RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:

Bid Receiving - PWGSC / Réception des soumissions - TPSGC
11 Laurier St. / 11, rue Laurier
Place du Portage , Phase III
Core 0A1 / Noyau 0A1
Gatineau
Québec
K1A 0S5
Bid Fax: (819) 997-9776

LETTER OF INTEREST
LETTRE D'INTÉRÊT

Title - Sujet Tactical Headquarters Shelter Sys	
Solicitation No. - N° de l'invitation W8476-13HQSS/A	**Date** 2012-08-17
Client Reference No. - N° de référence du client W8476-13HQSS	**GETS Ref. No. - N° de réf. de SEAG** PW-$$QF-024-23082
File No. - N° de dossier 024qf.W8476-13HQSS	**CCC No./N° CCC - FMS No./N° VME**
Solicitation Closes - L'invitation prend fin **at - à 02:00 PM** **on - le 2012-11-30**	**Time Zone** **Fuseau horaire** Eastern Daylight Saving Time EDT
F.O.B. - F.A.B. **Plant-Usine:** ☐ **Destination:** ☑ **Other-Autre:** ☐	
Address Enquiries to: - Adresser toutes questions à: Gagné, Annamarie	**Buyer Id - Id de l'acheteur** 024qf
Telephone No. - N° de téléphone (819) 956-0582 ( )	**FAX No. - N° de FAX** (819) 956-5650
Destination - of Goods, Services, and Construction: **Destination - des biens, services et construction:**	

Comments - Commentaires

Instructions: See Herein

Instructions: Voir aux présentes

Vendor/Firm Name and Address
Raison sociale et adresse du fournisseur/de l'entrepreneur

Delivery Required - Livraison exigée	**Delivery Offered - Livraison proposée**

Vendor/Firm Name and Address
Raison sociale et adresse du fournisseur/de l'entrepreneur

Telephone No. - N°de téléphone
Facsimile No. - N° de télécopieur

Name and title of person authorized to sign on behalf of Vendor/Firm (type or print)
Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)

Signature **Date**

Issuing Office - Bureau de distribution

Electronics, Simulators and Defence Systems Div.
/Division des systèmes électroniques et des systèmes de simulation et de défense
11 Laurier St. / 11, rue Laurier
8C2, Place du Portage
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HEADQUARTERS SHELTER SYSTEM (HQSS)

Letter of Interest (LOI)

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1. Purpose

The Department of National Defence has a requirement for the provision of Headquarters Shelter System comprising Shelters, Lighting, Flooring and HVAC.

The objective of this Letter of Interest (LOI) is to:

- advise industry of this potential forthcoming requirement and provide industry with general information on the HQSS project.

- provide industry with a preliminary set of high level specifications, deliverables, schedule, and project scope information.

- enable Canada to engage industry and obtain information regarding existing, in-service HQSS, including detailed, indicative, non-binding cost information for project planning purposes.

- enable Canada to better evaluate and progress towards a potential HQSS acquisition with associated future in-service support requirements.

- seek feedback from Industry regarding:
  - potential equipment configuration to be utilized for assessment during setup and for testing;
  - the draft equipment specifications at Annex A, B, C & D;
  - obtaining information regarding Industrial and Regional Benefits (IRB) as per Annex E;
  - a proposed project schedule from suppliers;
  - potential in-service support element of the acquisition; and
  - any other information that may be useful.

2. Background

The Department of National Defence (DND) has identified a requirement for tactical Headquarter Shelter Systems (HQSS). The HQSS project emphasizes the need for a modular, spacious and environmentally protective shelter from which unit and brigade headquarters can command. The project will provide a new System of tactical soft-walled shelters and ancillary equipment to support the functions of digitized headquarters command posts, accommodations and field hospitals.

Upon completion, the project will provide a common, CF-wide capability of a scalable, tactically mobile, shelter system providing full environmental protection and control in a wide range of climatic conditions.

3. Project Scope

The Headquarters Shelter System (HQSS) project will procure an integrated system of soft-walled tactical shelters, shelter accessories, heating ventilation and air conditioning, tactical lighting, and semi-rigid flooring to support the functions of a headquarters command post, non-surgical medical shelters, and for temporary accommodation in austere environments. The project will also procure integrated logistics support and long term in-service support for the system. There will be separate Statements of Work (SOW) for the Equipment Acquisition (Acquisition SOW) and In-Service Support (ISS SOW).

A headquarters command post complex will consist of an interconnected complex of operations, planning and office shelters and shelter accessories. There are generally five sizes of command post headquarters complexes, although the variations are endless given the system's flexibility. These configurations are: a division at 990m2, a brigade at 750m2, regional operational stock systems at 640m2, a unit at 450m2 and smaller squadron sized systems that range between 50 to 230 m2. There are four categories of medical shelters systems to satisfy Canadian Forces Health Services Group requirements. They are: a medical unit command post, a unit medical section, a non-surgical medical shelter, and a dental section. There are no special configurations for accommodation complexes. Planning shelters will be the primary shelter to accommodate personnel.

The HQSS will be delivered in sea containers to be potentially supplied by the Contractor, and will be capable of being transported to the field via all in-service CF logistics vehicles. All HQSS equipment will be capable of being unloaded and set-up without any material handling equipment. The HQSS will also be able to interconnect with a specified set of the Canadian Force's command vehicles.

The project has the following high-level mandatory requirements:

- Flexible Foot Print

  The individual equipment that makes up the HQSS complex must be modular and flexible in their interconnectivity to enable a commander to individually tailor the design of the HQ complex to meet the mission requirements.

- Set-up/Tear Down Simplicity

  The set-up/tear down and storage procedures must be simple and robust enough to be effective in all weather and restricted light conditions. From the commencement of a shelter's set-up, six soldiers, with only one being familiar with the system, must be able to be under canopy within 20 minutes. Any removable parts must be easily identifiable for their use in low light level conditions and simply stored for transport.

- Tactical Mobility

  The design of the HQSS must enable it to be set-up/torn down and moved multiple times within a given mission scenario within the specified climatic conditions. Moving and removable parts must remain effective assuming the presence of dirt, ice/snow and limited dexterity.

- Repair Simplicity

  It is expected that portions of the HQSS will be damaged while deployed. The parts of the system that are most likely to fail must have available spares. Furthermore the conduct of first and second line repairs in the field must be achievable while a shelter remains erect and operational.

- Climate Protection

  The system must be impervious to rain and provide adequate snow load capability to safely operate in Canada's arctic. It must protect the occupants and their electronic equipment from high winds, driving rains and dust. The air conditioning / heating systems when combined with the insulating properties of the shelter must provide comfortable internal temperatures while operating in extreme ambient temperatures. The system's floor must include the capability to provide stand-off from the ground and be capable of accommodating uneven terrain.

- Collaborative Work Spaces

  The HQ environment involves multiple groups who collectively view the same situational awareness screens to plan and execute their tasks. The layout of the HQSS's internal space must be conducive to fostering collaborative work areas, space for briefings and room for the multitude of display screens.

- Testing of Equipment

  As part of the potential upcoming RFP process, DND is planning to conduct testing on suppliers' proposed HQSS equipment. At least one mandatory pass/fail test will be conducted. This test will determine the capacity of the proposed Operations and/or Planning and/or Office shelter to withstand a specified snow load. Scored tests may be conducted against one or more of the high level mandatory requirements for the system. For example, the evaluation testing of equipment may require bidders to set up a representative example of a Headquarters Command Post complex using proposed components of the HQSS.

SOW's are currently under development for both Equipment Acquisition and In-Service Support. The Acquisition SOW will be structured assuming that some developmental work may be required, along with system integration activities. The final Acquisition SOW will follow a system engineering process including the production of several design analyses intended to establish

the baseline technical data required for long term support of the system. The technical data will be used by Canada to support the equipment throughout its life and DND will have the rights to use that technical data and/or to have it used by third parties on behalf of DND. The Acquisition SOW will produce a first article equipment and demonstrate full compliance to the technical requirements, via the means indicated in the requirements verification matrix, prior to production of the equipment.
The Acquisition SOW will follow the general DND template for a complex SOW, including, but not limited to, the following sections:

- Scope
- Applicable Documents
- Project Management
- System Engineering
- Integrated Logistics Support
- Technical Requirements
- Contract Data Requirements List
- Data Item Descriptions

The ISS SOW will seek long-term in-service support to include, if feasible, the following services:

- Supply of spare parts up to complete assemblies;
- Repair and Overhaul;
- Technical Investigation and Engineering Support;
- Field Service Representative;
- Obsolescence Management and Technological Refreshments;
- Warehousing;
- Inventory Management; and
- Others services as applicable

DND is also investigating the possibility of other concepts of support, for example Contractor-owned inventory for spares.

Industry comment is invited on the system in-service support concept above.

4. Requirement

The draft HQSS requirements are detailed in the Draft Statements of Work and Draft Technical Performance Specifications Annex A, B, C, and D.

5. Schedule

In providing responses, the following estimated Project schedule should be utilized as a baseline:

- LOI - Summer 2012

- Potential RFP Issue date - TBD
- Potential Contract award date - TBD
- Potential Full Capability Delivery date - TBD

The "TBD" will be further defined through a subsequent amendment to the LOI.

6. Industry Day

Canada will host a non-mandatory Industry Day, which interested suppliers are encouraged to attend. Canada will provide a presentation on the Project and a Question and Answer session will be held. *Attendance at the event is not mandatory and will not prevent suppliers from bidding on a possible future solicitation*. Any exchange of information including Questions and Answers deemed to be of significant value to suppliers may be provided to non-attendees through an amendment to the LOI on MERX.

The Industry Day event is tentatively scheduled to take place in Ottawa, Ontario with the date to be determined. A subsequent amendment will be issued against the LOI, which will confirm location and date of the event.

Suppliers are requested to submit their questions, at the latest, 14 days prior to the Industry Day event. Responses to these questions will be provided during the Industry Day. These questions and answers will subsequently be published on MERX through an amendment to the LOI. For all other questions received post-Industry Day, suppliers are directed to Section 13. Please note that throughout this process suppliers anonymity will be respected and questions will be re-worded to protect the identity of the each supplier.

A maximum of four (4) attendees per supplier will be permitted to attend the event. Suppliers who choose to attend must submit a confirmed list of attending representatives to the PWGSC Contracting Authority identified under Section 14 of this LOI. The confirmed list of attending representatives is to be submitted no later than _____, 2012 (date to be confirmed through a subsequent amendment to the LOI).

In order to provide adequate time to make travel arrangements, Canada will send all attending suppliers the confirmed event dates, and the official event agenda shortly after _____, 2012 (date to be confirmed through a subsequent amendment to the LOI).

Canada will not be responsible for any costs associated with attendance at the Industry Day.

7. Additional Information Requests

After review of all the information packages, additional information / clarifications may be sought from suppliers by DND via the Public Works and Government Services (PWGSC) Contracting Authority identified in Section 14.

8. Potential Standard Acquisition Clauses and Conditions

If a follow-on Solicitation is issued, the following may apply:

- General Conditions

  2030 General Conditions - Higher Complexity - Goods:
  http://ccua-sacc.tpsgc-pwgsc.gc.ca/pub/rqqr.do?lang=eng&id=2030&date=2011-05-16&eid=1

- Intellectual Property

  4006 - Contractor to Own Intellectual Property Rights in Foreground Information:
  Http://ccua-sacc.tpsgc-pwgsc.gc.ca/pub/rqqr.do?lang=eng&id=4006&date=2010-08-16&eid=40

  Notwithstanding the above, for greater clarity on Canada's intentions on use of IP, suppliers are directed to 4006-04.

- Financial Capability (SACC A9033T)

  Suppliers are encouraged to review the above SACC at the following link:
  https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/A/A9033T/8

  NOTE: There is no specific criteria used to evaluate the financial strength of a bidder. It is a professional opinion that is based upon the review and examination of various types of information including, but not limited to, financial statements, details on availability of credit, cash flow projections and any other financial information deemed relevant by Canada. The information requested by Canada is reviewed while taking into account the financial demands that may be placed on a potential contractor in order to successfully enter into and perform the proposed contract.

- Security Requirements

  There may be a security requirement associated with this requirement. A requirement of this scope could require a Enhanced Reliability to perform the in-service support work.

- Shipping Instructions

  Delivered Duty Paid to _____ (Destination to be identified in the potential upcoming RFP).

9. Trade Agreements

This requirement pertains to excluded goods (FSC Group 8340, Textiles) and, as such, is exempt from:

- The North American Free Trade Agreement (NAFTA) under Chapter 10, Annex 1001.1b-1 Goods, Section A, General Provisions;
- The World Trade Organization Agreement on Government Procurement (WTO-AGP) in accordance with Canada's Annex 1 to Appendix 1;
- The Canada Chile Free Trade Agreement (CCFTA) Part 3, Annex K bis-01.1-3 Section A, General Provisions and Section B, List of Certain Goods; and
- The Canada Peru Free Trade Agreement (CPFTA) under Chapter 14, Annex 1401.1-3, Section A, General Provisions and Section B, List of Certain Goods.

The Agreement on Internal Trade (AIT) is applicable.

10. Comprehensive Land Claim Agreements (CLCA)

This procurement is not subject to the Comprehensive Land Claim Agreements (CLCAs) as the final delivery points of the goods and services required are not within the Comprehensive Land Claims Settlements Areas.

11. Industrial and Regional Benefits (IRB)

Canada's Industrial and Regional Benefits Policy will be a mandatory element of the Headquarters Shelter System (HQSS) project, with the contractor committing to achieve IRB valued at 100% of the contract value. The IRB Policy is administered by Industry Canada (IC) with assistance from the Regional Development Agencies.

Respondents should provide an overview of their plans for the provision of long-term, sustainable economic benefits to Canada as an informational Annex to their LOI response. This information will be used to facilitate HQSS project planning for the development of the economic benefits portion of the upcoming RFP.

Respondents should include with their LOI responses the information as detailed in Annex E.

12. Aboriginal Economic Development

Pursuant to the Federal Framework for Aboriginal Economic Development, the socio-economic development of Aboriginal people and communities is one of Canada's national policy objectives. In support of this objective, the respondent is encouraged to include Aboriginal businesses and individuals in the work performed under the contract wherever possible. For example, this could include hiring Aboriginal subcontractors and employees. If it is not possible

to involve Aboriginal businesses or individuals in the work, the respondent is encouraged to demonstrate alternative methods of supporting Aboriginal socio-economic development, such as offering scholarships or mentorship opportunities to Aboriginal individuals.

In order to demonstrate how the respondent will support Aboriginal socio-economic development, the respondent is encouraged to demonstrate its ability to:

- hire Aboriginal businesses as contractors and or subcontractors;
- hire Aboriginal businesses as contractors and or subcontractors specifically for the in-service support;
- hire Aboriginal individuals;
- purchase goods from Aboriginal suppliers;
- provide scholarships and opportunities for the transfer of skills;

The respondent is encouraged to provide as much detail as possible on how it will achieve the goals listed above. The respondent is not limited to these goals and is encouraged to provide alternative methods or suggestions for contributing to the socio-economic development of Aboriginal businesses and Aboriginal individuals.

In support of Aboriginal socio-economic development, within the upcoming potential Request for Proposal (RFP), bidders will be encouraged through the use of incentives such as additional evaluation points - to help unlock the economic potential of Aboriginal businesses and Aboriginal individuals.

13. Enquiries

All enquiries and other communications related to this LOI shall be directed exclusively to the PWGSC Contracting Authority. All enquiries must be submitted to the Contracting Authority no later than fifteen (15) calendar days before the LOI closing date. Enquiries received after that time may not be answered.

Care should be taken by suppliers to explain each question in sufficient detail in order to enable Canada to provide an accurate answer. Technical enquiries that are of a proprietary nature must be clearly marked "proprietary" at each relevant item. Items identified as "proprietary " will be treated as such except where Canada determines that the enquiry is not of a proprietary nature. Canada may edit the questions or may request that the respondent do so, so that the proprietary nature of the question is eliminated, and the enquiry can be answered with copies to all Suppliers. Enquiries not submitted in a form that can be distributed to all Suppliers may not be answered by Canada.

Changes to this LOI may occur and will be advertised through an LOI amendment on the Government Electronic Tendering System (MERX).

14. PWGSC Contracting Authority

Annamarie Gagne
Public Works and Government Services Canada (PWGSC)
Defence and Major Projects Sector (DMPS)
Electronics, Simulators, and Defence Systems Division (QF)
11 Laurier Street, Place du Portage, Phase III, 8C2-7
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15. Notes to Interested Suppliers

This is neither a call for tender nor a Request for Proposal (RFP), and no agreement or contract for the procurement of the equipment stated above will be entered into solely as a result of this LOI. This announcement does not constitute a commitment by Canada. Canada does not intend to award a contract on the basis of the notice or otherwise pay for the information solicited. Any and all expenses incurred by industry in pursing this opportunity, including the provision of information and potential visits, are at industry's sole risk and expense.

Any discussions on this subject with project staff representing DND or PWGSC, or any other Government of Canada representative, or other personnel involved in project activities, shall not be construed as an offer to purchase or as commitment by DND, PWGSC or Government of Canada as a whole.

Although the documents / information / data collected may be provided as commercial-in-confidence and will not be provided to a third party outside of Canada, Canada reserves the right to use the information to assist them in drafting performance specifications and for budgetary purposes. Requirements are subject to change, which may be as a result of information provided in response to this LOI. Suppliers are advised that any information submitted to Canada in response to this LOI may, or may not, be used by Canada in the development of the potential subsequent RFP. The issuance of this LOI does not create an obligation for Canada to issue a subsequent RFP, and does not bind Canada legally or otherwise, to enter into any agreement or to accept or reject any suggestions.

There will be no short-listing of Suppliers for the purposes of undertaking any future work, as a result of this LOI. Similarly, participation in this LOI is not a condition or prerequisite for the participation to any RFP.

Respondents are requested to submit with their package:

- Feedback on the DND specifications;
- Technical brochures, test reports and technical data sheets;
- A project schedule;
- Information as it pertains to the in-service support element; and

- IRB information as detailed in Annex E.

Respondents to this LOI should identify any submitted information that is to be considered as either company confidential, proprietary or if the response contains controlled goods.

16. LOI Closing Date and Submission of Respondent Information Packages

- Suppliers are asked to submit their HQSS information package to the PWGSC Contracting Authority identified in Section 13 of this LOI document, on or before November 30, 2012 (LOI Closing date).

- Four (4) hard copies and four (4) soft copies of the information packages are requested.

- Respondent point of contact information should be included in the package.

HQSS Partial Statement of Work and Specification – Shelters and Shelter Accessories

NOTE: The HQSS SOW and associated specifications are still under development. All aspects of this partial draft SOW and spec are subject to change.

Purpose: The purpose of this document is to solicit industry feedback on the draft HQSS shelters and shelter accessories SOW and Requirements statements contained herein. The final version of this document will be incorporated into a master HQSS Acquisition SOW and associated Appendices. ALL of the statements in this document are subject to change, including additions and deletions.

References:

U.S. FED-STD-595, Colors Used in Government Procurement

U.S. MIL-STD-810, Environmental Engineering Considerations and Laboratory Tests

U.S. MIL-HDBK-759, Handbook for Human Engineering Design Guidelines

Large Screen Display Dimensions: envelope is depth 66cm; width 188cm; height, including stand, 209cm which includes a 5cm envelope for air circulation on all dimensions.

Characteristics of a Workstation (subject to change): Each Workstation shall include a flat work surface of a minimum of width of 65cm and depth of 40cm. Each Workstation should have a flat work surface with a width of 90cm and depth of 60cm. A Workstation shall provide a space behind the flat work surface for the placement of a chair. The space allowance for the chair shall be a minimum of 80 cm depth behind the Workstation. Therefore, the overall minimum floor space required for a Workstation is 60cm width by 120cm depth. The preferred floor space for a workstation is 90cm width by 120cm depth.

Verification of Requirements: There are four acceptable means of verification of requirements. All requirements must be verified prior to first article acceptance. The four acceptable means of verification are: Inspection, Demonstration, Analysis, and Test. Formal definitions of these terms will be provided in the final SOW. The required means of verification will also be provided in the final SOW; if more than one means of verification appears next to a requirement, then the Contractor may choose the means from the options provided. There will be no blanks in the verification column of the final SOW; in this draft document blank requirement verification means the TA has not yet chosen the means of verification. In general, Analysis and Test are seen to be the more demanding means of requirement verification. Where these terms are used, the expectation is an engineering analysis as a formal report, or a formal test report.

Notes:

1. Terms that are capitalized will be formally defined in the final SOW; additional terms may also be formally defined in the SOW.
2. There have been several significant changes to this document since a very early version of it was published previously. There have been significant changes to most aspects of the HQSS shelter requirement, including shelter connections, replacement of the previous concept of “connector hub” by shelter interface; acceptable size ranges and many other changes. Therefore, any reader should consider this document to be the “original” HQSS shelter spec.
3. Shelter doors are assumed to be fabric doors unless specifically identified as “hard doors” in this document.
4. Under the SOW evidence for requirements verification must be provided for all requirements, post-Contract Award. Evidence of verification of some requirements may be required with the bid proposal.
5. DND is presently considering the best means to specify the characteristics of the textile components of the HQSS Shelters. The selected textiles must be water repellent, perform well under extreme cold, carry the rated load without compromise, be UV, mildew, and fire resistant and exhibit high durability. We are reviewing numerous commercial and military textile specifications and associated tests and the detailed requirements may not be available prior to RFP release. Industry comment is invited.
6. Packaging: the HQSS will be delivered as a containerized system using 20-foot sea containers. Previously, DND intended to provide these containers to the Contractor, however, DND is reconsidering and may require the Contractor to provide the containers as part of the HQSS SOW. In addition to the basic containerization of the System, DND will also require most components to come with additional protective cases of some form or other. For the shelters, these will be soft covers. Shelter accessories, for example, guy lines and stakes, may be required to be provided in hard cases.

7. In the enclosed draft SOW and Specification, the word “shall” is associated with an essential requirement and the word “should” is associated with a desirable requirement.

	SOW Text	Verification	OPI Comment	Industry Comment
	System Description			
	The Canadian Forces (CF) requires an integrated tactical shelter system to perform the functions of a headquarters command post, Role 1 and Role 2B medical shelters, and accommodations.	N/A	Role 1 and Role 2B medical shelters implies non-surgical use.	
	The tactical shelter system shall be known as the Headquarters Shelter System (HQSS).	N/A		
	The Contractor shall design and deliver the HQSS as an integrated system, with all ancillary equipment matched to the system level requirements.	N/A		
	The HQSS shall support world-wide CF operations with the sole exception of the NATO C4 climate zone.	N/A	The C4 climate zone includes central Greenland, central Siberia and Antarctica. All other parts of the world are included for the	

	SOW Text	Verification	OPI Comment	Industry Comment
	System Description			
			purpose of system design. Further info may be found in US DoD document MIL-STD-810.	
	The HQSS shall be suitable for use in a tactical environment, as characterized by the following:	N/A		
	Unloading, unpacking, set-up, striking, packing, loading and transport under low light and adverse weather conditions;	N/A		
	Handling by six or fewer soldiers without any special tools or handling equipment;	N/A		
	Multiple movements within the same mission;	N/A		
	Transport in the field via a broad range of CF logistics vehicles over rough terrain;	N/A		
	Simple field repairs using a	N/A		

	SOW Text	Verification	OPI Comment	Industry Comment
	System Description			
	Contractor-supplied repair kit; and			
	Covert operations where visible, infrared and noise signature management is essential.	N/A		
	The Contractor shall design the HQSS shelters and shelter accessories to avoid damage during normal setup and strike under all required climatic conditions.			
	The Contractor shall design Operations Shelters, Planning Shelters, Office Shelters and Vestibules to accommodate the installation of standalone smoke detectors.		Expect further refinement of this statement, to include specific requirements for installation locations (e.g., ceiling mounted and wall mounted installation locations to be provided.)	
	The Contractor shall design the HQSS to allow for shelter entry		Litter carrier is a two-wheeled trolley.	

	SOW Text	Verification	OPI Comment	Industry Comment
	System Description			
	and egress of the CF litter carrier, NSN 6530-01-591-9636, without causing harm to a litter-borne patient.			
	The Contractor shall design the HQSS to be capable of being erected and configured in winds of 80km/hr, gusting to 110 km/hr.			

Draft Quantity Table: Shelters and Shelter Accessories Required

Item	Minimum Quantity	Funded Options	Unfunded Options
Operations Shelters	99	25	TBD
Planning Shelters	1,070	268	TBD
Office Shelters	249	62	TBD
Solar Shades	One per shelter	One per shelter	One per shelter
Vestibules	1,300	418	TBD
Hard Doors	1,300	418	TBD
Shelter Interfaces	370	97	TBD
Vehicle Interfaces	354	88	TBD

Note: DND intends to request unfunded options for additional items in the HQSS contract; these quantities are under consideration.

	System Level Requirements	Verification	OPI Comment	Industry Comment
	The HQSS shall be capable of being assembled by not more than six soldiers without the use of any special tools or the use of any material handling equipment.	Demonstration		
	No single component of the HQSS should have a mass of more than 136kg.	Inspection and/or Analysis		
	Operations Shelters, Planning Shelters, and Office Shelters shall be capable of Basic Erection by not more than six suitably trained or supervised soldiers, in 20 minutes or less, without the use of any Special Tools.	Demonstration		
	The HQSS shall be designed to be unloaded, unpacked, set up, struck, packed up and loaded into CF logistics vehicles by six soldiers wearing CF Arctic	Demonstration	The CF Arctic mitten is a large, bulky mitten which reduced dexterity.	

	clothing.			
	Each HQSS component shall be capable of being transported in the CF 850kg trailer.	Inspection and/or Analysis	Basic dimensions of the cargo area of an 850kg trailer (subject to change!) are: length, 240cm; width, 166cm; and height, 185cm.	
	The Contractor shall design the HQSS to interface with the following Specified CF Vehicles by means of a Vehicle Interface:	Inspection and/or Demonstration		
	M577 Command Post Vehicle;	Inspection and/or Demonstration		
	LAV III Vehicle (all variants);	Inspection and/or Demonstration		
	MECC Shelter; and	Inspection and/or Demonstration		
	MSVS Shelter (all variants).	Inspection and/or Demonstration		
	The HQSS shall have a minimum life expectancy of 15 years.	Analysis		
	Additional system level			

	requirements may be added.			

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Shelter Definitions			
	The Effective Floor Area of a shelter shall be defined as that area with an enclosed clear height of 183cm, when the shelter is set up on a flat level surface without any semi-rigid flooring installed.	N/A	This definition is subject to change.	
	The HQSS shall consist of three types of soft-walled tactical shelters as defined below:	N/A		
	An Operations Shelter, with an Effective Floor Area of between $74m^2$ and $93m^2$.	Analysis		
	A Planning Shelter, with an Effective Floor Area of between $37m^2$ and $65m^2$.	Analysis		
	An Office Shelter, with an Effective Floor Area of between $16m^2$ and $28m^2$.	Analysis		

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Shelter Accessories			
	The following Shelter Accessories shall be included with the HQSS:	Inspection	Note: All items in the following list are mandatory.	
	Entrance Vestibules to provide the means to minimize heat and light leakage during entry and egress to/from a shelter or shelter complex;	Inspection		
	Hard Doors, to facilitate entry and egress from shelter and shelter complex main entrances;	Inspection		
	Solar Shades, to reduce energy consumption in hot climates;	Inspection		
	Vehicle Interfaces, to provide internal passage between a shelter or shelter complex and a Specified CF Vehicle;	Inspection	Vehicle interfaces to meet the same snow load requirements as the shelters, i.e., these are more than just a sheet of fabric draped over the end of a vehicle.	
	Shelter Interfaces, to provide	Inspection		

	internal inter-connection of shelters and to provide a minimum stand-off distance between two shelters;			
	Shelter Internal Partitions, to provide sleeping compartments and medical treatment areas; and	Inspection and/or Demonstration	Concept of a partition is not fully determined; at present it is not intended that they reach the full height of the shelter, but serve as privacy shields.	
	Fabric floors, for every Operations Shelter, Planning Shelter, Office Shelter, Vestibule, and Shelter Interface, to provide a resilient, water-impermeable, non-conductive, removable barrier to ground moisture, pests and dust ingress.	Demonstration and/or Analysis	Note: non-conductive means non-metallic; not intended to provide a dielectric rating (for the fabric flooring)	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Additional Shelter Accessories			
	The following Shelter Accessories may be included with the HQSS if required to meet other specified requirements:	N/A		
	Wind Kits, to reinforce a shelter's wind resistance.	Analysis		

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Configuration of a Shelter Complex			
	The CF will configure an HQSS according to the requirements of the particular mission being undertaken and the constraints provided by local terrain.	N/A	Info only.	
	The HQSS shall support the following types of shelter connections:	Inspection and/or Demonstration		
	Operations Shelter to Planning Shelter, via the use of a Shelter Interface;	Inspection and/or Demonstration		
	Operations Shelter to Office Shelter, via the use of a Shelter Interface;	Inspection and/or Demonstration		
	Planning Shelter to Office Shelter, via the use of a Shelter Interface;	Inspection and/or Demonstration		
	Entrance Vestibule to Operations Shelter, by direct connection;	Inspection and/or Demonstration		

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Configuration of a Shelter Complex			
	Entrance Vestibule to Planning Shelter, by direct connection;	Inspection and/or Demonstration		
	Entrance Vestibule to Office Shelter, by direct connection;	Inspection and/or Demonstration		
	Operations Shelter to Vehicle Interface, by direct connection;	Inspection and/or Demonstration		
	Planning Shelter to Vehicle Interface, by direct connection; and	Inspection and/or Demonstration		
	Office Shelter to Vehicle Interface, by direct connection.	Inspection and/or Demonstration		
	Regardless of the shape of an individual shelter, Operations Shelters, Planning Shelters and Office Shelters shall provide a minimum of four Points of Interconnection located at 0-degrees, 90-degrees, 180-degrees, and 270-degrees relative position on a 360-degree circular footprint.	Inspection and/or Demonstration	Note: This requirement is about points of connection; it is NOT about the shape of a shelter.	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Configuration of a Shelter Complex			
	Operations Shelters should provide more than four Points of Interconnection.	Inspection and/or Demonstration	Desirable to have additional points to connect other shelters, vehicles or vestibules.	
	Planning Shelters should provide more than four Points of Interconnection.	Inspection and/or Demonstration	Desirable to have additional points to connect other shelters, vehicles or vestibules.	
	All Points of Interconnection shall be capable of being configured as:	Demonstration		
	An exterior door;	Demonstration		
	A connection from a shelter to a Vestibule;	Demonstration		
	A connection from a shelter to a Shelter Interface; and	Demonstration		
	A connection from a shelter to a Vehicle Interface.	Demonstration		

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Configuration of a Shelter Complex			
	The HQSS configuration shall support the following types of shelter connections:	Inspection and/or Demonstration		
	Operations Shelter to Planning Shelter, via direct connection;	Inspection and/or Demonstration		
	Operations Shelter to Office Shelter, via direct connection; and	Inspection and/or Demonstration		
	Planning Shelter to Office Shelter, via direct connection.	Inspection and/or Demonstration		
	The HQSS configuration should support the following types of shelter connections:	Inspection and/or Demonstration	List of desirable shelter inter-connections:	
	Operations Shelter to the CF's in-service Tent, Expandable Modular System, via the use of a Shelter Interface;	Inspection and/or Demonstration	Desirable This interface may be different from the Shelter Interface.	
	Planning Shelter to the CF's in-service Tent, Expandable Modular System, via the use of a	Inspection and/or Demonstration	Desirable	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Configuration of a Shelter Complex			
	Shelter Interface; and			
	Office Shelter to the CF's in-service Tent, Expandable Modular System, via the use of a Shelter Interface.	Inspection and/or Demonstration	Desirable	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Shelter Performance Characteristics			
	Operations Shelters, Planning Shelters, Office Shelters, Vestibules, Shelter Interfaces and Vehicle Interfaces shall be fully enclosed, soft-sided structures consisting of a fabric-covered structure, insulation, and removable fabric floor.	Inspection		
	Operations Shelters shall be capable of supporting a Design Occupancy of 30 personnel with their Workstations, and provide room for three Large Screen Displays viewable by all personnel.	Demonstration and/or Test		
	Planning Shelters shall be capable of supporting a Design Occupancy of 20 personnel with their Workstations, and provide room for one Large Screen Display viewable by all personnel.	Demonstration and/or Test		

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Shelter Performance Characteristics			
	Office Shelters shall be capable of supporting a Design Occupancy of five personnel with their Workstations.	Demonstration and/or Test		
	When configured to support their Design Occupancy, Operations Shelters and Planning Shelters shall be capable of supporting a minimum of two connections to vehicles, vestibules, or other shelters, in any combination.	Demonstration		
	Operations Shelters, Planning Shelters, and Office Shelters shall provide a clear aisle height of at least 200cm, measured with the Semi-Rigid Flooring system installed.	Inspection	200cm from the semi-rigid flooring to the nearest overhead obstacle, when measured on a flat, level surface. 200cm = height of 99% male + helmet + clearance.	
	Operations Shelters, Planning Shelters, Office Shelters, Shelter Interfaces and Vestibules shall	Analysis and Test	Will require an analysis as a post-contract deliverable,	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Shelter Performance Characteristics			
	include one or more layers of removable insulating material to provide a minimum fuel savings of 15% over the un-insulated shelter, under heating or cooling conditions.		and DND will conduct an independent test. Insulation to be removable to facilitate maintenance.	
	Operations Shelters, Planning Shelters, Office Shelters, Shelter Interfaces and Vestibules should include one or more layers of removable insulating material to provide a minimum fuel savings of 25% over the un-insulated shelter, under heating or cooling conditions.	Analysis and Test	Desirable to have even higher fuel savings.	
	Shelter, Vestibule and Interface insulation should be designed to be removable only at 2nd or 3rd line maintenance facilities.	Inspection	Intent: insulation should be integral to the shelter to encourage its use, but needs to be replaceable for maintenance and upgrade.	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Shelter Performance Characteristics			
	Shelters should be designed to not require more than first-line maintenance on an annual basis under usage conditions defined in the SOW.	Inspection and/or Analysis	Usage conditions TBD.	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Shelter Structural Requirements			
	Operations Shelters, Planning Shelters, Office Shelters, Vestibules, Shelter Interfaces and Vehicle Interfaces shall be freestanding, self-supporting, engineered structures.	Analysis	SOW will require a structural loads analysis as a deliverable.	
	Operations Shelters, Planning Shelters, Office Shelters, Vestibules, Shelter Interfaces and Vehicle Interfaces shall have a minimum snow load capacity of 480 Pa.	DND Test	(~10 lbs / sq ft) This test will be performed by DND during bid evaluation; 3rd party or other test results will not be accepted.	
	Shelter frames shall be of corrosion-resistant construction.	Inspection and/or Analysis	Composite frames by inspection; corrosion resistance of metal frames will be via CARC paint.	
	The shelter frame design should create a large interior span	Inspection	Desirable	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Shelter Structural Requirements			
	without the requirement for interior support poles.			
	Shelter frames should be designed to minimize the number of assembly operations required.	Demonstration	Desirable	
	Shelter frames shall be of modular construction to allow for compact storage and effective parts replacement.	Inspection and/or Demonstration		
	Operations Shelters, Planning Shelters, Office Shelters, Vestibules, Shelter Interfaces and Vehicles Interfaces shall be capable of withstanding steady or gusting winds up to 60km/hr without guy lines.	Demonstration and/or Test		
	Operations Shelters, Planning Shelters, Office Shelters, Vestibules, Shelter Interfaces and Vehicle Interfaces shall be capable of withstanding wind gusts up to 110 km/hr with	Demonstration and/or Test		

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Shelter Structural Requirements			
	additional restraint system, as determined by the Contractor, included as a Wind Kit.			
	All textiles subject to snow load and forming part of any of an Operations Shelter, Planning Shelter, Office Shelter, Vestibule, Shelter Interface or Vehicle Interface shall be capable of transferring the load in accordance with the structural analysis.	Analysis	Structural analysis must include consideration of the material characteristics of the textiles, and how the load is transferred to the shelter frame or supporting structure.	
	All textiles subject to snow loading shall carry the snow load up to the maximum required load without compromising the textile's water tight characteristics.	Demonstration and/or Analysis and/or Test		

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Shelter General Characteristics			
	The exterior colour scheme of the shelter fabric shall be one of the following, in descending order of preference:	Inspection	The exterior colour scheme of the shelter fabric shall be one of the following, in descending order of preference:	
	First Preference: Any one of FED-STD-595 colours: 34082, 34094, or 34095;	Inspection		
	Second Preference: Other green colour as approved by the Technical Authority.	Inspection		
	The interior side of shelter wall and ceiling fabric shall be white, or other light colour as approved by the Technical Authority, to provide reflective interior lighting.	Inspection		
	Shelter fabric flooring shall be durable enough to support office furniture, including occupied	Inspection and/or Demonstration and/or Analysis		

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Shelter General Characteristics			
	chairs.			
	Shelter doors should include zippered closure mechanisms to seal the opening against precipitation and dust.	Inspection and/or Demonstration and/or Test		
	Shelter doors may include other closure mechanisms at the discretion of the Technical Authority.	Inspection	Hook and loop closure mechanisms may be permissible.	
	Shelter framing components of metal or composite construction shall be painted with CARC paint.	Analysis		
	Operations Shelters, Planning Shelters and Office Shelters shall contain sufficient windows to allow the rated occupancy number of staff to perform their normal work in each shelter type, during daylight hours, without the use of supplemental lighting.	Analysis and/or Demonstration and/or Test.	Ambient light conditions to assume overcast sky, temperate climate, summer, noon.	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Shelter General Characteristics			
	Vehicles Interfaces and Shelter Interfaces shall include one window on each side.	Inspection		
	Shelter and Interface windows shall include a mesh layer for air circulation; a clear layer for conditions where heating/cooling is required; and an opaque cover to create light-tight conditions.	Demonstration	Note: additional requirements may be added regarding factors like mesh size, thickness of the clear layer, etc. Industry comment is invited on these details.	
	The mesh layer and clear layer of each window shall be designed to be removable, by means of hook and loop fasteners.	Demonstration		
	Operations Shelters, Planning Shelters, Office Shelters, Vestibules, Shelter Interfaces and Vehicle Interfaces, configured individually or as a shelter complex, shall prevent the detection of any emitted	Test	It is possible that a complementary requirement may be added for resistance to visual detection using an NVIS	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Shelter General Characteristics			
	visible light by an observer at a minimum distance of 30m in any direction, and with a minimum interior illumination level of 540 lux.		device.	
	The textile used for the outer cover of Operations Shelters, Planning Shelters, Office Shelters, Vestibules, Shelter Interfaces and Vehicle Interfaces shall provide a water impermeable covering.	Analysis and/or Test	DND may require a specific water resistance test for first article acceptance.	
	All shelter fabric and flooring fabric shall be mould, mildew, and fungus resistant.	Inspection and/or Analysis and/or Test		
	Connections between shelters and Shelter Interfaces shall prevent ingress of moisture from precipitation, melting snow, runoff, or via the ground.	Inspection and/or Demonstration	This requirement may become more specific.	
	Connections between shelters and Vehicle Interfaces shall	Inspection and/or Demonstration	This requirement may become more	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Shelter General Characteristics			
	prevent ingress of moisture from precipitation, melting snow, runoff, or via the ground.		specific.	
	Connections between shelters and Vestibules shall prevent ingress of moisture from precipitation, melting snow, runoff, or via the ground.	Inspection and/or Demonstration	This requirement may become more specific.	
	Vehicle Interfaces shall be designed to surround the external envelope of the vehicle to the extent of creating a continuous enclosed passage between the designated vehicle door and the HQSS shelter to which the Vehicle Interface is connected	Demonstration	Vehicle Interface Concept is a covered loading bay into which you partially back the vehicle, and then close a curtain around the vehicle to minimize light and heat leakage.	
	Vehicle Interfaces shall include a means to create a weather resistant seal between the vehicle and the Vehicle Interface.	Demonstration	Not intended to be 100% water or light tight, but should resist rain, wind, snow, and block some light emission.	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Shelter General Characteristics			
	Vehicle Interfaces shall be a single configuration.	Inspection	Intent is a “one size fits all” vehicle interface.	
	Vehicle Interfaces shall allow access to the LAV III interior via the rear ramp in fully lowered configuration.	Inspection and/or Demonstration		
	Vehicle Interfaces shall allow access to the M577 via the rear ramp in fully lowered configuration.	Inspection and/or Demonstration		
	Vehicle Interfaces shall allow access to the MSVS shelter via the double doors at the end of the MSVS shelter with the doors open inside the Vehicle Interface.	Inspection and/or Demonstration	Interested parties may assume that the MSVS shelter is an ISO container with an access door in one end. Other shelter variants are under study.	
	Vehicles Interfaces shall allow enclosed access to the rear of an	Demonstration	MSVS shelters must interface on the truck	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Shelter General Characteristics			
	MSVS shelter, when the shelter is mounted on an MSVS vehicle, and when the MSVS shelter is unloaded adjacent to a Vehicle Interface.		and on the ground.	
	Shelter Interfaces shall be designed to create a 3m distance between any two shelters.	Inspection	This is a fire safety requirement in constructing a shelter complex.	
	Shelter Interfaces should be designed to telescope inward, to allow for 1m separation of the two interconnected shelters if required by operational constraints.	Demonstration	Desirable to be able to connect shelters, via a shelter interface, at less then 3m standoff.	
	Guy line connection points on shelters shall be reinforced to resist shock loading from wind gust or guy line snagging.	Inspection and/or Analysis		
	In addition to the requirements for windows, Operations Shelters, Planning Shelters and	Inspection and/or Analysis	TBD – whether the natural ventilation requirement will be	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Shelter General Characteristics			
	Office Shelters shall include provision for cross-shelter ventilation.		expressed in further detail.	
	Shelter vents shall be provided with integral covers for operations in extreme climates and for operation under covert conditions.	Inspection		
	Vestibules shall be of sufficient size to accommodate a CF stretcher and six attendants, including any space necessary to open and close the door between the shelter and the Vestibule.	Demonstration	Allow 215cm length for a CF stretcher.	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Solar Shades			
	Solar shades shall be provided for each Operations Shelter, Planning Shelter and Office Shelter.	Inspection		
	Solar shades shall be designed to provide a barrier to the transmission of radiant solar energy.	Analysis	SOW will require a technical analysis of the energy efficiency provided by solar shades.	
	Solar shades shall be designed as a separate component of the HQSS.	Inspection		
	Solar shades shall be constructed of textile material.	Inspection		
	Solar shades may be designed to be supported by a separate structure.	Inspection		
	The textile components of the solar shades shall be tan in colour.	Inspection	Note: expect a preferred colour number to be specified.	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Solar Shades			
	Solar shades shall be designed to provide a minimum of 20cm air gap between the solar shade textile cover and the exterior textile cover of the shelter.	Inspection	This may be changed to a performance requirement.	
	Solar shades shall be open at the sides to promote air circulation between the solar shade and the fabric cover.	Inspection		
	Solar shades shall be designed to resist winds gusting to 110km/hr.	Demonstration		

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Provision for HVAC			
	Each shelter shall have a minimum of four (4) openings suitable for external connection of HVAC ducts.	Inspection	Ducts will be used for heating or cooling as appropriate. Ducts to be sized as appropriate to meet the HVAC requirements.	
	Each shelter opening intended for ducts shall have an integral means of sealing the opening against water leakage and entrance of sand or dust when no duct is connected.	Inspection and/or Test	DND may test for dust or sand ingress as part of First Article Acceptance.	
	Duct openings shall be designed to prevent entry of insects into the shelter, with or without ducts installed.	Inspection and/or Analysis		
	Duct openings shall be suitable for connection to an internal air distribution system.	Inspection and/or Demonstration		
	Each shelter shall be provided	Inspection		

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Provision for HVAC			
	with one (1) or two (2) removable, ceiling-mounted, internal air distribution systems, which connects to an HVAC opening in the shelter and is suitable for directing air towards Workstations or equipment.			
	Each shelter should be provided with a single removable, ceiling-mounted, internal air distribution system, which connects to an HVAC opening in the shelter and is suitable for directing air towards Workstations or equipment.	Inspection	Desirable to have a single air distribution system in each shelter; allowable to have two.	
	Each shelter shall provide a simple means to secure an HVAC inlet duct to the side of the shelter in such a manner that the inlet air is directed upward.	Demonstration	Intent: if the shelter distribution system is removed, there must be a means of pulling the end of the HVAC supply duct through the HVAC interface and pointing the air flow away from any adjacent	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Provision for HVAC			
			Workstation.	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Cable Management			
	Operations Shelters, Planning Shelters, Office Shelters, and Shelter Interfaces shall have provision for separate wiring entrance of electrical power and data communications cables.	Inspection	Power and data cables require separate entrances with min 1m separation.	
	Provision for cable entrance should allow for multiple entrance points to facilitate flexibility in HQSS configuration.	Inspection	Note: entrance points counted in pairs (one for power and one for data)	
	Operations Shelters, Planning Shelters, Office Shelters, Vehicle Interfaces, and Shelter Interfaces shall provide points of connection for three separate, and continuous internal cable runs (two data and one power) along opposite sides of each specified component.	Inspection	Total of six internal cable runs to be provided; power may be run along the base of the shelter/interface walls.	
	All cable runs shall be provided with a minimum of 1m separation from an adjacent cable run,	Demonstration		

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Cable Management			
	including consideration of any cable sag.			
	Each cable run shall be designed to contain sufficient data or electrical cable to support up to 75% of the Workstations in each shelter.	Analysis	Weight supported and size.	
	Operations Shelters, Planning Shelters, Office Shelters, Vestibules, Shelter Interfaces and Vehicle Shelters, along with all ancillary equipment, shall be capable of being assembled at night by not more than six soldiers, using only one head-mounted tactical light and one hand-held flashlight, both lights including coloured filters.	Demonstration		

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Safety			
	Shelters and Shelter Accessories shall be capable of being configured into Shelter Complexes, such that Shelter Complex main entrances provide 3m of clearance on either side of the entrance and an egress path that is straight ahead from the main entrance.	Demonstration		
	All Shelter doors shall provide an integral, photoluminescent exit sign, conforming to the requirements of ISO 7010-2011, E001 or E002.	Inspection and Demonstration		
	All exit signs shall be affixed to the shelter wall.	Inspection	“permanently” installed, however, capable of being removed at 2nd line for maintenance.	
	All exit signs shall include an integral cover that can be used to	Inspection and		

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Safety			
	cover or reveal the sign depending on whether or not the specific door is configured as an exit.	Demonstration		
	All textiles used in the HQSS shall be certified compliant with CAN/ULC S-109 for fire resistance.	Test, via accredited 3rd party test facility.	TBD: whether large or small or both.	
	All Hard Doors shall be capable of being opened by means of pushing on the door, either by the use of a push-bar release mechanism, or by other suitable means as approved by the Technical Authority.	Demonstration		
	Shelters shall be designed to minimize the ingress of exhaust gases from any vehicle or equipment operating at a distance of 1m or greater from the shelter.	Inspection and/or Analysis		
	Structural components of shelters shall be constructed to	Inspection		

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Safety			
	minimize soldier exposure to sharp edges and pinch injuries.			

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Blast Resistance			
	Operations Shelters, Planning Shelters and Office Shelters should have a rated blast pressure protection.	3rd party test	Desirable – may specify a minimum blast pressure for this requirement.	
	Operations Shelters, Planning Shelters and Office Shelters that make use of rigid framing members should provide external guy lines that connect directly to the shelter frame.	Inspection	Desirable Interfaces must be weather tight.	
	Operations Shelters, Planning Shelters and Office Shelters should include windows or other features designed to fail in a controlled manner when subject to a blast wave, to minimize the effects of an internal pressure wave created by compression of the shelter cover.	Analysis and or Test	Note: windows are mandatory. Windows designed to fail in a controlled manner under blast are desirable. Note shelter windows located at normal seated head height will not be included as a blast feature; they must be located	

	Shelter Spec Text	Verification	OPI Comment	Industry Comment
	Blast Resistance			
			higher.	
	Operations Shelters, Planning Shelters, Office Shelters, Vestibules, Shelter Interfaces and Vehicle Interfaces should provide blast resistant means of connection of appliances to the shelter structure.	Analysis	Minimize the likelihood of appliances such as light fixtures from detaching at high velocity during a blast impact event.	

List of Abbreviations

CF	Canadian Forces
cm	centimetre
DND	Department of National Defence
DoD	United States Department of Defense
HQSS	Headquarters Shelter System
kg	kilogram
m^2	square metres
N/A	Not Applicable
NATO	North Atlantic Treaty Organization
RFP	Request for Proposals
SOW	Statement of Work
UV	Ultra-Violet

DRAFT DOCUMENT – SUBJECT TO CHANGE

HQSS Partial Statement of Work and Specification – Tactical Lighting System

NOTE: ALL REQUIREMENTS IN THIS DRAFT SPEC ARE SUBJECT TO CHANGE; ADDITIONS AND DELETIONS ARE ALSO POSSIBLE.

Note: Definition of a kit to be updated to include feed cable and switched outlet per shelter.

External References (Partial List) that may be called up:

- US MIL-STD-3009, Lighting, Aircraft, Night Vision Imaging System Compatible
- US MIL-STD-461, Requirements for the Control of Electromagnetic Interference
- US MIL-STD-810, Environmental Engineering Considerations and Laboratory Tests
- US MIL-STD-1472 Human Engineering Design Criteria
- US MIL-HDBK-454 Safety Design Criteria (Note: Handbooks can be mandatory in Canadian contracts)
- CSA 22.2 No 141 – Unit Equipment for Emergency Lighting
- CSA 22.2 No 184 – Solid State Lighting Controls
- MIL-STD-3009 Lighting, Aircraft, Night Vision Imaging System (NVIS) Compatible
- UL-1449

DND Publications that may be called up:

D-01-000-200/SF-001	Joint Electronics Type Designation System (JETDS) Assignment and Procedures
D-01-100-214/SF-000	Specification for the Preparation of Provisioning Parts Breakdowns for the Canadian Forces
D-01-100-215/SF-000	Specification for the Preparation of Material Change Notices for the Canadian Forces
D-01-400-001/SG-000	Engineering Drawing Practices
D-01-400-002/SF-000	Drawings, Engineering and Associated Lists
D-02-002-001/SG-001	Identification Markings of Canadian Military Property

Verification of Requirements: There are four acceptable means of verification of requirements. All requirements must be verified prior to first article acceptance. The four acceptable means of verification are: Inspection, Demonstration, Analysis, and Test. Formal definitions of these terms will be provided in the final SOW. The required means of verification will also be provided in the final SOW; if more than one means of verification appears next to a requirement, then the Contractor may choose the means from the options provided. There will be no blanks in the verification column of the final SOW; in this draft document blank requirement verification means the TA has not yet chosen the means of verification. In general, Analysis and Test are seen to be the more demanding means of requirement verification. Where these terms are used, the expectation is an engineering analysis as a formal report, or a formal test report.

The HQSS requirement is for a minimum of 18,000 fixtures built to the enclosed spec; quantity is subject to change.

Number	SOW Text - PARTIAL	Verification	OPI Comments	Reviewer Comments
	Tactical Lighting System			
	The Contractor shall provide a Tactical Lighting System with the HQSS.			
	The Contractor shall provide the Tactical Lighting System in accordance with the requirements of the Tactical Lighting System Specification.			
	The Contractor shall conduct requirements verification activities in accordance with the Verification column of the Tactical Lighting System			

Number	SOW Text - PARTIAL	Verification	OPI Comments	Reviewer Comments
	Tactical Lighting System			
	Specification.			
	The Contractor shall design the Tactical Lighting System so that the on/off lighting function in each shelter can be manually controlled by a single switch located near a main entrance to the shelter.		CIM: Comment updated 7 Dec 2011. Light fixtures should be capable of being daisy chained, and when daisy chained, should draw a maximum of 10A from a 120V circuit, to light the largest shelter.	

Number	Spec Text - PARTIAL	Verification	OPI Comments	Reviewer Comments
	General Characteristics			
	The Tactical Lighting System shall consist of Tactical Lighting Fixtures, connecting cables, and hard-sided storage cases.	First Article Inspection		
	The Tactical Lighting System shall operate over the temperature range of -40C to +49C.	Demonstration and/or Test	System must operate from -40C to +49C. CIM: Updated 6 Dec 2011.	
	The Tactical Lighting System should operate over the full operating temperature range of the HQSS System.	Demonstration and/or Test	System should operate from -50C to +49C. CIM: Updated 6 Dec 2011	
	The enclosure rating for the body of the light fixture shall conform to IP67.		CIM: Updated Jan 2012.	
	The Tactical Lighting Fixtures	First Article		

Number	Spec Text - PARTIAL	Verification	OPI Comments	Reviewer Comments
	General Characteristics			
	and any connecting cables shall be provided in hard-sided cases for storage and transport.	Inspection		
	When fully packed, no Tactical Lighting System storage case shall have a mass of more than 25kg.	First Article Inspection		
	A Tactical Lighting Fixture shall have a mass not exceeding 5kg.	First Article Inspection		
	Tactical Lighting Fixtures shall include integral means of installation in any HQSS shelters, shelter connector, vestibule, and vehicle interfaces.	Demonstration (system level)	Hanging straps or other means of connection provided with the fixture (and attached to the fixture to reduce likelihood of loss.)	

Number	Spec Text - PARTIAL	Verification	OPI Comments	Reviewer Comments
	Modes of Operation			
	The Tactical Lighting System shall provide the following three modes of operation:	First Article Inspection or Demonstration		
	a. Normal Mode;		Normal mode is intended for night operations when the local threat level is low, and when there is no need for staff to maintain dark adaptation.	
	b. Covert Mode; and		Covert mode serves two purposes: it reduces the probability of detection of the CP complex via light leakage; and it helps personnel maintain become more quickly dark adapted for the conduct of covert	

Number	Spec Text - PARTIAL	Verification	OPI Comments	Reviewer Comments
	Modes of Operation			
			external operations.	
	c. Emergency Mode.		Emergency mode is an automatically-activated, limited time mode, to allow evacuation of the HQ complex in an emergency. Emergency Mode is not intended to provide the capability to continue operations in a “power out” situation.	

Number	Spec Text - PARTIAL	Verification	OPI Comments	Reviewer Comments
	Performance Characteristics			
	When operating in Normal Mode, the Tactical Lighting System shall emit white light with a colour temperature between 4000K and 5300K.	Analysis and/or test.	CIM: Updated 7 Dec 2011 to include colour temp range, to ensure neutral colour light. CIM: Updated Jan 2012 with slightly larger colour temperature range.	
	When operating in Normal Mode, the Tactical Lighting System shall provide a minimum luminance level of 540 lux over 80% of a horizontal plane located 75cm above floor level.	Test		
	When operating in Normal Mode, the Tactical Lighting System shall provide a maximum luminance level of 700 lux over 80% of a horizontal plane located 75cm above floor level.	Test	CIM: Updated 7 Dec 2011	

Number	Spec Text - PARTIAL	Verification	OPI Comments	Reviewer Comments
	Performance Characteristics			
	When operating in Covert Mode, the Tactical Lighting System shall provide light that conforms to the colour requirements of “NVIS Green A” as defined in US MIL-STD-3009, or other colour as approved by the Technical Authority.	Analysis and/or Test	CIM: Jan 2012, restored NVIS Green A requirement. Understand this may require the use of a filter. Will also allow alternate colour with the approval of the TA.	
	When operating in Covert Mode, the light fixture shall not emit any electromagnetic radiation capable of being detected and amplified by Gen III or better Image Intensification devices located within 30m of the fixture.	Analysis and/or Test	CIM: Added 7 Dec 2011 to replace the NVIS Green A requirement (2 of 2).	
	When operating in Covert Mode, the Tactical Lighting System shall provide a minimum luminance level of 40 lux over 80% of a horizontal plane located 75cm above floor level.	Test	CIM: Jan 2012 – minimum lux updated for covert mode.	
	When operating in Covert Mode, the Tactical Lighting System shall	Test	CIM: Jan 2012 – maximum lux	

Number	Spec Text - PARTIAL	Verification	OPI Comments	Reviewer Comments
	Performance Characteristics			
	provide a maximum luminance level of 75 lux over 80% of a horizontal plane located 75cm above floor level.		updated for covert mode.	
	When operating in Emergency Mode, the Tactical Lighting System shall provide white light.	Analysis		
	When operating in Emergency Mode, the Tactical Lighting System shall provide a minimum luminance level of 30 lux over 80% of a horizontal plane located 75cm above floor level.	Test		
	When operating in Emergency Mode, the Tactical Lighting System shall provide sufficient light to evacuate a shelter complex within 90 seconds of an evacuation order.	Demonstration	CIM: Modified 23 Feb 2012.	
	The Tactical Lighting System shall operate and meet all its requirements at an ambient temperature range from -40C to	Demonstration and/or Test	CIM: Updated 7 Dec 2011.	

Number	Spec Text - PARTIAL	Verification	OPI Comments	Reviewer Comments
	Performance Characteristics			
	+49C.			

Number	Spec Text - PARTIAL	Verification	OPI Comments	Reviewer Comments
	Lighting System Control			
	Each light fixture shall have a manual on/off function switch on the fixture.	Demonstration		
	The manual fixture on/off switch, in either “ON” or “OFF” setting, shall not prevent adjacent fixtures from operating.	Demonstration		
	Each light fixture shall provide a switch to control 50% or 100% rated intensity, when operating in Normal Model.	Demonstration and/or Test	CIM: Added 8 Dec 2011. Intent of this requirement is to incorporate a limited dimming capability. CIM: Updated Jan 2012 to make specific to Normal Mode (only).	
	Each light fixture shall have a	Demonstration		

Number	Spec Text - PARTIAL	Verification	OPI Comments	Reviewer Comments
	Lighting System Control			
	manual Normal/Covert mode switch on the fixture.			
	Fixture-mounted controls shall be oriented to be accessible for operation when the fixtures are installed for use.	Demonstration		
	Emergency Mode shall activate automatically when the source power is disconnected.	Demonstration		
	Emergency Mode shall deactivate automatically when source power is available.	Demonstration		

Number	SPEC Text - PARTIAL	Verification	OPI Comments	Reviewer Comments
	Lighting System Electrical			
	Any transformer required by a Tactical Lighting Fixture, shall be located within the main body of the fixture.	First Article Inspection	Each fixture will have its own on-board transformer; one transformer will not supply more than one fixture. CIM: Updated 7 Dec 2011 for clarity.	
	Tactical Lighting System plug connectors shall be of NEMA 5-15 type.	First Article Inspection	CIM: Added 7 Dec 2011	
	Tactical Lighting System power outlets shall be NEMA 5-20 type or other type as approved by the Technical Authority	First Article Inspection	CIM: Added 7 Dec 2011 CIM: Intent of this requirement is to support daisy chaining. Minimum is one outlet per fixture. Comment added 2 Feb 2012.	

Number	SPEC Text - PARTIAL	Verification	OPI Comments	Reviewer Comments
	Lighting System Electrical			
	The Tactical Lighting System shall be weather resistant to the IP67 standard.	Analysis and or Test	CIM: Updated Jan 2012.	
	The lighting system shall not include any battery.	First Article Inspection	No batteries means emergency mode should be designed with a capacitive discharge system.	
	The Tactical Lighting System shall be designed for supply side power of 120 V, single phase, 3 wire 60Hz, maximum 15A per outlet.			
	At a nominal supply voltage of 110VAC, the maximum total current draw for Normal mode lighting in an Operations shelter shall not exceed 10A.		CIM: Added 7 Dec 2011.	

Number	Spec Text - PARTIAL	Verification	OPI Comments	Reviewer Comments
	Lighting System Certifications			
	The Tactical Lighting System shall be CSA certified.	3rd party Analysis or test.	Contractor funded testing. CIM: UL or other CSA-certified lab also accepted. Comment added 2 Feb 2012	
	The Tactical Lighting System shall be EMI/EMC certified compliant to MIL-STD-461, RE102, CE 102 and RS103 for Ground equipment.	3rd party Test	CIM: Updated 7 Dec 2011. This requirement may be further developed by identifying the specific Paragraphs that are applicable. Certification testing is Contractor funded.	
	The Tactical Lighting Fixtures shall be certified to comply with MIL-STD-810G, Method 516.6, Procedure I, Functional Shock	3rd party Test (first article)	CIM: Updated 7 Dec 2011 to remove the “when packed in cases”, i.e., must	

Number	Spec Text - PARTIAL	Verification	OPI Comments	Reviewer Comments
	Lighting System Certifications			
	2g.		meet the requirement without any additional protection, to account for being dropped during installation.	
	When packed in their hard-sided storage cases, the Tactical Lighting Fixtures shall be certified to comply with MIL-STD-810G, Method 514.6, Procedure I, to resist Category I ground mobile vibrations.	3 party Test (first article)		

Number	Spec Text – PARTIAL	Verification	OPI Comments	Reviewer Comments
	Lighting System Reliability			
	Tactical Lighting Fixtures shall have an MTBF of not less than 20,000 hours of operation.	Analysis		
	Manual switches used in the Tactical Lighting System shall be	Analysis	HQSS System Life to be defined in the	

Number	Spec Text – PARTIAL	Verification	OPI Comments	Reviewer Comments
	Lighting System Reliability			
	provided with a MTBF that is longer than the projected HQSS System Life.		SOW.	
	All LED's used in the Tactical Lighting System shall be of high quality manufacture.	Inspection	CIM: Added, Jan 2012.	

Number	SOW Text	Verification	OPI Comments	Reviewer Comments
	Lighting System Safety			
	The maximum surface temperature of a Tactical Lighting Fixture shall not exceed 60C when operating.	Demonstration and/or Analysis and/or Test		
	(Expect more requirements.)			

Number	SOW Text	Verification	OPI Comments	Reviewer Comments
	Lighting System Labelling			
	All Tactical Lighting System components shall be marked for identification purposes in accordance with CFTO D-02-002-001/SG-001.	First Article Inspection		

List of Abbreviations:

CFTO	Canadian Forces Technical Order (DND Internal publication)
CSA	Canadian Standards Association
HQSS	Headquarters Shelter System
IP	
MTBF	Mean Time Between Failure
NEMA	
OPI	Officer of Primary Interest
SOW	Statement of Work

HQSS Partial Statement of Work and Specification – Flooring System

Purpose: The purpose of this document is to solicit industry feedback on a partial draft specification for the HQSS semi-rigid flooring system.

Scope: This partial spec includes the requirements for the semi-rigid flooring system; this partial spec DOES NOT include the requirements for the fabric flooring system that will also form part of the HQSS. The fabric flooring requirements will be included in the shelter portion of the HQSS specification.

ALL of the statements in this document are subject to change, including additions and deletions.

Flooring System References:

DND Documents:

Canadian Standards

- CAN/ULC S-102, Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies

International Standards:

- ASTM D256 - 10 Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics

Verification of Requirements: There are four acceptable means of verification of requirements. All requirements must be verified prior to first article acceptance. The four acceptable means of verification are: Inspection, Demonstration, Analysis, and Test. Formal definitions of these terms will be provided in the final SOW. The required means of verification will also be provided in the final SOW; if more than one means of verification appears next to a requirement, then the Contractor may choose the means from the options provided. There will be no blanks in the verification column of the final SOW; in this draft document blank requirement verification means the TA has not yet chosen the means of verification. In

general, Analysis and Test are seen to be the more demanding means of requirement verification. Where these terms are used, the expectation is an engineering analysis as a formal report, or a formal test report.

Document Notes: In general, terms that begin with capital letters are (or will be) formally defined somewhere in the SOW. Statements that contain the word “shall” are mandatory; statements that contain the word “should” are desirable.

Note: It is intended to add a Flame Spread Rating requirement for the semi-rigid flooring system. The required value is presently under investigation.

DRAFT SOW Statements (Subject to Changes and Additions)

Number	SOW Text	Verification	OPI Comments	Reviewer Comments
	Semi-Rigid Flooring System			
	In the event of conflicting flooring requirements, the Contractor shall consult the Technical Authority, who will determine which requirement takes precedence.		This will be a general statement in the SOW.	
	The Contractor shall provide a Semi-Rigid Flooring system for the HQSS.			
	The Contractor shall design the Semi-Rigid Flooring system to meet all HQSS System Level Requirements.		HQSS System Level Requirements to be a section in the final SOW.	
	The Contractor shall provide Semi-Rigid Flooring equivalent in area to the total area of HQSS tactical shelters, shelter connectors, vestibules, and vehicle interfaces.			
	The Contractor shall provide inspection, cleaning and maintenance procedures for the		Note: This will be under a separate section of the SOW, for Integrated Logistics	

Number	SOW Text	Verification	OPI Comments	Reviewer Comments
	Semi-Rigid Flooring system.		Support, and will cover the entire HQSS System.	
	The Contractor shall design the Semi-Rigid Flooring system to be capable of being set-up, configured and safe to use in low light conditions.		Low light conditions for HQSS setup to be defined in the SOW. (Think – head lamp and mini-flashlight with blue or green filters)	

Number	Flooring Spec Text	Verification	OPI Comments	Reviewer Comments
	Flooring Performance Requirements			
	Within the setup time required by this specification, the Semi-Rigid Flooring system shall be capable of being configured to cover the defined Effective Floor Area of the HQSS Operations Shelter, Plans Shelter and Office Shelter.	Test		
	Within the setup time required by this specification, the Semi-Rigid Flooring system should be capable of being configured to cover the entire floor area of the HQSS Operations Shelter, Plans Shelter, Office Shelter, and floor space adjoining two or more shelters.	Test	For this requirement, the entire floor area defined as having a gap of not greater than 5cm between the edge of the flooring and each side-wall of the shelter.	
	The Semi-Rigid Flooring system shall be capable of being configured to provide a continuous floor covering between any two shelters connected by means of a shelter interface.	Demonstration		
	The Semi-Rigid Flooring system	Demonstration		

Number	Flooring Spec Text	Verification	OPI Comments	Reviewer Comments
	Flooring Performance Requirements			
	shall be capable of being configured to provide a continuous floor covering between any two directly-connected shelters.			
	The Semi-Rigid Flooring system should be capable of providing a continuous floor covering between any HQSS shelter configured with a vehicle interface, and each of the HQSS specified vehicles.	Demonstration		
	The Semi-Rigid Flooring system shall be capable of providing a continuous floor covering between any HQSS shelter and a shelter complex main entrance connected by means of a vestibule.	Demonstration	Flooring continuous from the shelter through the vestibule to the door.	
	The Semi-Rigid Flooring system shall be designed to enable six soldiers to install the flooring of a Planning Shelter in 15 minutes or less time.	Demonstration	This time is provided as a performance metric to acquire a simple, robust flooring system.	
	The Semi-Rigid Flooring system shall be capable of installation by soldiers adopting a standing	Demonstration	Intent: system shall be set up without the need to get on your hands	

Number	Flooring Spec Text	Verification	OPI Comments	Reviewer Comments
	Flooring Performance Requirements			
	posture.		and knees.	
	The Semi-Rigid Flooring system shall be designed to remain integral when laid on ground that has protrusions or depressions up to 12 cm in height/depth.	Demonstration	Soldiers will only have a shovel and pick-axe to remove obstacle, so a floor system needs tolerances in its connections to form over some undulating ground.	
	The Semi-Rigid Flooring system shall be designed to remain serviceable with minimal maintenance between uses.	Demonstration and/or Analysis	Intent: Simple cleaning procedure.	
	The Semi-Rigid Flooring system should provide an integral system of cable channels allowing cable runs in two perpendicular directions.	Demonstration	Desirable Requirement. Integral intended to mean that the cable channels are moulded into each segment, and accessible without lifting the flooring.	
	The Semi-Rigid Flooring system shall be designed to be installed	Demonstration		

Number	Flooring Spec Text	Verification	OPI Comments	Reviewer Comments
	Flooring Performance Requirements			
	either before or after erection of the shelter or shelter accessory it is intended to serve.			
	The Semi-Rigid Flooring shall be capable of through penetration by a 2cm dia spike, without shattering, at -50C°.	Demonstration	For the case where flooring is laid before the shelter, it may extend beyond the shelter walls, therefore necessitating the ability to spike through the flooring to secure the tent.	

Number	Flooring Spec Text	Verification	OPI Comments	Reviewer Comments
	Flooring Characteristics			
	The Semi-Rigid Flooring system shall consist of common segments capable of being joined together to form a continuous floor covering.	Inspection		
	The Semi-Rigid Flooring system segments shall be manufactured from a plastic material, or other material as approved by the Technical Authority.	Analysis	There will be a deliverable requirement for the characteristics of the material used. Alternate materials only acceptable if approved in advance by the TA.	
	The Semi-Rigid Flooring segments shall be designed to interlock in a manner that ensures a mechanical connection resistant to horizontal and vertical stresses.	Demonstration	Intent of this requirement is to ensure that segments stay together on uneven ground.	
	Hook and loop style fasting shall not be used for joining Semi-Rigid Flooring segments.	Inspection		
	The length and width of an individual Semi-Rigid Flooring segment shall fit within the envelope of 120cm by 100cm.	Inspection	Intent is to fit on a standard North American pallet.	

Number	Flooring Spec Text	Verification	OPI Comments	Reviewer Comments
	Flooring Characteristics			
	The mass of any single Semi-Rigid Flooring segment shall not exceed 10 kg.	Inspection		
	The Semi-Rigid Flooring system shall have a static load resistance of 3.5MPa.	Analysis		
	The Semi-Rigid Flooring segments shall be perforated to allow run-off of water.	Inspection		
	Perforations shall be sized to prevent structural weak points and to allow standard command post furniture such as four-legged tables and chairs to be placed safely.	Analysis and Demonstration	Analysis to verify no structural weakness; Demonstration to verify movement of furniture.	
	The Semi-Rigid Flooring system should consist of a single part number.	Inspection	Desirable to avoid multiple parts of different size.	
	The Semi-Rigid Flooring System shall have a thickness in the range of 1.5cm – 4.0 cm.	Inspection		
	The Semi-Rigid Flooring system should include a rated thermal insulation.	Analysis		

Number	Flooring Spec Text	Verification	OPI Comments	Reviewer Comments
	Flooring Characteristics			

Number	Flooring Spec Text	Verification	OPI Comments	Reviewer Comments
	Flooring Environmental and Safety Requirements			
	The Semi-Rigid Flooring shall be fire resistant in accordance with CAN/ULC S-102	3rd party test		
	Any Volatile Organic Compounds emitted by the Semi-Rigid Flooring system shall be within accepted standards for occupied spaces.	Analysis	May be a standard applied to this requirement.	
	The Semi-Rigid Flooring system shall not be an environmental hazard if left behind in frozen or other ground conditions that prevent retrieval.	Analysis	Note: the HQSS SOW will have a requirement for an Environmental Health and Safety Impact Report deliverable.	
	The Semi-Rigid Flooring shall be designed to minimize slip risk when wet.	Demonstration	The Semi-Rigid Flooring shall be designed to minimize slip risk when wet.	
	The floor materiel shall be electrically non-conductive.	Analysis	The floor must protect soldiers from a shorted power cable or from an electrical strike that could travel via the	

Number	Flooring Spec Text	Verification	OPI Comments	Reviewer Comments
	Flooring Environmental and Safety Requirements			
			floor. Under investigation: calling up an appropriate commercial standard for resistivity, for example Electrical resistivity IEC 61340-5-1 or EN 1081.	

List of Abbreviations

ASTM	American Society for Testing an Materials
C	Celsius
cm	Centimetre
DND	Department of National Defence
HQSS	Headquarters Shelter System
IEC	International Electrotechnical Commission
kg	Kilogram
MPa	Megapascals
SOW	Statement of Work
TA	Technical Authority
ULC	Underwriters Laboratories Canada

HQSS Partial Statement of Work and Specification – HVAC System

Purpose: The purpose of this document is to solicit industry feedback on the draft HQSS HVAC System SOW and Requirements statements contained herein. The final version of this document will be incorporated into a master HQSS Acquisition SOW and associated Appendices. ALL of the statements in this document are subject to change, including additions and deletions.

HVAC System References:

HVAC Specific References:

- ASHRAE 62.1, Ventilation for Acceptable Indoor Air Quality

US Govt References:

- MIL-STD-1472, Human Engineering; Note: a new release, G, of MIL-STD-1472, was issued in Jan 2012. After study, this new release may or may not form part of the final SOW (if it has been 'streamlined', the old F-version may be used; if it is seen as 'improved', the new version may be used)
- MIL-STD-461, Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
- MIL-STD-810, Environmental Engineering Considerations and Laboratory Tests
- MIL-HDBK-310, U.S. Dept of Defense Handbook, Global Climatic Data For Developing Military Products. (NOTE: In Canada, US MIL HDBKS can be invoked as requirements; the document cover notice to the contrary shall be disregarded for application to Canadian requirements.)
- MIL-DTL-53072, Chemical Agent Resistant Coating (CARC) System – Application Procedures and Quality Control Inspection
- MIL-DTL-64159, Coating, Water Dispersible Aliphatic Polyurethane, Chemical Agent Resistant
- MIL-PRF-22750, Coating, Epoxy, High Solids
- Guidelines for Environmental Infection Control in Health-Care Facilities, Centers for Disease Control and Prevention Healthcare Infection Control Practices Advisory Committee, U.S. Dept of Health and Human Services

DND Documents:

- D-02-002-001/SG-001, Identification Marking of Canadian Military Property
- D-01-100-203/SF-000, Preparation of Operating Instructions
- D-01-100-204/SF-000, Preparation of Preventive Maintenance Instructions
- D-01-100-205/SF-000, Preparation of Corrective Maintenance Instructions

HVAC Equipment Load:

- 100 W continuous per laptop (one per occupant)
- 600 W continuous per large screen display

- Server Room: It has been confirmed that HQSS shelters will not be required to serve the function of a server room in the field; therefore, this function need not be considered in the HQSS HVAC design calculations. (CIM: 10 Feb 2012.)

Verification of Requirements: There are four acceptable means of verification of requirements. All requirements must be verified prior to first article acceptance. The four acceptable means of verification are: Inspection, Demonstration, Analysis, and Test. Formal definitions of these terms will be provided in the final SOW. The required means of verification will also be provided in the final SOW; if more than one means of verification appears next to a requirement, then the Contractor may choose the means from the options provided. There will be no blanks in the verification column of the final SOW; in this draft document a blank requirement verification means the TA has not yet chosen the means of verification. In general, Analysis and Test are seen to be the more demanding means of requirement verification. Where these terms are used, the expectation is an engineering analysis as a formal report, or a formal test report.

Document Notes: In general, terms that begin with capital letters are (or will be) formally defined somewhere in the SOW. Statements that contain the word “shall” are mandatory; statements that contain the word “should” are desirable.

Notes:

1. In this version, some requirements have been added; some deleted; and some changes. For some unchanged requirements, additional comments have been added to clarify or emphasize the requirement.

2. Most changes made since the 26 Oct version are highlighted. Major changes include:
- Medical HVAC requirement was removed and then reinserted after further discussion among system clients;
- HVAC performance has been corrected to be consistent with MIL-HDBK-310;
- Requirement validation column additions and modifications
- External fuel tank draw for heater added

3. Industry is encouraged to provide feedback on all aspects of this draft spec, including the proposed means of requirement verification, as these means may become mandatory in the final SOW.

4. When more than one possible means of requirements verification is provided, the Technical Authority will have the final say in which means is acceptable, so industry should consider the risk that a more expensive means of verification may be required where more than one means is specified (more incentive to comment ahead of time!)

5. It is acknowledged that some of the standards called up by this draft spec are intended for the use of semi-permanent or permanent facilities. Unless industry feedback provides a rational argument that requirements derived from these documents are definitely not applicable (or not achievable) for the HQSS HVAC, then it will be assumed that they are both feasible and achievable.

6. The HQSS project team wishes to emphasize to industry that the -50C cold start requirement for the Diesel Fired Space Heater, is an essential and non-negotiable requirement. It is understood that design modifications and extra cost may be involved in meeting this requirement without the use of any additional equipment (such as an add-on 'cold start kit') or other external supply (such as the use of "quick start").

7. Required quantities of HVAC units are subject to change.

8. The HQSS Project team is considering requiring a single size (capacity) of cooling unit to be provided, for the purposes of a standardized fleet.

DRAFT HVAC SOW Statements (Subject to Changes and Additions)

Number	SOW Text	Verification	OPI Comments	Reviewer Comments
	HVAC System			
	In the event of conflicting HVAC requirements, the Contractor shall consult the Technical Authority, who will determine which requirement takes precedence.		This will be a general statement in the SOW.	
	In the event that the Contractor's interpretation of any HQSS system or component requirement differs from the Technical Authority's interpretation of the same requirement, the Technical Authority shall decide which interpretation shall be implemented.		CIM: Added 24 Feb 2012	
	The Contractor shall design the HQSS HVAC system to meet all HQSS System Level Requirements.		HQSS System Level Requirements to be a section in the final SOW.	
	The Contractor shall design the HQSS HVAC system to meet all the HQSS HVAC system requirements.			
	The Contractor shall document the design of the HVAC System in an HQSS HVAC System Design		The design document will be described in a Data Item Description	

Number	SOW Text	Verification	OPI Comments	Reviewer Comments
	Document, according to CDRL ____		document attached to the SOW. This DID will require air flow calculations and heat transfer calculations documenting system design parameters.	
	The Contractor may design the HQSS HVAC system for Class 1 air, as defined in ASHRAE 62.1-2004.			
	The Contractor may design the HQSS HVAC system according to the Occupancy Category of Office Space as defined in ASHRAE 62.1-2004.			
	The Contractor shall provide inspection, cleaning and maintenance procedures for all HVAC equipment.		Note: This will be under a separate section of the SOW, for Integrated Logistics Support, and will cover the entire HQSS System. This information will be required in DND format. There will be a CDRL for these documents.	

Number	SOW Text	Verification	OPI Comments	Reviewer Comments
	The Contractor shall design the HVAC system to prevent precipitation or dust infiltration into the HQSS shelters.		May need to limit this for dust. (G4 or F5-F7?)	
	The Contractor shall provide a sub-assembly level reliability analysis of the ECU's and Diesel Fired Space Heaters to substantiate the proposed maintenance schedule.		Data Item Description will be provided.	
	The Contractor shall design the HVAC system to be capable of being set-up, configured and operated in covert lighting conditions.		Covert lighting conditions to be defined in the SOW. (Think – head lamp and mini-maglite with blue filters)	
	The Contractor shall design the HVAC system to minimize detection by hostile personnel using Night Vision Imaging Systems.		Minimize the use of indicator lights that provide non-NVIS compatible light.	
	The Contractor shall design the HVAC system performance in accordance with the MIL-HDBK-310 guidance for 5-percentile extremes for each required performance condition.		CIM: Added, 24 Feb 2012.	

Number	SOW Text	Verification	OPI Comments	Reviewer Comments

HQSS Partial Specification – DRAFT HVAC Requirements

Note: Under the shelter portion of the specification, the requirement for Natural Ventilation will be included. Natural ventilation requirements will include windows and dedicated air exhaust vents. All natural ventilation means shall be capable of being covered or uncovered by a person standing on the floor of the shelter.

Spec Sections:

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	Overview – HQSS HVAC Requirements			
	The HVAC System shall meet all the HQSS System Level Requirements.	System level test	Final SOW to identify System Level Requirements (SOW Section)	
	The HQSS requires an HVAC System that can provide suitable climate control during hot and cold climate extremes as well as in transitional climates where daily cooling and nightly heating may be required.	Information	This section of the SOW pertains to climate control in hot weather climates and transitional weather (spring/fall) conditions, where the most demanding function is cooling with a secondary requirement for heating.	
	The HVAC System shall consist of the following components:		Definition of “HVAC System”.	
	a. Environmental Cooling Units (ECU), to include a limited	Inspection		

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	Overview – HQSS HVAC Requirements			
	heating capacity for transitional climate conditions;			
	b. Diesel Fired Space Heaters;	Inspection		
	c. Mixing and manifold system, if required, to supply a maximum of two distribution and air return connections to each shelter;	Inspection	25 Oct 2011: Increased max no. of air dist paths in any shelter to two.	
	d. Air Distribution System in each shelter; and	Inspection		
	f. Ancillary equipment specified elsewhere in this section, to include: ducting, remote control devices, detachable electrical cords, and removable stacks.	Inspection		
	The mass of any single HVAC System component shall not exceed 191kg.	Test	420 pound system level requirement. Weight of heater to be measured with minimum usable fuel. CIM – comment	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	Overview – HQSS HVAC Requirements			
			added 2 Feb 2012.	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Performance Requirements			
	The Corrected Effective Temperature (CET) shall be defined in accordance with MIL-STD-1472F, Para 5.8.1.1 and Figure 34.	N/A	CIM: Corrected para ref – 22 Jan 2012	
	The HVAC System shall be capable of maintaining an interior CET of at least 10℃, at a height of 70cm off the floor when the exterior temperature is -50℃, with winds of up to 110km/hr.	Analysis and/or Test		
	The HVAC System shall be capable of maintaining a maximum interior CET of 29.5℃, at a height of 185cm above floor level or lower, when the HQSS is deployed in any of NATO Climate zones A1, A2, A3, B1, B2, and B3 as defined in MIL-STD-810.	Analysis and/or Test	CIM: Updated 24 Feb 2012	
	The HVAC System should be	Analysis and/or Test	CIM: Desirable requirement updated	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Performance Requirements			
	capable of maintaining a maximum interior CET of 25.5℃, at a height of 185cm above floor level or lower, when the HQSS is deployed in any of NATO Climate zones A1, A2, A3, B1, B2, and B3 as defined in MIL-STD-810.		24 Feb 2012.	
	The HVAC System shall be capable of maintaining a minimum interior CET of 10℃, at a height of 40cm above floor level or lower, when the outside ambient temperature is -50℃.	Analysis and/or Test		
	The HVAC System should be capable of maintaining a minimum interior CET of 15℃, at a height of 40cm above floor level or lower, when the outside ambient temperature is -50℃.	Analysis and/or Test	CIM: Desirable requirement added 24 Feb 2012.	
	The heating, ventilation, and air conditioning (HVAC) system shall be capable of providing and maintaining a relative humidity	Test	CIM: New relative humidity requirement, 22 Jan 2012 (from MIL-STD-1472G, Para	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Performance Requirements			
	within a range from 30 percent minimum to 70 percent maximum with 40 percent to 45 percent preferred. The temperature / humidity design goal shall be between 21℃ and 25℃ and 45 percent humidity.		5.5.2.1.4.c)	
	The temperature of the air at floor level and at head level at any personnel position should not differ by more than 5.5℃.	Test	CIM: Desirable temperature uniformity performance requirement added 22 Jan 2012.	
	The HVAC system should be capable to maintain a comfortable environment as defined in accordance with MIL-STD-1472F, Figure 36.	Analysis	CIM: Desirable requirement added 22 Jan 2012.	
	The HVAC System shall function normally with any component resting on an incline up to 15 degrees in any direction.	Demonstration		
	The Diesel Fired Space Heater shall function normally on an	Demonstration		

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Performance Requirements			
	incline of up to 25 degrees in any direction.			
	The ECU shall be provided with the capability to detect frost formation on the evaporator and correct it automatically.	Demonstration	CIM: Updated 22 Jan 2012; added 'evaporator'	
	The ECU shall be provided with freeze protection for the evaporator.	Demonstration	CIM: Updated 22 Jan 2012: removed 'condensor'.	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Control and Display Requirements			
	~~In addition to the following requirement, the HVAC System should provide the capability to control the temperature throughout a Shelter Complex via the operation of a single interior thermostat.~~	~~Demonstration~~	Shelter Complex to be defined in the final HQSS SOW. CIM: 22 Jan 2012 – proposed for deletion.	
	The HVAC System shall provide the capability to control the heating and cooling for each shelter from within that shelter, to include the functions of:	Test		
	a. System on/off function;	Demonstration		
	b. Temperature control function;	Test		
	c. Ventilation only on/off function;	Demonstration	CIM: It has been proposed that this function be available only on the HVAC unit to avoid	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Control and Display Requirements			
			inadvertent tampering with the system by unskilled personnel. 22 Jan 2012.	
	In-shelter control/display panels for the HVAC system shall be connected to the heating or cooling equipment via wired connection.	Inspection		
	In-shelter control/display panels for the HVAC system shall be detachable from heating and cooling units.	Inspection and/or Demonstration		
	The Diesel Fired Space Heater and ECU shall provide the capability of full system control without any remote control panel being attached.	Demonstration		
	The HVAC System in-shelter control/display panel shall display an alert if a safety sensor is	Test		

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Control and Display Requirements			
	activated on a heating or cooling unit.			
	The HVAC System shall include pressure differential type displays to monitor condition of all filters.	Inspection	Note: if more than one filter is included, then each filter should be separately monitored.	
	The Diesel Fired Space Heater shall include an hour meter to display cumulative hours of operation.	Inspection and/or Demonstration		
	The Diesel Fired Space Heater shall include the following status indicators:	Inspection and/or Demonstration and/or Test		
	a. Power on;			
	b. Burner fail to start;			
	c. Flame-out fault;			
	d. Over temperature;			

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Control and Display Requirements			
	e. CO or CO2 detected;			
	f. Tilt shutoff;			
	g. Combustion air intake fan fail;			
	h. Blower failure; and			
	i. Set point light to indicate shelter temperature has reached the thermostat set point.			
	The Diesel Fired Space Heater shall include a fuel level indicator.	Inspection		
	The Diesel Fired Space Heater and ECU shall include a bubble level in at least two perpendicular dimensions.	Inspection		
	~~The ECU shall display power draw (Amperes).~~	~~Demonstration~~	CIM: To Be deleted; function will be provided by the existing power distribution system.	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Control and Display Requirements			
			25 Feb 2012.	
	~~The ECU shall provide a 3-phase voltage display.~~	~~Demonstration~~	CIM: To be deleted; function will be provided by the existing power distribution system. 25 Feb 2012.	
	The ECU shall provide indication of high or low refrigerant pressure.	Inspection and/or Analysis and/orTest		

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Ventilation and Ducting Requirements			
	The HVAC System shall be designed with the following shelter occupancies:		Usable floor area of a shelter will be defined as that floor area which has a clear height of	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Ventilation and Ducting Requirements			
			185cm.	
	a. Five (5) people in an office shelter;	Analysis	CIM: There will be a Deliverable for HVAC Analysis, 22 Jan 2012.	
	b. Twenty (20) people in a planning shelter; and	Analysis	CIM: There will be a Deliverable for HVAC Analysis, 22 Jan 2012.	
	c. Thirty (30) people in an operations shelter.	Analysis	CIM: There will be a Deliverable for HVAC Analysis, 22 Jan 2012.	
	The HVAC System shall be capable of providing from 0% to 25% fresh air.	Inspection and/or Demonstration and/or Analysis		
	When configured for heating, the HVAC System shall be capable of providing circulated and fresh air when the heating function is shut off.	Demonstration		

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Ventilation and Ducting Requirements			
	When configured for cooling, the HVAC System shall be capable of providing circulated and fresh air when the cooling and heating functions are shut off.	Demonstration		
	HVAC System components that handle ventilation air shall be mould resistant in accordance with the requirements of ASHRAE 62.1-2004, Para 5.5.1	Inspection and/or Analysis		
	The HVAC System shall include supply and return ducts that connect the ECU or Diesel Fired Space Heater, and any separate filtration unit, to and from the shelter.	Inspection	Terminology: outside the shelter it's called a supply or return duct; inside the shelter it's called an air distribution system.	
	The same supply and return system should serve both the heating and cooling requirements of a shelter.	Inspection and/or Analysis	Contractor is not obliged to provide ducting that will serve both heating and cooling, but will get	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Ventilation and Ducting Requirements			
			credit for doing so. Note: system performance takes precedence.	
	The HVAC System shall be designed to accommodate 2.0 inches of external static pressure.	Analysis	To accommodate some kinking in ducts. CIM, 22 Jan 2012: Industry is criticizing this requirement, saying it will result in a noisy, energy-consuming system. To be further investigated.	
	HVAC System supply and return ducts shall be insulated.	Analysis and/or Inspection		
	HVAC System supply and return ducts shall be removable without the use of tools.	Demonstration		

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Ventilation and Ducting Requirements			
	HVAC System supply and return ducts shall use an accordion style design to facilitate pack-up and transport.	Inspection and/or Demonstration		
	HVAC System supply and return ducts shall be designed to prevent collapse under all operating conditions.	Analysis and/or Demonstration and/or Inspection	CIM: Updated 22 Jan 2012, to remove negative pressure condition.	
	HVAC System supply and return ducts shall include end fittings suitable for connection to the HQSS shelters, ECUs, and Diesel Fired Space Heaters.	Demonstration		
	HVAC System supply and return ducts should use the same end fitting design for both ends of a duct.	Inspection	Intent: avoid a hose that must be connected in a particular orientation.	
	The air distribution system shall be capable of being configured to avoid the direct discharge of air on personnel.	Demonstration	CIM: Added 22 Jan 2012. Note – in the final SOW, this may appear under the	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Ventilation and Ducting Requirements			
			shelter section.	
	All external ducting shall be UV resistant.		CIM: Added 22 Jan 2012.	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Filtration Requirements			
	Filtration requirements shall apply to both heating and cooling equipment configurations.	Analysis		
	The HVAC System shall filter the air to a level of MERV 14.	Inspection and/or Analysis		
	The HVAC System shall provide indication when any filter requires replacement.	Inspection and/or Analysis and/or Test	Indication visible on the unit without need to remove any panel.	
	The HVAC System shall filter outside and recirculated air.			
	If a separate filtration unit is provided, the supply and return ducting shall be designed to work with or without the filtration unit installed.			
	The HVAC System supply and return ducts should be interchangeable.			
	The HVAC System supply and return ducts shall be of resilient		This spec is likely to be tightened up.	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Filtration Requirements			
	design and suitable for use in all HQSS System level environmental conditions.		Message is: we want good quality, durable ducts.	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Equipment Certifications			
	The HVAC System shall be certified CSA compliant.	Test and/or Analysis and/or Inspection (See Note)	Note: Third party assessment required at Contractor expense.	
	The HVAC System shall be certified to comply with MIL-STD-461E, RE 102 from 10kHz to 18GHz, CE 102 from 10kHz to 10MHz and RS 103 from 2MHz to 40GHz, as applicable to Army ground equipment	Test (See Note)	Note: The SOW text will require the Contractor to provide 3rd party test information at the Contractor's expense.	
	The HVAC System shall be certified to comply with MIL-STD-810G, Method 506.5 Blowing Rain, procedure I.	Test (See Note)	Note: The SOW text will require the Contractor to provide 3rd party test information at the Contractor's expense.	
	The HVAC System shall be certified to comply with MIL-STD-810G, Method 521.3, for ice and	Test (See Note)	Note: The SOW text will require the Contractor to provide	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Equipment Certifications			
	freezing rain.		3rd party test information at the Contractor's expense.	
	The HVAC System shall be certified to comply with MIL-STD-810G, Method 502.5, Procedure I, for cold weather storage and operation to -50℃.	Test (See Note)	Note: The SOW text will require the Contractor to provide 3rd party test information at the Contractor's expense.	
	The HVAC system shall be certified to comply with MIL-STD-810G, Method 516.6, Procedure I, Functional Shock 2g.	Test (See Note)	Note: The SOW text will require the Contractor to provide 3rd party test information at the Contractor's expense.	
	The HVAC system shall be certified to comply with MIL-STD-810G, Method 514.6, Procedure I, to resist Category I ground	Test (See Note)	Note: The SOW text will require the Contractor to provide 3rd party test information at the	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Equipment Certifications			
	mobile vibrations.		Contractor's expense.	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Safety Requirements			
	The Diesel Fired Space Heater shall contain a flame-out detector with positive fuel shut off.	Inspection.		
	The Diesel Fired Space Heater shall contain a carbon monoxide detector with alarm and positive fuel shutoff.	Inspection.		
	The Diesel Fired Space Heater shall contain tip-over protection switch(es).	Demonstration		
	The Diesel Fired Space Heater shall contain overheat protection.	Inspection		
	DND will place the heating and cooling units up to 3m away from the closest side of the shelter being heated or cooled, to maintain a fire break.	N/A	Info – for designing ducting, etc.	
	The HVAC System shall be designed to meet the NIOSH eight hour exposure limits for personnel working a distance of		Units will be placed approx 3m from working shelters.	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Safety Requirements			
	3m from any operating unit, without the requirement for supplementary hearing protection.			
	The HVAC System should provide a maximum noise level of TBD at a distance of 3m in any direction from the unit.		Will add a more restrictive desirable maximum noise level.	
	The HVAC System shall comply with the safety labelling requirements of MIL-STD-1472F, Paras 5.13.2.1 and 5.13.2.8.		Note: All labels bilingual.	
	HVAC System components shall be labelled for recommended number of people to lift.		Is there a standard for this?	
	All access doors in the ECU and Diesel Fired Space Heater that provide access to moving or electrical parts shall be protected by inter-locks that shut off or de-energize the component.			
	The Diesel Fired Space Heater			

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Safety Requirements			
	shall be designed to detect failure of the heat exchanger and automatically shut down if combustion air mixes with air circulating to the shelter.			
	The HVAC System shall be designed to isolate all moving parts to facilitate inspection during system operation.			
	The ECU shall provide Hi/low pressure cut outs for the refrigerant.			
	The surface temperature of the ECU and Diesel Fired Space Heater shall not exceed 60C while operating.			

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments

	HVAC Electrical Requirements			
	The Diesel Fired Space Heater electrical power requirement shall be 120V, 60Hz, single phase.			
	The Diesel Fired Space Heater shall provide a 2m, detachable power cord.		2m +/- 10cm cable length.	
	The power cord for the Diesel Fired Space Heater shall be capable of being stored inside the unit for transport.			
	The ECU shall require 120/208 VAC, 3 Phase, 60 Hz, 5-wire, maximum 60A power.			
	The ECU shall come complete with a detachable 10m long main power cable with Hubbell 560P9W plug, or equivalent.		10m +/- 10cm cable length.	
	To come: spec for cable end that attaches at the unit.			
	The ECU and Diesel Fired Space Heater shall have access panel(s) to facilitate servicing of electrical components.			

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Electrical Requirements			
	Input power quality??		May or may not provide info on input power quality assumptions.	
	The HVAC system shall not incorporate fuses.			
	Wiring protection shall be by means of Circuit Breakers, where required.			

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	Diesel Fired Space Heater Requirements			
	The Diesel Fired Space Heater shall be capable of operating on the following fuels without performance degradation:			
	a. Automotive diesel fuel;	Demonstration		
	b. Kerosene;	Demonstration		
	c. Aviation Fuel Grades F-34 and F-44; and	Demonstration		
	d. Biodiesel specification B100.	Demonstration	Specification to be verified. (Source: Field Heater project spec)	
	The Diesel Fired Space Heater shall incorporate a fuel tank of sufficient capacity to operate at maximum output for a minimum of 8 hours without refuelling.	Demonstration		
	The Diesel Fired Space Heater shall be capable of drawing fuel from an external reservoir such as a jerry	Demonstration	CIM: Added, 22 Jan 2012	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	Diesel Fired Space Heater Requirements			
	can or fuel barrel.			
	The fuel supply system of the Diesel Fired Space Heater shall not require any special priming procedure should the system experience a fuel out condition, either prior to operation or during operation.			
	The Diesel Fired Space Heater shall have an indicated efficiency of not less than 78%, measured per ASHRAE standard.	TBD	Should specify which ASHRAE standard.	
	The Diesel Fired Space Heater should have an indicated efficiency of not less than 85%, measured per ASHRAE standard.			
	The Diesel Fired Space Heater shall provide a minimum ground clearance of 14cm.			
	The Diesel Fired Space Heater shall be capable of drawing fuel from a supplemental jerry can, placed on the ground, and hose that feed the			

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	Diesel Fired Space Heater Requirements			
	fuel tank.			
	The Diesel Fired Space Heater shall provide the means to adjust the system to operate at peak efficiency for an altitude range of sea level to 3000m above sea level.			
	The Diesel Fired Space Heater shall include independent means to analyze the combustion efficiency.		This is a requirement for STTE: a combustion gas analyzer. Actual quantities of these instruments are TBD; probably will NOT be one per unit.	
	The maximum temperature of heated air produced by the Diesel Fired Space Heater shall not exceed 110℃ at the outlet.			
	The Diesel Fired Space Heater shall include a removable flue stack.			
	The removable flue stack shall be insulated.			

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	Diesel Fired Space Heater Requirements			
	The removable flue stack shall be a minimum of 1.3m in height when installed.			
	The removable flue stack should be capable of being stored within the outer envelope of the Diesel Fired Space Heater.			

Number	HVAC Spec Text	Verification	DND Comment	Industry Feedback
	HVAC Environmental Cooling Unit Requirements			
	The ECU should include a means to capture condensate.		Intent: provide a float activated condensate pump that can feed an external jerry can (jerry can not part of the requirement.)	
	The ECU shall provide a minimum ground clearance of 14cm.		Except for the feet, the lowest part on a level surface is at least 14cm off the ground.	
	The heating function that is integral to the ECU may be provided by an electric element or by a heat pump function.			

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Equipment Paint Requirements			
	The Diesel Fired Space Heater and ECU shall be painted with CARC paint in accordance with the requirements of US specification MIL-DTL-53072.		See also: MIL-DTL-53022, MIL-DTL-53030, MIL-DTL-64159	
	Exterior surfaces of the Diesel Fired Space Heater and ECU shall be painted with a polyurethane topcoat meeting the requirements of specification MIL-DTL-64159 type II (latest edition), colour 34094 (flat green) as per standard FED-STD-595 (latest edition).			
	Interior surfaces of the Diesel Fired Space Heater and Environmental Cooling Unit shall be painted with An epoxy topcoat meeting the requirements of specification MIL-PRF-22750 (latest edition), colour 17925 (gloss white) as per standard			

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Equipment Paint Requirements			
	FED-STD-595.			

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Environmental Protection Requirements			
	The cooling units shall not include refrigerants banned under the Canadian Environmental Protection Act and its associated regulations.	Inspection	Should be more specific than this in the final version, for example SOR/DORS/2003-289, Schedule 1.	
	The Diesel Fired Space Heater shall be designed to prevent fuel leakage in the event of a tip-over condition.	Demonstration		
	The Diesel Fired Space Heater shall be designed to minimize environmental contamination during refuelling via provision of	Inspection	Spill tray could be part of the fuel spout or could be designed to sit under the entire	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Environmental Protection Requirements			
	a spill tray.		heater.	
	The Diesel Fired Space Heater shall include a collapsible fuel spill berm intended to be placed under the operating unit.			
	Mercury shall not be used in the HVAC system.		No mercury tip-over switches.	
	The ECU shall contain an integral drain pan.			
	The ECU drain should be pressurized to ensure moisture expulsion.			
	The ECU drain pan should provide the means to prevent the water from being contaminated.		CIM, 22 Jan 2012: The intent of this desirable requirement is to use this condensate as potable water.	
	The ECU drain pan should provide the means to capture			

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Environmental Protection Requirements			
	uncontaminated water for re-use.			

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC - Design for Reliability and Maintainability Requirements			
	The ECU shall have access panel(s) to facilitate servicing of electrical components.			
	All moving parts of any HVAC component shall be isolated from other components.		To assist with maintenance and inspection while the unit is running.	
	The HVAC system shall be designed for maintainability in accordance with the full requirements of Section 5.9 of MIL-STD-1472F.		Will probably call up specific paras in the final SOW.	
	The use of brazed joints shall be minimized in the pressurized components of the ECU.			
	The ECU shall be designed for safe inspection of refrigerant level during operation.			
	The ECU design shall avoid the			

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC - Design for Reliability and Maintainability Requirements			
	direct contact of dissimilar metals in heat transfer components.			

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Design for Transportability Requirements			
	All HVAC components with a weight of more than 10kg shall have integral lifting handles.			
	Quantity and location of lifting handles shall be designed to accommodate the maximum required number of people for lifting the unit.		If you need six people to lift it, you need to provide six lifting points.	
	The ECU and Diesel Fired Space Heater shall include integral forklift channels, with a spacing of 0.71m centre-to-centre.		For handling in main warehouses.	
	All HVAC components shall be capable of being secured to a flatbed truck or aircraft pallet without damage to the component.			
	The HVAC System shall be designed such that all external		All connections, controls and	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC Design for Transportability Requirements			
	interfaces are protected by hard doors for transport and storage.		displays.	
	Except for supply and return ducts, any component of the HVAC System that is normally detached for shipping should be capable of being stored within the unit it is normally attached to during operation.		CIM: Changed to desirable, 22 Jan 2012.	
	Supply and return ducts shall be provided with end caps for transport and storage.			
	ECU's and Diesel Fired Space Heaters shall be designed to be stackable up to a maximum height of 3.1m.			
	The Diesel Fired Space Heater shall include a drain plug in the fuel tank to enable the tank to be emptied of fuel for transport and storage.			

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	HVAC System Labelling Requirements			
	All HVAC System components shall be marked for identification purposes in accordance with CFTO D-02-002-001/SG-001.			

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	Medical HVAC Requirements			
	A limited number of Medical HVAC Systems will be required for medical treatment areas. The number of systems is to be confirmed. These systems will be required to maintain either positive or negative pressure, and they will require HEPA filtering. The Medical HVAC should be designed to use the same heaters and ECUs as designed for the non-medical HVAC, with the provision of additional control components and a separate HEPA filter module. This may not prove practical for design or cost reasons.	N/A	Information CIM: Minimum numbers removed, 24 Feb 2012 – still under internal discussion.	
	The Medical HVAC System shall be defined as a modified HVAC System suitable for use in support of Field Hospital functions.			
	The Medical HVAC System shall meet all the requirements of the HVAC System, except as noted in this section.		Medical HVAC meets all requirements above (except as noted), plus the ones added in this section.	

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	Medical HVAC Requirements			
	The Medical HVAC System shall include a HEPA Filter Module located down stream from the dust filter.	Inspection		
	The HEPA Filter Module shall not use paper filter material.	Inspection		
	The Medical HVAC System shall provide an air filtration efficiency of not less than 99%.	Analysis		
	No component of the Medical HVAC System should have a mass greater than 191kg.			
	The Medical HVAC System should include an Ultraviolet Germicidal Irradiation capability.		May be offered as part of proposal or as an option (or not at all.)	
	The Medical HVAC System shall be capable of maintaining relative humidity levels within the range of 30-60%, for all HQSS System Level ambient conditions.			
	The Medical HVAC System shall be capable of maintaining either a positive or negative pressure			

Number	HVAC Spec Text	Verification	OPI Comments	Reviewer Comments
	Medical HVAC Requirements			
	environment in any shelter within the following limits:			
	a. A minimum positive pressure differential of 2.5Pa;			
	b. A desirable positive pressure differential of up to 8Pa;			
	c. A minimum negative pressure differential of 2.5Pa.		Value is a “differential” therefore figure is an absolute value. Shelter pressure of -2.5Pa compared to ambient.	

List of Abbreviations

A	Amperes
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
CARC	Chemical Agent Resistant Coatings
CDRL	Contract Data Requirements List
CE	Conducted Emissions
CFTO	Canadian Forces Technical Order
cm	Centimetre
CO	Carbon Monoxide
CO2	Carbon Dioxide
CET	Corrected Effective Temperature
CSA	Canadian Standards Association
DID	Data Item Description
DND	Department of National Defence
ECU	Environmental Cooling Unit
F-34, F-44	(NATO) Military Aviation Kerosene
HEPA	High Efficiency Particulate Air
HVAC	Heating Ventilation and Air Conditioning
kg	Kilogram

m	Metre
MERV	Minimum Efficiency Reporting Value
MHz	Megahertz
N/A	Not Applicable
NIOSH	(U.S.) National Institute for Occupational Safety and Health
NVIS	Night Vision Imaging System
OPI	Officer of Primary Interest
Pa	Pascal
RE	Radiated Emissions
RS	Radiated Susceptibility
SOW	Statement of Work
STTE	Special Tools and Test Equipment
TA	Technical Authority
TBD	To Be Determined
VAC	Volts Alternating Current
W	Watts

ANNEX E
INDUSTRIAL AND REGIONAL BENEFITS

1. Industrial and Regional Benefits (IRB) Requirement

1.1. IRB Requirement at potential upcoming RFP

1.1.1. Canada's Industrial and Regional Benefits Policy will be a mandatory element of the Headquarters Shelter System (HQSS) project, with the contractor committing to achieve IRB valued at 100% of the contract value. The IRB Policy is administered by Industry Canada (IC) with assistance from the Regional Development Agencies.

Detailed IRB requirements and instructions will be issued with the potential upcoming RFP. The start of the IRB Achievement Period will begin on the date of release of this LOI.

To obtain information about Canada's IRB Policy, please visit the IC website at: www.ic.gc.ca/irb.

1.1.2. Canada reserves the right to request minimum Direct IRB levels on both the HQSS Acquisition and In-Service Support contracts. Requirements will be detailed in the potential upcoming RFP.

1.1.3. Any Direct IRB requirement will be subject to the Government's new Global Value Chain (GVC) equivalency policy, as announced by the Government of Canada in September 2009. GVC equivalency will permit contractors to meet the Direct IRB requirement through either direct activity on Canada's shelter equipment and/or service requirements, as well as through direct-equivalent activity within a contractor's global portfolio of business activities related to similar shelter equipment and/or services arrangements.

1.1.4. Any requirement for Direct IRB will be expressed in the form of a percentage of the total contract value; specific transactions or activity types under the Direct IRB requirement will not be requested as part of the IRB requirements.

1.1.5. Any Direct IRB requirement will be based, in part, on the following considerations: LOI response by Respondents and assessment of industry capabilities, both domestic and international.

1.1.6. Any Direct IRB requirement will be adjusted to take into account any, or all, DND operational requirements that are, as part of the potential upcoming RFP, requested to remain in Canada due to operational imperatives.

1.2. LOI IRB Response

1.2.1. Respondents should provide an overview of their plans for the provision of long-term, sustainable economic benefits to Canada as an informational Annex to their LOI response. This information will be used to facilitate HQSS project planning for the development of the economic benefits portion of the potential upcoming RFP.

1.2.2. As part of this information, Respondents should include information regarding the total Canadian content currently included in the production of similar existing shelter equipment and accessories, expressed as a percentage of the shelter equipment and accessories price. Respondents are requested to provide this input (within a reasonable level of assurance), broken down in categories such as, but not limited to:

- Engineering Development;
- Initial Parts/Component Manufacture;
- Requirements Verification Testing and Acceptance;
- Integrated Logistics Support Products (Training, Technical Data, Initial Sparing);
- Full Production;
- Packaging and Delivery;
- Other Activities proposed by the Respondent.

1.2.3. Respondents should also include information regarding the total Canadian content planned to be proposed to Canada for the HQSS, expressed as a percentage of the estimated Acquisition contract bid price. Respondents are requested to provide this input (within a reasonable level of assurance), broken down in categories such as, but not limited to:

- Engineering Development;
- Initial Parts/Component Manufacture;
- Requirements Verification Testing and Acceptance;
- Integrated Logistics Support Products (Training, Technical Data, Initial Sparing);
- Full Production;
- Packaging and Delivery;
- Other Activities proposed by the Respondent.

1.2.4. Furthermore, Respondents should include information regarding the total Canadian content planned to be proposed to Canada for the In-Service Support portion of the HQSS project, expressed as a percentage of the estimated In-Service Support contract bid price. Respondents are requested to provide this input (within a reasonable level of assurance), broken down in categories such as, but not limited to:

- Engineering Services
- Repair and Overhaul
- Parts Management and Supply
- Other Activities proposed by the Respondent.

1.2.5. Respondents are encouraged to explain any assumptions used in the development of the information provided in response to Paragraphs 1.2.2., 1.2.3. and 1.2.4..

1.2.6. A suggested sample template is provided at Annex XX in order to assist Respondents in providing the information requested in Paragraphs 1.2.2., 1.2.3. and 1.2.4..

1.2.7. Respondents should provide a specific number for the total Canadian content requested in Paragraphs 1.2.2., 1.2.3. and 1.2.4. and not a range of values (e.g. 10% - 30%). If the total Canadian content number is zero (0) percent or no Canadian content, then Respondents should clearly write the number zero (0) in their LOI response.

APPENDIX 1 TO ANNEX E
IRB SAMPLE TEMPLATE

Acquisition Contract:

Description of Activity	**Current Canadian Content of the bidder's shelter equipment expressed as a percentage (%) of the shelter equipment price – Part XX, paragraph 1.2.2.**	**Planned Canadian Content to be proposed by the Respondent for the HQSS project expressed as a percentage (%) of the estimated Acquisition contract bid price – Part XX, paragraph 1.2.3.**	**Respondent's Comments**
Engineering Development			
Initial Parts/Component Manufacture			
Requirements Verification Testing and Acceptance			
Integrated Logistics Support Products (Training, Technical Data, Initial Sparing)			
Full Production			
Packaging and Delivery			
Other Activities as proposed by the Respondent			
Total			

In-Service Support Contract:

Description of Activity	**Planned Canadian Content to be proposed by the Respondent for the HQSS project, expressed as a percentage (%) of the estimated In-Service Support contract bid price - Part XX, paragraph 1.2.4.**	**Respondent's Comments**
Engineering Services		
Repair and Overhaul		
Parts Management and Supply		
Other Activities as proposed by the Respondent		
Total		