution inside the shelter is design driven. i.e. it can be AC, DC or any combination of both.

**SRS** (PRTTDCIS-2145)

It shall be possible to power the TDCIS Node electrical system from the shelter internal Power Generator Unit (PGU).

**SRS** (PRTTDCIS-4664)

The Contractor shall implement security mechanisms preventing the System Administrator to power on the PGU from inside the shelter if necessary preliminary actions (e.g. door opening, flap opening, etc.) have not been executed.

**SRS** (PRTTDCIS-4665)

The PGU starting preventing mechanisms will be feedback through LEDs visible inside the shelter.

**SRS** (PRTTDCIS-2154)

Switching between mains and generator shall be performed manually.

**SRS** (PRTTDCIS-4522)

Each Shelter shall include a minimum of FOUR (04) 230VAC Utility sockets, one per Security Domain (i.e. xU, xR, xS and BLK), inside the shelter.

**SRS** (PRTTDCIS-4539)

Each Shelter shall include a minimum of Power External outputs as follow:

- Auxiliary Output - Mains used to daisy chain power supply from the Shelter Main Input to a second shelter or to a GAR-T trailer; and,
- Auxiliary Outputs - PGS used to provide power supply to the GAR-T HF Variant trailer for the RL Node Variant, to the NS Kit and to the Tent ECU; and,
- Auxiliary Outputs – UPS used to provide power supply to the Helpdesk tool kit of the Sys Admin Tent.

**7.3.4.2 Electrical Distribution****SRS** (PRTTDCIS-2146)

The external 230VAC Input shall protect the shelter internal electrical system against surges and spikes as well as incorporate an isolation transformer to isolate the power earth references of the external power source from the Shelter Power Earth.



**SRS (PRTTDCIS-2147)**

The 230VAC Input shall power:

- the ECU subsystem; and,
- the UPS subsystem; and,
- the Auxiliary Output - Mains.

**SRS (PRTTDCIS-2148)**

The shelter UPS shall power with uninterrupted and filtered (clean) power following circuits:

- The lightning and ancillaries equipment; and,
- The CIS equipment; and,
- The 230VAC Utility Sockets.

**SRS (PRTTDCIS-2150)**

The electrical distribution system shall segregate the power circuits by:

- Each Rack; and,
- Environmental Control Unit; and,
- Lighting; and,
- Utility sockets.

**SRS (PRTTDCIS-2152)**

The Power distribution system shall power all Shelter housed elements, including PFE, and include provision for all Elements for which the Node variant has been marked as Enabled (e.g. Military SATCOM Terminal, CNR, etc.).

**SRS (PRTTDCIS-2155)**

The shelter shall contain an electrical switchboard with the necessary circuit breakers and Residual Current Breakers (RCB) for AC and DC.

**SRS (PRTTDCIS-4666)**

The Contractor shall implement separate Circuit Breakers for each Transmission System instance, each CNR instance and each Security Domain (including BLK).

**SRS (PRTTDCIS-2156)**

The electrical switchboard shall contain the AC and the DC Distribution Panel.

**SRS (PRTTDCIS-2157)**

The AC distribution panel shall display real time measurement of Voltage, Current and Frequency of the AC.

**SRS (PRTTDCIS-1952)**

It shall be possible to daisy-chain up to TWO (02) shelters (i.e. the shelter itself plus one) on a single Main 230VAC input.

**SRS** (PRTTDCIS-2219)

The Auxiliary 230VAC Output shall be protected with an isolator transformer and surge and spike arrestors.

**7.3.4.3 Power Generation Unit****SRS** (PRTTDCIS-2167)

Each shelter shall be equipped with a Power Generator Unit (PGU).

**SRS** (PRTTDCIS-2169)

The PGU will be the primary source of electrical power and shall be capable to provide continuous power to:

- All shelter internal CIS (i.e. communications equipment, servers, etc.); and,
- All shelter non-CIS systems (i.e. lighting, Environmental Control Unit (ECU), auxiliary equipment, etc.); and,
- Elements connected to the Auxiliary Output - PGS; and,
- Recharge simultaneously the UPS batteries in less than 3 hours.

**SRS** (PRTTDCIS-4534)

The PGU in combination with the ECU shall be design in such a way that ECU startup current peak are accommodated and do not trigger circuit breakers.

**NOTE** (PRTTDCIS-4530)

The PGU will not provide power to the Auxiliary Output - Mains.

**SRS** (PRTTDCIS-2171)

The refueling of the PGU shall be performed from the outside of the shelter.

**SRS** (PRTTDCIS-2173)

The PGU enclosure shall be realized as a weatherproof cab tunnel or engineering cabinet of the shelter, providing sound isolation to the main working area of the shelter.

**NOTE** (PRTTDCIS-2448)

Fuel Jerry Cans to refill the Shelter PGU will be stored on the Vehicle transporting the Shelter. These are not to be considered as a Shelter payload. Shelter PGU Jerry Cans are PFE to this project.

**SRS** (PRTTDCIS-3487)

The Shelter PGU shall be remotely monitored and controlled from inside the shelter.

**SRS** (PRTTDCIS-3350)

It shall be possible to couple the PGU enclosure lighting to the mode selected for the Shelter.

**SRS** (PRTTDCIS-3351)

It shall be possible to set the PGU enclosure lighting mode independently from the mode selected for the Shelter.

**SRS** (PRTTDCIS-3488)

There shall be a PGU Control Panel inside the shelter which provides all functions and features of the Shelter PGU local Digital Diagnostic Control Panel.

**SRS** (PRTTDCIS-4523)

The PGU shall be integrated with the LMM for monitoring and management.

**7.3.4.4 Uninterruptible Power Supply****SRS** (PRTTDCIS-2177)

All shelters shall contain an Uninterruptible Power Supply (UPS).

**SRS** (PRTTDCIS-2178)

Output power levels of the UPS shall be in accordance to the power requirements of the installed CIS and non-CIS equipment.

**SRS** (PRTTDCIS-2179)

The UPS battery system shall be capable of providing sufficient power to:

- Run the CIS equipment and the auxiliary equipment for a period of 30 minutes; and,
- Run the CNR for 12 hours; and,
- Run the lighting for 12 hours.

**NOTE** (PRTTDCIS-2180)

The UPS battery will not power the ECU.

**SRS** (PRTTDCIS-2181)

After the specified UPS battery life period for the CIS equipment is over, enough battery power shall be available to perform a graceful shutdown of the CIS systems.

**SRS** (PRTTDCIS-2182)

The UPS shall be integrated with the LMM for monitoring, management and to trigger the graceful shutdown.

**SRS** (PRTTDCIS-2183)

The UPS and its battery system shall be designed to meet the power demand of the most power consuming Node variant shelter version.

**SRS** (PRTTDCIS-2184)

The UPS and its battery system shall be fitted identically to all shelter types without resizing.

**SRS** (PRTTDCIS-2185)

The UPS battery system shall be capable of operating in a low ventilation environment (i.e. without air conditioning).

**7.3.4.5 Lighting****SRS** (PRTTDCIS-2194)

The Shelter LED-based lightning system shall be ceiling mounted

**SRS** (PRTTDCIS-2193)

When the lighting system is in Normal Mode it shall support automatically switch to Combat Mode when the shelter door is opened.

**SRS** (PRTTDCIS-2188)

The shelter internal lighting system shall be controlled through a "Lighting Control Panel".

**SRS** (PRTTDCIS-2189)

The Lighting Control Panel shall support the following switch modes:

- OFF; and,
- Garrison Operation Mode (in which the lights are always white); and,
- Normal Operation Mode (in which the lights are normally white and change to red when the door opens); and,
- Combat Mode (in which the lights are always red).

**SRS** (PRTTDCIS-2190)

The Normal Mode lighting system shall be measured in Kelvin and have a colour temperature between 2,800K and 3,000K.

**SRS** (PRTTDCIS-2191)

The Combat Mode lighting system shall have wavelength between 625nm and 650nm.

**SRS** (PRTTDCIS-2192)

The shelter internal lighting system shall provide a minimum illumination at the floor level of 300 lux/m<sup>2</sup>.

**SRS** (PRTTDCIS-2187)

The shelter internal lighting system shall have a life cycle duration of 20,000 hours.

### 7.3.4.6 Power Earth and Grounding

#### SRS (PRTTDCIS-2195)

All shelters shall include a set of four grounding stakes with 3m long connecting meshes to establish a low impedance physical contact between the shelter and the ground.

#### SRS (PRTTDCIS-2196)

The grounding stakes and meshes shall be transported and stored inside the shelter.

#### SRS (PRTTDCIS-2197)

The shelter ground resistance from any point to earth shall be in accordance with the PRT regulations and where possible, be 5 ohms or less.

### 7.3.5 Environmental Control Unit

#### SRS (PRTTDCIS-2205)

The Environmental Control Unit (ECU) shall ensure that the cooled airflow will efficiently be directed to the racks and equipment.

#### SRS (PRTTDCIS-2206)

Under the specified most extreme operation conditions, the ECU shall be capable of;

- Maintaining an air temperature of +18 degrees Celsius, +/- 2 degrees Celsius inside the shelter, at minimum outside temperature exposure; and
- Maintain an air temperature of +20 degrees Celsius, +/- 2 degrees Celsius inside the shelter, at maximum outside temperature and solar radiation exposure.

#### SRS (PRTTDCIS-2207)

The ECU shall be capable of being controlled and monitored via an "ECU Remote Control Unit" located inside the shelter and reachable by a System Administrator.

#### SRS (PRTTDCIS-2208)

The ECU Remote Control Unit shall support the selection of the following modes:

- Refrigeration; and,
- Heating; and,
- Ventilation (i.e. using air from outside); and,
- Recirculation (i.e. blocking air from outside).

#### SRS (PRTTDCIS-2209)

The ECU Remote Control Unit shall be integrated with the LMM for monitoring and management.

**SRS** (PRTTDCIS-2395)

The shelter shall be designed in overpressure meaning that during operation, the overall internal pressure of the shelter will always be higher than the external pressure in all operating conditions with the exception of "recirculation" mode.

**SRS** (PRTTDCIS-3107)

The shelter shall be designed to provide fresh-air ventilation.

**SRS** (PRTTDCIS-3026)

ECU components requiring regular maintenance (e.g. filters) shall be easily accessible for a technician without having to remove TDCIS node components (other than opening a hatch or a vent) or interrupt any services.

**SRS** (PRTTDCIS-4531)

ECU shall be design in such a way that it does not blow air in a direct way to the System Administrator sitting at the temporary working position.

### 7.3.6 Termination Panels

#### 7.3.6.1 General

**SRS** (PRTTDCIS-2210)

All shelters shall support the following External and Internal Termination Panels.

- External Power Panel (EPP); and,
- External Communications Panel (ECP); and,
- External Line of Sight Roof Panel (ELOS RP); and,
- External SATCOM Roof Panel (ESATRP); and,
- External RF Panels (ERFP); and,
- External Commercial Communication Roof Panel (ECCRP); and,
- Internal RF Panels (IRFP).

**NOTE** (PRTTDCIS-2211)

The external panels can be located on any of the shelter's walls or roof, as long as these do not protrude outside of the shelter "free area" envelope.

**NOTE** (PRTTDCIS-4667)

Should roof panels be used, those shall prevent accumulation of Water, Snow, Dust, Sand, Ice, etc., in line with Environmental performance targets, even when cables are connected.

**SRS** (PRTTDCIS-2212)

All Communications shelter external panels shall be protected by a hinged flap door with rubber side protections unfolding when opened.

**SRS** (PRTTDCIS-2213)

The hinged flap door shall open along the horizontal top axis of the door.

**SRS** (PRTTDCIS-2214)

The hinged flap door shall have a locking mechanism when closed and a support mechanism when opened to prevent cable damage.

**SRS** (PRTTDCIS-2215)

All panels shall be labelled beneath the protective flap door.

**SRS** (PRTTDCIS-2216)

All connectors shall be labelled with a reference and keyword as to its functionality (e.g. AC INPUT, Protective Power Earth, Ethernet, etc.).

**SRS** (PRTTDCIS-2217)

All external connectors shall be easy to access from the outside of the shelter. No outer parts or structures shall interfere with the ease of connection and fixation of the connector.

**SRS** (PRTTDCIS-3231)

All External Termination Panels shall include lightning and surge protection components for all connectors where applicable (Power, RF, Copper base network ports...).

**SRS** (PRTTDCIS-4668)

All External Termination Panels shall contain an anti-traction protection mechanism, matching anti-traction solution for cables.

**7.3.6.2 External Power Panel**

**SRS (PRTTDCIS-2218)**

The External Power Panel (EPP) connector quantities are design driven. EPP shall implement, as a minimum:

- ONE (01) panel mounted IEC 60309, 230VAC, 50/60 Hz, 2 pole connector (single phase) and Power Earth with protective cap and ingress protection to IP67 or better, labelled as INPUT; and,
- ONE (01) panel mounted IEC 60309, 230VAC, 50/60 Hz, 2 pole connector (single phase) and Power Earth with protective cap and ingress protection to IP67 or better, labelled as AUXILIARY OUTPUT - MAINS; and,
- THREE (03) panel mounted IEC 60309, 230VAC, 32A, 50/60 Hz, 2 pole connector (single phase) and Power Earth with protective cap and ingress protection to IP67 or better, labelled as :
  - AUXILIARY OUTPUT – PGS - 01; and,
  - AUXILIARY OUTPUT – PGS - 02; and,
  - AUXILIARY OUTPUT – PGS - 03; and,
- TWO (02) panel mounted CEE 7/3 type, 230VAC, 50/60 Hz, 16 A, 2 poles with Power Earth, socket with protective cap and ingress protection to IP67 or better, labelled as :
  - AUXILIARY OUTPUT – UPS - 01; and,
  - AUXILIARY OUTPUT – UPS - 02; and,
- TWO (02) Power Earth Stub Connectors.

**7.3.6.3 External Communication Panel**

**SRS (PRTTDCIS-2221)**

The External Communication Panel (ECP) shall support:

- MIL-DTL-38999 standard RJFTV (square flange receptacle) Class D / Cat. 6 or better Ethernet sockets supporting female RJ45 back termination; and,
- Two Channel Single Mode (SM) HxMA flange mount bulkhead optical connectors; and,
- Pairs of press (binding posts) for Single Pair, High Speed Digital Subscriber Line (SHDSL) and Connection of Analog Phones.

**SRS (PRTTDCIS-2222)**

The minimum quantity of connectors required on the ECP is design driven. The ECP shall support additional connectors quantities as per following table:

	RJ45	HxMA	Binding Post (Pairs)
<b>BLK</b>	4	4	4
<b>xU</b>	4	4	4
<b>xR</b>	4	4	-
<b>xS</b>	4	4	-

Table 41 - ECP additional connectors quantities



**SRS** (PRTTDCIS-2223)

The different security domain connectors shall be grouped together and colour labelled on the ECP.

**7.3.6.4 External Line of Sight Roof Panel****SRS** (PRTTDCIS-2224)

The shelter shall support TWO (02) External Line of Sight Roof Panels (ELOS RP) to pass communication, power and control signals to the HCLOS and Mini LOS radios systems.

**SRS** (PRTTDCIS-2225)

Each ELOS RP panel shall be located adjacent to the electrically motorised telescopic mast mounting point.

**SRS** (PRTTDCIS-2226)

The ELOS RP shall support a set of panel connectors to pass communication signals to the HCLOS and Mini LOS radios systems and a set of panel connectors to pass power and control signals to the HCLOS and Mini LOS radios systems.

**SRS** (PRTTDCIS-2227)

The ELOS RPs shall include surge arrester filters

**7.3.6.5 External SATCOM Roof Panel****SRS** (PRTTDCIS-2228)

The shelter shall support ONE (01) External SATCOM Roof Panel (ESATRP) to pass communication signals, power and control to the Outdoor Units (ODU) of the Military SATCOM Terminal antenna subsystem (e.g. dish and other ancillary equipment).

**SRS** (PRTTDCIS-2229)

The ESATRP shall support a set of panel connectors to pass communication signals to the Military SATCOM Terminal antenna subsystem and a set of panel connectors to pass power and control signals to the Military SATCOM Terminal antenna subsystem.

**SRS** (PRTTDCIS-2230)

The ESATRP shall include surge arrester filters.

**7.3.6.6 External RF Panel****SRS** (PRTTDCIS-2231)

The communications shelter shall support SIX (06) External RF Panels (ERFP) to pass communication signals to the whip antennas.

**SRS** (PRTTDCIS-2232)

Each ERFPP panel shall be located adjacent to the whip antenna mounting point.

**SRS** (PRTTDCIS-2233)

Each ERFPPs shall include, as a minimum, TWO (02) type N female coaxial connectors and TWO (02) type TNC female coaxial connectors.

**SRS** (PRTTDCIS-2234)

All ERFPPs shall include surge arrester filters.

**SRS** (PRTTDCIS-2235)

The shelter shall provide a structure within the shelter "allocable area" for the installation of the CNR 150W HF Antenna Tuning Unit (ATU) having the approximate following dimensions and weight:

- Dimension 147 x 72 x 225 mm (W x D x H); and,
- Weight 2Kg

**SRS** (PRTTDCIS-2236)

The shelter shall support an additional ERFPP located on the lateral side of the shelter in support of the RL Node HF antenna mounted on the GAR-T Rear link version, with a high power capable (1kW CW) RF interface.

### 7.3.6.7 External Commercial Communication Roof Panel

**SRS** (PRTTDCIS-2237)

The communications shelter shall support an External Commercial Communication Roof Panel (ECCRP) to pass BGAN, Iridium and IMT Network communication signals to the BGAN, Iridium and IMT Network antennas.

**SRS** (PRTTDCIS-2238)

The ECCRP shall support both type N female coaxial connectors and type TNC female coaxial connectors.

**NOTE** (PRTTDCIS-2239)

The exact type and number of ECCRP connectors will be design-driven from the type of antenna system selected by the contractor.

**SRS** (PRTTDCIS-2240)

The ECSRPP shall include surge arrester filters.

### 7.3.6.8 Internal RF Panels

#### SRS (PRTTDCIS-2241)

The shelter shall support an internal RF Panel (IRFP) to patch and route RF signals between the Indoor Communication Units and all the ERFPs.

#### SRS (PRTTDCIS-2242)

The IRFP shall be located adjacent to the rack hosting radio Indoor Units (IDU).

#### SRS (PRTTDCIS-2243)

The quantities and types of IRFP connectors shall be equivalent to the matching ERFp connectors.

### 7.3.7 Antennas and masts

#### SRS (PRTTDCIS-2245)

The shelter shall support, on the shelter roof, the specified terminal and antennas in size and quantities, e.g.

- The Military SATCOM terminal; and,
- The Commercial SATCOM terminal; and,
- The Iridium terminal outdoor unit; and,
- Two vehicle mounted (voice/data) IMT Network antennas.

#### SRS (PRTTDCIS-2246)

The Military SATCOM terminal shall remain mounted on the roof of the shelter, when in transport (i.e. folded) and when in operation (i.e. deployed).

#### SRS (PRTTDCIS-2247)

All shelters shall support, on the roof or on the sides, the following:

- SIX (06) mobile vehicle mounted “whip” antennas; and,
- TWO (02) electrically motorized telescopic masts in support of the HCLOS and MiniLOS ODUs.

#### NOTE (PRTTDCIS-2248)

The mobile vehicle mounted “whip” antennas supporting the CNR and the IP HF Radio are PFE.

#### SRS (PRTTDCIS-2249)

Each mobile vehicle mounted “whip” antenna (CNR, IP HF Radio, or Broadband Radio) shall be mounted on a “mounting point” located within the shelter “allocable area” or on the shelter roof.

**SRS (PRTTDCIS-4740)**

The distribution of the “whip” antenna mounting points shall not degrade the performance of any of the radio systems in any of the possible antenna deployment configuration (i.e. from a single mounting point used to all mounting points populated with antenna).

**SRS (PRTTDCIS-2250)**

Mobile vehicle mounted “whip” antennas mounting points shall be in accordance with the NATO 4-hole mounting base specification, as shown in following figure:

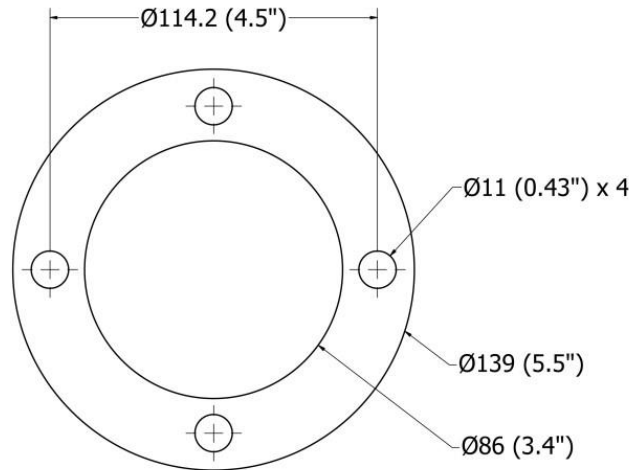


Figure 88 - TO 4-hole base pattern

**SRS (PRTTDCIS-2251)**

The two electrically motorised telescopic masts shall be fixed to the communications shelter external side panels.

**SRS (PRTTDCIS-2252)**

When these masts are retracted (during transport), the full body shall fall within the “allocable area” of the shelter envelope.

**SRS (PRTTDCIS-2253)**

The two electrically motorised telescopic masts shall when fully extended; have a height of at least 10.5m measured from the shelter “zero height reference”.

**SRS (PRTTDCIS-2254)**

The two electrically motorised telescopic masts shall (together) support up to a maximum of FOUR (04) radio systems (e.g. 4 HCLOS, 3 Mini-LOS plus 1 HCLOS, etc.).

**SRS (PRTTDCIS-2255)**

It shall be possible to raise and lower the two motorised telescopic masts with all equipment mounted (i.e. antennas, rotors, radios adapters, cables, etc.).

**SRS** (PRTTDCIS-2256)

The motorised telescopic masts shall be powered by the shelter power system.

**SRS** (PRTTDCIS-2257)

Operation of the two motorised telescopic masts shall be possible through the use of a remote control system.

**SRS** (PRTTDCIS-2258)

It shall be possible to raise and lower the motorised telescopic masts manually (i.e. in case of total power failure) by a single System Administrator within 600 seconds.

**SRS** (PRTTDCIS-4545)

Only Nodes delivered with HCLOS or Mini-LOS shall be delivered with Electrically Motorized Masts.

**SRS** (PRTTDCIS-4546)

In the case of a Node with double shelter, only the Communication Shelter shall be delivered with Electrically Motorized Masts.

**SRS** (PRTTDCIS-4669)

It shall be possible to transfer ONE (01) Electrically Motorized Masts from one shelter to another with TWO (02) trained operators in no more than FOUR (04) hours without the need of lifting equipment.

## 7.3.8 Ancillary Equipment

### 7.3.8.1 General

#### SRS (PRTTDCIS-2165)

All shelters shall include the following internal ancillary equipment to be stowed inside the shelter;

- Storage compartment(s) for the transportation and accommodation of general purpose equipment and accessories; and,
- ONE (01) Magnetic “white” marker board” having approximate dimensions of 430 x 840 mm; and,
- ONE (01) wall mounted folding steel table painted in RAL 840R 6014, non-gloss or equivalent; and,
- TWO (02) folding steel table painted in RAL 840R 6014, non-gloss or equivalent; and,
- TWO (02) folding steel chairs for use with the folding table, painted in RAL 840R 6014, non-gloss or equivalent; and,
- ONE (01) pickaxe, with a handle shaft approx. 46cm long and drop forged carbon steel head, hardened and tempered for durability, painted in RAL 840R 6014, non-gloss or equivalent; and,
- ONE (01) sledge hammer, with handle shaft approx. 70cm long, 40mm in diameter, painted in RAL 840R 6014, non-gloss or equivalent; and,
- ONE (01) shovel, with a handle shaft approx. 70cm long, approx. 17cm wide carbon steel blade with collar at the handle/socket connection for added strength, forward turned step for secure foot placement, painted in RAL 840R 6014, non-gloss or equivalent; and,
- ONE (01) 6 kg portal ABC dry powder fire extinguishers Class ABC and suitable for fires involving electronic equipment up to 1000 V, mounted in such a manner that it is located in highly visible and easily accessible place; and,
- ONE (01) First Aid kit located in a highly visible location with provision adequate for TWO (02) staff.

#### SRS (PRTTDCIS-3148)

The fire extinguisher shall meet requirements as stipulated in following standards:

- EN 3-7:2004+A1:2007 Portable fire extinguishers. Characteristics, performance requirements and test methods; and,
- EN 3-8:2006 Portable fire extinguishers. Additional requirements to EN 3-7 for the construction, resistance to pressure and mechanical tests for extinguishers with a maximum allowable pressure equal to or lower than 30 bar; and,
- EN 3-10:2009 Portable fire extinguishers. Provisions for evaluating the conformity of a portable fire extinguisher to EN 3-7.

**SRS (PRTTDCIS-2166)**

All shelters shall include the following external ancillary equipment;

- ONE (01) anodised aluminium plate providing information pertaining to air (as internal cargo load and as helicopter external load), land, maritime and railways transportation.
- Retractable supports to access the shelter roof. The supports shall be placed on the outside of the communications shelter.
- ONE (01) adjustable folding ladder, painted in RAL 840R 6014, non-gloss or equivalent, providing access to all areas of the communications shelter structure. The ladder shall be stowed on the outside of the communications shelter.

**SRS (PRTTDCIS-3215)**

Shelter shall be equipped with wind tie-downs to cater for the environmental conditions it has to comply with.

**SRS (PRTTDCIS-3216)**

When designing the wind tie-downs the Contractor shall consider the shelter sitting on the Vehicle with Vehicle stabilization legs deployed as the worst case scenario.

**SRS (PRTTDCIS-4535)**

Every Shelter shall be equipped with a fire prevention system compliant with PRT National Fire prevention regulation and including, as a minimum, smoke detectors inside the shelter and in the PGU compartment.

**SRS (PRTTDCIS-4536)**

Shelter prevention system shall be integrated in the LMM to, as a minimum, relay smoke detector alarms and identify the compartment.

**7.3.8.2 Sys Admin Tent****7.3.8.2.1 General****SRS (PRTTDCIS-3010)**

ONE (01) Tent shall be delivered per Node for the System Administrators helpdesk.

**SRS (PRTTDCIS-2750)**

Tent shall be stored inside the shelter or in any of its allocable areas.

**SRS (PRTTDCIS-4735)**

Tent shall not always be deployed. Therefore, keeping the tent in its storage emplacement shall not prevent the operation of the Shelter nor any of its housed elements in any Node variant configuration.

**SRS (PRTTDCIS-2751)**

Each tent shall be provided with a set of installation tools.

**SRS** (PRTTDCIS-2752)

Each tent shall be delivered with three repair and maintenance kits, one for echelon/level 1 repairs, one for echelon/level 2 repairs and one for echelon/level 3 repairs.

**SRS** (PRTTDCIS-2754)

Tents shall be of inflatable type and allow operation under heavy snow without collapsing inward.

**SRS** (PRTTDCIS-3013)

The Tent shall include floor and table power distribution for the System Administrators equipment and lighting consisting of fluorescent light Units (or LED) similar to those used in the shelter.

**SRS** (PRTTDCIS-2755)

It shall be possible to switch lights inside the tents from white to red (combat mode).

**SRS** (PRTTDCIS-2756)

Tents shall implement sufficient air flow to avoid the accumulation of heat in any space.

**SRS** (PRTTDCIS-2758)

All visible tent surfaces shall be the same color as for the Shelters external surfaces.

**SRS** (PRTTDCIS-2763)

The Tent shall be suitable to host TWO (02) staff members with their working position and the furniture stored in the shelter while taking into consideration the separation distance required between elements of belonging to different security domains.

**SRS** (PRTTDCIS-3011)

It shall be possible to create bigger tent by attaching multiple tents together.

**SRS** (PRTTDCIS-2753)

Tents shall be deployable in all climatic areas and on soft or hard surfaces (i.e. concrete surface), therefore adequate sunshields and weights (i.e. water ballast) shall be delivered with the tents.

**SRS** (PRTTDCIS-3166)

The tent configuration shall assure rapid deployment without aid of ancillary equipment.

**SRS** (PRTTDCIS-3167)

The tent configuration shall assure that packaging allows the tent to be moved / stowed by TWO (02) people.



**SRS (PRTTDCIS-3168)**

The tent shall have vertical sidewalls of minimum 150 cm height to maximize usable space on its floor.

**SRS (PRTTDCIS-3169)**

The tent height at the apex shall be minimum 210 cm.

**SRS (PRTTDCIS-3170)**

The tent doors shall be at both ends with double ties and overlap.

**SRS (PRTTDCIS-3171)**

The tent fabric shall be UV resistant.

**SRS (PRTTDCIS-3172)**

The tent shall be equipped with at least one roof vent cap.

**SRS (PRTTDCIS-3173)**

The tent shall be equipped with at least one sealable (for example with a cover with Velcro fasteners) opening in the sidewalls to allow installation of flexible ducting from the Sys Admin Tent ECU.

**SRS (PRTTDCIS-3175)**

The tent floor shall be vinyl and flame retardant.

**SRS (PRTTDCIS-3176)**

The tent shall withstand wind load of 89 km/h with gusts up to 105 km/h.

**SRS (PRTTDCIS-3177)**

The tent shall withstand snow load of 50 kg/m<sup>2</sup> for minimum 12 hours.

**SRS (PRTTDCIS-4537)**

The tent shall include a detachable extension tunnel to allow connection between the tent and the shelter, on the shelter door side.

**SRS (PRTTDCIS-4538)**

The tent detachable extension tunnel shall support both shelter on the ground and shelter on vehicle positions.

**SRS** (PRTTDCIS-3012)

Tent shall include a Helpdesk tool kit to the benefit of the System Administrators while working in the Tent, consisting of:

- ONE (01) semi-rugged network switch for each security domain (including BLK), each including a minimum of 2 PoE ports (only for xU and xR); and,
- Sufficient table-top fixable heavy duty power strips; and
- Sufficient patch and power cables to connect from the shelter Termination Panel to the Tent and inside the Tent.

**NOTE** (PRTTDCIS-4670)

All Helpdesk tool kit semi-rugged switches will preferably be of identical model in all security domains.

**SRS** (PRTTDCIS-4671)

The Contractor shall ensure that Helpdesk tool kit semi-rugged switches, while being operated, shall meet all Security performance targets (e.g. power line filtering, emission limits, etc.) specific to the security Domain it is connected to.

**SRS** (PRTTDCIS-3014)

The Shelter UPS endurance shall include all helpdesk elements (network components, Tent lighting, etc.), with the exception of System Administrator workstations, in its computation.

**7.3.8.2.2 Sys Admin Tent ECU****SRS** (PRTTDCIS-4672)

The Sys Admin Tent ECU shall meet or exceed following performances:

- Cooling capacity between 5000 BTU per hour and 7000 BTU per hour; and,
- Heating Capacity between 900 W and 1100 W.

**SRS** (PRTTDCIS-4673)

The Sys Admin Tent ECU total Weight shall not exceed 55 kg.

**SRS** (PRTTDCIS-4674)

The Sys Admin Tent ECU shall be integrated in a Case.

**SRS** (PRTTDCIS-4675)

The Sys Admin Tent ECU shall meet:

- OPE-1a if operated from outside of the Sys Admin Tent; or,
- OPE-1c if operated from inside the Sys Admin Tent.

**SRS** (PRTTDCIS-4676)

The Sys Admin Tent ECU shall be powered from the Shelter.

**NOTE** (PRTTDCIS-4677)

The Sys Admin Tent ECU will not be considered as a payload for the dimensioning of the Shelter PGU and the Shelter UPS.

**NOTE** (PRTTDCIS-4678)

The Sys Admin Tent ECU will be transported in a separate Vehicle. Therefore the Sys Admin Tent ECU is not to be considered as a Shelter Payload.

### 7.3.9 Lifting Jacks Kit

**NOTE** (PRTTDCIS-3542)

The Lifting Jacks Kit will be used to load and unload a shelter from a Vehicle. It is to be considered as a Material Handling Equipment (MHE) which will be transported in separate Vehicle than the Shelter carrier. Therefore it is not to be considered as part of the Shelter payload.

**SRS** (PRTTDCIS-3516)

Each Lifting Jacks Kit shall be composed by FOUR (04) electrically operated jacks.

**SRS** (PRTTDCIS-3517)

The Lifting Jacks Kit shall include all necessary components to be powered by a 24VDC power source.

**SRS** (PRTTDCIS-3518)

The Lifting Jacks Kit shall include all necessary components to be powered by a 230VAC - single phase power source.

**SRS** (PRTTDCIS-3521)

Each Lifting Jacks Kit shall be controlled via a cabled or wireless remote control console, capable of operating over a distance of not less than 15 meters.

**SRS** (PRTTDCIS-3524)

The Lifting Jacks Kit shall allow a maximum Shelter-Ground clearance of 1650 mm.

**SRS** (PRTTDCIS-3526)

The Lifting Jacks Kit shall be capable of raising and lowering the shelter when fully loaded with all components, equipment and accessories.

**SRS** (PRTTDCIS-3537)

The Lifting Jacks Kit shall be capable of raising and lowering ISO certified containers of any dimension.

**SRS** (PRTTDCIS-3538)

The Lifting Jacks Kit minimum lift capacity shall be 5000kg.

**NOTE** (PRTTDCIS-3529)

The Lifting Jacks Kit will be operated on solid ground (e.g. concrete or tarmac) with a maximum ground slope not exceeding 5 degrees across the area of the container being lifted.

**SRS** (PRTTDCIS-3532)

The Lifting Jacks Kit shall be CE certified and designed according to EN 1494:2000+A1:2008 Mobile or movable jacks and associated lifting equipment.

**SRS** (PRTTDCIS-3533)

The Lifting Jacks Kit shall be equipped with a tilt sensor.

**SRS** (PRTTDCIS-3534)

The Lifting Jacks Kit shall be equipped with a control system synchronising the action of all the kit's lifting jacks, when raising a single container.

**SRS** (PRTTDCIS-3535)

The Lifting Jacks Kit shall embed safety mechanisms preventing its operation, in the event it has not been fitted to a container and prepared for operation in the correct manner.

**SRS** (PRTTDCIS-3536)

Each Lifting Jacks Kit shall control the automatic leveling of the shelter while it is loaded on and unloaded from a Vehicle.

**SRS** (PRTTDCIS-3539)

The Lifting Jacks Kit shall require a maximum of TWO (02) trained System Administrators for its installation and operation.

**SRS** (PRTTDCIS-3540)

The Lifting Jacks Kit operating temperature range shall be from -10 degrees Celsius to +49 degrees Celsius.

**SRS** (PRTTDCIS-3541)

Installation of the Lifting Jacks Kit shall only rely on the standard locking mechanism of ISO corners.

**SRS** (PRTTDCIS-3543)

The Lifting Jacks Kit shall be delivered in transport cases containing all its elements and meeting all transportation constraints.

### 7.3.10 Maintenance Platform

**NOTE** (PRTTDCIS-3150)

Shelter maintenance platform is not to be stored in any container or vehicle. It will be used at PRT Peacetime Location maintenance facility or deployed to a forward logistic support unit.

**SRS** (PRTTDCIS-3151)

The Shelter Maintenance Platform shall be foldable, aluminium, waterproofed, light but sturdy structure, easily installed and detachable from the shelter.

**SRS** (PRTTDCIS-3152)

The Shelter Maintenance Platform shall be equipped with wheels that support easy movement over hard surfaces with wheel breaking mechanism.

**SRS** (PRTTDCIS-3153)

The Shelter Maintenance Platform shall be manually adjustable in height enabling elevation of the platform deck to the same level as the shelter roof when the shelter is resting on fully extended lifting legs and on the vehicle.

**SRS** (PRTTDCIS-3154)

The Shelter Maintenance Platform shall be equipped with stairs (manually adjustable height), with railing on at least one side, that provides access to the platform deck when the platform is extended at full height.

**SRS** (PRTTDCIS-3155)

The Shelter Maintenance Platform stairs at their upper/top end shall be equipped with self-closing and latching inward opening.

**SRS** (PRTTDCIS-3156)

The Shelter Maintenance Platform deck shall be equipped with railing mounted along the deck edge facing outwards the platform.

**SRS** (PRTTDCIS-3157)

The Shelter Maintenance Platform deck as well as the stairs shall form non-slip, self-draining surface.

**SRS** (PRTTDCIS-3158)

The Shelter Maintenance Platform shall have a load bearing capacity minimum 200 kg/m<sup>2</sup>.

**SRS** (PRTTDCIS-3159)

The Shelter Maintenance Platform deck width shall be minimum 80 cm.

**SRS** (PRTTDCIS-3160)

The Shelter Maintenance Platform stairs width shall be minimum 60 cm.

**SRS** (PRTTDCIS-3161)

The Shelter Maintenance Platform deck railing height shall be minimum 110 cm.

**SRS** (PRTTDCIS-3162)

The Shelter Maintenance Platform stairs railing height shall be minimum 90 cm.

**SRS** (PRTTDCIS-3163)

The Shelter Maintenance Platform deck shall form a "U" shape in order to enable access to shelter roof from three (3) sides at the same time.

**SRS** (PRTTDCIS-3164)

The Shelter Maintenance Platform including stairs, railing and its other components shall be compliant with ISO 14122 series.

**SRS** (PRTTDCIS-3165)

The Shelter Maintenance Platform shall be able to withstand the same climatic and environmental conditions as the DPOP.

## 7.4 Trailer

### 7.4.1 Common Base

#### 7.4.1.1 General

**NOTE** (PRTTDCIS-2263)

The GAR-T has a common base structure, consisting of;

- Mechanical; (i.e. trailer, etc.); and,
- Electrical Power; and,
- Telescopic Antenna Mast; and,
- Ancillary Equipment.

**SRS (PRTTDCIS-1504)**

The GAR-T Trailer is the housing element for CIS and non-CIS assets for the Rear Link HF trailer and for the HCLOS Relay trailer. Following figure illustrates the GAR-T Trailer breakdown structure. It identifies the elements it is composed of. Each GAR-T Trailer shall be built upon the building blocks as identified in this reference.

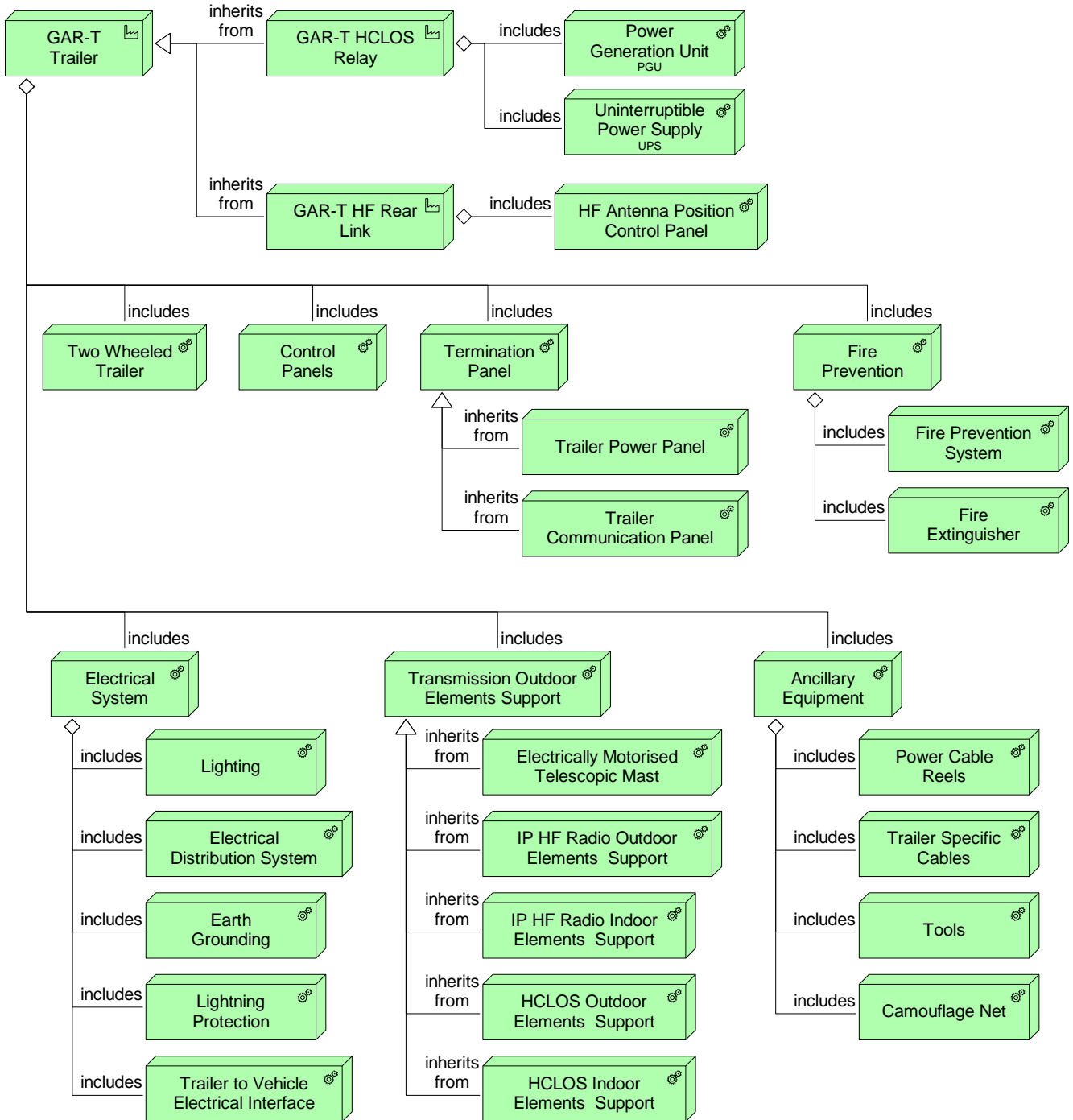


Figure 89 - GAR-T Trailer Breakdown Structure

**SRS** (PRTTDCIS-2266)

The GAR-T Trailer shall support;

- Electrical power generation and/or distribution; and,
- ONE (01) electrically motorized telescopic mast and associated equipment; and,
- Electrical command and control interface for the operation of all the electrical equipment (e.g. generator, masts, etc.); and,
- Ancillary equipment; and,
- Mast stabilization fixtures and accessories (e.g. guy wires, pickets, etc.).

**7.4.1.2 Mechanical****SRS** (PRTTDCIS-2267)

The GAR-T shall be assembled on a single two wheeled trailer.

**SRS** (PRTTDCIS-2268)

The maximum weight of the trailer including all installed equipment shall not exceed 2000kg.

**SRS** (PRTTDCIS-2422)

The Trailer overall dimensions, weight, and axle loading shall comply with the European Traffic Regulation

**SRS** (PRTTDCIS-2269)

The GAR-T maximum dimensions shall not exceed following values:

- maximum Total Length: 4200mm; and,
- maximum Total Width: 2200mm; and,
- maximum Height: 2100mm.

**SRS** (PRTTDCIS-2270)

The GAR-T shall be suitable for on-road and off-road traffic when towed by a range of tactical vehicles.

**SRS** (PRTTDCIS-2272)

The towed Trailer shall be meet following speed limits

- Road speed:  $\geq 90$  km/h; and,
- All terrain speed:  $\geq 30$  km/h.

**SRS** (PRTTDCIS-2273)

The Trailer shall include four mechanically operated stabilization retractable legs (two at the rear and two at the front) equipped with "bulls-eye" level systems.



**SRS (PRTTDCIS-2537)**

The trailer stabilization legs shall be designed to ensure sufficient stability to the trailer when its payload (Power Generator, Antenna, etc.) are operating or being maintained while the trailer is disconnected from the vehicle.

**SRS (PRTTDCIS-2274)**

The maximum installation ground slope for trailer payload operation shall be considered to be 20 degrees in any direction.

**SRS (PRTTDCIS-2423)**

The Trailer Towing Eye shall be compliant with STANAG 4101.

**SRS (PRTTDCIS-2514)**

The Towing Eye shall allow the maximum possible articulation between tractor and trailer in compliance with STANAG 4101 and DIN74050.

**SRS (PRTTDCIS-2421)**

The Trailer shall comply with following limits

- Exit angle:  $\geq 27$  degree; and,
- Turning angle:  $\geq 80$  degree; and,
- Wading:  $\geq 760$  mm.

**SRS (PRTTDCIS-2424)**

The height above the ground level of the Trailer towing eye (trailer towing bar) shall be adjustable between 45 cm and 105 cm.

**SRS (PRTTDCIS-2526)**

The jockey wheel height shall be continuously adjustable when in vertical position.

**SRS (PRTTDCIS-2428)**

The Trailer braking systems shall be built in accordance with EEC Regulation (EC) No 661/2009 of the European Parliament and of the Council of 13 July 2009.

**SRS (PRTTDCIS-2429)**

The Trailer braking system shall include Anti-lock Braking System (ABS) connections.

**SRS (PRTTDCIS-2430)**

The trailer shall be equipped with an efficient hydraulic or compressed air braking system on all wheels and a mechanical hand-brake able to keep the fully loaded trailer in standing position on an incline of minimum 30 degrees.

**SRS (PRTTDCIS-2431)**

The trailer shall be equipped with tie down hooks/lugs for anchoring the equipment inside aircraft or on other transportation means during transit as well as with a set of lashing material that assure safe and secure tie down.

**SRS (PRTTDCIS-3179)**

The lashing straps with buckle shall be in accordance with the European Standard for lashing: EN-12195 series.

**SRS (PRTTDCIS-2524)**

The trailer shall be equipped with reinforced metallic mudguards and pneumatic tires designed for use on motorway as well as off-road (rough terrain).

**SRS (PRTTDCIS-2432)**

The Trailer tires shall be Multi-Purpose Tires (MPT) steel belted radial military.

**SRS (PRTTDCIS-2507)**

The tires shall be "Run Flat" type, tread with mud and snow profile mounted on heavy duty type wheels.

**SRS (PRTTDCIS-2506)**

The overall trailer dimensions, weight, and axle loading shall be in accordance with the European Traffic Regulation.

**SRS (PRTTDCIS-2433)**

A spare wheel, with spare tire mounted on it, shall be installed on each trailer.

**SRS (PRTTDCIS-2439)**

The trailer shall be equipped with a retractable jockey wheel, which shall be very rigidly and safely fixed to the towing attachment.

**SRS (PRTTDCIS-2440)**

The jockey wheel height shall be continuously adjustable when in vertical position;

**SRS (PRTTDCIS-2441)**

Any trailer fixed side boards, and droppable and removable tailgate shall be equipped with restraining chains

**SRS (PRTTDCIS-2442)**

The Trailer shall include adequate draining holes.

**SRS (PRTTDCIS-2443)**

The Trailer ground clearance shall not be less than 300mm.

**SRS (PRTTDCIS-2504)**

Prior to delivery to and acceptance by the Purchaser, the Contractor shall adjust and service each trailer for immediate operational use, including at least the following:

- adjusting braking system; and,
- checking electrical system; and,
- inflating all tires; and,
- completely lubricating all running gear with grades of lubricants specified by the Contractor for the ambient temperature at the delivery point.

**SRS (PRTTDCIS-2525)**

The tires (including the spare tire) shall comply with Regulation (EC) No 661/2009 of the European Parliament and of the Council of 13 July 2009.

**SRS (PRTTDCIS-2509)**

Sufficient space around the wheels shall be foreseen to allow the safe operation of the trailer with tire chains.

**SRS (PRTTDCIS-2508)**

The spare wheel shall be easily accessible for dismounting and re-mounting by maximum TWO (02) staff.

**SRS (PRTTDCIS-2511)**

The trailer shall be fabricated from aluminium or steel, or stainless steel, or austenitic stainless steel.

**SRS (PRTTDCIS-2512)**

The trailer deck assembly shall have an "anti-slip" finish to support the presence and movement of personnel.

**SRS (PRTTDCIS-2515)**

The trailer shall be equipped with a retractable jockey wheel, which shall be very rigidly fixed to the towing attachment.

**SRS (PRTTDCIS-2516)**

The trailer shall be equipped with minimum FOUR (04) lifting eyes for lifting with a crane and for helicopter under slung transportation.

**SRS (PRTTDCIS-2517)**

The Contractor shall ensure that the fully equipped trailer weight is evenly distributed.

**SRS (PRTTDCIS-2527)**

The longitudinal weight distribution shall be such that the trailer is easily maneuverable and stable on all kinds of ground.

**SRS (PRTTDCIS-2528)**

The fully loaded configuration of the trailer shall have the center of gravity marked with matt black color paint on its structure

**SRS (PRTTDCIS-2518)**

The trailer shall include operation plates and designation plates imprinted on photosensitive anodized aluminium, conforming to type H, MIL-DTL 15024F, with a matt black background.

**SRS (PRTTDCIS-2530)**

Plates shall be located in convenient position without creating confusion with each other.

**SRS (PRTTDCIS-2531)**

Plates shall include as the minimum:

- operation instructions; and,
- servicing instruction; and,
- precautionary instructions to avoid personnel injury or equipment damage (red background); and,
- emergency procedures; and,
- hydraulic schemes; and,
- characteristics; and,
- identification; and,
- serial numbers,

**SRS (PRTTDCIS-2519)**

The trailer shall give sufficient load on the towing hook to ensure a good road holding.

**SRS (PRTTDCIS-2532)**

The trailer shall be equipped with two handles at the rear and two handles at the towing attachment to facilitate movement by hand.

**SRS (PRTTDCIS-2522)**

The trailer suspension shall be independent progressive with a telescopic shock absorber per wheel.

**7.4.1.3 Electrical****SRS (PRTTDCIS-2271)**

The GAR-T trailer electric system shall be 24VDC.

**SRS (PRTTDCIS-2284)**

The GAR-T shall include an electrical management system for the operation of the electrical equipment, electrical protection systems and exterior interfaces.

**SRS (PRTTDCIS-2285)**

The GAR-T electrical management system shall be housed in an environmentally proof cabinet with a lockable door.

**SRS (PRTTDCIS-2544)**

The GAR-T electrical management cabinet shall contain LED-based illumination light source with following modes:

- Turned OFF; and,
- White Light; and,
- Combat Lights.

**SRS (PRTTDCIS-2545)**

The GAR-T electrical management cabinet illumination light source in combat mode shall meet following characteristics:

- 625nm to 650nm wavelength; and,
- Connected to a control panel that allows combat mode On/Off which; and,
- Shall be automatically engaged and bypass White light mode when respective door is open; and,
- Powered from UPS with autonomy of at least 30 minutes; and,
- Equipped with a test button.

**SRS (PRTTDCIS-2286)**

The GAR-T electrical management system shall include:

- Operational indicators - green colour; and,
- Malfunction indicators - red colour; and,
- Electrical protection for equipment and operator; and,
- Mast controller system; and,
- One external power input; and,
- One external power output; and,
- An Emergency stop push-button that meets the following:
  - A Red Mushroom type push button; and,
  - Protected to prevent inadvertent operation; and,
  - With an activation that shall be possible without opening any panels, flaps, doors or any other type of covers with easy access and no obstructions; and,
  - Conforms to the following directives and standards: MD 2006/42/EC, LVD 2014/35/EU, IEC 60947-5-1:2016, IEC 60204-1:2016, ISO 13849-1:2015, IEC 60947-5-5:1997 +AMD1:2005+AMD2:2016 CSV.

**SRS** (PRTTDCIS-2287)

The GAR-T electrical sockets shall be as follows;

- External input electrical socket: Mennekes INB.WCD 2P+Earth 230VAC IP67 TM or equivalent, in colour RAL 840R 6014, non-gloss or equivalent; and,
- External output electrical socket: Mennekes INB. Contact Box 16A 3P 6H 230VAC IP67 TM SCHUKO or equivalent, in colour RAL 840R 6014, non-gloss or equivalent.

**SRS** (PRTTDCIS-2425)

The trailer electrical connectors for connection to a towing vehicle shall meet requirements stipulated in STANAG 4007 edition 2.

**SRS** (PRTTDCIS-2523)

The lighting on the trailer shall consist of:

- normal service lighting and reflectors in accordance with Regulation (EC) No 661/2009 of the European Parliament and of the Council – Lighting and Light-signaling Devices; and,
- blackout and convoy lighting in accordance with the requirements of the latest issue of STANAG 4381.

**SRS** (PRTTDCIS-2534)

The trailer shall include a 12-core type connection cable to connect the trailer to the Vehicle.

**SRS** (PRTTDCIS-2535)

The length of the connection cable shall be such as to extend at least 500 mm beyond the towing eye.

**SRS** (PRTTDCIS-2536)

The cable connection plug shall be equipped with a spring-loaded metallic protective cap.

**SRS** (PRTTDCIS-2533)

The Trailer shall be equipped with a junction box fixed to the trailer chassis and terminated by a NATO 12-pin receptacle (socket) in accordance with STANAG 4007 edition 2.

#### 7.4.1.4 Ancillary Equipment

##### SRS (PRTTDCIS-1427)

The GAR-T shall include the following ancillary equipment;

- ONE (01) 6 kg dry chemical power dry powder fire extinguishers Class ABC and suitable for fires involving electronic equipment up to 1000 V mounted in such a manner that it is easily accessible from the ground; and,
- TWO (02) high intensity LED cold white light directional spotlights; and,
- ONE (01) aluminium box to store equipment and accessories (e.g. cable reels, stakes, etc.), with dimensions appropriated to the available space on GAR-T; and,
- Earthing stakes in adequate size and quantities to assure effective and safe earthing, "T" shape, with threaded cone end and mechanic couplings to connect to the copper braid earthing straps; and,
- Copper braid earthing straps in adequate size and quantities to assure effective and safe earthing of at least 10 meters in length each; and,
- TWO (02) metal wheel-arresting wedges; and,
- TWO (02) snow chains; and,
- A storage box including wheel changing tools (a tire jack, lug wrench, and strong-arm bar). The box shall be designed to restrict the entry of water and the tools shall be secured in place; and,
- Aluminium plate or plates (as required) with black background with following information printed:
  - Operating instructions, emergency procedures, electrical schematics, technical characteristics, nomenclature and serial number;
  - Center of gravity marking in yellow in accordance with the colour standard mat paint RAL 1007; and,
  - Information pertaining to air (as internal cargo-load and as helicopter external load), land, maritime and railways transportation.

##### SRS (PRTTDCIS-3180)

The fire extinguisher shall meet requirements as stipulated in following standards:

- EN 3-7:2004+A1:2007 Portable fire extinguishers. Characteristics, performance requirements and test methods; and,
- EN 3-8:2006 Portable fire extinguishers. Additional requirements to EN 3-7 for the construction, resistance to pressure and mechanical tests for extinguishers with a maximum allowable pressure equal to or lower than 30 bar; and,
- EN 3-10:2009 Portable fire extinguishers. Provisions for evaluating the conformity of a portable fire extinguisher to EN 3-7.

##### SRS (PRTTDCIS-2436)

The Trailer shall be delivered with a camouflage net stored on the trailer.

##### SRS (PRTTDCIS-3046)

As a set together with Vehicle Camouflage Net, the nets shall cover the entire trailer and its associated Shelters, and disguise its shapes.

**SRS (PRTTDCIS-3048)**

The net shall be composed of disruptive patterning for the European Theatre of Operations (woodland).

**SRS (PRTTDCIS-3184)**

Camouflage net shall be in compliance with Allied Engineering Publication AEP-31e(1) Reference Document of Colors for Disruptive Camouflage for Military Equipment In Use In NATO.

**SRS (PRTTDCIS-3185)**

Camouflage net materials shall be resistant to mould growth and shall withstand limited contamination by the most relevant fungal species listed in Table 1 of AECTP 300 Edition D, version 1, test method 308 without substantial degradation. The mould growth shall manifest as no greater than 'Trace' when tested in accordance with method 308.

**SRS (PRTTDCIS-3186)**

Camouflage net water absorption shall not exceed 10% and shall not become logged or heavy due to wet or damp conditions.

**SRS (PRTTDCIS-3187)**

Camouflage net shall be UV deterioration and infra-red treated, of a non-toxic fabric, but lightweight, strong and durable.

**SRS (PRTTDCIS-3188)**

Camouflage net shall resemble normal foliage in natural conditions and blend into the natural surroundings while being as quiet and rustle free as possible.

**SRS (PRTTDCIS-3189)**

Camouflage net shall be specially coated to reduce shine and glare.

**SRS (PRTTDCIS-3190)**

Camouflage net shall remain pliable in the extreme environmental conditions the associated housing element is to be compliant with.

**SRS (PRTTDCIS-3191)**

Special flame retardant treatments shall have been applied to Camouflage net.

**SRS (PRTTDCIS-3192)**

Camouflage net shall be easily compressed and packed into a storage bag for ease of transportation and storage.



**NOTE** (PRTTDCIS-3193)

The use of lightweight modern waterproof textiles is recommended.

**SRS** (PRTTDCIS-3194)

Camouflage net storage bag shall be sized to allow repacking under field conditions.

**SRS** (PRTTDCIS-3195)

Camouflage net shall be provided with all the necessary associated equipment in order to set-up the nets over the housing element and to anchor it. This might include, but is not limited to strings, spikes, arch and bars. All shall be stored with the nets.

**SRS** (PRTTDCIS-3198)

TDCIS shall continue to meet all requirements (functional, technical, performance, operational, safety, environmental endurance, etc.) while the camouflage nets are fitted on the trailers and on other pieces of equipment.

**SRS** (PRTTDCIS-3199)

The design of the trailer shall include any device to allow the camouflage net fitting.

**SRS** (PRTTDCIS-3200)

The design of the trailer shall provide space for storage of the camouflage net.

**SRS** (PRTTDCIS-3201)

The design of the trailer shall ensure TDCIS operation and safety shall not be affected by the camouflage net.

**SRS** (PRTTDCIS-2437)

The Trailer shall be delivered with a maintenance road kit including all necessary tools and spares.

**SRS** (PRTTDCIS-2438)

The Trailer maintenance road kit shall be stored on the trailer.

**7.4.1.5 Telescopic Mast****SRS** (PRTTDCIS-2291)

The GAR-T shall support ONE (01) electrically operated telescopic antenna mast to support either a Beyond Line of Sight (BLOS) HF Rotating Log-periodic Antenna or two HCLOS radio systems.

**SRS (PRTTDCIS-2292)**

The GAR-T mast dimensions shall be measured from the ground and be:

- Height when fully retracted shall fit within the GAR-T foot print; and,
- Height when fully extended;  $\geq 10.5$  m.

**SRS (PRTTDCIS-2293)**

It shall be possible to raise and lower the GAR-T motorised telescopic mast with all equipment installed (antennas, rotors, radios adapters, cables, etc.).

**SRS (PRTTDCIS-2294)**

The GAR-T motorised telescopic mast shall be raised and lowered when powered by the main electrical power supply (external or generator) or when powered by the UPS (i.e. Shelter UPS or Trailer UPS for the HCLOS relay variant).

**SRS (PRTTDCIS-2295)**

Operation of the GAR-T motorised telescopic mast shall be possible through the use of a remote control system.

**SRS (PRTTDCIS-2296)**

It shall be possible to raise and lower the GAR-T motorised telescopic mast manually (i.e. in case of total power failure) by a single System Administrator within 600 seconds.

**SRS (PRTTDCIS-2538)**

The Contractor shall include supplementary wind tie-downs in the trailer design to cater for the Climatic and Geographical Conditions GAR-T variants are to operate.

**SRS (PRTTDCIS-2539)**

The wind tie-downs shall be securely stored within each trailer to be deployed on set up.

**SRS (PRTTDCIS-2543)**

When designing the wind tie-downs, the Contractor shall keep the quantities of ground anchor points to the strict minimum necessary.

**SRS (PRTTDCIS-2540)**

When designing the wind tie-downs, the Contractor shall consider the trailer disconnected from any vehicle, with fully extended telescopic antenna mast and antenna mounted on it (whichever variant poses greater load when combined with wind load) in its worst-case scenario.

## 7.4.2 GAR-T HF Rear Link Variant

### NOTE (PRTTDCIS-2283)

The GAR-T HF Rear Link variant electrical power will be provided by the power generator system of the associated Rear Link shelter.

### SRS (PRTTDCIS-2290)

The GAR-T HF Rear Link variant shall include an antenna positioner control panel.

### SRS (PRTTDCIS-2298)

The GAR-T HF Rear Link telescopic mast shall support one Log-Periodic HF antenna and its positioner for angular orientation.

### SRS (PRTTDCIS-2300)

In addition to those specific in the GAR-T Common Base, the HF Rear Link variant shall include compartments to accommodate the following;

- One Log-Periodic HF antenna system (Positioner and Antenna); and,
- One reel containing a 100m RF coaxial cable terminated with N-type male plug, adequate for the RF signal between the shelter and the ATU; and,
- One reel containing a 100m power cable adequate for the GAR-T Rear Link Variant power rating.

## 7.4.3 GAR-T HCLOS Relay Variant

### SRS (PRTTDCIS-2288)

In addition to the GAR-T common base, the HCLOS Relay variant electric management system shall also include:

- Power generator supervisory and control system; and,
- Measurement instruments (volt meters, amp meters, frequency meter).

### SRS (PRTTDCIS-2289)

The GAR-T HCLOS relay variant electrical command and control panel shall support provisions (e.g. cover) to “blackout” the command and control system indicators.

### SRS (PRTTDCIS-2275)

The GAR-T HCLOS relay variant shall include a PGU.

### SRS (PRTTDCIS-2278)

The GAR-T HCLOS relay variant power generator unit shall include:

- Digital command panel; and,
- Battery charger; and,
- Starter protection; and,
- Electronic voltage stabilization.

**SRS** (PRTTDCIS-2279)

The GAR-T HCLOS relay variant electrical generator system noise level (dB) shall be  $\leq$  55/65/70 at distance (m) of 7/5/3 respectively.

**SRS** (PRTTDCIS-4749)

The GAR-T HCLOS relay variant PGU continuous rating shall be established for Voltage, Phase, Frequency and Speed at 230VAC, 50 Hz and up to a maximum of 3000rpm.

**SRS** (PRTTDCIS-2445)

Jerry Cans to refuel the power generator shall be included and stored on the Trailer.

**SRS** (PRTTDCIS-2447)

The Trailer shall include enough Jerry Cans to perform TWO (02) PGU full Fuel tank refill.

**SRS** (PRTTDCIS-2280)

The GAR-T HCLOS relay variant shall include a UPS battery system.

**SRS** (PRTTDCIS-2281)

The GAR-T HCLOS relay variant UPS battery system shall be charged by the power generator or the external power input.

**SRS** (PRTTDCIS-4679)

In addition to those specific in the GAR-T Common Base, the HCLOS variant shall include compartments to accommodate the following;

- TWO (02) HCLOS systems and ancillaries; and,
- Cable reels necessary to connect HCLOS Systems to any Node.

## 7.5 Cases

### 7.5.1 General

**NOTE** (PRTTDCIS-4470)

Cases specialization in different variants is illustrated on following diagram.

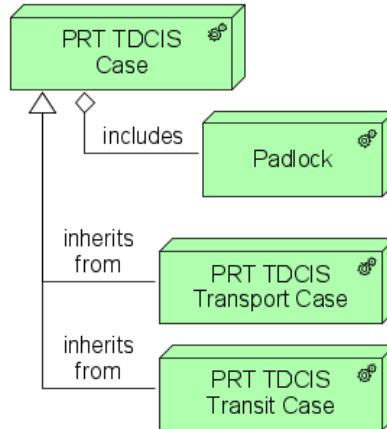


Figure 90 - Cases specialization into variants

**SRS** (PRTTDCIS-4471)

Cases containing their housed elements, fully assembled and enclosed ready for transport, shall not exceed the external sizes and weights as specified in following table, including lids.

Case Type	Maximum Width x Height x Depth	Maximum Weight
TINY	35 x 15 x 35cm	10 kg
HANDCARRY	58 x 27 x 45cm	20 kg

Table 42 - Transit cases maximum size and weights

**SRS** (PRTTDCIS-4472)

Each Case shall be equipped with:

- 1) Heavy duty, drop lifting handles with return spring and plastic or rubber sheathing with a minimum of four for cases heavier than 40 kg.; and,
- 2) Auto pressure release valves, and humidity indicators; and,
- 3) A re-settable and re-usable device to detect shocks and tilt, including the direction and angle of impact; and,
- 4) Stacking corners; and,
- 5) Removable or retractable casters to allow easy handling; and,
- 6) Fittings to assure that each case is lockable to prevent theft or tampering (i.e. padlocks).

**SRS** (PRTTDCIS-4473)

Each Case shall be delivered with a padlock that meets following requirements:

- 1) Body made from hardened steel; and,
- 2) Inner components made from non-corrosive materials; and,
- 3) Hardened boron steel shackle with minimum 8mm diameter; and,
- 4) 05 (FIVE) digits code locking mechanism; and,
- 5) Suitable for outdoor use, weatherproof; and,
- 6) Tested against impact, drilling, cutting, lever – test certificate /CoC issued by the supplier shall be provided; and,
- 7) Minimum GRADE 3 – Medium / High Security: according to Central European Norm (CEN Grade) or EN 12320:2012 Building hardware. Padlocks and padlock fittings. Requirements and test methods.

**SRS** (PRTTDCIS-4474)

Once active components in Cases are configured for a given security classification, their affiliation to the security domain shall be visually identifiable through the use of removable tags mentioning the Security domain and using Colour scheme in line with security domain color scheme. These tags shall be firmly attached to the surface of the cases, to avoid accidental removal.

**NOTE** (PRTTDCIS-4475)

Upon removal of the configuration data, and sanitation of non-volatile storage from the active elements, the security domain tags will be removed.

**SRS** (PRTTDCIS-4476)

Cases, when fully loaded, shall allow stacking them on top of each other with no damage to housed equipment and the cases itself.

**SRS** (PRTTDCIS-4477)

Case stacks shall be secured through the use of interlocks or equivalent mechanisms.

**SRS** (PRTTDCIS-4478)

Pressure release valves shall avoid also soaking water into the case. This can occur for example (but not only) due to the negative pressure when a case is rapidly cooled down during rain after being exposed long to the sun.

**SRS** (PRTTDCIS-4479)

Cases shall be protected against ingress of particles and liquids at IP65 or higher.

**SRS** (PRTTDCIS-4480)

Cases shall be stackable on Standard Euro Pallets (EUR 1, 1,200 by 800 by 144 millimeters) not exceeding these dimensions.

**SRS** (PRTTDCIS-4481)

Transit Cases shall be able to be loaded and secured on HCU 463L Air Cargo Pallet (HCU-6/E), that is compliant with MIL-STD-1791C w/Change 1 - 29 December 2017: Designing for Internal Aerial Delivery in Fixed Wing Aircraft (certified for these aircrafts: C-130, C-5, C-27, CH-47, KC-10, C-17, C-9).

**SRS** (PRTTDCIS-4482)

Cases packed for transport shall be capable of being transported via road, rail, sea, and air transport.

**SRS** (PRTTDCIS-4483)

Cases shall be capable of being secured to anchor points to prevent theft and movement during transportation.

**SRS** (PRTTDCIS-4484)

For Road Transport, Cases shall support all roads (motorway, unpaved road and country road) without sustaining any damage (for example due to shock or vibrations).

**SRS** (PRTTDCIS-4485)

For Rail Transport, Cases shall be capable of withstanding, without damage, the shocks and vibrations normally induced by rail transport.

**SRS** (PRTTDCIS-4486)

For Air Transport, Cases shall be capable of being loaded into and transported by military transport aircraft.

## 7.5.2 Transport Cases

**NOTE** (PRTTDCIS-4487)

Transport Case is the term used to denote those cases carrying equipment not installed in rack chassis frames. Transport Cases contains padding or shock-absorbing material to carry components or user appliances.

**SRS** (PRTTDCIS-4488)

Transport cases shall be used to store and transport Elements not integrated in Transit Cases (e.g. End-User Devices (EUD)) and ancillaries.

## 7.5.3 Transit Case

**NOTE** (PRTTDCIS-4489)

Transit Case is the term used to denote those cases carrying active CIS equipment (including cryptographic devices) integrated in standardized chassis frames (typically 19in rack). Transit Case components include the shell or housing (e.g. latches, covers, power and signal external terminal boards).

**SRS (PRTTDCIS-4490)**

Transit cases shall be used to host, support and protect Elements built in it during storage, transport, operation and handling.

**SRS (PRTTDCIS-4491)**

The detailed system design of the Transit Case shall adhere to the subsystems breakdown presented on the following picture:

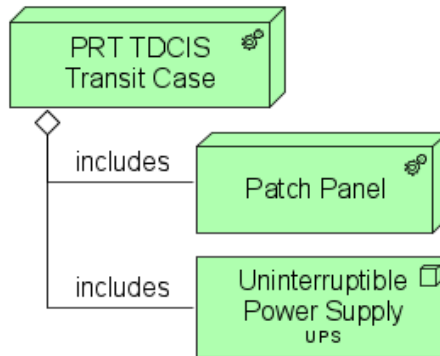


Figure 91 - Transit Case Breakdown

**SRS (PRTTDCIS-4510)**

The Transit Case shall implement an Uninterruptible Power Supply (UPS) solution.

**SRS (PRTTDCIS-4511)**

All ports (e.g. Copper, Fiber, Console, etc.) from all CIS Elements housed in the transit case shall be remoted to a patch panels.

**SRS (PRTTDCIS-4492)**

The complete assembly of components and transit case shall meet the Climatic and Environmental requirements of the CIS module it houses.

**SRS (PRTTDCIS-4493)**

The components in a transit case shall be mounted on shock absorbers and vibration dampers, or otherwise hardened, such that the transit case with mounted components as a whole meets the operation, transport, storage and handling conditions specifications.

**SRS (PRTTDCIS-4494)**

Where applicable, the racks shall be mounted with sliding bases and retractable cable harness, to allow easy maintenance.

**SRS (PRTTDCIS-4495)**

The transit cases shall be of a welded frame construction.



**SRS** (PRTTDCIS-4496)

Any removable EMC protection to the CIS Modules transit cases shall count against the maximum weight for the specified transit case and shall be carried for transport within the transit case.

**SRS** (PRTTDCIS-4497)

Each transit case, with CIS and/or UPS equipment operating from within the case, shall be provided with adequate air inlets and air outlets to assure required air flow and heat dissipation.

**SRS** (PRTTDCIS-4498)

The air inlets and air outlets shall be protected with removable lids for transport and storage

**SRS** (PRTTDCIS-4499)

The removable lids shall count against the maximum weight for the specified transit case and shall be carried for transport within the transit case.

**SRS** (PRTTDCIS-4500)

Transit Cases shall include patch panels to be used, as a minimum, for any external cable to be connected from or to any Element housed in the Transit Case.

## 8 User Appliances

### 8.1 General

**NOTE** (PRTTDCIS-4395)

This section details the User Appliances (e.g. Workstations, Phones, Printers, etc.).

### 8.2 Semi-Rugged Laptop

**SRS** (PRTTDCIS-1823)

Semi-Rugged Laptops shall meet or exceed the following specification:

Attribute	Value
Processor	Intel Core i7
Display	14in LCD, 1920x1080
Memory	16GB DDR4
Optical	DVD optical drive
Keyboard	Portuguese language keyboard layout
Pointing device	Touchpad
Internal Storage	<ul style="list-style-type: none"> <li>ViaSat Eclipt Core 600 SATA SSD 7mm - 128GB (xS laptops)</li> <li>1TB Solid State Disk (BLK, xU and xR laptops)</li> </ul>
Network Adapter	<ul style="list-style-type: none"> <li>100BASE-FX 1300nm multimode (SC) Network Adapted (xS and NS Kit laptops)</li> <li>Integrated 10/100/1000 Gigabit Ethernet Network Adapter (BLK, xU and xR laptops)</li> </ul>
I/O Ports	As a minimum: 2x USB 3.0 port, 1x VGA port, <del>1x RJ45 Ethernet</del>
Integrated Accessories	Webcam
Power Rating	< 90 W
Environmental constraint	Semi-Rugged

Table 43 - Semi-Rugged Laptop specification

**SRS** (PRTTDCIS-4736)

Each Viasat Eclipt Core 600 SATA SSD shall be delivered with TWO (02) Keystone Tokens.

### 8.3 VoIP phones

**SRS** (PRTTDCIS-1831)

Wired VoIP Phones for the xU, xR and xS security domains shall meet or exceed the features of the Voice End User PFE baseline

**SRS** (PRTTDCIS-1832)

Wired VoIP Phones for the xU and xR security domains shall connect to the corresponding UAM over an Eth-Cu interface.

**SRS** (PRTTDCIS-4747)

Wired VoIP Phones for the xS security domains shall connect to the corresponding UAM over an Ethernet Fiber Optic 100BASE-FX~~Eth-FO-SR~~ interface.

**SRS** (PRTTDCIS-1836)

The Wireless VoIP phones for the xU security domain shall meet or exceed the features of the Voice End User PFE baseline for wireless phone.

**SRS** (PRTTDCIS-1837)

The wireless IP phones for the xU security domain shall connect to any UAM-xU WiFi Access Point (e.g. Shelter or detachable UAM).

**SRS** (PRTTDCIS-4393)

Wired VoIP Phones for the NS Kit shall meet or exceed the features of the Voice End User PFE baseline

**SRS** (PRTTDCIS-4394)

Wired VoIP Phones for the NS Kit shall connect to the corresponding UAM over an Eth-FO-SR interface.

**SRS** (PRTTDCIS-1830)

VoIP phones shall be delivered with the corresponding user licenses to enable required features for operation with the MMA subsystem of the CNM.

### 8.4 Headset

**SRS** (PRTTDCIS-4734)

The Workstation Headset shall be suitable for Voice Collaboration and VTC Services.