



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

**Communication Gateway Shelter (CGS)
Lifetime Extension (LTE)
Short Title: CGS LTE**

Book II - Part IV

**Statement of Work (SoW)
Annex A – System Requirements Specification (SRS)
Amendment 2**

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1 Introduction

1.1 Purpose

- [1] The purpose of this System Requirements Specification (SRS) (as Annex A to the Statement of Work) is to define the functional and technical requirements for the non-Communication Information System (CIS) components, namely the expandable shelter with “leg supports” and associated facilities, of the Communications Gateway Shelter (CGS) system.
- [2] 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 the non-CIS components of the CGS.

1.2 Context

- [3] The Communications Gateway Shelter (CGS) is a transportable system that provides CIS assets to deployed NATO commands in support of NATO operations operation at NATO Secret (NS), Mission Secret (MS) and NATO Unclassified (NU) levels.
- [4] The full CGS system comprises a two-axle track for the transportation of the shelter, a power generator system and the shelter itself.
- [5] The CGS shelter can be transported using any method/vehicle (i.e. road, rail, air, sea) that supports the transportation of an ISO 20 foot container.
- [6] The Shelter specified in this SRS will be furnished with the CIS equipment described later at the NCI Agency facilities CIS Sustainment Support Centre (CSSC) located at Brunssum, The Netherlands.
- [7] The Shelter component of CGS system as specified in this SRS consists of the ISO container and all non-CIS components / subsystems, mechanical, electrical and environmental required to support the complete CGS system.

1.3 Structure

- [8] This SRS is structured as follows:
- Section 1 (this section) – provides an Introduction and sets the stage with context, purpose and scope, to facilitate the understanding of the following sections.
 - Section 2 – provides the High Level Design, guiding the formulation of requirements in the following sections.
 - Section 3 – CIS Assets Specification, provides the functional and Technical requirements for CIS assets, encompassing CIS Modules, Transmission systems.

- Section 4 – provides the specification of the Non-CIS elements supporting the CIS nodes in Section 3.

1.4 Conventions

- [9] General informational, descriptive text is numbered as [###].
- [10] Mandatory requirements are numbered as SRS-#.
- [11] Text in numbered lists (1)...(N) under a SRS-# requirement are to be considered as individual requirements under the “shall” statement of the parent requirement. As such, they shall be traced (as SRS-#-i) and be subject to individual verification.
- [12] xS is the generic suffix denoting both NS and MS.
- [13] Information and requirements contained under a “General” heading are applicable to all the elements covered by the corresponding section.
- [14] Functional Requirements are provided at system-level, whereas Technical (non-functional) Requirements are provided down to subsystem-level. The latter are derived from existing architectures and systems that are already in operation and with which the CGS needs to interoperate. Requirements at subsystem level, including those related to component and/or subsystem redundancy, shall be considered design constraints that the Contractor shall adhere to when preparing the Low Level Design (LLD) specification.
- [15] Availability requirements are formulated in terms of Operational Availability. Assumptions are made for mean logistics delays based on positioning spares locally, at intermediate depots (e.g. Forward Support Points), or at centralized depots (CSSC).
- [16] The term "including", as used throughout this Annex, is never meant to be limiting - the list that follows is always non-exhaustive.
- [17] Figures employing the Building Blocks use the following colouring convention:
 - 1) Green: in scope, these are the blocks subject of the description
 - 2) Orange: in scope; these are used to put the other building blocks in context
 - 3) Grey: not in scope (i.e. CIS PFE); these are used to put the other building blocks in context.

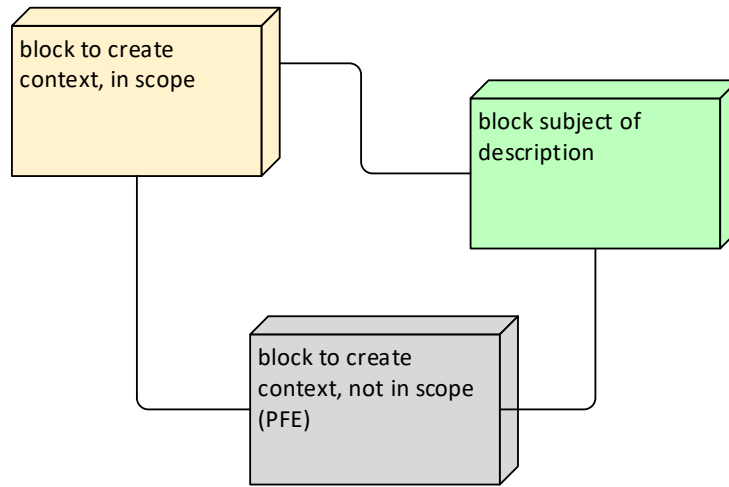


Figure 1-1 Block colouring convention

2 High Level Design Description

- [18] This System Requirements Specification (SRS) defines the requirements of the non-CIS components of the CGS, hereafter referred generally as the “CGS Shelter” or “Shelter”.
- [19] The non-CIS components of the CGS Shelter include:
- 1) The ISO container based expandable shelter with self-levelling leg supports and other mechanical components;
 - 2) Electrical: Power sourcing, Lighting, Cabling, Lightning/EMP protection, etc.;
 - 3) Environment control: Heating & Cooling, Weather, Biological & Chemical protection, etc.;
 - 4) External Interfaces; and,
 - 5) Ancillary items.
- [20] Following picture shows the building block breakdown of the CGS.

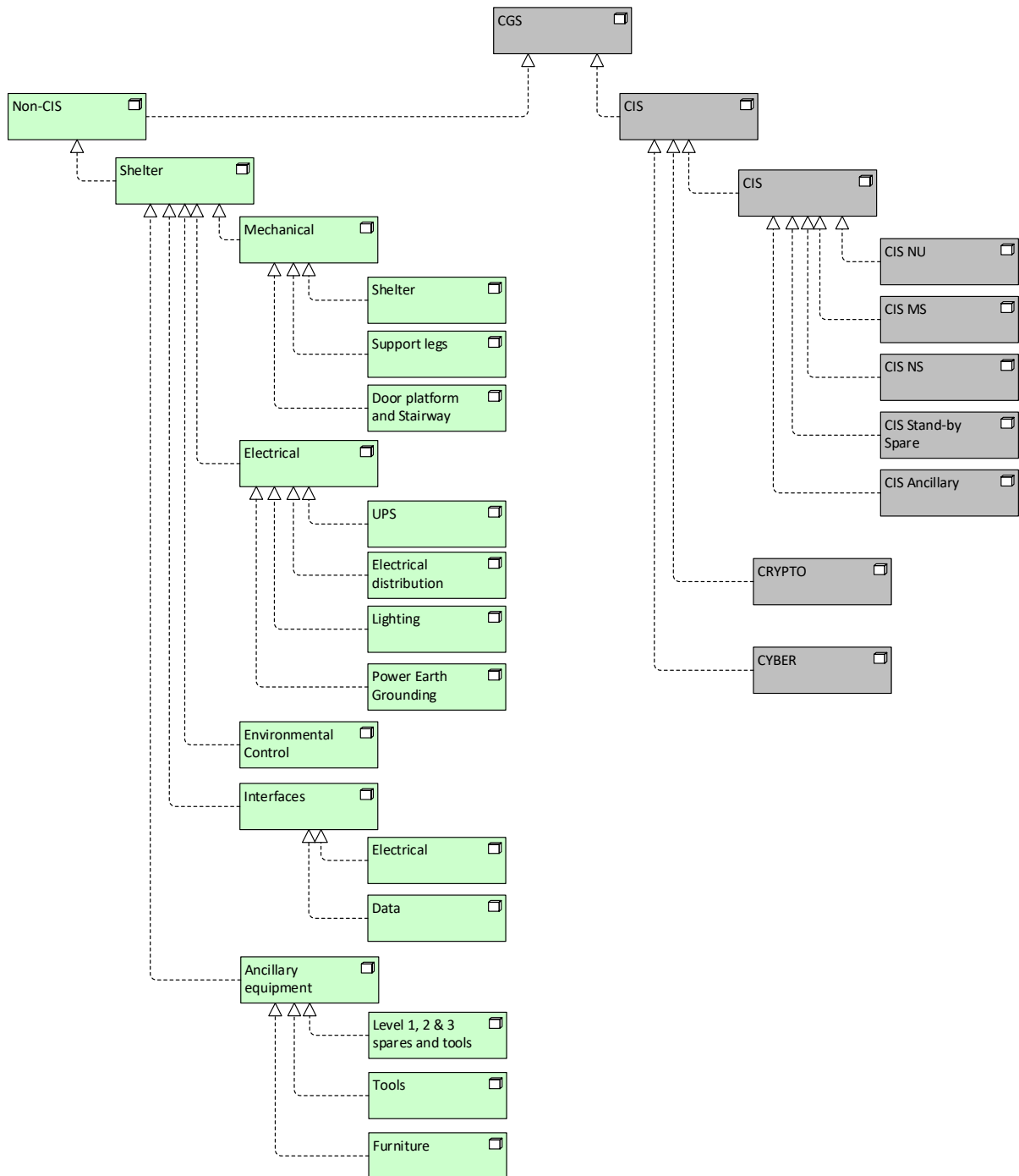


Figure 2-1 CGS CIS & non-CIS Break Down

2.1 CGS Overview

SRS-1 The CGS Shelter shall be based on an ISO 20' foot container with a 1:2 expandable section as illustrated in Figure 2-2.



Figure 2-2 CGS General Overview

- SRS-2 The CGS Shelter internal space shall be divided into two separated and isolated areas:
- "User Compartment" to accommodate the six (6) 19" racking systems and the CGS operators; and
 - "Technical Compartment" to house the electrical and environment non-CIS components as shown in Figure 2-3.
- [21] The User Compartment will consist of the "stationary" section of the ISO container and the expandable section.
- SRS-3 The CGS shelter shall be equipped with three (3) doors, the main door, entry to the stationary section, the "emergency" door on the external wall of the expandable section and an access door to the Technical Compartment on the front of the stationary section.
- SRS-4 The CGS shelter shall be equipped with a platform in front of the main door at the same level of the user compartment floor.
- SRS-5 The access to the CGS Shelter shall be done through a variable height stairway with handle rail.
- SRS-6 The CGS shelter shall be equipped with four (4) electrically adjustable support legs that allow:

- 1) Automatically level the Shelter on irregular terrain; and,
 - 2) Allow the unloading of the shelter from a 1600 mm high load platform without assistance of other handling equipment.
- SRS-7 The CGS shall have a redundant Environmental Control Unit (ECU) to maintain the operational capability of the internal CIS equipment and the habitability of the user compartment.
- SRS-8 The condenser units of the ECU shall be located in the Technical Compartment and the refrigeration airflow shall be performed through lateral flap doors.
- SRS-9 The CGS shelter shall provide BC COLPRO. For this requirement the user compartment doors can be considered as always closed during BC contaminants present, therefore no airlock area is required. The air filtration unit (AFU) shall be located in the technical compartment and the unfiltered air intake shall be performed through a lateral flap door.
- SRS-10 The CGS shelter shall provide protection against Electromagnetic Pulses (EMP).
- SRS-11 The CGS shelter shall have an electrical ETB where the power supply of the CGS shall be attached. This electrical ETB shall be located at any of the sides of the technical compartment and shall be performed through a flap door. The maximum power input available shall be less than 60 KVA.
- SRS-12 The CGS shelter shall have an internal electrical distribution system dividing the incoming 3 phase 400VAC 50Hz.
- SRS-13 The CGS power supply shall be below 60 KVA for the full shelter, including all CIS and non-CIS appliances.
- SRS-14 The CSG shelter shall have an internal lighting system with normal light and combat mode light.
- [22] Figure 2-3 below gives an overview of the CGS shelter layout.

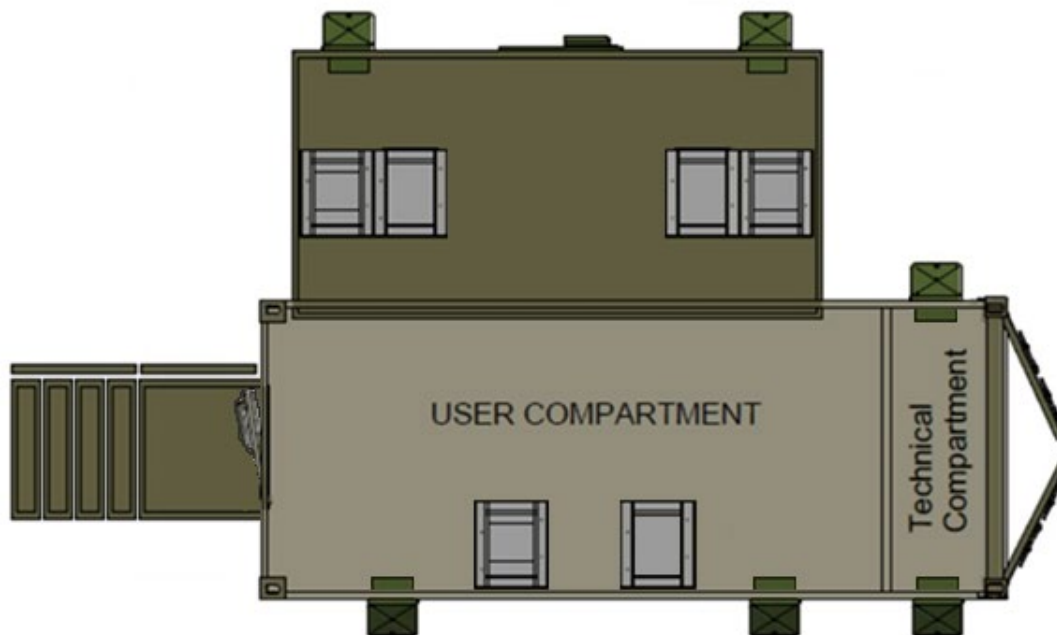


Figure 2-3 CGS Shelter Expanded Top-View

SRS-15 The CGS Shelter shall have four (4) Data External Termination Panels (ETB) for attachment of FO cables.

SRS-16 These Data ETBs shall be located:

- 1) Two (2) at the right side of the stationary section to the sides of the 19" racks;
- 2) One (1) on the external wall of the expandable section behind the 19" racks No 1 & 2; and,
- 3) One (1) on the external wall of the expandable section behind the 19" racks.

[23] The six 19" racks, as described in para. 2.2 below, will be fitted with the respective CIS equipment, (e.g. such a Routers, Switches, Uninterruptable Power Supplies (UPS), etc.), by NCI Agency personnel, on completion and delivery of the fitted container, to the NCI Agency facilities CIS Sustainment Support Centre (CSSC) located at Brunssum, The Netherlands.

SRS-17 The CIS equipment shall not be delivered as part of this SRS.

2.2 CGS 19" Racking System

[24] This section describes the CGS 19" racking system and the associate CIS equipment (out of scope) to enable the contractor to calculate the mechanical (e.g. weight), electrical (e.g. power) and environmental (e.g. heating/cooling) requirements for the racks and the CGS as a whole as well as derive the specific low-level design requirements such as floor planning, electrical power distribution/protection, cable racking systems, warm/cold air distribution, etc.

[25] The distribution for the six (6) 19" racks is shown in Figure 2-4.

SRS-18 CGS 19" racks # 1 to 4 shall be equal, 42U high, have a load capacity of ≥ 400 kg and have the correct depth to accommodate the CIS equipment.

SRS-19 CGS 19" racks # 5 and 6 shall be equal, 32U high, have a load capacity of ≥ 350 kg and have the correct depth to accommodate the CIS equipment.

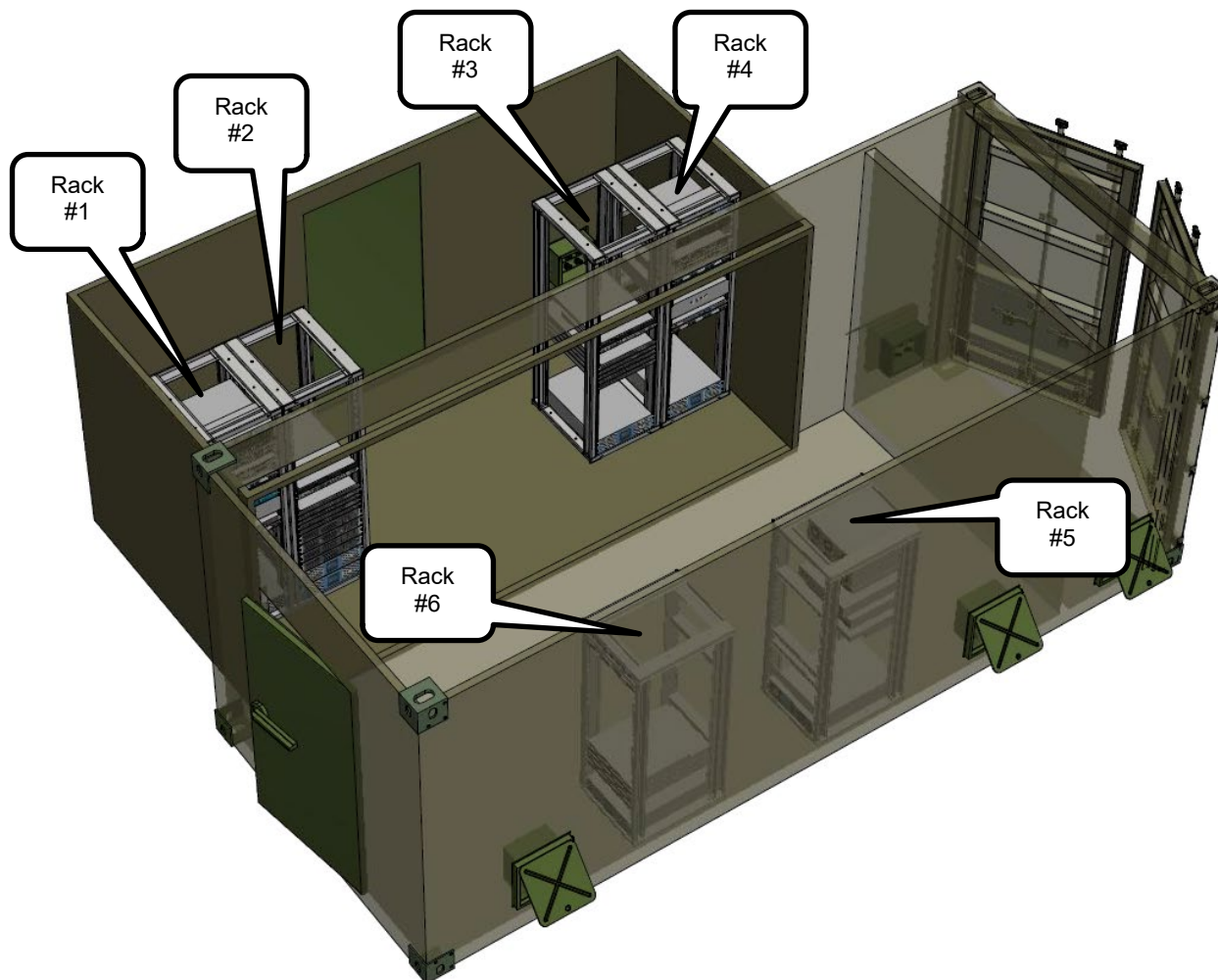


Figure 2-4 19" Racking System Distribution

2.2.1 CGS 19" Racks

[26] The CGS racks will be occupied with CIS appliances as per the following table:

Table 2-1 – Rack occupancy

Rack #	Total weight of CIS equipment	Total required power of CIS equipment	Total required cooling of CIS equipment
1	178 kg	4750 W	8233 BTU
2	293 kg	12300 W	24440 BTU
3	185 kg	4900 W	10395 BTU
4	142 kg	3850 W	6114 BTU
5	163 kg	4700 W	9714 BTU
6	147 kg	4770 W	10102 BTU

[27] The maximum depth of CIS equipment is 700 mm.

SRS-20 An additional 5% for power supply and cooling capacity shall be considered.

3 General Technical Requirements

- [28] The section identifies the general technical requirements (also known as non-functional requirements) of the Communication Gateway Shelter (CGS) systems specified hereafter.
- SRS-21 The CGS Shelter shall be designed in accordance to ASTM E1925-18.
- SRS-22 The CGS Shelter shall be considered once CIS equipment is installed as a CIS asset. Therefore the climatic conditions of a full exposed deployable CIS asset, as described in the TN-1078 "CLIMATIC AND ENVIRONMENTAL SPECIFICATION FOR NATO CP 0A0149, 'DEPLOYABLE C2 ASSETS'" shall be taken into consideration.
- SRS-23 The CGS Shelter shall withstand the severity of the climatic and environmental conditions of an OPE-1a physical configuration.
- [29] It can be assumed that the internal CIS assets of the CGS meet OPE-3 requirements.
- [30] If the CGS Shelter is provided with a solar screen, OPE-1b physical configuration can be considered.
- SRS-24 The CGS Shelter shall provide EMP protection and therefore be designed according to NATO AEP-20 Ed-1 "EMP Design and Test Guidelines for systems in mobile shelters".
- SRS-25 The CGS Shelter shall provide collective protection against Chemical and Biological threats, as per NATO AEP-70 COLLECTIVE PROTECTION (COLPRO) IN A CHEMICAL, BIOLOGICAL, RADIOLOGICAL AND NUCLEAR (CBRN) ENVIRONMENT
- [31] For this requirement the user compartment doors can be considered as always closed during BC contamination episodes; therefore, no airlock area is required.
- SRS-26 The CGS Shelters shall be equipped with smoke detectors and adequate fire extinguishers.
- SRS-27 Electrical design and installation shall follow IEC 60364 and the Low Voltage Directive - Directive 2014/35/EU of the European Parliament.
- SRS-28 All cables shall be labelled at both ends.
- SRS-29 All connectors shall be protected with removable protective dust covers.

3.1 Operational and Storage/Transportation States

- SRS-30 The Communication CGS shall be designed to be easily placed into one of two states:
- 1) **Operational:** panels opened to allow access to all interfaces and plugs; all equipment mounted; doors unlocked.
 - 2) **Storage and Transportation:** all doors and panels closed, all external equipment stowed and properly secured inside. Pressure equalization valve(s) opened ready for air transportation.

- SRS-31 The Contractor shall propose the best transportation load plan, including how items are secured for transportation, so that the approximate centre of the weight of the cargo is close to the mid-length of the container.
- SRS-32 All CGS equipment or components, including contents packed within the shelters; such as: tie-downs, portable stairs, grounding equipment and other items shall be sufficiently robust to remain undamaged when correctly secured and transported across country on trailers or vehicles, on trains, ships and by air.
- SRS-33 When in the Storage/Transportation state, the CGS weight shall be distributed as evenly as possible over the floor of the container and the centre of gravity shall be below the half-height of the container in accordance with STANAG 2236 Multimodal Transport Issues - AMovP-5.
- SRS-34 The Contractor shall ensure that more than 60% of the load is concentrated in less than half the length of a container measured from one end. The centre of gravity is to be below the half-height of the container (STANAG 2236 - AMovP-5).
- SRS-35 The CGS, including all associated equipment, shall be secured for shipment in such a way that it can return to operational condition in the least time possible.

4 CGS Shelter functional requirements

[32] This section defines the specific functional requirements of the CGS Shelter.

[33] The upcoming requirements have been grouped into 5 major groups and subgroups as per the following figure.

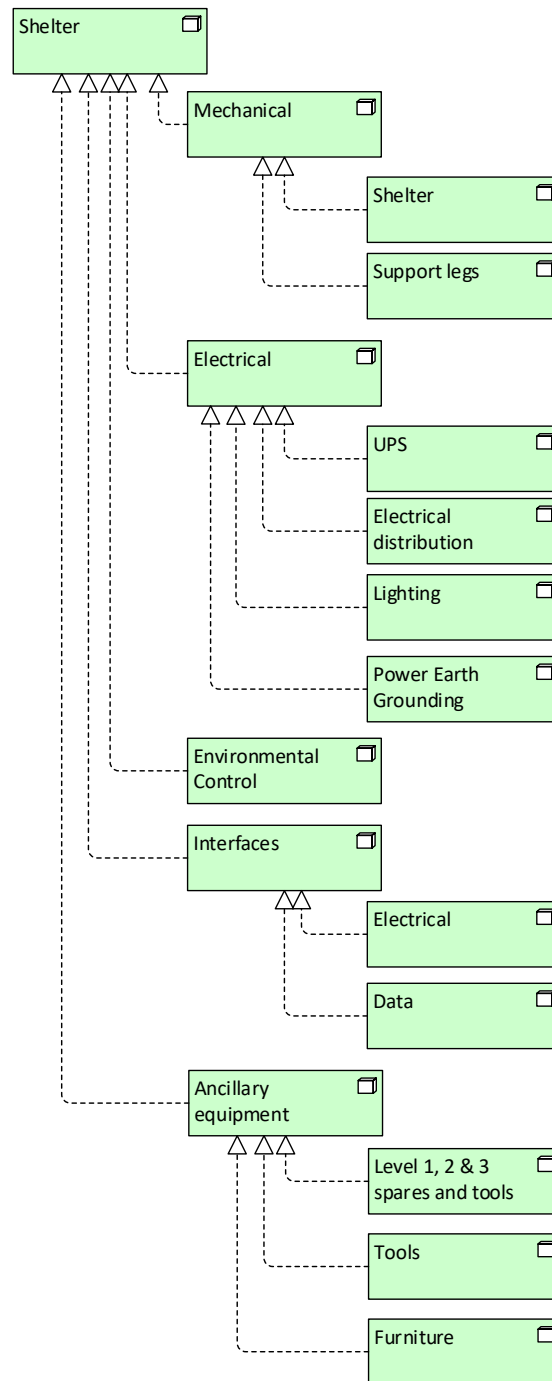


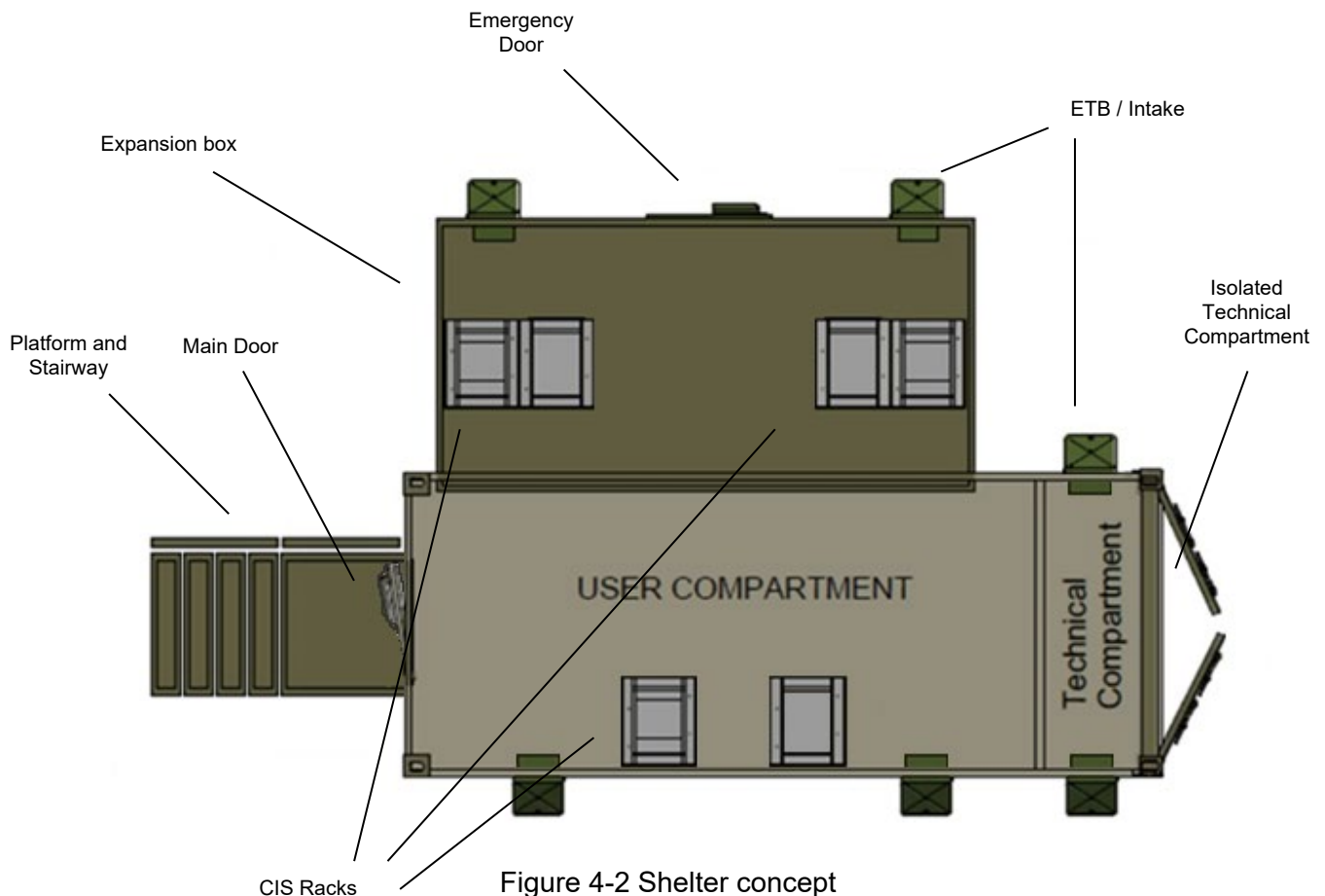
Figure 4-1 Non-CIS Modular break-down

4.1 Mechanical

4.1.1 Shelter

- SRS-36 The CGS Shelter shall be based on a 20-foot ISO container type structure in accordance with ISO 668:2013 - "Series 1 Freight Containers".
- SRS-37 The Shelter shall measure 6058 mm x 2438 mm x 2438 mm (LxWxH).
- SRS-38 The CGS Shelter shall support "ISO corner" mounting in accordance with ISO 1161:2016 – "Series 1 Freight Containers – Corner and intermediate fittings".
- SRS-39 The CGS Shelter total gross weight, excluding installed CIS equipment shall not exceed 5,000 kg.
- SRS-40 The CSG wall and ceiling panels shall be mechanically reinforced, so that they are able to withstand the forces and loads resulting from anchoring and tie-down of all necessary accessories and equipment, under all conditions (operation, transportation, handling and storage).
- SRS-41 A standalone CGS Shelter shall support mechanisms to allow the shelter to be capable of being lifted and transported by a forklift or crane.

SRS-42 The CGS Shelter concept shall adhere to the concept depicted in following figure:



- SRS-43 The CGS Shelter shall have an expandable side with a length of between minimum 4000 mm to maximum 4300 4400 mm.
- SRS-44 The extension or closing of the CGS shall be possible when mounted on a vehicle or trailer and shall not require more than two (2) personnel.
- SRS-45 The CGS door panels, hinges, cover plates and handles shall not protrude beyond the shelter outer wall surfaces when closed and in the transportation state.
- SRS-46 All CGS external to internal wall openings necessary for the inlet-outlet of power, ventilation, etc. shall be protected with an upper-hinged metallic cover/panel able to insulate the internal environment from the exterior environment.
- SRS-47 All CGS covers/panels shall be able to stay raised (in-place) to protect the respective panel from the weather when in use.
- SRS-48 All CGS covers/panels shall have a locking mechanism for storage and transportation.

- SRS-49 All CGS covers/panels shall be suitably recessed to allow the shelter to meet ISO container shipping requirements.
- SRS-50 The CGS Shelter's user compartment inner dimensions when expanded shall be at least:
- 1) User compartment stationary section:
 - a) Length: 4845 mm
 - b) Width: 2222 mm
 - c) Height: 2222 mm
 - 2) Expansion box section:
 - a) Length: 4170 4000 mm
 - b) Width: 2060 mm
 - c) Height: 2020 mm
- SRS-51 The main door shall have a clearance of 1900 mm height and 900 mm width.
- SRS-52 The Emergency Exit door shall have a clearance of at least 1500 mm height and 700 mm width.
- SRS-53 The Technical Compartment door shall allow full exposure of the technical compartment.
- SRS-54 The CGS main door shall be equipped with a doorstop mechanism to prevent the door from opening too widely and to hold the door open at 90 degrees.
- SRS-55 The CGS main door shall be equipped with an automatic heavy-duty door closure mechanism certified to EN 1154 with adjustable strength from EN 1-4 and CE-marked to EN1154 or EN1155.
- SRS-56 All CGS doors shall be equipped with a six (6) point locking mechanism.
- SRS-57 All CGS doors shall support an opening system operable from the outside and inside. It shall be possible to open the door from the inside within 2 seconds, even when closed from the outside.
- SRS-58 The CGS main door shall include a mechanism to allow locking from the outside with a padlock with at least a 4-digit code. The padlock shall be provided with each CGS.
- SRS-59 All CGS doors shall have a drainage system installed above the doors to prevent rainwater runoffs over the doors.
- SRS-60 The CGS external doorframes shall have an electric heating system installed to prevent any rubber seals from freezing under the climatic and environmental conditions as specified in ASTM E1925-18.
- SRS-61 The CGS doorframe heating system shall automatically turn on when the outside temperature falls below 4°C and automatically turn off when the outside temperature rises above 4°C.
- SRS-62 The CGS Technical Compartment, shall be used as a service area to house air conditioning, power distribution, conditioning and control equipment,

isolation transformer(s), Biological/Chemical (BC) filters, and air distribution devices.

- SRS-63 The CGS User Compartment shall be physically separated from the Technical Compartment with adequate sound and thermal insulation.
- SRS-64 The CGS roof assembly shall be able to withstand a personnel load of 300 kg static over an area of 60×30cm.
- SRS-65 The CGS roof assembly shall allow for personnel walking on its surface without introducing any deformation or damage to the surface or paint coatings.
- SRS-66 The CGS roof assembly shall have an “anti-slip” finish to support the presence and movement of personnel.

4.1.1.1 Internal layout of User Compartment

- SRS-67 The Shelter shall be provided with six (6) racks mounted on shock absorbing devices, as described in section 2.2.
- SRS-68 The floorplan of the User Compartment shall adhere to Figure 4-2.
- SRS-69 The CGS floors shall be horizontal and flat, with only a minimal sill at the doorframe.
- SRS-70 The CGS floor panels shall be capable of supporting a uniform load of 320 kg/m² in accordance with ASTM E1925-18.
- SRS-71 The CGS floor panels shall be capable of supporting a concentrated load of 900 kg over a 0.37m² area at the centre of the floor.
- SRS-72 The CGS floor panels shall be capable of supporting a point load of 57 kg over a 650mm² area.
- SRS-73 The loads shall not cause any permanent deformation of the CGS floor panels or cause any deflections that interferes with proper shelter operation.
- SRS-74 The CGS floor panel shall have an “anti-slip” and anti-static cover.
- SRS-75 The CGS floor panels shall have water drains that shall be closed by default, but capable of being opened without tools.
- SRS-76 The CGS floor panels water drains shall be located at accessible points and shall have EMI shielded closing covers/lids.
- SRS-77 The CGS shall be equipped with aluminium NATO C-profile railing to support the attachment and installation of internal equipment and ancillary items. The NATO C-rails shall be compliant with ACE 6516/SHCPE/86 paragraph 3.5.5.2 (Walls traction, ceiling and floor).

4.1.2 Support Legs

- SRS-78 The CGS Shelter shall be equipped with an integrated leg system composed by four (4) electrically operated support legs controlled from a control system

allowing the automatic levelling (within a margin of +/- 1°) of the shelter and the controlled extension retraction of the support legs.

[34] It can be considered that the electrical actuators can be detached when not used and stored on-board the CGS to prevent environmental aging.

SRS-79 The CGS electrical jacks shall be powered by the transport vehicle and/or CGS power system.

SRS-80 The CGS electrical jacks shall be controlled via a remote control console, capable of operating via a wireless or cable system over a distance of not less than 15 meters.

SRS-81 The self-levelling legs, when retracted, shall be suitably recessed to allow the CGS to meet ISO container shipping requirements.

SRS-82 Each CGS self-levelling leg shall rest on a swivelling footplate with a bearing area such that the pressure on the ground shall be less than 18 N/cm².

SRS-83 The Support Legs shall allow a Shelter-Ground clearance of 1800 mm.

SRS-84 The support legs shall rise the shelter in less than 10 minutes.

SRS-85 The self-levelling legs system shall be capable of raising and lowering the CGS when fully loaded with all components, equipment and accessories, including a contingency load of 5% of the total CGS weight.

4.1.3 Shelter painting colour

SRS-86 All the CGS external surfaces shall be painted with an infrared reflective, corrosion and chemical resistance paint in accordance with the colour standard mat paint RAL 6031 Bronze Green or equivalent.

SRS-87 All CGS interior surfaces shall be painted white in accordance with the colour standard mat paint RAL 9010, with the exception of the doors (main and emergency) where all surfaces shall match the external colour

SRS-88 The CGS paint finish (exterior and interior) shall be guaranteed against any visible deterioration for a minimum of ten years.

4.2 Electrical

SRS-89 The full electrical system shall be designed in accordance to 230/400 VAC 50Hz electrical power.

SRS-90 The Electrical Supply shall be less than 60 KVA, including all CIS and non-CIS equipment.

4.2.1 Electrical Distribution

[35] The internal electrical distribution is considered part of the CGS Shelter.

SRS-91 The Electrical Distribution of the CGS Shelter shall be formed by:

- 1) Input Stage: input plug(s), EMP protection, Isolation transformer;
- 2) Distribution panel; and,

3) Internal distribution: trunks, sockets and rack socketing.

4.2.1.1 Input Stage

- SRS-92 The electrical input to the Shelter shall be provided with IEC 60309 power plug(s), installed in the Electrical ETB.
- SRS-93 As the power available from external generators is limited to a maximum of 60 KVA, no input circuit shall be dimensioned above this limit.
- SRS-94 The input circuit(s) shall be provided with adequate EMP protection (surge arrestors, line filters, etc.) and an isolation transformer.
- SRS-95 Protective devices of the input stage shall be provided with an individual Power Earth Connection point located in the Electrical ETB.
- SRS-96 The internal distribution circuit shall be isolated with an isolation transformer. The Power Earth Connection point for the Internal distribution circuit shall be located in the Electrical ETB.

4.2.1.2 Distribution Panel

- SRS-97 The Power distribution panel shall:
- 1) Distribute hierarchically the electrical power throughout the CGS electrical loads;
 - 2) Protect effectively the personnel from electrical discharges; and,
 - 3) Protect effectively the systems from electrical damages.
- SRS-98 The Power distribution panel shall implement different circuits at least for:
- 1) ECU(s);
 - 2) BC COLPRO AFU(s);
 - 3) Lighting System;
 - 4) CIS Racks; and,
 - 5) Internal Power Sockets.
- SRS-99 The addition of all single phase circuits (i.e. CIS equipment) of the Shelter shall not produce an unbalance greater than a 10% in the three phase system.
- SRS-100 Each circuit shall be protected with its own power limiting circuit breaker and residual current circuit breaker.

4.2.1.3 Internal electrical distribution

- SRS-101 The Shelter internal electrical distribution shall be done in a trunking system.
- SRS-102 The electrical distribution system shall follow TEMPEST requirements. For this purpose the electrical cables to the racks of a different classification domains (i.e. NU, MS and NS), shall be installed in different trunks with a

separation between each, of more than 100mm. Cables of the other circuits (lighting, power sockets) shall also be installed in separated trunks.

SRS-103 Each Rack shall be provided with 16 (sixteen) CEE 7/3 sockets (Schuko sockets).

SRS-104 All Racks shall be designed electrically equal and support the maximum power consumption as described in Table 2-1.

SRS-105 Additionally 12 (twelve) CEE 7/3 sockets shall be available along the Shelter at the approximate locations marked with red dots in the figure below:

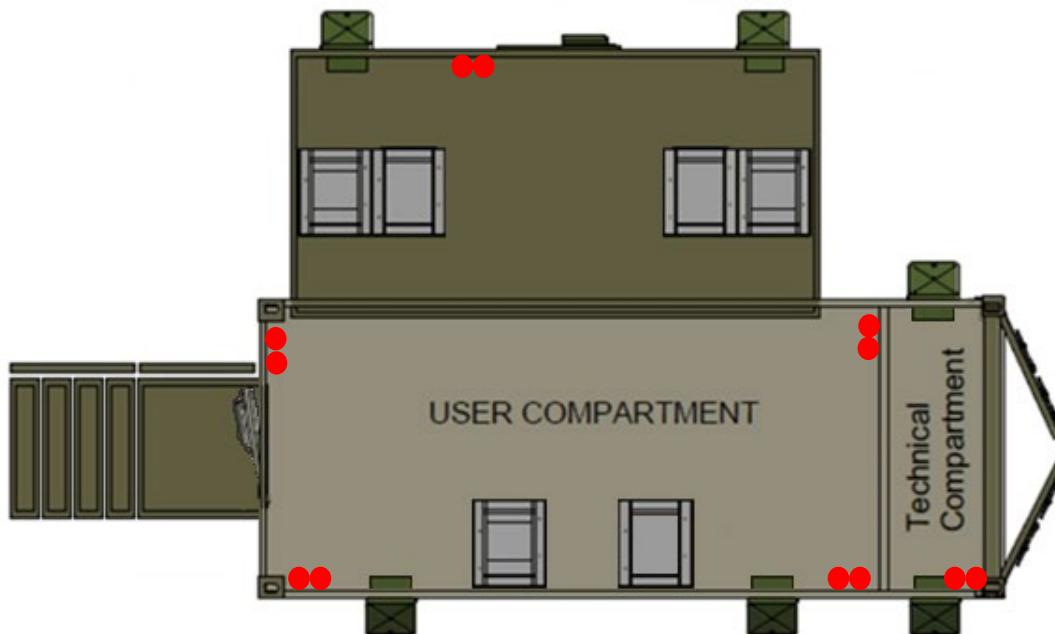


Figure 4-3 Internal Power Socket locations

[36] The electrical connections of the circuits between the stationary and the expandable sections of the Shelter may be done with pluggable connectors when the Shelter is in expanded condition.

SRS-106 The Shelter shall include three (3) additional trunks with a separation of 100 mm between each of them to support data cabling activities performed by the purchaser. These trunks shall be installed following the pattern shown with blue lines in the figure below:

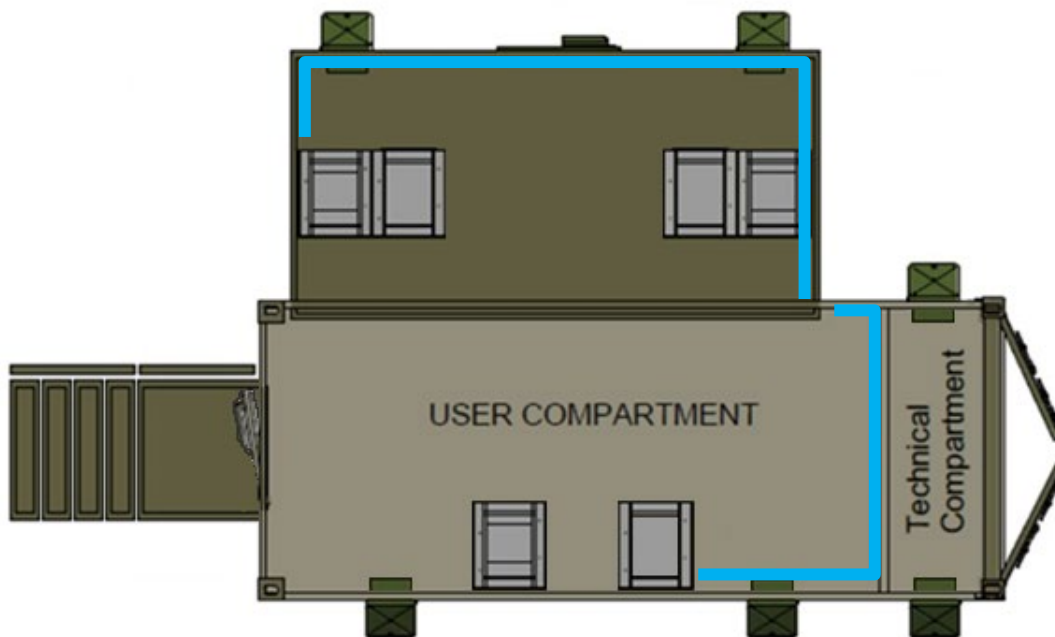


Figure 4-4 Data cable trunk locations

4.2.2 Lighting

SRS-107 The Shelter shall be provided with internal LED lighting system located at the ceiling.

SRS-108 The Lighting System shall allow (approx. 3000K) white light for normal mode and (625nm to 650nm wavelength) red light for combat mode.

SRS-109 The Lighting System shall provide also Emergency lights at the exits that will automatically turn on in case of a power failure of the electrical supply to the lighting system (i.e. after main power fail the UPS is completely discharged).

SRS-110 The Lighting System shall have a control panel that allows:

- 1) On/Off Switching of the lighting system;
- 2) Combat mode On/Off;
- 3) Emergency lights manual disable; and,
- 4) Visual indicator for the engagement of the Lighting UPS.

SRS-111 The different modes shall be testable from the control panel.

SRS-112 The Combat mode shall be automatically engaged when any door is open.

4.2.3 UPS

SRS-113 In support to the Lighting, the CGS Shelter shall have a UPS that enables the normal light operation for 60 minutes after Power Loss.

[37] Note that this UPS functionality does not support the CIS equipment and only the internal lights.

4.2.4 Power Earth Grounding

SRS-114 The CGS shall be provided with one extensible power earth stake and three (3) separate earth cables, one for the protective devices, one for the structure and one for the provision of internal power earth.

SRS-115 The Protective devices Power Earth impedance shall be designed in accordance to the protection level required.

SRS-116 The Internal Power Earth impedance shall be less than 500 mOhm from any point of the internal power earth circuit.

4.3 Environmental Control Unit and CB Air Filtering

SRS-117 A redundant Environmental Control System shall be installed in the CGS as it shall be operating 24/7 during extents of several months.

SRS-118 The Environmental Control Unit shall be able to adjust the internal temperature of the shelter with 2 personnel working inside to following margins:

- 1) +10°C to +21°C when the ECU works in heating mode (winter conditions); and,
- 2) +24°C to 32°C when the ECU works in cooling mode (summer conditions).

SRS-119 As required in section 3, CB COLPRO shall be considered only for an all doors closed condition of the Shelter. In this case the CB Air Filtering Unit (AFU) shall provide sufficient airflow to maintain the required overpressure and sufficient fresh air supply for 4 personnel.

SRS-120 The ECU and AFU shall be controllable from a dedicated control panel installed in the User Compartment that allow at least:

- 1) Manual Stop and Start;
- 2) Temperature and Humidity Indication;
- 3) Temperature Selection; and,
- 4) Running hours counter.

SRS-121 For cooling capacity calculations the environmental exposure conditions of the shelter (see SRS-23), the CIS equipment heat generation (see Section 2.2) and a 2 personnel working in the Shelter.

SRS-122 The condenser unit of the ECU and the filtering unit of the AFU shall be located inside of the technical compartment, requiring only the opening of the flap doors for operation.

SRS-123 The ECU system shall direct cooling air to the CIS Racks, assuring that the CIS equipment work within the working temperature limits.

SRS-124 Each rack's cooling duct shall be settable to the required cooling of each rack and support the maximum cooling requirement as described in Table 2-1.

4.4 Interfaces – External Termination Boards

4.4.1 Electrical ETB

[38] The Electrical ETB is the external connection point for electrical connections.

SRS-125 The Electrical ETB shall have IEC 60309 4 pole connectors (3 phase + neutral) and Power Earth suitable for 60KVA 400VAC 50Hz, in a number as required derived from the design of the Power consumption and power distribution.

SRS-126 The external colour of the ETB and the connectors shall be RAL6031 Bronze Green.

SRS-127 The Electrical ETB shall be located in the technical compartment area.

SRS-128 All connectors shall be provided with removable dust cover.

4.4.2 Data ETB

SRS-129 The shelter shall be equipped with four (4) Data ETB (DETB) as shown and identified in the figure below:

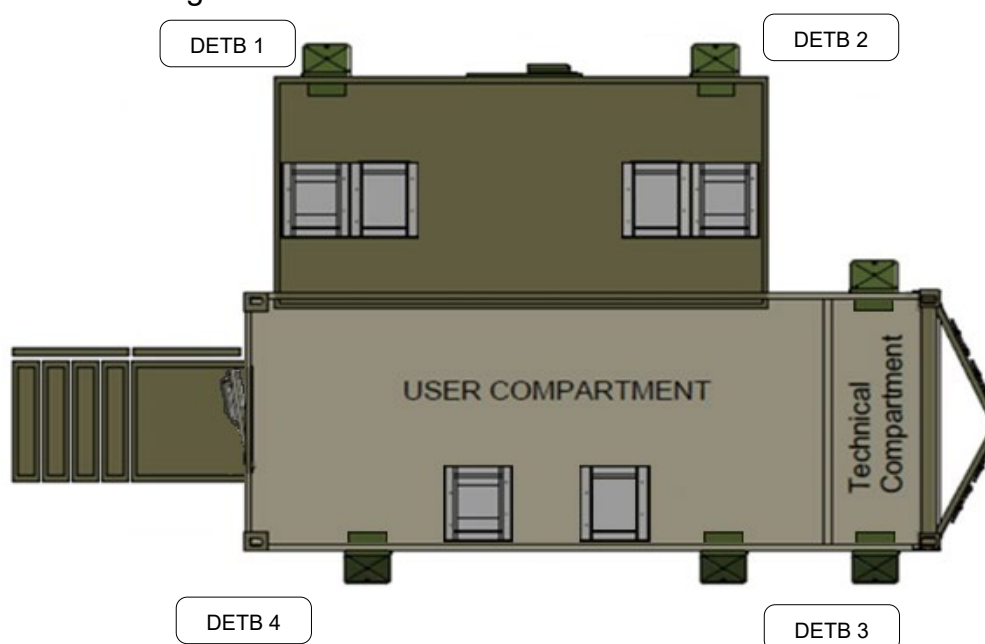


Figure 4-5 DETB location and identification

SRS-130 The DETBs shall be provided with ten (10) HMA 4 core Single Mode FO connectors eight (8) HMA 4 core single mode fibre optic connector system and six (6) S900 multi-mode fibre optic connector system.

SRS-131 The external colour of the DETBs and the connectors shall be RAL6031 Bronze Green.

SRS-132 All connectors shall be provided with removable dust cover.

4.5 Ancillary Equipment

4.5.1 External Accessories

SRS-133 The CGS container shall have installed adequate foldable steps on the outside structure and necessary handgrip points to allow easy access to the roof.

SRS-134 The CGS main entrance doorway shall include a removable or hinged stair-landing platform 1300mm width, 1200mm long, immediately outside the door that shall allow the door to swing open to 90°.

SRS-135 The CGS door platform shall have enough capacity to support four adults and ready to support the stairs flight with fast connection mechanism (as achieved by linchpins, hitch pins and clips).

SRS-136 The CGS shall include one (1) stairway that can be deployed on set up, and will attach to the door platform referred to above.

SRS-137 The CGS stairs shall come with adequate tread rise and handrail (one side only), and be adjustable to the height difference that may result from uneven terrain.

SRS-138 The CGS stairs steps shall include a non-slip surface, preferably metal mesh floor type to allow snow or sand to pass through, resistant up to 300kg/m², and shall include a suitable base plate to avoid the stairs sinking into soft soil.

SRS-139 When the CGS stairs are not in use they shall be stowed and secured inside the shelter.

SRS-140 The CGS shall include a ladder for access to the emergency exits that shall be fixable to the external wall of the container so that it cannot be accidentally moved.

SRS-141 The CGS ladder shall be stored inside the shelter when in transportation mode.

4.5.2 Internal Accessories

SRS-142 The CGS shall include the following internal ancillary equipment to be stowed inside the shelter;

- 1) First Aid Kit in a highly visible location on the inside with provision adequate for five (5) staff.
- 2) Fire extinguishers in a highly visible location

SRS-143 The CGS shall have the following internal ancillary equipment, provided in the same colour as the shelters

- 1) 1× pickaxe, with a handle shaft approx. 46cm long and drop forged carbon steel head, hardened and tempered for durability.

- 2) 1× sledge hammer, with handle shaft approx. 70cm long, 40mm in diameter
- 3) 1× 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.
- 4) 1 × hatchet, with a handle shaft approx. 46cm long; C45 high-grade carbon steel head/blade. Drop forged carbon steel head, hardened and tempered for durability.
- 5) 1 × chisel, all-steel chisel approx. 40cm long and approx. 16mm in diameter. Drop forged carbon steel chisel shaped head, hardened and tempered for durability.

4.5.3 Furniture

SRS-144 The CGS shall include the following furniture equipment to be stowed inside shelter

- 1) Storage compartment for the transportation and accommodation of general-purpose equipment and accessories.
- 2) Magnetic “white” marker board” having approximate dimensions of 430 x 840 mm.
- 3) A folding steel table painted “NATO green” in accordance with the colour standard mat paint RAL 6031 or equivalent paint.
- 4) Two (2) folding steel chairs for use with the folding table, painted “NATO green” in accordance with the colour standard mat paint RAL 6031 or equivalent

4.5.4 Spares and Tools

SRS-145 The CGS shall be delivered with a full set of required spares and special tools to perform Level 1, 2 and 3 Maintenance and Repair.

Appendix A Applicable and Reference Documents

A.1 Applicable Documents

[NC3A TN-1078, 2008] Climatic and Environmental Specification for NATO CP 0A0149, 'Deployable C2 Assets', February 2008, NCI Agency, The Hague, Netherlands (NATO Unclassified)