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## MODIFICATION DE L'INVITATION

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

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Fisheries and Oceans  
Canada

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Canadian  
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# *Vessel Radar and ECDIS Statement of Work*



*Canadian Coast Guard*  
**SOW**

Canada

**Published under the Authority of:**

Integrated Technical Services Directorate  
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VESSEL RADAR AND ECDIS STATEMENT OF WORK

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Asset Class Manager Electronics and Informatics	Paul Chefurka	Approved: _____ Date: _____
Director, Electronics and Informatics	Sam Ryan	Approved: _____ Date: _____
Director General, Integrated Technical Services	Michel Cécire	Approved: _____ Date: _____

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## **Document Management**

### **1. Authority**

This document is issued by the Director General, Integrated Technical Services, CCG's National Technical Authority under delegation from the Deputy Minister, Fisheries and Oceans and the Commissioner of the Canadian Coast Guard.

### **2. Responsibility**

- a) The Project Manager, Vessel Radar Procurement is responsible for:
  - i) the creation and promulgation of the document; and
  - ii) the identification of an Office of Primary Interest (OPI) who is responsible for the coordination and the content of the document.
- b) The OPI is responsible for:
  - i) the validity and accuracy of the content;
  - ii) the availability of this information;
  - iii) the update as needed;
  - iv) the periodical revision; and
  - v) the follow-up of all requests, comments and/or suggestions received by the originator.

### **3. Inquiries and/or Revision Requests**

All inquiries regarding this document, including suggestions for revision and requests for interpretation shall be addressed to:

Position Title: Project Manager, Vessel Radar Procurement  
Address: 200 Kent St. Stn 7S036  
Ottawa, ON  
K1A 0E6

All requests should:

- i) be clear and concise; and
- ii) reference the specific Chapter, Section, Figure or Table.



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## **Foreword**

### **1. Purpose**

Radar equipment is required on CCG vessels under the International Maritime Organization (IMO) Carriage Requirements detailed in the International Convention for the Safety of Life at Sea (SOLAS) of which Canada is a participating member. The radar equipment now fitted on CCG vessels has reached its end of life, and must be replaced in order to maintain CCG program integrity.

### **2. Scope**

This Statement of Work (SOW) document details the activities and deliverables associated with the procurement of replacement Navigational Radar and Electronic Chart Display and Information Systems (Radar and ECDIS) to be installed on large Coast Guard vessels across Canada. The technical requirements of the equipment to be procured under this Statement of Work are given in the associated document, “Radar and ECDIS Technical Statement of Requirements”, which will hereinafter be referred as the TSOR.

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## Chapter 1      DELIVERABLES

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### 1.1      EQUIPMENT

#### 1.1.1      Equipment Supplied

- 1.1.1.1      The Vendor *shall* supply equipment as detailed in the Technical Statement of Requirements, complete with all installation instructions, service and operator manuals, materials, parts and assemblies necessary for installation and integration.

## **1.2 DOCUMENTATION & DATA**

### **1.2.1 General**

- 1.2.1.1 All documentation developed or supplied under this Contract *shall* be in reproducible hard copy and native electronic format (Microsoft Word, Excel, etc., and Autocad for all drawings or acrobat reader PDF format).
- 1.2.1.2 The Vendor *shall* provide all documentation developed or supplied for this procurement in equally accurate Canadian English and Canadian French languages.
- 1.2.1.3 All installation instructions, service and operator manuals *shall* be supplied in searchable PDF format.
- 1.2.1.4 Applicable operator manuals *shall* also be supplied in both hard copy and electronic formats with the purchase of each unit.

### **1.2.2 Maintenance**

- 1.2.2.1 The commercial documentation supplied with the equipment *shall* identify all necessary corrective and preventative maintenance tasks or procedures.

## **1.3 TECHNICAL TRAINING**

### **1.3.1 Maintenance Training**

- 1.3.1.1 The Vendor *shall* be able to provide maintenance training course/s, to be delivered by the vendor's representatives to the technical staff of CCG, no later than twelve (12) months from contract award date.
- 1.3.1.2 The course shall meet the following criteria:
  - Class size shall be up to eight (8) students;
  - The training course shall be scheduled for normal business hours with a maximum of five and one half (5.5) hours of class time per day;
  - The course shall last no longer than five (5) working days; and
  - The course shall be offered at the CCG College, in Sydney, NS.
  - Travel and living costs for the vendor's representatives shall be included in the course price;
  - The course shall be available in both of Canada's official languages, French and English;
  - Each individual course shall be delivered in one of Canada's two official languages;

- The choice of language for the course shall be at the discretion of CCG; and
- Courseware shall be treated as documentation under the provisions set out in the General Conditions.

### 1.3.2 Operator Training

- 1.3.2.1 The vendor *shall* provide an operator computer based type specific training on the ECDIS system, with a minimum of 20 licences per ECDIS workstation procurement.
- 1.3.2.2 The operator computer based type specific training on the ECDIS system *shall* be available in both of Canada's official languages, English and French, as per the user's choice, no later than twelve (12) months from contract award date.



Fisheries and Oceans  
Canada

Pêches et Océans  
Canada

Canadian  
Coast Guard

Garde côtière  
canadienne

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# ***Radar and ECDIS Technical Statement of Requirements (TSOR)***



***Canadian Coast Guard***  
**TSOR**

Canada

**Published under the Authority of:**

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Fisheries and Oceans Canada

Canadian Coast Guard

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RADAR AND ECDIS TECHNICAL STATEMENT OF REQUIREMENTS

VERSION 5 – DECEMBER 2015

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Office of Primary Interest (OPI)	Andrew deHaan	Approved:	
Ship Electronics		Date:	
Manager	Benoit Guyon	Approved:	
Ship Electronics		Date:	
Director	Sam Ryan	Approved:	
Electronics and Informatics		Date:	
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## Introduction

### 1. General

The Canadian Coast Guard (CCG), a Special Operating Agency of the Department of Fisheries and Oceans (DFO), owns and operates the federal government's civilian fleet. The Oceans Act gives the Minister of Fisheries and Oceans responsibility for providing:

- a) aids to navigation
- b) marine communications and traffic management services
- c) icebreaking and ice-management services
- d) channel maintenance
- e) marine search and rescue
- f) marine pollution response
- g) support of other government departments, boards and agencies by providing vessels, aircraft and other services

The Canada Shipping Act gives the Minister responsibilities for and obligations concerning:

- a) aids to navigation
- b) Sable Island
- c) search and rescue (SAR)
- d) pollution response
- e) vessel traffic services

Shipboard navigation equipment carriage requirements on CCG vessels are governed by Safety of Life at Sea (SOLAS) in International Maritime Organization (IMO) document 110E Chapter V, the Canada Shipping Act Regulations, Arctic Waters Pollution Prevention Act, and are supplemented by CCG Operations requirements.

### 2. Purpose

The purpose of this Technical Statement of Requirements (TSOR) is to provide the requirements to procure suitable Radar and Electronic Chart Display and Information System (ECDIS) equipment for the Canadian Coast Guard fleet. This document describes the technical and operational requirements to be met by the supplier.

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## Chapter 1 SCOPE AND BACKGROUND

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### 1.1 SCOPE

This document presents the technical requirements for Commercial-Off-The Shelf (COTS) equipment for:

- a) Radar; and
- b) ECDIS equipment for medium and large CCG Vessels.

This document is to be used in conjunction with the attached Statement of Work (SOW) during the procurement process.

### 1.2 BACKGROUND

The CCG fleet is composed of many different vessels of various size, weight and voyage classifications. Navigation equipment fitted varies in age and asset lifecycle stage. To meet the International and Domestic regulations, class management, CCG Operations and vessel specific equipment requirements, configurations for radar and electronic chart systems must be both scalable and adaptable.

#### 1.2.1 Radar

Shipborne radar systems combined with other sensors provide an indication, in relation to own ship, of the position of other surface craft, obstructions and hazards, navigation aids and shorelines.

X-Band Radar (9.2-9.5 GHz) is used for target discrimination, good sensitivity and tracking performance in optimal conditions.

S-Band Radar (2.9-3.1 GHz) is used to ensure that target detection and tracking capabilities are maintained in adverse conditions of fog, rain and sea clutter.

Canada requires type-approved X-Band Radars on medium and larger vessels. Some larger vessels will also carry an S-Band Radar in addition to one or more X-Band Radar(s).

#### 1.2.2 ECDIS

The use of paper charts for navigation purposes is being phased out as the advent of paperless electronic charting systems has increased navigational accuracy and near real time situational awareness at sea.

Canada requires a type-approved ECDIS solution to further the paperless bridge requirement initiative for its vessels.

**Scope and Background**

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**1.2.3 Multifunction Workstation**

A multifunction workstation combines the normal Radar functions and the ECDIS functions in a single workstation. Operators then have identical, correct and timely navigation data available on any combination of networked multifunction workstations.

Canada requires multifunction workstations instead of individual task specific standalone equipment.

Canada requires a modular system that facilitates phased in implementation. For example, an ECDIS workstation procured in the first year is upgraded and integrated into a network of multifunction (Radar/ECDIS) workstations procured in the third year.



## Chapter 2 EQUIPMENT CONFIGURATIONS

- 2.1 Multifunction workstations combining Radar and ECDIS functions **shall** be provided.
- 2.2 Standalone Radar workstations and standalone ECDIS workstations **shall** be available.
- 2.3 Workstations and equipment procured **shall** be modular and upgradeable as required by Canada. E.g. A standalone Radar or ECDIS workstation upgraded to Multifunction Workstation.
- 2.4 An upgraded system **shall** not duplicate functions or equipment unnecessarily. For example, radars upgraded to multifunction workstations will utilize existing workstation processors and network hardware.

*Note: Each system is defined by the listed requirements in table 1 below.*

**Table 1 System Requirements List**

System	Requirements
Radar	3.1.1, 3.1.2 3.2 3.4.1 to 3.4.2, 3.4.4 to 3.4.8 3.5.2 to 3.5.8 3.6 3.7 3.9 3.10.1, 3.10.3 to 3.10.4
ECDIS	3.1.3 3.2 3.4.1, 3.4.3 to 3.4.8 3.5 3.6.1 to 3.6.2 3.7.1 to 3.7.6 3.8 3.10
Multifunction Workstation	All requirements

**Equipment Configurations**

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## Chapter 3 REQUIREMENTS

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### 3.1 REGULATORY REQUIREMENTS

- 3.1.1 Proof of certification of transmitting radionavigation equipment in accordance with Radio Standards Specification RSS-238 by Industry Canada **shall** be supplied in the form of a Technical Acceptance Certificate (TAC), issued by the Certification and Engineering Bureau of Industry Canada, or an Industry Canada recognized body.
- 3.1.2 Radar proof of compliance **shall** be provided for the appropriate Maritime Safety Committee performance standard MSC.192(79) Annex 34 and International Electrotechnical Commission testing standard IEC 62388 referenced by the International Convention for SOLAS, and Canada Shipping Act CSA 2001, Navigation Safety Regulations SOR/2005-134.
- 3.1.3 ECDIS proof of compliance **shall** be provided for the appropriate performance MSC.232(82) and testing IEC 61174 standards referenced by the International Convention for SOLAS, and CSA 2001, Charts and Nautical Publications Regulations, 1995 SOR/95-149.

*Note: Use the most current pertinent version of the International Maritime Organization (IMO), International Electrotechnical Commission (IEC), Maritime Safety Commission (MSC), and Radio Standards Specification (RSS) publications for purposes of this TSOR.*

### 3.2 GENERAL WORKSTATION(S)

- 3.2.1 Human Interface Device (HID) controls necessary to operate the workstation **shall** be dedicated hardware including a keyboard and trackball.
- 3.2.2 HID controls **shall** allow workstation primary functions to be operated from a remote operating position in addition to the main controls.
- 3.2.3 Workstation displays **shall** be of flat panel design and available in the following sizes that meet or exceed all applicable regulatory requirements for radar and ECDIS.
  - a) Display sized to accommodate approximately 250 mm circle diameter radar and ECDIS, measuring diagonally within 19 inches to 22 inches.
  - b) Display sized to accommodate approximately 320 mm circle diameter radar and ECDIS, measuring diagonally within 23 inches to 27 inches.
- 3.2.4 Workstations fitted with displays accommodating ECDIS and/or a ~250 mm circle diameter radar presentation **shall** be available as follows:
  - a) Kit format where equipment is supplied at component level for installation in existing consoles.
  - b) Tabletop format where equipment display and HID are contained and supplied as a single unit for installation on top of a table or desk.

## Requirements

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- 3.2.5 Workstations fitted with displays accommodating ECDIS and/or a ~320 mm circle diameter radar presentation **shall** be available as follows:
- a) Kit format where equipment is supplied at component level for installation in existing consoles.
  - b) Tabletop format where equipment display and HID are contained and supplied as a single unit for installation on top of a table or desk.
  - c) Deck standing format where workstation equipment components are contained and supplied as a standalone unit for installation on a vessels deck.
- 3.2.6 The workstation **shall** be updateable to facilitate changes to IMO standards and take advantage of software upgrades or new features.
- 3.2.7 Workstations **shall** have a system accessible Compact Disc/Digital Versatile Disc (CD/DVD) drive and universal serial bus (USB) port for chart uploading, software updates, etc.
- 3.2.8 This requirement has been removed.
- 3.2.9 This requirement has been removed.

## 3.3 MULTIFUNCTION WORKSTATION(S)

- 3.3.1 Multifunction workstation software applications (e.g. Radar/ECDIS) **shall** share common information presentation style and interface logic.
- 3.3.2 Multifunction workstations **shall** include a conning display mode that presents the following IEC 61162 and/or National Marine Electronics Association (NMEA) 0183 sensor data:
- a) Heading
  - b) Pitch and Roll
  - c) Rudder angles
  - d) Rate of Turn
  - e) Position fix
  - f) Speed
  - g) Propeller pitch
  - h) Wind speed and direction (both true and relative)
  - i) Date and time
- 3.3.3 Conning display mode screen **shall** allow select sensor information to be presented in a configurable layout.
- 3.3.4 Multifunction workstations **shall** include an alert management system that manages alarm information from navigational equipment e.g. AIS, DGPS, Gyro, Radar, ECDIS, etc.

- 3.3.5 Multifunction workstations **shall** offer default display configurations for route monitoring, collision avoidance tasks, conning display and alarm monitoring, selectable by one operator action at each workstation.

### 3.4 INTERFACES

- 3.4.1 Each workstation or workstation serial interface **shall** accept a minimum of three (3) IEC 61162-1 inputs and two (2) IEC 61162-2 inputs.
- 3.4.2 In addition to the mandatory interface sentences and equipment listed in IEC 62388 Section H, the radar **shall** interface with depth sounders and wind anemometers in accordance with IEC 61162-1.
- 3.4.3 In addition to the mandatory interfaces listed in IEC 61174 Section 4.12, the ECDIS **shall** interface with depth sounders, wind anemometers, radar tracked targets (TT formerly known as Automatic Radar Plotting Aids (ARPA)) and Automatic Identification System (AIS) in accordance with IEC 61162-1 and IEC 61162-2.
- 3.4.4 Workstations **shall** integrate with other like workstations using Ethernet network infrastructure.
- 3.4.5 An additional workstation video output port **shall** be available for mirror image video on a secondary display.
- 3.4.6 The video output for a secondary display **shall** have a native resolution matching the requirements of the following display resolutions at a minimum:
- a) 4:3 – XGA+ (1280X960) or
  - b) 5:4 – SXGA (1280X1024) or
  - c) 16:9 – HD1080 (1920X1080) or
  - d) 8:5 – WUXGA (1920X1200)
- 3.4.7 An additional HID interface port or HID interface port splitter/hub **shall** be available to allow workstation primary functions to be operated from a remote operating position in addition to the main controls.
- 3.4.8 Workstations **shall** have a minimum of one video input interface.

### 3.5 WORKSTATION NETWORK

- 3.5.1 Networked workstations **shall** share at least the following functions and resources:
- a) own ship navigation sensor information
  - b) display colour palette
  - c) day/night mode settings
  - d) route plans
  - e) active route monitoring

## Requirements

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- f) Tracked Targets (TT) formerly known as Automatic Radar Plotting Aids (ARPA)

- 3.5.2 It **shall** be possible to operate workstations independently from others on the same network.
- 3.5.3 Networked workstation navigation sensor inputs/outputs **shall** be monitored and distributed by a fully redundant data management system.
- 3.5.4 Networked workstations **shall** use a Consistent Common Reference System (CCRS) to ensure that different sensor information is distributed to the relevant parts of the network. The common reference system will ensure that all parts of the network are provided with the same data from the same source.
- 3.5.5 When multiple sensors/sources (e.g. Differential Global Positioning System DGPS #1 and DGPS #2) are available it **shall** be possible to select an individual sensor for use across networked workstations.
- 3.5.6 When a selected sensor is in use, its identification **shall** be indicated on the display.
- 3.5.7 When sensor data is compromised, it **shall** be indicated on the display.
- 3.5.8 Networked workstations **shall** use a Consistent Common Reference Point (CCRP) for all spatially related information.

## 3.6 POWER REQUIREMENTS

- 3.6.1 Below deck equipment such as workstations and transceivers (down mast), etc. **shall** operate on 115 VAC,  $\pm 10\%$ , single phase, 60 Hz  $\pm 5\%$ . This may be internally converted for subsystem requirements.
- 3.6.2 Each workstation **shall** be powered from and protected by a single Det Norske Veritas (DNV) or Lloyd's Register and American Bureau of Shipping (ABS) type-approved Uninterruptable Power Supply (UPS) capable of handling a twenty (20) minute blackout at 100% load.
- 3.6.3 X band transceivers (up-mast) and turning units **shall** accept the following input power:
  - a) 115 VAC,  $\pm 10\%$ , single phase, 60 Hz  $\pm 5\%$  and
  - b) 220 VAC, single phase,  $\pm 10\%$ , 60 Hz  $\pm 5\%$
- 3.6.4 S band transceivers (up-mast) and turning units **shall** accept the following input power:
  - a) 115 VAC,  $\pm 10\%$ , single phase, 60 Hz  $\pm 5\%$  and
  - b) 220 VAC, single phase,  $\pm 10\%$ , 60 Hz  $\pm 5\%$  and
  - c) This requirement has been removed.

### 3.7 FAULT DIAGNOSIS AND SERVICING

- 3.7.1 This requirement has been removed.
- 3.7.2 Diagnostic software and hardware **shall** be provided to assist system maintainers in troubleshooting.
- 3.7.3 This requirement has been removed.
- 3.7.4 Workstation maintenance access **shall** be password protected.
- 3.7.5 This requirement has been removed.
- 3.7.6 This requirement has been removed.
- 3.7.7 For maintenance purposes, an override switch for S band antenna rotation and Radio Frequency (RF) transmission **shall** be available.
- 3.7.8 A radar performance monitor **shall** be provided with each turning unit.

### 3.8 ELECTRONIC CHARTS

- 3.8.1 Workstations **shall** be able to utilize Electronic Navigational Charts (ENC) vector chart formats released by Canadian Hydrographic Services (CHS), National Oceanic and Atmospheric Administration (NOAA) and other members of the International Hydrographic Office (IHO), built to the IHO's S-57 standard
- 3.8.2 Workstations **shall** be able to utilize Raster Navigation Charts (RNC) produced by CHS and NOAA in the BSB format, meeting the requirements for ECDIS operating in Raster Chart Display System (RCDS) mode within the following time limits:
  - a) BSB v3 (Unencrypted BSB charts from CHS and NOAA) no later than twelve (12) months from contract award date.
  - b) BSB v4 (Encrypted BSB charts from CHS) no later than twelve (12) months from contract award date.

*Note: Encryption source code and sample BSB v4 charts are available for development purposes upon signing a non-disclosure agreement with CHS.*

- 3.8.3 This requirement has been removed.
- 3.8.4 Electronic chart installations, updates and corrections on one workstation **shall** automatically replicate to other workstations if selected.
- 3.8.5 Workstation S-57 chart presentation shall utilize selectable chart information layers (e.g. base display, standard display, full display) that allow filtering of chart information features displayed.
- 3.8.6 This requirement has been removed.

**Requirements**

---

## **3.9 RADAR PERFORMANCE**

### **3.9.1 Antennas**

- 3.9.1.1. X Band radar antenna **shall** be provided in the following approximate lengths:
- a) Up to five (5) feet with a range of approximately zero (0) to thirty-six (36) nautical miles at a minimum

*Note: X Band radar antenna measuring up to five (5) feet in length will not be used for navigation and are not required to meet regulatory requirements listed in 3.1.2.*

- b) Five (5) to Six (6) foot
  - c) Eight (8) foot
- 3.9.1.2. S Band radar antenna **shall** be approximately twelve (12) feet in length or less.
- 3.9.1.3. High speed X band radar antenna rotation rates **shall** be available for high speed craft operating at speeds of greater than 30 Knots.

### **3.9.2 Transceivers**

- 3.9.2.1. X-Band transceivers operating in the 9.2 – 9.5 GHz range **shall** be provided with nominal output powers of ten (10) kW and twenty-five (25) kW.
- 3.9.2.2. S-band transceivers operating in the 2.9 – 3.1 GHz range **shall** be provided with nominal output power of thirty (30) kW.
- 3.9.2.3. X and S-band radar systems used for navigation **shall** be compatible with radar beacons, SARTs and radar enhancers.
- 3.9.2.4. All radar transceiver configurations **shall** be combined up-mast scanner/transceiver unit.
- 3.9.2.5. A high power X-band (~25 kW) and S-Band (~30 kW) transceiver configuration option **shall** also be down-mast/bulkhead mounted.
- 3.9.2.6. Radars **shall** be capable of eliminating or suppressing mutual interference caused by other on-board radar(s), operating in the same band. The method used to suppress mutual interference may include, but not be limited to, the use of a mutual interference suppression trigger input to momentarily suppress or delay the video at each display.

### **3.9.3 Interswitching**

- 3.9.3.1. An interswitching feature **shall** allow up to three (3) radar transceivers to be operated and displayed from up to four (4) workstations in any combination.

### **3.9.4 Tuning**

- 3.9.4.1. Automatic tuning capabilities **shall** be provided.



### 3.9.5 Composite Radar Function

- 3.9.5.1. Where multiple radars are fitted, a composite 360 degree radar picture **shall** be available by combining radar signals from multiple transceivers to eliminate sector blind spots.
- 3.9.5.2. When using the composite radar function, control of all transceivers **shall** be possible from a single workstation.

### 3.9.6 Signal Processing and Clutter Suppression

- 3.9.6.1. Automatic clutter suppression techniques **shall** be used to enhance the capability of identifying small targets in a cluttered environment such as ice, sea, and rain, without having to manually adjust clutter or gain.
- 3.9.6.2. Manual clutter suppression techniques **shall** also be available to the operator.

## 3.10 NAVIGATION TOOLS

### 3.10.1 Voyage Records

- 3.10.1.1. Workstations **shall** allow the playback of approximately six (6) hours of recorded voyage data under normal operating conditions.
- 3.10.1.2. This requirement has been removed.
- 3.10.1.3. Automatic deletion of unneeded voyage records by maximum storage time or file size **shall** be possible.

### 3.10.2 Routes

- 3.10.2.1. It **shall** be possible to create a destination from given coordinates and have the system plot a route from the vessel's location to that destination.
- 3.10.2.2. Routes **shall** be transportable (e.g. USB flash drive, etc.) between compatible workstations (same or different vessel).
- 3.10.2.3. An active route **shall** supply Estimated Time of Arrival (ETA) to the end of the route and to the end of the current waypoint.
- 3.10.2.4. Search and Rescue (SAR) route pattern generation **shall** be available.
- 3.10.2.5. SAR pattern generation **shall** incorporate operator selectable parameters such as limits of total search area, starting point, type of search pattern and turning points.

### 3.10.3 Target Tracking

- 3.10.3.1. Workstations **shall** be capable of acquiring and automatically tracking a minimum of seventy-five (75) targets.
- 3.10.3.2. Of the seventy-five (75) targets tracked, workstations **shall** be capable of tracking a minimum of forty (40) active AIS targets.

**Requirements**

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- 3.10.3.3. Fusible radar TT (ARPA) and AIS targets **shall** be possible to avoid presentation of two (2) target symbols for the same physical target.

**3.10.4 Chart Radar**

- 3.10.4.1. Chart radar as described in MSC.191 (79) para 7.2.2, Display of Chart Information on Radar **shall** be available.
- 3.10.4.2. Chart radars **shall** be able to utilize S-57 Electronic Navigational Charts (ENC) vector charts released by members of the International Hydrographic Office (IHO).

**3.10.5 Radar Overlay on Charts**

- 3.10.5.1. Multifunction workstation chart display **shall** be capable of incorporating appropriately scaled radar information as an overlay.

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**Requirements****Appendix A GLOSSARY****Table 2 Glossary**

ABS	American Bureau of Standards
AIS	Automatic Identification System
ARCS	Admiralty Raster Charts Service
ARPA	Automatic Radar Plotting Aids
BSB	Raster Charts in .bsb format
CCG	Canadian Coast Guard
CCRP	Consistent Common Reference Point
CCRS	Consistent Common Reference System
CD	Compact Disc
cd/m <sup>2</sup>	Candela per square metre
COTS	Commercial off the Shelf
CPA	Closest Point of Approach
CSA	Canada Shipping Act
CSMA/CD	Carrier Sense Multiple Access with Collision Detection
DFO	Department of Fisheries and Oceans
DGPS	Differential Global Positioning System
DHCP	Dynamic Host Configuration Protocol
DNC	Digital Nautical Chart
DNV	Det Norske Veritas
DVD	Digital Versatile Disc
DVI-I	Digital Visual Interface – Interlaced
ECDIS	Electronic Chart Display and Information System
ECS	Electronic Chart System
ENC	Electronic Navigational Charts
ETA	Estimated Time of Arrival
GUI	Graphical User Interface
HID	Human Interface Device

**Requirements**

IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IHO	International Hydrographic Office
IMO	International Maritime Organization
INS	Integrated Navigation System
IPv4	Internet Protocol Version 4
KTS	Knots
LRU	Lowest Replaceable Unit
MSC	Maritime Safety Committee
NMEA	National Marine Electronics Association
OPI	Office of Primary Interest
PC	Personal Computer
PIP	Picture in Picture
RF	Radio Frequency
RNC	Raster Navigational Charts
RSS	Radio Standards Specification
S-57	A vector interchange format used for maritime charts. The currently common profile is known as ENC
S-63	International Hydrographic Organization standard for encrypting and securing electronic navigational chart data
SAR	Search and Rescue
SLP	Service Location Protocol
SNMP	Simple Network Management Protocol
SOLAS	Safety of Life at Sea
SOW	Statement of Work
TAC	Technical Acceptance Certificate
TSOR	Technical Statement of Requirement
TT	Target Tracking <i><b>Note:</b> Target Tracking (TT) as defined in MSC.192 (79) has replaced Automatic Radar Plotting Aids (ARPA), which is defined by IMO Assembly resolution A.823 (19).</i>
UPS	Uninterruptible Power Supply
USB	Universal Serial Bus
V	Volt

**Requirements**

---

VA	Volt Amps
VAC	Volts alternating Current
VGA	Video Graphics Array

## **ANNEX C**

**SAMPLE PWGSC-TPSGC 942, CALL-UP AGAINST  
A STANDING OFFER FORM**

**RADAR AND ELECTRONIC CHART DISPLAY AND  
INFORMATION SYSTEMS**

**F7048-140120**



Public Works and Government  
Services Canada

Travaux publics et Services  
gouvernementaux Canada

## Call-up Against a Standing Offer

### Commande subséquente à une offre à commandes

Ship to - Expédier à

**To the supplier:** The standing offer identified below is accepted as follows: You are required to supply the goods or services, or both, shown below at the prices or on the pricing basis stated and in accordance with the other conditions stated in the standing offer. Only goods or services, or both, included in the standing offer will be supplied in the call-up against the standing offer.

Supplier - Fournisseur

**Au fournisseur:** L'offre à commandes indiquée ci-dessous est acceptée selon les modalités suivantes : Vous devez fournir les biens ou les services, ou les deux, indiqués ci-dessous selon les prix ou la base de tarification établie, et conformément avec les autres conditions stipulées dans l'offre à commandes. Seuls les biens ou les services, ou les deux, inclus dans l'offre à commandes seront fournis dans la commande subséquente à l'offre à commandes.

**Security:** The call-up includes security provisions.

**Sécurité :** La demande comprend des exigences en matière de sécurité.

☐ NO  
NON

☐ YES  
OUI

If YES, attach a SRCL to the call-up  
Si OUI, joindre une LVERS à la demande

Invoices must be sent in accordance with - Les factures doivent être envoyées selon :

☐

The detailed instructions in the standing offer  
Les instructions détaillées dans l'offre à commandes

☐

The address shown in the "Ship to" block  
L'adresse indiquée dans la case « Expédier à »

☐

Special instructions below  
Les instructions particulières ci-dessous

Each shipment must be accompanied by a packing or delivery slip. All invoices, bills of lading and packing slips must show the following reference numbers.

Financial Code(s) - Code financier(s)

Chaque expédition doit être accompagnée d'un bordereau d'emballage ou de livraison. Les factures, connaissements et bordereaux d'emballage doivent tous porter les numéros de référence suivants.

Standing Offer No. - N° de l'offre à commandes

Requisition No. - N° de demande  
Order. Off. - Bur. dem. YY-AA Serial No. - N° de série

Client Reference No. (optional)  
N° de référence du client (facultatif)

The representative of the identified User signing the call-up form must indicate his or her physical address. This address will constitute the address most connected with the supply and will determine, where applicable, the place of supply for this procurement.  
Le représentant de l'utilisateur désigné qui signe le formulaire de commande subséquente doit indiquer son adresse municipale, qui constituera l'adresse la plus associée à l'approvisionnement et qui déterminera, le cas échéant, le lieu d'approvisionnement pour cette commande.

Amendment No. N° de modification	Previous Value (\$) Valeur précédente (\$)	Value of increase or decrease (\$) Valeur de l'augmentation ou diminution (\$)	Total estimated expenditures or revised Total des dépenses estimatives ou révisées
-------------------------------------	---	---	---

Item No. N° de Article	NATO Stock No. / Item Description N° de nomenclature de l'OTAN / Description de l'article	U. of I. U. de d.	Quantity Quantité	Unit Price Prix unitaire (\$)	Extended Price Prix calculé (\$)

Special Instructions - Instructions particulières

Total

For further information, call - Pour renseignements supplémentaires, contacter

Delivery required by - Livraison requise le  
(YYYY-MM-DD) (AAAA-MM-JJ)

Name - Nom

Telephone No. - N° de téléphone

For internal purposes only - Pour usage interne seulement

Approved for the Minister - Approuvé pour le Ministre

Pursuant to subsection 32(1) of the *Financial Administration Act*, funds are available.  
En vertu du paragraphe 32(1) de la *Loi sur la gestion des finances publiques*, des fonds sont disponibles.

Signature (Mandatory - Obligatoire)

Date (YYYY-MM-DD - AAAA-MM-JJ)

Signature (Mandatory - Obligatoire)

Date (YYYY-MM-DD - AAAA-MM-JJ)

Canada

PWGSC-TPSGC 942 (01/2014)





Fisheries and Oceans  
Canada

Pêches et Océans  
Canada

Canadian  
Coast Guard  
MECTS-#3531401

Garde côtière  
canadienne

# *Vessel Radar and ECDIS Evaluation Plan*



*Canadian Coast Guard*

*EP*

Canada

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Ottawa, Ontario

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RADAR ECDIS – EVALUATION PLAN

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FINAL – JANUARY 2016

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## **Chapter 1      PROPOSAL EVALUATION**

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### **1.1      EVALUATION PROCESS**

The successful bidder will be selected based on a best-value basis determined through the following evaluation process:

1. To be considered responsive, a bid must meet all of the MANDATORY requirements of this solicitation. Bids not meeting ALL THE MANDATORY requirements given in both the Statement of Work and the Technical Statement of Requirements, and attested to in the accompanying Compliance Matrices (see Chapter 2 – Evaluation Plan; Mandatory Requirements M4 and M5) will be given no further consideration.
2. Bids will be evaluated in the following order:
  - i. Evaluations of proposal – All Terms and Conditions have been met.
  - ii. Evaluation of Technical Mandatory Requirements as detailed in Annex D – Evaluation Plan;
  - iii. An Acceptance Test may be conducted at Canada’s discretion, as per paragraph 1.2.3 of this document;
  - iv. Price.

## 1.2 TECHNICAL EVALUATION

### 1.2.1 Phase 1- Mandatory Requirements and Proof of Compliance

	<b>Bidder's Name:</b>			
<b>Mandatory Requirement</b>	<b>Section</b>	<b>Bidder's Response</b>	<b>Met / Not Met</b>	<b>Proof of compliance</b>
<b>M1. Transmitting radio approved by Industry Canada and possesses a Technical Acceptance Certificate (TAC)</b>	TSOR 3.1.1			Recent Copy of TAC and supporting documentation
<b>M2. Equipment is approved by Transport Canada</b>	TSOR 3.1.2			Recent copies of certification and supporting documentation
<b>M3. Equipment is type-approved for ECDIS</b>	TSOR 3.1.3			Recent Copies of Certification and supporting documentation
<b>M4. Compliance Matrix for Statement of Work</b>	2.1			written acknowledgement is required to indicate compliance to all mandatory criteria's of the SOW with references if possible
<b>M5. Compliance Matrix for Technical Statement of Requirements</b>	2.2			Supporting documentation to prove compliance

For M4, and M5, bidders shall provide a Compliance Matrix, indicating their compliance to each one of the mandatory requirements of the Statement of Work (SOW) and Technical Statement of Requirements (TSOR). For M4, Annex A Statement of Work, a written acknowledgement must be provided to indicate compliance to all mandatory criteria of the SOW with references as applicable.

Mandatory requirements can be identified with a *shall* throughout Annex A – Statement of Work and Annex B – Technical Statement of Requirements.

Examples of Compliance Matrices have been included in Annex D-Appendix A for TSOR and Annex D- Appendix B for SOW. Bidders can use the same format as the example matrices to complete their bids. Bidders are responsible for ensuring the accuracy of these compliance Matrices. It is recommended that bidders cross-reference both the SOW and TSOR to ensure no mandatory criteria are missed.

For all mandatory requirements in M5 (Technical Statement of Requirements), bidders shall provide proof of compliance documentation e.g. certification copies, product brochures, GUI screen-shots, product pictures, system specifications, as appropriate with their bid. Bidder must prove compliance to each mandatory requirement in M5 with appropriate supporting documentation, to show that all CCG's mandatory specifications are met as listed in the Technical Statement of Requirements (TSOR) at the time of bid submission.

It is the responsibility of the bidder to clearly reference and list the proof of compliance documentation in order for Canada to validate that their proposed solution meets all MANDATORY requirements given in the Technical Statement of Requirements, and attested to in the accompanying Compliance Matrix (see Annex D-Appendix A; Mandatory Requirements M5).

### 1.2.2 Acceptance test

At the discretion of Canada, an acceptance test may be conducted at the contractor's facility to seek demonstration of the proposed Commercial of the Shelf (COTS) solution. Only bids having met all Technical Mandatory Requirements in the Technical Evaluation, listed in 1.2.1, shall continue on to this stage of the Evaluation. The Acceptance Test shall be conducted by Canada's authorized personnel. The contractor shall be asked to set up the proposed equipment as per their bid proposal and facilitate live product demonstration and testing to seek compliance to the Annex B - TSOR requirements listed below:

#	TSOR reference	#	TSOR reference
1	2.1-2.4	8	3.6.1-3.6.2
2	3.1- 3.2	9	3.7.2- 3.7.6
3	3.3.1-3.3.3	10	3.8.1
4	3.3.5	11	3.8.3 - 3.8.6
5	3.4.4- 3.4.8	12	3.9.6
6	3.5.1-3.5.4	13	3.10.1 - 3.10.2
7	3.5.8	14	3.10.4 - 3.10.5



## Chapter 2 COMPLIANCE MATRICES

---

**Notes:**

1. Bidders must complete a separate Compliance Matrix for each document, Annex A - Statement of Work and Annex B - Technical Statement of Requirements.
2. Bidders shall include a column in Compliance matrix for the Technical statement of requirement (TSOR) for proof of compliance Criteria, as described in section 1.2.1 of this document.
3. Bidders shall include a column in the Compliance matrix for the Statement of Work (SOW), for a written attestation of compliance as described in section 1.2.1 of this document.
4. Each Compliance Matrix must contain all the Mandatory Requirements from the associated document, and an indication of compliance with each requirement.
5. Comments may be added if necessary.
6. Sample Compliance Matrix can be found in Annex D-Appendix A for Technical Statement of Requirements (TSOR) and Annex D-Appendix B for Statement of Work (SOW).

## Appendix A

Bidder:				
Technical Statement of Requirement				
Item Reference	Description	Compliant (Y/N)	Comments	Proof of compliance (Reference source and page number)
2.1	Multifunction workstations combining Radar and ECDIS functions shall be provided.			
2.2	Standalone Radar workstations and standalone ECDIS workstations shall be available.			
2.3	Workstations and equipment procured shall be modular and upgradeable as required by Canada. E.g. A standalone Radar or ECDIS workstation upgraded to Multifunction Workstation.			
2.4	An upgraded system shall not duplicate functions or equipment unnecessarily. For example, radars upgraded to multifunction workstations will utilize existing workstation processors and network hardware (for complete requirement please see TSOR).			
3.1.1	Proof of certification of transmitting radio navigation equipment in accordance with Radio Standards Specification RSS-238 by Industry Canada <b>shall</b> be supplied in the form of a Technical Acceptance Certificate (TAC), issued by the Certification and Engineering Bureau of Industry Canada, or an Industry Canada recognized body.			
3.1.2	Radar proof of compliance <b>shall</b> be provided for the appropriate Maritime Safety Committee performance standard MSC.192(79) Annex 34 and International Electrotechnical Commission testing standard IEC 62388 referenced by the International Convention for SOLAS, and Canada Shipping Act CSA 2001, Navigation Safety Regulations SOR/2005-134.			
3.1.3	ECDIS proof of compliance <b>shall</b> be provided for the appropriate performance MSC.232(82) and testing IEC 61174 standards referenced by the International Convention for SOLAS, and CSA 2001, Charts and Nautical Publications Regulations, 1995 SOR/95-149.			
3.2.1	Human Interface Device (HID) controls necessary to operate the workstation <b>shall</b> be dedicated hardware including a keyboard and trackball.			

Bidder:				
Technical Statement of Requirement				
Item Reference	Description	Compliant (Y/N)	Comments	Proof of compliance (Reference source and page number)
3.2.2	HID controls <b>shall</b> allow workstation primary functions to be operated from a remote operating position in addition to the main controls.			
3.2.3	Workstation displays <b>shall</b> be of flat panel design and available in the following sizes that meet or exceed all applicable regulatory requirements for radar and ECDIS. a) Display sized to accommodate approximately 250 mm circle diameter radar and ECDIS, measuring diagonally within 19 inches to 22 inches. b) Display sized to accommodate approximately 320 mm circle diameter radar and ECDIS, measuring diagonally within 23 inches to 27 inches.			
3.2.4	Workstations fitted with displays accommodating ECDIS and/or a ~250 mm circle diameter radar presentation <b>shall</b> be available as follows: a) Kit format where equipment is supplied at component level for installation in existing consoles. b) Tabletop format where equipment display and HID are contained and supplied as a single unit for installation on top of a table or desk.			
3.2.5	Workstations fitted with displays accommodating ECDIS and/or a ~320 mm circle diameter radar presentation <b>shall</b> be available as follows: a) Kit format where equipment is supplied at component level for installation in existing consoles. b) Tabletop format where equipment display and HID are contained and supplied as a single unit for installation on top of a table or desk. c) Deck standing format where workstation equipment components are contained and supplied as a standalone unit for installation on a vessels deck.			
3.2.6	The workstation <b>shall</b> be updateable to facilitate changes to IMO standards and take advantage of software upgrades or new features.			
3.2.7	Workstations <b>shall</b> have a system accessible Compact Disc/Digital Versatile Disc (CD/DVD) drive and universal serial bus			

Bidder:				
Technical Statement of Requirement				
Item Reference	Description	Compliant (Y/N)	Comments	Proof of compliance (Reference source and page number)
	(USB) port for chart uploading, software updates, etc.			
3.2.8	This requirement has been removed.			
3.2.9	This requirement has been removed.			
3.3.1	Multifunction workstation software applications (e.g. Radar/ECDIS) <b>shall</b> share common information presentation style and interface logic.			
3.3.2	Multifunction workstations <b>shall</b> include a conning display mode that presents the following IEC 61162 and/or NMEA sensor data: a) Heading b) Pitch and Roll c) Rudder angles d) Rate of Turn e) Position fix f) Speed g) Propeller pitch h) Wind speed and direction (both true and relative) i) Date and time			
3.3.3	Conning display mode screen <b>shall</b> allow select sensor information to be presented in a configurable layout.			
3.3.4	Multifunction workstations <b>shall</b> include an alert management system that manages alarm information from navigational equipment e.g. AIS, DGPS, Gyro, Radar, ECDIS, etc.			
3.3.5	Multifunction workstations <b>shall</b> offer default display configurations for route monitoring, collision avoidance tasks, conning display and alarm monitoring, selectable by one operator action at each workstation.			
3.4.1	Each workstation or workstation serial interface <b>shall</b> accept a minimum of three (3) IEC 61162-1 inputs and two (2) IEC 61162-2 inputs.			
3.4.2	In addition to the mandatory interface sentences and equipment listed in IEC 62388 Section H, the radar shall interface with depth sounders and wind anemometers in accordance with IEC 61162-1.			
3.4.3	In addition to the mandatory interfaces listed in IEC 61174 Section 4.12, the ECDIS <b>shall</b> interface with depth sounders, wind			

Bidder:				
Technical Statement of Requirement				
Item Reference	Description	Compliant (Y/N)	Comments	Proof of compliance (Reference source and page number)
	anemometers, radar tracked targets (TT formerly known as Automatic Radar Plotting Aids (ARPA)) and Automatic Identification System (AIS) in accordance with IEC 61162-1 and IEC 61162-2.			
3.4.4	Workstations shall integrate with other like workstations using Ethernet network infrastructure.			
3.4.5	An additional workstation video output port shall be available for mirror image video on a secondary display.			
3.4.6	The video output for a secondary display <i>shall</i> have a native resolution matching the requirements of the following display resolutions at a minimum: a) 4:3 – XGA+ (1280X960) or b) 5:4 – SXGA (1280X1024) or c) 16:9 – HD1080 (1920X1080) or d) 8:5 – WUXGA (1920X1200)			
3.4.7	An additional HID interface port or HID interface port splitter/hub shall be available to allow workstation primary functions to be operated from a remote operating position in addition to the main controls.			
3.4.8	Workstations <i>shall</i> have a minimum of one video input interface.			
3.5.1	Networked workstations <i>shall</i> share at least the following functions and resources: a) own ship navigation sensor information b) display colour palette c) day/night mode settings d) route plans e) active route monitoring f) Tracked Targets (TT) formerly known as Automatic Radar Plotting Aids (ARPA)			
3.5.2	It shall be possible to operate workstations independently from others on the same network.			
3.5.3	Networked workstation navigation sensor inputs/outputs shall be monitored and distributed by a fully redundant data management system.			
3.5.4	Networked workstations shall use a Consistent Common Reference System (CCRS) to ensure			

Bidder:				
Technical Statement of Requirement				
Item Reference	Description	Compliant (Y/N)	Comments	Proof of compliance (Reference source and page number)
	that different sensor information is distributed to the relevant parts of the network. The common reference system will ensure that all parts of the network are provided with the same data from the same source.			
3.5.5	When multiple sensors/sources (e.g. Differential Global Positioning System DGPS #1 and DGPS #2) are available it shall be possible to select an individual sensor for use across networked workstations.			
3.5.6	When a selected sensor is in use, its identification shall be indicated on the display.			
3.5.7	When sensor data is compromised, it shall be indicated on the display.			
3.5.8	Networked workstations <b>shall</b> use a Consistent Common Reference Point (CCRP) for all spatially related information.			
3.6.1	Below deck equipment such as workstations and transceivers (down mast), etc. <b>shall</b> operate on 115 VAC, $\pm 10\%$ , single phase, 60 Hz $\pm 5\%$ . This may be internally converted for subsystem requirements.			
3.6.2	Each workstation shall be powered from and protected by a single Det Norske Veritas (DNV) or Lloyd's Register and American Bureau of Shipping (ABS) type-approved Uninterruptable Power Supply (UPS) capable of handling a twenty (20) minute blackout at 100% load.			
3.6.3	X band transceivers (up-mast) and turning units shall accept the following input power: a) 115 VAC, $\pm 10\%$ , single phase, 60 Hz $\pm 5\%$ and b) 220 VAC, single phase, $\pm 10\%$ , 60 Hz $\pm 5\%$			
3.6.4	S band transceivers (up-mast) and turning units <b>shall</b> accept the following input power: a) 115 VAC, $\pm 10\%$ , single phase, 60 Hz $\pm 5\%$ and b) 220 VAC, single phase, $\pm 10\%$ , 60 Hz $\pm 5\%$ and c) This requirement has been removed.			
3.7.1	This requirement has been removed.			
3.7.2	Diagnostic software and hardware shall be provided to assist system maintainers in			

Bidder:				
Technical Statement of Requirement				
Item Reference	Description	Compliant (Y/N)	Comments	Proof of compliance (Reference source and page number)
	troubleshooting.			
3.7.3	This requirement has been removed.			
3.7.4	Workstation maintenance access shall be password protected.			
3.7.5	This requirement has been removed.			
3.7.6	This requirement has been removed.			
3.7.7	For maintenance purposes, an override switch for S band antenna rotation and Radio Frequency (RF) transmission shall be available.			
3.7.8	A radar performance monitor <i>shall</i> be provided with each turning unit.			
3.8.1	Workstations <i>shall</i> be able to utilize Electronic Navigational Charts (ENC) vector chart formats released by Canadian Hydrographic Services (CHS), National Oceanic and Atmospheric Administration (NOAA) and other members of the International Hydrographic Office (IHO), built to the IHO's S-57 standard			
3.8.2	Workstations <i>shall</i> be able to utilize Raster Navigation Charts (RNC) produced by CHS and NOAA in the BSB format, meeting the requirements for ECDIS operating in Raster Chart Display System (RCDS) mode within the following time limits: a) BSB v3 (Unencrypted BSB charts from CHS and NOAA) no later than twelve (12) months from contract award date. b) BSB v4 (Encrypted BSB charts from CHS) no later than twelve (12) months from contract award date.			
3.8.3	This requirement has been removed.			
3.8.4	Electronic chart installations, updates and corrections on one workstation shall automatically replicate to other workstations if selected.			
3.8.5	Workstation S-57 chart presentation shall utilize selectable chart information layers (e.g. base display, standard display, full display) that allow filtering of chart information features displayed.			
3.8.6	This requirement has been removed.			

Bidder:				
Technical Statement of Requirement				
Item Reference	Description	Compliant (Y/N)	Comments	Proof of compliance (Reference source and page number)
3.9.1.1	<p>X Band radar antenna <b>shall</b> be provided in the following approximate lengths:</p> <p>a) Up to five (5) feet with a range of approximately zero (0) to thirty-six (36) nautical miles at a minimum</p> <p><i>Note: X Band radar antenna measuring up to five (5) feet in length will not be used for navigation and are not required to meet regulatory requirements listed in 3.1.2.</i></p> <p>b) Five (5) to Six (6) foot</p> <p>c) Eight (8) foot</p>			
3.9.1.2	S Band radar antenna <b>shall</b> be approximately twelve (12) feet in length or less.			
3.9.1.3	High speed X band radar antenna rotation rates <b>shall</b> be available for high speed craft operating at speeds of greater than 30 Knots.			
3.9.2.1	X-Band transceivers operating in the 9.2 – 9.5 GHz range <b>shall</b> be provided with nominal output powers of ten (10) kW and twenty-five (25) kW.			
3.9.2.2	S-band transceivers operating in the 2.9 – 3.1 GHz range shall be provided with nominal output power of thirty (30) kW.			
3.9.2.3	X and S-band radar systems used for navigation shall be compatible with radar beacons, SARTs and radar enhancers.			
3.9.2.4	All radar transceiver configurations shall be combined up-mast scanner/transceiver unit.			
3.9.2.5	A high power X-band (~25 kW) and S-Band (~30 kW) transceiver configuration option shall also be down-mast/bulkhead mounted.			
3.9.2.6	Radars shall be capable of eliminating or suppressing mutual interference caused by other on-board radar(s), operating in the same band. The method used to suppress mutual interference may include, but not be limited to, the use of a mutual interference suppression trigger input to momentarily suppress or delay the video at each display.			
3.9.3.1	An interswitching feature <b>shall</b> allow up to three (3) radar transceivers to be operated and displayed from up to four (4) workstations in any combination.			



Bidder:				
Technical Statement of Requirement				
Item Reference	Description	Compliant (Y/N)	Comments	Proof of compliance (Reference source and page number)
3.9.4.1	Automatic tuning capabilities <i>shall</i> be provided.			
3.9.5.1	Where multiple radars are fitted, a composite 360 degree radar picture <i>shall</i> be available by combining radar signals from multiple transceivers to eliminate sector blind spots.			
3.9.5.2	When using the composite radar function, control of all transceivers <i>shall</i> be possible from a single workstation.			
3.9.6.1	Automatic clutter suppression techniques <i>shall</i> be used to enhance the capability of identifying small targets in a cluttered environment such as ice, sea, and rain, without having to manually adjust clutter or gain.			
3.9.6.2	Manual clutter suppression techniques <i>shall</i> also be available to the operator.			
3.10.1.1	Workstations <i>shall</i> allow the playback of approximately six (6) hours of recorded voyage data under normal operating conditions.			
3.10.1.2	This requirement has been removed.			
3.10.1.3	Automatic deletion of unneeded voyage records by maximum storage time or file size <i>shall</i> be possible.			
3.10.2.1	It shall be possible to create a destination from given coordinates and have the system plot a route from the vessel's location to that destination.			
3.10.2.2	Routes shall be transportable (e.g. USB flash drive, etc.) between compatible workstations (same or different vessel).			
3.10.2.3	An active route shall supply Estimated Time of Arrival (ETA) to the end of the route and to the end of the current waypoint.			
3.10.2.4	Search and Rescue (SAR) route pattern generation shall be available.			
3.10.2.5	SAR pattern generation shall incorporate operator selectable parameters such as limits of total search area, starting point, type of search pattern and turning points.			
3.10.3.1	Workstations <i>shall</i> be capable of acquiring and automatically tracking a minimum of seventy-five (75) targets.			
3.10.3.2	Of the seventy-five (75) targets tracked, workstations <i>shall</i> be capable of tracking a minimum of forty (40) active AIS targets.			

**Bidder:****Technical Statement of Requirement**

Item Reference	Description	Compliant (Y/N)	Comments	Proof of compliance (Reference source and page number)
3.10.3.3	Fusible radar TT (ARPA) and AIS targets <b>shall</b> be possible to avoid presentation of two (2) target symbols for the same physical target.			
3.10.4.1	Chart radar as described in MSC.191 (79) para 7.2.2, Display of Chart Information on Radar <b>shall</b> be available.			
3.10.4.2	Chart radars <b>shall</b> be able to utilize S-57 Electronic Navigational Charts (ENC) vector charts released by members of the International Hydrographic Office (IHO).			
3.10.5.1	Multifunction workstation chart display <b>shall</b> be capable of incorporating appropriately scaled radar information as an overlay.			

## Appendix B

Bidder:				
Statement of Work				
Item Reference	Description	Compliant (Y/N)	Comments	Written acknowledgement or attestation that bidder shall comply with the requirement
1.1.1.1	The Vendor shall supply equipment as detailed in the Technical Statement of Requirements, complete with all installation instructions, service and operator manuals, materials, parts and assemblies necessary for installation and integration.			
1.1.1.2	This requirement has been removed.			
1.1.1.3	This requirement has been removed.			
1.2.1.1	All documentation developed or supplied under this Contract shall be in reproducible hard copy and native electronic format (Microsoft Word, Excel, etc., Autocad for all drawings or Adobe Acrobat Reader PDF format).			
1.2.1.2	The Vendor shall provide all documentation developed or supplied for this procurement in equally accurate Canadian English and Canadian French languages.			
1.2.1.3	All installation instructions, service and operator manuals shall be supplied in searchable PDF format.			
1.2.1.4	Applicable operator manuals shall also be supplied in both hard copy and electronic formats with the purchase of each unit.			
1.2.2.1	The commercial documentation supplied with the equipment shall identify all necessary corrective and preventative maintenance tasks or procedures.			
1.2.2.2	This requirement has been removed.			
1.2.2.3	This requirement has been removed.			
1.3.1.1	The Vendor shall be able to provide maintenance training course/s, to be delivered by the vendor's representatives to the technical staff of CCG, no later than twelve (12) months from contract award date.			
1.3.1.2	The course shall meet the following criteria: Class size shall be up to eight (8) students; The training course shall be scheduled for normal business hours with a maximum of five and one half (5.5) hours of class time per			

<b>Bidder:</b>				
<b>Statement of Work</b>				
<b>Item Reference</b>	<b>Description</b>	<b>Compliant (Y/N)</b>	<b>Comments</b>	<b>Written acknowledgement or attestation that bidder shall comply with the requirement</b>
	<p>day;</p> <p>The course shall last no longer than five (5) working days; and</p> <p>The course shall be offered at the CCG College, in Sydney, NS.</p> <p>Travel and living costs for the vendor's representatives shall be included in the course price;</p> <p>The course shall be available in both of Canada's official languages, French and English;</p> <p>Each individual course shall be delivered in one of Canada's two official languages;</p> <p>The choice of language for the course shall be at the discretion of CCG; and</p> <p>Courseware shall be treated as documentation under the provisions set out in the General Conditions.</p>			
<b>1.3.2.1</b>	The vendor shall provide an operator computer based type specific training on the ECDIS system, with a minimum of 20 licences per ECDIS workstation procurement.			
<b>1.3.2.2</b>	The operator computer based type specific training on the ECDIS system shall be available in both of Canada's official languages, English and French, as per the user's choice, no later than twelve (12) months from contract award date.			

## **Schedule 1 – Pricing Schedule**

### **Radar and Electronic Chart Display and Information Systems (ECDIS)**

**F7048-140120**

## **SCHEDULE 1 - PRICING SCHEDULE**

All prices included herein are provided in the following currency \_\_\_\_\_ (customs duties included and Goods and Services Tax or Harmonized Sales Tax is extra, if applicable).

<b>TSOR Ref.</b>	<b>Item</b>	<b>Quantity</b>	<b>Estimated Delivery Time</b>	<b>Year 1 Pricing</b>	<b>Year 2 Pricing</b>	<b>Year 3 Pricing</b>	<b>Year 4 Pricing</b>	<b>Year 5 Pricing</b>
2.1, 3.2, 3.3	Multifunction workstation including Radar and ECDIS software applications, CPU, HID	1						
2.2, 3.2	Standalone Radar workstation including Radar software application, CPU, HID	1						
2.2, 3.2	Standalone ECDIS workstation including ECDIS software application, CPU, HID	1						
2.3	Equipment/software required to upgrade an existing standalone ECDIS workstation to a multifunction workstation including Radar software application	1						
2.3	Equipment/software required to upgrade an existing standalone Radar workstation to a multifunction workstation including ECDIS software application	1						
2.3, 3.10.4	Equipment/software required to upgrade an existing standalone Radar and/or ECDIS workstation to include Chart Radar software application	1						
3.2.2	HID for remote operating station	1						
3.2.3 a)	Display sized to accommodate ~250 mm circle diameter radar and ECDIS (19" to 22" measured diagonally)	1						
3.2.3 b)	Display sized to accommodate ~320 mm circle diameter radar and ECDIS Display (23" to 27"	1						







3.9.1.2	~Twelve (12) foot S Band antenna or shorter	1							
3.9.1.3	High Speed X Band Antenna Rotation	1							
3.9.2.5	25 KW X Band Down mast Bulkhead Transceiver	1							
3.9.2.5	30 KW S Band Down mast Bulkhead Transceiver	1							
3.9.2.6	Mutual interference suppressor	1							
3.9.3	Interswitch	List QTY 1 of each unique equipment model							
3.9.5	Composite Radar	1							
<b>SOW Ref.</b>									
1.3.1	Maintenance Training Course (English)	1							
	Maintenance Training Course (French)	1							
1.3.2	Operator CBT Training (English)	1							
	Operator CBT Training (French)	1							

Note: Do not duplicate pricing.

E.g. If composite radar functionality is incorporated in the interswitch, include the cost of the interswitch with the composite radar option and without.

E.g. If the interswitch functionality is incorporated in the network infrastructure, include the cost of the interswitch as \$0 with note indicating functionality included elsewhere.

Solicitation No. - N° de l'invitation  
F7048-140120/001/QF  
Client Ref. No. - N° de réf. du client  
F7048-140120/C

Amd. No. - N° de la modif.  
001  
File No. - N° du dossier  
103qf7048-140120

Buyer ID - Id de l'acheteur  
103qf  
CCC No./N° CCC - FMS No./N° VME

Solicitation Amendment # 001 is raised to include the corresponding Schedule 1 and Annexes A to D that were accidentally omitted in the release of the solicitation.

**All other terms and conditions remain unchanged.**