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**LETTER OF INTEREST
LETTRE D'INTÉRÊT**

Comments - Commentaires

Vendor/Firm Name and Address
Raison sociale et adresse du
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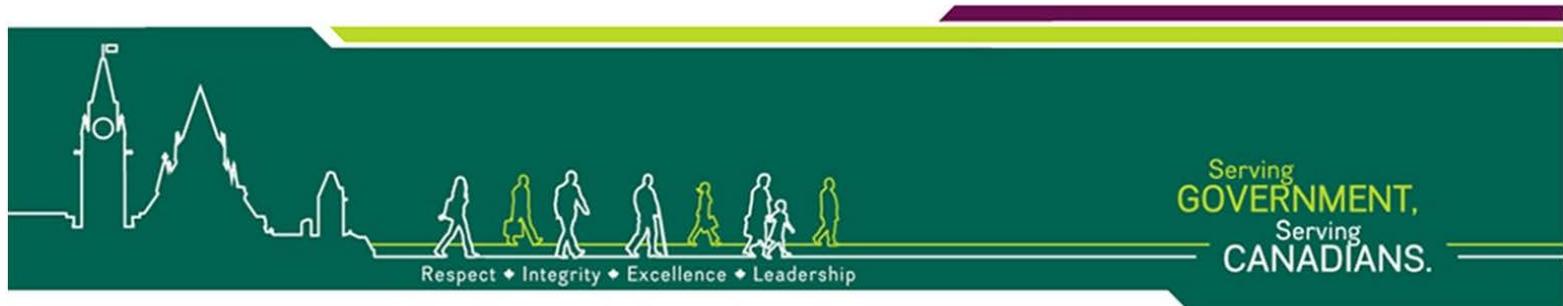
Issuing Office - Bureau de distribution
Defence Communications Division. (QD)
11 Laurier St./11, rue Laurier
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Gatineau, Québec K1A 0S5

Title - Sujet HF 1kW Radio System Replacement	
Solicitation No. - N° de l'invitation W8474-197676/B	Date 2018-10-30
Client Reference No. - N° de référence du client W8474-197676	GETS Ref. No. - N° de réf. de SEAG PW-\$\$QD-028-27037
File No. - N° de dossier 028qd.W8474-197676	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2018-11-23	
Time Zone Fuseau horaire Eastern Standard Time EST	
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Garate, Oscar	Buyer Id - Id de l'acheteur 028qd
Telephone No. - N° de téléphone (819) 420-1768 ()	FAX No. - N° de FAX () -
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: Specified Herein Précisé dans les présentes	

Instructions: See Herein

Instructions: Voir aux présentes

Delivery Required - Livraison exigée See Herein	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



W8474-197676

LETTER OF INTEREST (LOI)

For

1 KW High Frequency Radio System

1. Purpose and Nature of the Letter of Interest (LOI)

Public Services and Procurement Canada (PSPC) is requesting Industry feedback regarding the 1 KW High Frequency Radio system requirement as listed in the annex and appendix provided herewith. The requirements as described in the attached annex will be fulfilled for Government of Canada on behalf of the Department of National Defence (DND).

The objectives of this LOI are to:

- a. Apprise potential bidders of the requirements of this project;
- b. Collect information regarding the technical feasibility of the requirements as published in this LOI package.
- c. Seek industry feedback to streamline DND technical requirements to help develop potential Request for Proposal that may be published sometime in the near future; and
- d. Engage potential bidders and answer their questions, as necessary.

Canada would like to engage industry and seek feedback on technical documents that are published via this LOI package, as this will facilitate formalizing the Request for Proposal (RFP) process. An Industry day or one-on-one meetings with the interested suppliers is being organized for this project, will be held in the National Capital Region (NCR). Canada may consider the information gathered for the improvement of the technical documents and the RFP process.

This LOI is neither a call for tender nor a Request for Proposal (RFP). No agreement or contract will be entered into based on this LOI. The issuance of this LOI is not to be considered in any way a commitment by the Government of Canada, nor as authority to potential respondents to undertake any work that could be charged to Canada. This LOI is not to be considered as a commitment to issue a subsequent solicitation or award contract(s) for the work described herein.

Although the information collected may be provided as commercial-in-confidence (and, if identified as such, will be treated accordingly by Canada), Canada may use the information to assist in drafting performance specifications (which are subject to change) and for budgetary purposes.

Respondents are encouraged to identify, in the information they share with Canada, any information that they feel is proprietary, third party or personal information. Please note that Canada may be obligated by law (e.g. in response to a request under the Access of Information and Privacy Act) to disclose proprietary or commercially-sensitive information concerning a respondent (for more information: <http://laws-lois.justice.gc.ca/eng/acts/a-1/>).



Respondents are asked to identify if their response, or any part of their response, is subject to the Controlled Goods Regulations.

Participation in this LOI is encouraged, but is not mandatory. There will be no short-listing of potential 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 in any potential subsequent solicitation/s.

Respondents will not be reimbursed for any cost incurred by participating in this LOI.

The LOI closing date published herein is not the deadline for comments or input. Comments and input will be accepted any time up to the time when/if a follow-on solicitation is published.

2. Background Information:

The Department of National Defence (DND) has an immediate requirement to replace the existing High Frequency (HF) 1 kW radio systems under the 1 kW HF Replacement Project. The project consists of legacy HF radio systems deployed at various DND facilities. The new HF radio systems will be used as a primary means of communication in support of search and rescue, deployed operations and support to domestic emergencies. These HF radio systems will provide voice and data communications to various organizations within DND using primarily Single Sideband (SSB) 3 KHz channels.

3. Potential Work Scope and Constraints:

The intent of the program is to supply DND with modern software defined HF radio systems capable of utilizing various types of ALE, data processing and analogue voice. The systems must be capable of operating with a single transmit and receive antenna as well as independent transmit and independent receive antennas with a minimum amount of reconfiguration. The program must also provide the requisite training material, manufacturers recommended spare parts list, data processing software, radio configuration software, radio remote control systems and technical documentation.

There is a further requirement for the HF radio systems to be controlled by DND's Radio Control Processor (RCP) software.

DND is responsible for the installation of the HF radio systems and associated encryption devices.

4. Legislation, Trade Agreements, and Government Policies:

The following is indicative of some of the legislation, trade agreements and government policies that may impact any follow-on solicitation(s):

- Canada Free Trade Agreement (CFTA)
- Controlled Goods Program (CGP)
- Federal Contractors Program for Employment Equity (FCP-EE)



5. Schedule:

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

Letter of Interest (LOI) Closing Date as specified on the main page of this document.
Industry Day or One-on-One session's week of 10 - 14 December 2018

Canada may modify the above timeline anytime as necessary.

6. Important Notes to Respondents:

Interested Respondents may submit their responses to the PSPC Contracting Authority, identified below, preferably via email:

Oscar Garate

Contracting Authority
Public Works and Government Services Canada
Acquisitions Branch
Land and Aerospace Equipment Procurement and Support Sector
Place du Portage, Phase III, 8C2
Gatineau, Québec K1A 0S5 Canada
Telephone: 819-420-1768
E-mail: oscar.garate@tpsgc-pwgsc.gc.ca

A point of contact for the Respondent should be included in the package.

Changes to this LOI may occur and will be advertised on the Government Electronic Tendering System. Canada asks Respondents to visit Buyandsell.gc.ca regularly to check for changes, if any.

7. Upcoming Engagement Sessions:

Interested respondents will have the opportunity to participate in the Industry day or one-to-one sessions with the government officials from 10 to 14 December 2018. The purpose of these sessions is to provide interested participants with the opportunity to obtain further information about the 1 KW HF Radio System and its specific requirements.

To register for the Industry day or one-one-one meeting, please email Contracting Authority at the email address provided above before **02 December 2018 at 14.00 Hrs.**

Non-attendance at the industry day will not preclude any supplier from bidding on this requirement should follow-on solicitation/s be issued.

8. Closing date for the LOI/RFI:

Responses to this LOI are to be submitted to the PSPC Contracting Authority identified above, on or before 23 November 2018 - 14.00 Hrs.

Respondents should present their responses in MS Word and Excel format as they deem fit.

ANNEX A

STATEMENT OF REQUIREMENT

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Appendix A1: Performance Specifications

1.0 INTRODUCTION

The Department of National Defence (DND) has a large diverse fleet of HF Radios utilized for Strategic Communications in support of search and rescue, deployed operations, domestic emergencies and sovereignty operations in Canada's far North. This fleet consists of fixed site and deployable Automatic Link Establishment (2G ALE, 3G ALE) and non-ALE type HF radios. Most of DND's fleet are nearing end of life cycle and are no longer supported by the original equipment manufacturer. DND has an immediate one time requirement to replace the end of life High Frequency (HF) 1 kW ALE fixed site radio systems situated at various DND facilities across Canada. The new replacement HF radio system will be used as a primary means of HF communication in support of search and rescue, deployed operations, support to domestic emergencies and sovereignty operations in Canada's far North.

Deliveries of the new systems will be made to three locations:

- a. DND Uplands HF Development Laboratory in Ottawa;
- b. Edmonton depot;
- c. Montreal depot.

2.0 DESCRIPTION OF EXISTING SYSTEM

The existing 1 kW HF Radio Systems allow military radio operators at a fixed site to communicate with deployed assets utilizing both voice and serial data over HF radio links. The HF radio links utilized are dependent on the capability of the deployed assets. The requirement could be non-ALE Single Sideband (SSB) 3 KHz channel, or the requirement could be for a 2G or 3G ALE link, 3 KHz channel. The majority of DND's deployable HF assets are 2G and 3G ALE capable. The primary link capability utilized by DND in the far North is 3G ALE at this time.

2.1 Key Components

Only the components listed from a) to n) are to be replaced under this contract; items m) to q) are DND's existing equipment and will remain in place:

- a) Continuous duty 1kW power amplifier;
- b) Power supplies;
- c) HF exciter;
- d) HF receiver;
- e) HF transmitter;
- f) Pre/post selectors;
- g) Remote Control Units;
- h) HF external modem;
- i) ALE controller;
- j) Equipment control software;
- k) Data application software;
- l) Handsets & headsets;
- m) Voice encryption;

- n) Data encryption;
- o) Radio Control Processor (RCP);
- p) Radio Control Network (STRATNET); and
- q) Antennas.

2.2 Government Furnished Equipment (GFE)

The following system components will be supplied by DND. The Contractor provided equipment must interface with each of the following DND provided components.

2.2.1 The Radio Control Processor (RCP) is an interface between the HF Control System and the Bidder offered HF Devices. It allows the HF Control Systems to be hardware independent. The RCP communicates with the HF Control System via TCP/UDP protocols. The RCP translates control traffic to and from the Vendor's proprietary control protocols. The contractor must provide non-proprietary industry standard control interfaces complete with a full description of device control protocols. The Government Furnished Equipment (GFE) provided RCPs will remain in service for the 1 kW HF radio system. The RCP terminal controls the following devices:

- a) HF receivers
- b) HF exciters
- c) HF transmitter
- d) HF modems.
- e) HF receive matrixes.
- f) HF transmit matrixes.
- g) Audio switching components.
- h) Antenna control.
- i) Remote Control Units.

2.2.2 The Radio Control Network (STRATNET) is a DND owned and managed network that provides backbone connectivity over a Shared Services Canada provided Multi-packet Label Switched Network (cloud) to all strategic HF communication stations and fixed sites across Canada. It provides transport to all the HF communication and control systems for all required services. That includes all of the functionalities (e.g. Open Systems Interconnection (OSI) Reference Model layer 1, layer 2, layer 3) and all infrastructure elements that are required by DND to deliver the telecommunication services. The infrastructure elements may include local access cabling, gateways, switches, routers, servers, End Instrument (EI) user devices, Local Session Controllers (LSC), Edge Boundary Controllers (EBC), and Communications Servers (CSs).

2.2.3 The antennas currently in use and supported by DND will be used for the new 1 kW HF radio systems. They are primarily of broadband design. There is no requirement for the contractor to provide antennas or antenna systems for this project.

3.0 OBJECTIVES

The overall objective of this contract is to acquire a replacement for DND's fixed 1 kW HF ALE capable radio systems. The Contractor must provision the key hardware as defined in para 2.1 and the requisite software components. The contractor must provide the protocol descriptions

and technical support to DND to modify the RCP for the new HF radio equipment. The specific objectives of this contract are as follows:

- a) To replace existing system components as identified in para 2.1, with current, commercial off the shelf technology that will be supportable for the next 10 years;
- b) To provide high quality, reliable HF radio equipment to the CAF;
- c) To integrate supplied equipment with existing Radio Control Processor, Radio Control Network and antenna systems;
- d) To procure spare parts;
- e) To have DND retain all intellectual rights to the DND Radio Control Processor and its associated software; and
- f) To provision the required training documentation for operations and maintenance.

3.1 Control System Design Concept

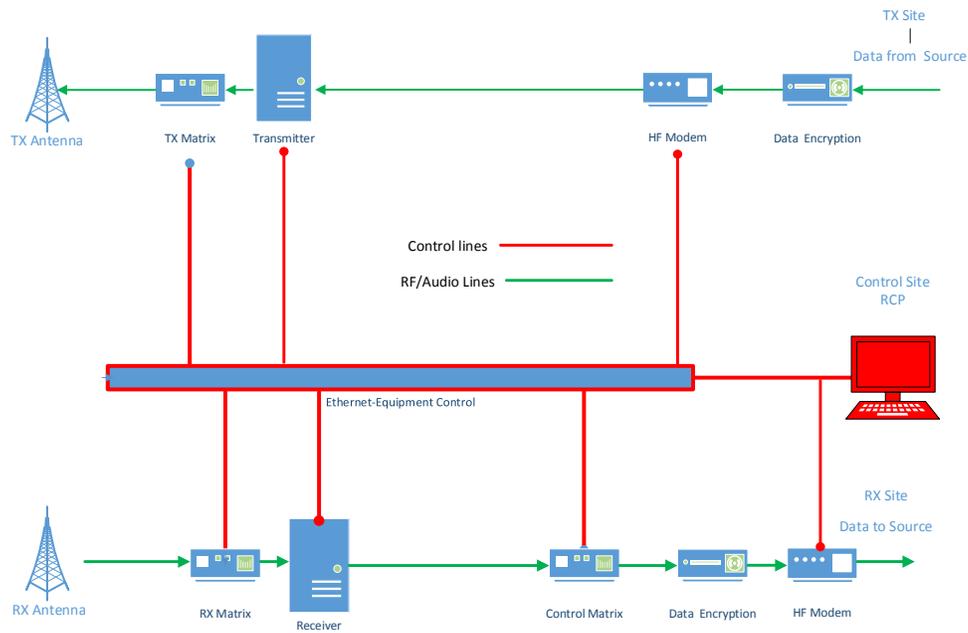
The new HF radio systems will be used to support two methods of HF Communications. The first is support to legacy HF communications which uses fixed frequency for both voice and serial data (Diagram 1 below). In this configuration RCP will control all aspects of the HF radio equipment provisioned under this contract the same as it is presently controlled. In the second method the radio system will be used to support (Diagram 2 below) HF ALE 2G and 3G. In this configuration contractor provided software and control parameters will be required to control the Contractor offered HF ALE system to establish the HF link. In some instances when deemed required by DND, RCP control may also be employed. RCP will be used to control existing GFE in either configuration. All contractor provided radio equipment must be capable of supporting 2G and 3G ALE and non-ALE fixed frequency methods of HF communication. The RCP and its associated software will remain the intellectual property of DND.

- a) Fixed frequency Broadcast transmission with serial data;
- b) Fixed frequency Receive serial data;
- c) Fixed frequency Transmit analogue voice;
- d) Fixed frequency Receive analogue voice;
- e) Automatic Link Establishment operations;
- f) STANAG 5066 Data ARQ and Non-ARQ; and
- g) STANAG 4538 ARCS.

3.2 RCP Control Concept Diagram 1

The diagram below shows the basic concept of operation using only RCP control for radio operations. This method of control will be used where ALE is not required as a method of establishing HF connectivity.

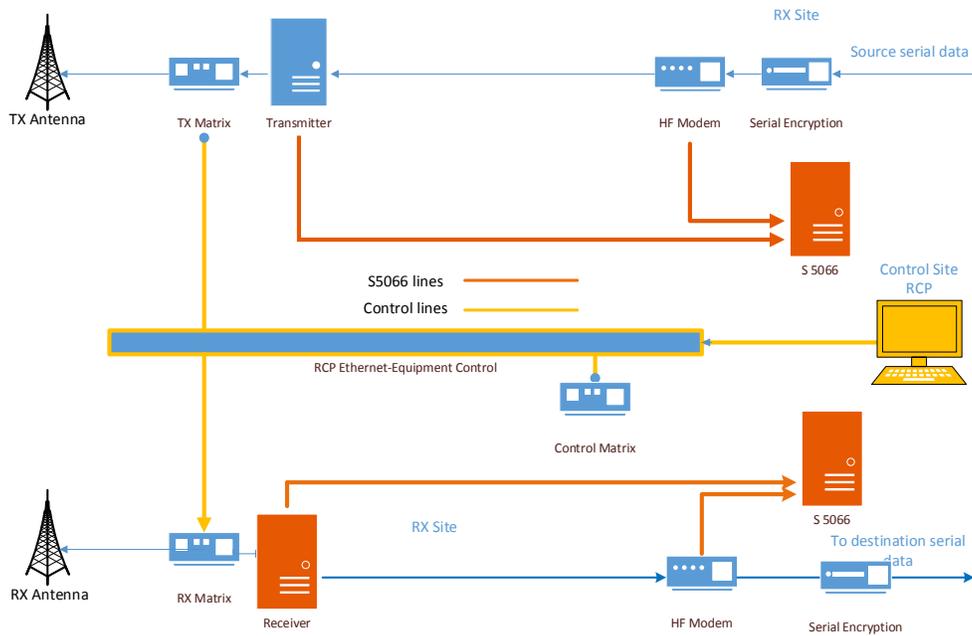
Typical RCP Configuration HF Data



3.3 ALE Operations augmented with RCP Control Diagram 2

The diagram below shows the basic concept of operations when using ALE

Typical RCP HF Split Site Configuration HF S5066



4.0 REQUIREMENT

The Contractor must supply all of the following equipment, spare parts list only, software, and documentation. All deliverables must comply with the Performance Specifications found in Appendix A1. The Contractor must test the equipment in a DND lab.

4.1 Equipment

4.1.1 The Contractor must provision the following HF radio components and applications and must include any additional components required to produce a functional system while using the Government Furnished Equipment.

- a) Continuous duty capable solid state 1kW power amplifier;
- b) Power supplies;
- c) Software defined HF exciter;
- d) Software defined HF receiver;
- e) Software defined HF transmitter;
- f) Software defined ALE Controllers;
- g) Software defined HF external modem;
- h) Pre/Post Selector;
- i) Audio input/output devices, such as 600 ohm balanced output, handset, headset, microphone and speaker.
- j) Requisite cabling for transmitter and receiver equipment interfacing within their respective racks must be provided;
- k) Remote Control Unit; and
- l) Any other equipment required to support the Contract specified functionality of the Contractor offered 1 KW HF ALE Radio System

4.1.2 The provisioned 1 kW HF system components must be commercial of the shelf equipment (COTS).

4.1.3 The resulting HF radio system must be capable of both split site and co-located operation.

4.1.4 In the split site configuration, transmit and receive functions must be controllable from a separate control site remotely.

4.1.5 All systems components must be 19" rack mountable.

4.1.6 All 1 KW HF ALE RADIO Systems must come with their own prewired 19" rack with requisite cabling for equipment interfacing within their respective racks.

4.1.7 Must be of modular design to minimize system repair time.

4.1.8 Overall physical dimensions must not exceed 24"W x 36"D x 78"H.

4.1.9 The HF Radio system must support Analogue voice IAW STANAG 4203.

4.1.10 The HF radio system must be able to support digital voice such as MELPe.

4.1.11 The transmitter and receiver portion of the HF radio system must be able to transmit and receive the MIL-STD-188-110C Appendix D and 240 kbps (48 kHz) per STANAG 5069 without modifying major components such as the HF exciter, HF Receiver and the HF Transmitter portions of the 1 KW HF ALE radio system.

4.1.12 The HF radio system must be able to support MIL-STD-188-203-1A, STANAG 5511, and STANAG 5522.

4.2 Spare Parts

4.2.1 The Contractor must provide a Recommended Spare Parts List (RSPL) for the HF radio system and software. The list must be provided in an Excel document, provided on a USB key and have at least the following columns:

- a) Part number;
- b) Model number;
- c) Manufacturer;
- d) Description; and
- e) NATO Stock Number (if available).

4.2.2 The spare parts must be at the Lowest Replaceable Unit (LRU) level. An LRU can be removed and replaced as a single entity and is typically replaceable by a DND technician. The Contractor must provide the nomenclature necessary to catalogue all LRUs in the DND Supply System including technical specifications. This must be provided as an internet link or PDF.

4.2.3 The contractor must ensure that all spare parts listed in the RSPL are available for the offered 1 kW HF radio system for not less than 10 years.

4.2.4 The HF radio components speciality connections for interfacing to GFE must be included in the spare parts list. Sufficient numbers of physical connectors must be provided as part of each delivered 1KW HF ALE radio system to insure integration into the DND provided GFE infrastructure.

4.3 Software

4.3.1 The contractor must supply all required software licences to operate the components, while they are in-service;

4.3.2 The contractor must supply all software and firmware updates for the system components for 5 years after the delivery of the equipment;

4.3.3 The contractor must provision the 1 kW HF radio components with scalable software defined HF radio systems such that they are able to support current mission requirements and meet future expansion needs for the next five years; (must be more specific in time and requirement)

4.3.4 The contractor must supply equipment remote control and programming software.

- 4.3.5 The contractor must supply STANAG 5066 Data application and configuration software.
- 4.3.6 The contractor must supply STANAG 4538 Data application and configuration software.
- 4.3.7 The contractor must supply STANAG 5066 Data application hardware interface.

4.5 Training Documentation

- 4.5.1 The Contractor must provide the training materials for the new HF radio systems to DND. This training data package must include operator level training for all provided hardware and software applications. The data package must also include training documentation to a minimum at the LRU level.
- 4.5.2 The contractor must supply hardware schematics to the component level directly to the TA. There must be three hard copies and three soft copies for each piece of hardware.
- 4.5.3 Training packages must be provided to DND in both hard and soft copies. One electronic and one hard copy must be provided for each component of the system.

4.6 Publications and Documentation

- 4.6.1 The Contractor must provide all maintenance and operating manuals in accordance with specifications below. All publications and documentation must be provided in the English language.

All Documentation or Publications provided must:

- a) be free of spelling or grammatical errors;
 - b) be written in plain language;
 - c) use proper technical terms and terminology;
 - d) be delivered in MS Format 2013 or higher and pdf versions; and
 - e) be professionally bound hard copies.
- 4.6.2 DND reserves the right to reproduce and distribute at DNDs discretion any materials such as documents, training aids, presentations lesson plans and technical documentation within DND.
 - 4.6.3 The contractor must provide one (1) soft copy and twenty (20) professionally bound hard copies of all maintenance & operating manuals, and as-built drawings to the Technical Authority.
 - 4.6.4 The Contractor must provide the nomenclature necessary to catalogue all provisioned equipment/software in the DND Supply System. This must be supplied in PDF format or by link to the contractor website. The documentation must include detailed technical specifications utilized to show conformance.

Appendix A1

PERFORMANCE SPECIFICATIONS

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1 PURPOSE

- 1.1 The purpose of this document is to provide the performance and functional specifications for the 1 kW HF Radio Systems Replacement Program.
- 1.2 The provisioned components must fully meet the performance and functional requirements of the radio system parameters as described in this document.

2 APPLICABLE STANDARDS

- 2.1 The HF Radio Systems must support 2nd and 3rd Generation Automatic Link Establishment (ALE) radio operation in accordance with MIL-STD-188-141A/B.
- 2.2 The HF Radio Systems must support STANAG 5066.
- 2.3 The HF Radio Systems must support 3G STANAG 4538 ARCS.
- 2.4 The HF Radio system external modem must support the following waveforms:
 - a) STANAG 4539
 - b) MIL-STD-188-110A
 - c) MIL-STD-188-110B and appendix C and F
 - d) STANAG 4285
 - e) STANAG 4415
 - f) FSK Variable
 - g) STANAG 4529
- 2.5 The HF Radio system must support Analogue voice IAW STANAG 4203.
- 2.6 The HF radio system must be able to support digital voice such as MELPe.
- 2.7 The transmitter and receiver portion of the HF radio system must be able to receive and transmit the MIL-STD-188-110C Appendix D and 240 kbps (48 kHz BW) per STANAG 5069 without any modifications to the transmitter or receiver portions of the radio.
- 2.8 The HF radio system must be able to support MIL-STD-188-203-1A, STANAG 5511, and STANAG 5522.

3 GENERAL SYSTEM REQUIREMENTS

- 3.1 The HF Radio System equipment must be comprised of Commercial Off The Shelf (COTS) products.
- 3.2 The contractor provisioned HF Radio System architecture must have been previously deployed and proven operational.
- 3.3 The 1kW HF radio systems must be software driven and HF radio equipment components must be updateable by firmware and software update.

- 3.4 All HF Radio System configurable settings must be stored in such a way that they are not lost due to a power failure.
- 3.5 The offered 1 kW HF Radio system must be able to interface phone patches.
- 3.6 Each HF radio system must be supplied with a programming application that supports all communication modes. These configuration files must be easily exportable to all like radios in the HF network. The programming application must provide a minimum of two levels of access for operation and administration with the highest level password protected.
- 3.7 2G ALE must support "any" and "all" calls.
- 3.8 2G ALE must support both sounding and bidirectional LQA exchanges.
- 3.9 All provisioned major system components must be controllable by the DND provided RCP.
- 3.10 Remote control of the hardware must support serial and Ethernet interfaces.
- 3.11 The contractor must provision remote control and data software for each system. This software must be COTS. The COTS software would be used in a standalone system installation.
- 3.12 Contractor must provide 19" rack(s) for the HF radio system(s).

4 MODEM SPECIFICATIONS

- 4.1 In addition to the standards listed in this document in Para 2.4 the HF Modem must have the following options.
- 4.2 Must support both synchronous and asynchronous communications.
- 4.3 The DTE port must be compliant to RS-422 balanced, RS-423, RS-232 unbalanced, EIA-530A with both full and half duplex operation. The DTE interface must also support MIL-STD-188-114.
- 4.4 Physical interface connections must be of a commercially available standardized configuration.
- 4.5 Remote control by serial and Ethernet connections.
- 4.6 Have the ability to save a minimum of 3 pre-set configurations.
- 4.7 Input Audio interface 600ohm balanced -20 to +10 dbm without adjustment.
- 4.8 Output audio 600ohm balanced -20 to +10 dbm without adjustment.

- 4.9 AC Power supply minimum specification 115Vac 47-63 Hz.
- 4.10 The modem must be 1U standard 19" rack mountable.
- 4.11 The modem must be external to the radio equipment.
- 4.12 Must support external serial data encryption devices.
- 4.13 Must support SSB and ISB operation.
- 4.14 Must have an extensive BITE test to the LRU level.

5 TRANSMITTER SPECIFICATIONS

- 5.1 RF output power must be minimum 1 kW PEP.
- 5.2 Must allow keying by open collector, contact closure and software control.
- 5.3 Nominal RF impedance must be 50 ohms with N-type termination.
- 5.4 Frequency range must be a minimum of 2-30 MHz.
- 5.5 The transmit portion must support USB, LSB, AM (AME) and ISB modulation types.
- 5.6 Frequency resolution must be in 1 Hz increments.
- 5.7 Power output must be variable in no less than three steps.
- 5.8 Channel storage of 100 minimum.
- 5.9 Frequency stability $\pm 1 \times 10^8$ /Day.
- 5.10 Transmitter control interface must support Serial, Ethernet and manual control from front panel.
- 5.11 The transmitter portions must be 100% duty capable.
- 5.12 The 1Kw transmitter must be software defined.
- 5.13 Must be 19" rack mountable.
- 5.14 Input voltage must support 230 Vac, 50-60 Hz single phase.
- 5.15 Must be split site capable in all operational modes.
- 5.16 Must be capable of transmitting and receiving when co-located and with access to one antenna

- 5.17 Must have an extensive BITE test to the LRU level.
- 5.18 The system must be of modular design so that field service is simplified.
- 5.19 Intermodulation distortion 36 dB below PEP.
- 5.20 Harmonic suppression minimum -60dB.
- 5.21 Sideband suppression minimum -60dB.
- 5.22 Load VSWR less than or equal to 2:1, Degraded operation \leq 3:1, Protective cut off 3:1.
- 5.23 Capable of split site operation via Ethernet.
- 5.24 Audio inputs to support external modems separate from microphone connections 600 ohms balanced.
- 5.25 Must have microphone input.
- 5.26 Must have an interlock to prevent transmission in the event no load is connected to the transmitter output.

6 RECEIVER SPECIFICATIONS

- 6.1 Nominal RF impedance must be 50 ohms with BNC termination.
- 6.2 Frequency range must be a minimum of 2-30 MHz.
- 6.3 Frequency resolution must be in 1 Hz increments.
- 6.4 Channel storage of 100 minimum. 119 dBm for 10 dB (S+N)/N in a 500-Hz bandwidth.
- 6.5 Frequency stability $\pm 1 \times 10^8$ /Day.
- 6.6 Must support Modulation type AM (AME) USB, LSB, CW and ISB for both voice and data communications.
- 6.7 Receiver sensitivity for SSB/ISB must be minimum 10 dB (S+N)/N at -113dBm.
- 6.8 Receiver sensitivity for CW must be minimum 10 dB (S+N)/N at -119dBm in a 500Hz bandwidth.
- 6.9 Receiver sensitivity for AM must be minimum 10 dB (S+N)/N at -116dBm.
- 6.10 Audio line output distortion 1% or less at 0 at 0 dBm.
- 6.11 Audio output to support external modems separate from microphone connections 600 ohms balanced.

- 6.12 Audio response ± 1.5 dB from 300 – 3050 Hz.
- 6.13 Image and IF Rejection 80 dB minimum.
- 6.14 AGC must be variable.
- 6.15 RF input Protection +40dBm or better.
- 6.16 Receiver control interface must support Serial, Ethernet and manual control from front panel.
- 6.17 The receiver must be software defined.
- 6.18 Must be 19" rack mountable.
- 6.19 Input voltage must support 120 Vac and 230 V ac, 50-60 Hz single phase.
- 6.20 Must be split site capable in all modes.
- 6.21 Receiver must be capable of operation when co-located with the transmitter.
- 6.22 Must have an extensive BITE test to the LRU level.
- 6.23 The system must be of modular design so that field service is simplified.

7 STANAG 5066 REQUIRED SPECIFICATIONS

The 1Kw Radio System when co-located or split site must be, at a minimum, capable of and compliant with the following STANAG 5066 specifications and be included in the offer.

- 7.1 Must include multiple adaptive data change mechanisms for auto baud waveforms. One of these mechanisms must include an algorithm that uses the SNR (Signal-to-Noise Ratio) and the FER (Frame Error Rate) estimate to make a data rate choice.
- 7.2 Must support fixed frequency and ALE communication methods.
- 7.3 Must support ARQ and non-ARQ modes of operation.
- 7.4 Must, at a minimum, support the use of STANAG 4539, STANAG 4285 and MIL-STD-188-110A/B.
- 7.5 The 5066 application must support CFTP and HMTTP data transfer protocols.
- 7.6 The 5066 application and hardware must support both synchronous and asynchronous data transfer types.
- 7.7 Must have a COSS Client to support ACP127 format.

- 7.8 Must support a chat application.
- 7.9 Must support interface to SMTP/POP3 e-mail servers.
- 7.10 Must contain an interoperability mode for use to communicate with other vendors STANG 5066 applications.
- 7.11 Must provide a minimum of two levels of access for operation and administration with the highest level password protected.
- 7.12 Must be able to operate using ISB and SSB methods of modulation.
- 7.13 STANAG 5066 radio and network configuration files must be easily importable and exportable to all STANAG 5066 systems by the administrator. The configuration files must be password protected to prevent tampering.
- 7.14 Must have a radio silence mode.
- 7.15 Must be current with STANAG 5066 Edition 3 or latest edition.

8 STANAG 4538 REQUIRED SPECIFICATIONS

The 1Kw HF Radio System when co-located or split site must be, at a minimum, capable of and compliant with the following STANAG 4538 specifications

- 8.1 STANAG 4538 radio and network configuration files must be easily importable and exportable to all STANAG 4538 system by the administrator. The configuration files must be password protected to prevent tampering.
- 8.2 Must support both synchronous and asynchronous scanning functions.
- 8.3 Must support both group and network calls.
- 8.4 Must support 3G link establishment.
- 8.5 Must support FLSU.
- 8.6 Must support separate and independent call and traffic frequencies.
- 8.7 Must provide a minimum of two levels of access operation and administration with the highest level password protected.
- 8.8 Must support HDL, LDL protocols with ARQ.
- 8.9 Must be able to control the radio.

9 PRE – POST SELECTOR REQUIREMENTS

- 9.1 Frequency range must be a minimum of 2-30 MHz;
- 9.2 The Tuning Time must be a maximum of 10 msec;
- 9.3 Unwanted Signal Rejection must be 35 dB minimum;
- 9.4 The antenna connections must be a RX – TX antenna port and a TX antenna port;
- 9.5 The interface connection must be RS232;
- 9.6 Maximum device size must be 1U;
- 9.7 Must have an extensive BITE test to the LRU level.

10 POWER REQUIREMENTS

- 10.1 The 1KW HF Radio System must be operable using 115 VAC, 60 Hz primary power with the exception of the 1KW power supply and amplifiers.
- 10.2 The AC power supply for the amplifier must operate on 230 VAC Single phase.
- 10.3 The HF Radio System devices must operate within the following tolerances:
 - 10.3.1 Voltage frequency of 47 Hz to 63 Hz;
 - 10.3.2 Voltage tolerance: $\pm 10\%$;
 - 10.3.3 Phase regulation: ± 1 electrical degree.

11 ENVIRONMENTAL REQUIREMENTS

- 11.1 The HF 1KW Radio System must meet the following environmental requirements while operational or when stored or being transported:
 - 11.2.1 Operating:
 - 11.2.1.1 Temperature: -20°C to 50°C;
 - 11.2.1.2 Ambient Relative Humidity: 95%;
 - 11.2.2 Storage and Transportation:
 - 11.2.2.2 Temperature: -40°C to 70°C;
 - 11.2.2.3 Altitude: Up to 10 000 m for transportation.

12 INDUSTRY STANDARDS AND SAFTY

- 12.1 The 1 kW HF radio system must be CSA approved.
- 12.2 The 1 kW HF radio system must be licensable in Canada.
- 12.3 The 1 kW HF radio system must be manufactured in accordance with ISO 9001 or latest edition of the standard.