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**REQUEST FOR PROPOSAL  
DEMANDE DE PROPOSITION**

**Proposal To: Public Works and Government  
Services Canada**

We hereby offer to sell to Her Majesty the Queen in right of Canada, in accordance with the terms and conditions set out herein, referred to herein or attached hereto, the goods, services, and construction listed herein and on any attached sheets at the price(s) set out therefor.

**Proposition aux: Travaux Publics et Services  
Gouvernementaux Canada**

Nous offrons par la présente de vendre à Sa Majesté la Reine du chef du Canada, aux conditions énoncées ou incluses par référence dans la présente et aux annexes ci-jointes, les biens, services et construction énumérés ici sur toute feuille ci-annexée, au(x) prix indiqué(s).

**Comments - Commentaires**

<b>Title - Sujet</b> Thruster systems CCGS Amundsen	
<b>Solicitation No. - N° de l'invitation</b> F7049-190057/B	<b>Date</b> 2020-04-29
<b>Client Reference No. - N° de référence du client</b> F7049-190057	
<b>GETS Reference No. - N° de référence de SEAG</b> PW-\$MTE-150-15722	
<b>File No. - N° de dossier</b> MTE-9-42191 (150)	<b>CCC No./N° CCC - FMS No./N° VME</b>
<b>Solicitation Closes - L'invitation prend fin</b> <b>at - à 02:00 PM</b> <b>on - le 2020-06-05</b>	<b>Time Zone</b> <b>Fuseau horaire</b> Eastern Daylight Saving Time EDT
<b>F.O.B. - F.A.B.</b> <b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input checked="" type="checkbox"/> <b>Other-Autre:</b> <input type="checkbox"/>	
<b>Address Enquiries to: - Adresser toutes questions à:</b> Giguère, Réjean	<b>Buyer Id - Id de l'acheteur</b> mte150
<b>Telephone No. - N° de téléphone</b> (514) 409-7393 ( )	<b>FAX No. - N° de FAX</b> ( ) -
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b> MINISTERE DES PECHEES ET DES OCEANS CCGS AMUNDSEN Canada	

**Instructions: See Herein**

**Instructions: Voir aux présentes**

**Vendor/Firm Name and Address**

**Raison sociale et adresse du  
fournisseur/de l'entrepreneur**

**Issuing Office - Bureau de distribution**

TPSGC/PWGSC  
Place Bonaventure, portail Sud-Oue  
800, rue de La Gauchetière Ouest  
7e étage, suite 7300  
Montréal  
Québec  
H5A 1L6

<b>Delivery Required - Livraison exigée</b> Voir doc.	<b>Delivery Offered - Livraison proposée</b>
<b>Vendor/Firm Name and Address</b> <b>Raison sociale et adresse du fournisseur/de l'entrepreneur</b>	
<b>Telephone No. - N° de téléphone</b> <b>Facsimile No. - N° de télécopieur</b>	
<b>Name and title of person authorized to sign on behalf of Vendor/Firm</b> <b>(type or print)</b> <b>Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)</b>	
<b>Signature</b>	<b>Date</b>



Item Article	Description	Dest. Code Dest.	Inv. Code Fact.	Qty Qté	U. of I. U. de D.	Unit Price/Prix unitaire FOB/FAM	Destination	Plant/Usine	Del. Offered Liv. offerte	Del. Offered Liv. offerte
1	Thruster systems CCGS Amundsen	F7049	F7049	1	Lot	XXXXXXXXXXXX	\$	XXXXXXXXXXXX	Voir doc.	

## **REQUEST FOR PROPOSAL**

FOR THE PROCUREMENT OF RETRACTABLE AZIMUTH THRUSTER SYSTEMS WITH ASSOCIATED EQUIPMENT, ELECTRONIC COMPONENTS, CONTROLS AND POWER EQUIPMENT FOR THE CANADIAN COAST GUARD SHIP (CCGS) AMUNDSEN

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## **PART 1 - GENERAL INFORMATION**

### **1.1 Introduction**

The Request for Proposals (RFP) is divided into seven (7) parts plus attachments and annexes as follows:

- Part 1 General Information: provides a general description of the requirement;
- Part 2 Bidder Instructions: provides the instructions, clauses and conditions applicable to the bid solicitation;
- Part 3 Bid Preparation Instructions: provides bidders with instructions on how to prepare their bid;
- Part 4 Evaluation Procedures and Basis of Selection: indicates how the evaluation will be conducted, the evaluation criteria that must be addressed in the bid, and the basis of selection;
- Part 5 Certifications: includes the certifications to be provided;
- Part 6 Financial and Other Requirements: includes specific requirements that must be addressed by bidders; and
- Part 7 Resulting Contract Clauses: includes the clauses and conditions that will apply to any resulting contract.

The annexes contain the Statement of Requirements (SOR), the Basis of Payment and other pertinent documentation.

### **1.2 Requirement**

#### **1.2.1 Background:**

The CCGS Amundsen is a type 1200, medium icebreaking, a Canadian Coast Guard (CCG) vessel that was built in 1979. In 2002, the vessel was converted to a dedicated Arctic Ocean research vessel in Les Mechnins, Quebec and renamed the CCGS Amundsen.

Although the vessel is considered to be in good overall condition, the Forward and Aft Retractable Azimuth Thruster Systems require replacement, upgrades and/or modifications to attain the vessels operational requirements. The renewal of the Thruster systems will allow for the installation of a fully integrated system with Dynamic Position (DP) performance to be restored on the vessel.

#### **1.2.2 The Requirement is:**

- 1.2.2.1 For the engineering, delivery, installation and commissioning of two new Thruster Systems (TS) that will provide the same functionality as the old systems and will meet or exceed the requirements contained in Annex A - Statement of Requirements (SOR),

1.2.2.2 To carry out, within the Work Period of the Contract, all unscheduled work authorized by the Contracting Authority as per Annex G, Procedure For Processing Unscheduled Work.

1.2.2.3: Work location: Quebec City, Province of Quebec, Canada.

1.2.3 The requirement is exempt from the provisions of the World Trade Organization Agreement on Government Procurement (WTO-AGP), Annex 4 and the North American Free Trade Agreement (NAFTA), Chapter Ten Annex 1001.2b Paragraph 1(a). However, it is subject to the Agreement on Internal Trade (AIT).

### **1.3 Communications Notifications**

The bidder must notify the Contracting Authority at least 7 calendar days in advance of its intention to make public an announcement related to the award of a contract.

### **1.4 Security Requirement**

There is no security requirement associated with this bid solicitation.

### **1.5 Debriefings**

Bidders may request a debriefing on the results of the bid solicitation process. Bidders should make the request to the Contracting Authority **within 15 working days** of receipt of the results of the bid solicitation process. The debriefing may be in writing, by telephone or in person.

## **PART 2 - BIDDER INSTRUCTIONS**

### **2.1 Standard Instructions, Clauses and Conditions**

All instructions, clauses and conditions identified in the bid solicitation by number, date and title are set out in the Standard Acquisition Clauses and Conditions Manual (SACC) issued by Public Services and Procurement Canada (PSPC) :

(<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>)

Bidders who submit a bid agree to be bound by the instructions, clauses and conditions of the bid solicitation and accept the clauses and conditions of the resulting contract.

The **2003** (2019-03-04) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.

### **2.2 SACC Manual Clause**

B1000T - Condition of Material, 2014-06-26

### **2.3 Submission of Bids**

Bids must be submitted only to Public Works and Government Services Canada (PWGSC) Bid Receiving Unit by using the epost Connect service provided by Canada Post Corporation ([https://www.canadapost.ca/web/en/products/details.page?article=epost\\_connect\\_send\\_a](https://www.canadapost.ca/web/en/products/details.page?article=epost_connect_send_a)) by the date and time indicated in the bid solicitation.

The email address of PWGSC Quebec region Bid Receiving Unit is:

[TPSGC.RQReceptionSoumissions-QRSupplyTendersReception.PWGSC@tpsgc-pwgsc.gc.ca](mailto:TPSGC.RQReceptionSoumissions-QRSupplyTendersReception.PWGSC@tpsgc-pwgsc.gc.ca)

**NOTE THAT YOU SHOULD NOT SEND YOUR OFFERS DIRECTLY TO THIS EMAIL ADDRESS, BUT PROCEED THROUGH CANADA POST EPOST CONNECT SERVICE. REFER TO THE 2003 STANDARD INSTRUCTIONS (2019-03-04).**

### **2.4 Enquiries - Bid Solicitation**

All enquiries must be submitted in writing to the Contracting Authority no later than **seven (7) working days** before the bid closing date. Enquiries received after that time may not be answered.

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



by Canada.

Any clarifications or changes to the bid solicitation resulting from the questions and answers will be published as an amendment to the bid solicitation.

## 2.5 Applicable Laws

Any resulting contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in the **Province of Quebec**.

Bidders may, at their discretion, substitute the applicable laws of a Canadian province or territory of their choice without affecting the validity of their bid, by deleting the name of the Canadian province or territory specified and inserting the name of the Canadian province or territory of their choice. If no change is made, it acknowledges that the applicable laws specified are acceptable to the bidders.

## 2.6 Mandatory Bidder's Conference

A mandatory bidders' conference call will be held at a later date, the exact date will be confirmed on a subsequent amendment on the Buy & Sell Website. It is mandatory that the Bidder or a representative of the Bidder attend this conference. The scope of the requirement outlined in the bid solicitation will be reviewed and questions will be answered.

Bidders must communicate with the Contracting Authority before the conference to confirm attendance. Bidders shall provide, in writing, to the Contracting Authority, the names of the person(s) who will be attending and a list of issues they wish to table at least **five (5) working days** before the scheduled conference. Bidders will be required to sign an attendance form.

Any clarifications or changes to the bid solicitation resulting from the bidders' conference will be included as an amendment to the bid solicitation. **Bidders who do not attend or send a representative will not be given an alternative appointment and their bids will be rejected as non-compliant.**

## 2.7 Term of the Contract

The Work must commence as follows:

For Phase 1: November 2020.

For Phase 2: November 2021.

By submitting a bid, the Bidder certifies that they have sufficient material and human resources allocated or available to deliver the Requirement and that the above Work Period is adequate to perform the work required to deliver the Requirement.



## **PART 3 - BID PREPARATION INSTRUCTIONS**

### **3.1 Bid Preparation Instructions**

Canada requests that Bidders provide their bid in separately bound sections as follows:

Section I - Technical Bid;

Section II - Financial Bid;

Section III - Certifications

**Prices must appear in the financial bid only. No prices must be indicated in any other section of the bid.**

In April 2006, Canada issued a policy directing federal departments and agencies to take the necessary steps to incorporate environmental considerations into the procurement process. See the Policy on Green Procurement at <http://www.tpsgc-pwgsc.gc.ca/ecologisation-greening/achats-procurement/politique-policy-eng.html>

### **3.2 Section I: Technical Proposal**

Bidders must submit a Technical Proposal Package for Canada's evaluation. The package must answer to all requests of the SOR, Annex A. In their technical proposal, bidders must demonstrate their understanding of the requirements contained in the bid solicitation and explain how they will meet these requirements. Bidders must demonstrate their capability in a thorough, concise and clear manner for carrying out the work.

The Technical Proposal must address clearly and in sufficient depth the points that are subject to the Evaluation Procedures and Basis of Selection as per the Part 4 of the RFP. Simply repeating the statement contained in the RFP is not sufficient. In order to facilitate the evaluation of the proposal, Canada requests that bidders address and present topics in the order of the evaluation criteria under the same headings. To avoid duplication, bidders may refer to different sections of their proposals by identifying the specific paragraph and page number where the subject topic has already been addressed.

**Ensure that the Annex "M" – MANDATORY PROPOSAL DELIVERABLES CHECKLIST - is completed accordingly.**

### **3.3 Section II: Financial Bid**

Bidders must submit their financial bid in accordance with the Annex C – Basis of Payment. Applicable taxes must be excluded or shown separately.

### **3.3.1 Cost Breakdown**

Bidders must include with their financial bid a cost breakdown for the additional work in accordance with Annex C – Basis of Payment. Applicable taxes must be excluded or shown separately.

### **3.3.2 Financial bid evaluation.**

1. The price provided in Annex C, Basis of Payment will be used for evaluating the bids.

THE EVALUATION PRICE WILL CONSIST OF THE TOTAL FIRM PRICE FOR THE CCGS AMUNDSEN, APPLICABLE TAXES NOT INCLUDED.

2. The information submitted as a mandatory item will be held as confidential business information. The details of this information may be used for contractual evaluation purposes and/or contract administration purposes.

### **3.3.3 Exchange Rate Fluctuation**

C3011T, 2013-11-06, Exchange Rate Fluctuation

### **3.3.4 Evaluation of Price**

SACC Manual Clause A0222T (2014-06-26), Evaluation of Price.

**Ensure that the Annex "M" – MANDATORY PROPOSAL DELIVERABLES CHECKLIST - is completed accordingly.**

### **3.4 Section III: Certifications**

Bidders must submit the certifications required under **Part 5**.

**Ensure that the Annex "M" – MANDATORY PROPOSAL DELIVERABLES CHECKLIST - is completed accordingly.**

## PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION

Proposals will be assessed in accordance with the entire requirement of the Request for Proposal (RFP) including the technical evaluation criteria and the financial requirement. An evaluation team composed of representatives of Canada will evaluate the bids.

### 4.1 BASIS OF SELECTION – HIGHEST COMBINED RATING OF TECHNICAL MERIT AND PRICE

4.1.1 To be declared responsive, a bid must:

- a) comply with all the requirements of the RFP
- b) meet all mandatory criteria (deliverables)
- c) obtain the required minimum of 90 points overall for the technical evaluation criteria which are subject to point rating. The rating is performed on a scale of 150 points

**Bids not meeting a, b, and c will be declared non-responsive.**

4.1.2 The selection will be based on the highest responsive combined rating of technical merit and price. The ratio will be 30% for the technical merit and 70% for the price.

4.1.3 To establish the technical merit score, the overall **technical score** for each responsive bid will be determined as follows: total number of points obtained/maximum number of points available multiplied by the ratio of 30%.

4.1.4 To establish the **pricing score**, each responsive bid will be prorated against the lowest evaluated price and the ratio of 70%.

4.1.5 For each responsive bid, the technical merit score and the pricing score will be added to determine its combined rating.

4.1.6 Neither the responsive bid obtaining the highest technical score nor the one with the lowest evaluated price will necessarily be accepted. The responsive bid with the highest combined rating of technical merit and price will be recommended for award of a contract.

4.1.7 The table below illustrates **an example** where all three bids are responsive and the selection of the Contractor is determined by a 30/70 ratio of technical merit and price, respectively. The total available point equal 135 and the lowest evaluated price is \$45,000 (45).

**Basis of Selection - Highest Combined Rating Technical Merit (30%) and Price (70%)**

	<b>Bidder 1</b>	<b>Bidder 2</b>	<b>Bidder 3</b>
<b>Overall Technical Score</b>	115/135	89/135	92/135
<b>Bid Evaluated Price</b>	\$55,000.00	\$50,000.00	\$45,000.00
<b>Technical Merit Score Calculation</b>	$115/135 \times 30 = 25.56$	$89/135 \times 30 = 19.78$	$92/135 \times 30 = 20.44$
<b>Pricing Score Calculation</b>	$45\,000/55\,000 \times 70 = 57.27$	$45\,000/50\,000 \times 70 = 63.00$	$45\,000/45\,000 \times 70 = 70.00$
<b>Combine Rating</b>	82.83	82.78	90.44
<b>Overall Rating</b>	<b>2nd</b>	<b>3rd</b>	<b>1st</b>

**4.2 MANDATORY TECHNICAL CRITERIA**

A mandatory requirement is described using the words “shall”, “must”, “will”, “is required” or “is mandatory”.

**4.2.1 Completeness and Quality of the Written Proposal**

In their technical bid, Bidders must demonstrate their understanding of the requirements contained in the bid solicitation and explain how they will meet, or exceed, these requirements. Bidders must demonstrate their capability in a thorough, concise and clear manner for carrying out the work.

The technical bid must address clearly and in sufficient depth the points that are subject to the evaluation criteria against which the bid will be evaluated. Simply repeating the statement contained in the bid solicitation will **not** be sufficient.

In order to facilitate the evaluation of the bid, Canada requests that Bidders address and present topics in the order of the evaluation criteria under the same headings. To avoid duplication, Bidders may refer to different sections of their bids by identifying the specific paragraph and page number where the subject topic has already been addressed.

#### **4.2.2 Classification Society**

Bidders must provide the name of the Classification Society that will evaluate and approve the design of the new Retractable Azimuth Thruster System, according to the laws and regulations applicable to this specific class of Vessel and the various requirements specified in the Statement of Requirements (SOR), Annex A. The selected Classification Society must be approved by Transport Canada Marine Safety (TCMS) under the Delegated Statutory Inspection Program (DSIP), available at this web address:

<https://www.tc.gc.ca/eng/marinesafety/dvro-fsc-dspi-1781.htm>

Bidders must complete Annex J, Certification for the Classification Society, indicating that they have reached an agreement with a firm to verify and approve the work.

The new thruster system shall not affect the current vessel ice class or generate any requirement for re-classification.

**Bidders must include the costs associated with the certification of the proposed thruster system by this classification society in their financial proposal.**

#### **4.2.3 Original Equipment Manufacturer (OEM) Requirements**

The new DP System Platform will have to interface to the existing navigation equipment, new Retractable Azimuth Thruster System, existing Wartsila Bow Thruster, ABB Propulsion Control System and Vessel's fitted equipment. The Bidder must accept to coordinate the integration of its systems and work with the OEMs to perform the interface requirements. Any costs associated with this requirement must be included in the Bidders proposal.

#### **4.2.4 Bidders Past Experience, as a Prime Contractor.**

Bidders must provide objective evidence of their ability to design, deliver, install and perform commissioning and training after installation, for the same Class approved or higher, Retractable Azimuth Thruster System that they propose as a solution for this project, by giving two (2) examples of successfully completed projects as a Prime Contractor within the last ten (10) years.

The new system proposed must meet IACS Ice Class ABS 1C or equivalent.

Note: IACS Ice Class ABS 1C equivalent classes may be referenced under Item 4 of the ASPPR Type Ship Equivalencies Table found here:

<https://www.tc.gc.ca/eng/marinesafety/tp-tp13670-tables-2154.htm>

Bidders must provide information on the date and the place of installation of these Systems, an overview of the work accomplished, as well as the name and registration numbers of the Vessels.

#### 4.2.5 System Check

Bidders must demonstrate how the new, IACS Ice Class ABS 1C or equivalent, Retractable Azimuth Thruster System will achieve a minimum effective thrust of 85kN per Thruster, with the functionality of the current system or better. The Contractor must also check and summarize, in tabular form, the current functions and corresponding functions proposed for the equipment as stated in the Annex A, SOR.

#### 4.2.6 Support Capacity

##### a) Field Service Representatives (FSR)

Bidders must demonstrate that they have or will have FSR's based in Canada and that qualified technicians will be available to provide on-site support within 48 hours, directly at the Canadian Coast Guard Base in Quebec City.

##### b) Equipment Life Cycle

Bidders must demonstrate that the equipment proposed for this Contract will have a minimum of ten (10) years remaining in its production life and fifteen (15) years remaining in its complete life cycle services.

Definitions:	
« Production life »	Equipment still being manufactured and sold. Full technical services are available
« Complete life cycle services »	Serial production ceased. All spare parts and full services remain available.

##### c) Spare Parts Availability

Bidders must demonstrate that spare parts for new equipment are quickly and easily available in North America, directly from the original Manufacturers or through authorized suppliers.

#### 4.2.7 Document Management Plan

Bidders proposal must provide a sample of their Document Management Plan that will be applied through the course of this contract, as per the requirements in Annex A, SOR, Section 7.2.

#### 4.2.8 Sample of Documentation

Bidders must provide with their proposals a sample of their documentation, as listed in Annex A, SOR, Section 7.6. The Bidder must demonstrate that they will be able to satisfy the requirements for documentation delivery as per the Preliminary Delivery Schedule provided in Annex A, SOR, Sections 3.4 and 4.2.

#### 4.2.9 Preliminary Planning and Scheduling

The CCG has provided its Preliminary Delivery Schedule in Annex A, SOR, Section 3.4 (Phase 1) and Section 4.2 (Phase 2).



Bidders must demonstrate how they will meet the requirements of the Preliminary Delivery Schedule. Bidders must provide, with their bid, a planning and scheduling Gantt chart, with milestones, that demonstrates how they will meet the Preliminary Schedule. The Gantt chart must have a column for the delivery date and one for the time required to complete the milestones for Phase 1 and Phase 2 of this project.

#### 4.2.10 Quality Management System

Bidders must provide with their proposals objective evidence that they have in place a Quality Management System registered to ISO 9001:2008 or a Quality Management System modeled on ISO 9001:2008 which will include:

- a) if registered, its valid ISO 9001:2008 Certification.
- b) an example of their Quality Assurance Management Plan as described in Annex A, SOR, Section 7.3.

#### 4.3 POINT RATED TECHNICAL CRITERIA

Bidders must provide clear and precise information detailing how they meet the following point rated technical criteria.

If no clear evidence is provided on how the requirement criteria has been met, the potential Bidder will receive a technical merit score of zero (0), against the corresponding criteria.

##### 4.3.1 Corporate History as a Prime Contractor

Note: To be valid, each of the Systems mentioned below as justification for the Bidders experience must be fully functional, Class approved, Retractable Azimuth Thruster Systems of the same size or higher than the one proposed as a solution for this project, for Vessels of the same Class or higher that the CCGS Amundsen.

Bidders must provide information on the date and the place of installation of these Systems, an overview of the work accomplished, as well as the name and registration numbers of the Vessels.

	<b>Bidders proven experience, as a Prime Contractor, in the design, delivery, installation and commissioning of Retractable Azimuth Thruster Systems of the same size or higher than the one proposed as a solution for this project, for Vessels of the same Class or higher that the CCGS Amundsen.</b>	<b>Max 25</b>
<b>A</b>	5 years' experience	<b>5 pts</b>
<b>B</b>	10 years' experience	<b>15 pts</b>
<b>C</b>	15 years' experience	<b>25 pts</b>

#### 4.3.2 Experience in similar projects, as a Prime Contractor, on icebreaker Vessels

Note: To be valid, each of the Systems mentioned below must be fully functional, Class approved, Retractable Azimuth Thruster Systems for icebreaker Vessels.

Bidders must provide information on the date and the place of installation of these Systems, an overview of the work accomplished, as well as the name and registration numbers of the Vessels.

	<b>Number of similar projects carried out by the Bidder over the past 20 years, as a prime contractor, on Icebreaker Vessels:</b>	<b>Max 25</b>
<b>A</b>	Design, delivery, installation and commissioning of 3 or 4 systems	<b>5 pts</b>
<b>B</b>	Design, delivery, installation and commissioning of 5 or 6 systems	<b>15 pts</b>
<b>C</b>	Design, delivery, installation and commissioning of 7 systems or more	<b>25 pts</b>

#### 4.3.3 Personnel in Charge of Technical Design and System Integration

Note: Bidders must provide the resume of the person in charge of the technical design and system integration of the proposed Retractable Azimuth Thruster Systems with IACS Ice Class ABS 1C or equivalent. It is will be their responsibility to identify all changes to be made so that the new System integrates and functions properly with the existing equipment on board the Vessel.

Bidders must provide information on the date and place of installation of the previous Thruster Systems by the person in charge of the design and integration, an overview of the work accomplished, as well as the name and registration number of the Vessels. This specific individual shall be employed by the Bidder for, as a minimum, the duration of the contract period.

	<b>Experience of the personnel in charge of the technical design and system integration:</b>	<b>Max 25</b>
<b>A</b>	Graduate Engineer with a minimum experience of 5 years in the design and integration of Retractable Azimuth Thrusters Systems meeting ice classification.	<b>5 pts</b>
<b>B</b>	Graduate Engineer with a minimum experience of 10 years in the design and integration of Retractable Azimuth Thrusters Systems meeting ice classification.	<b>15 pts</b>
<b>C</b>	Graduate Engineer with a minimum experience of 15 years or more in the design and integration of Retractable Azimuth Thruster Systems meeting ice classification.	<b>25 pts</b>

#### 4.3.4 Personnel in Charge of the Installation Package

Note: Bidders must provide the resume of the person in charge of the installation package of the proposed Retractable Azimuth Thruster System.

Bidders must provide information on the date and place of installation of the previous Systems by the person in charge, an overview of the work accomplished, as well as the name and registration number of the Vessels. This specific individual shall be employed by the Bidder for, as a minimum, the duration of the contract and shall supervise the installation on the Vessel.

	<b>Experience of the person in charge of the installation work:</b>	<b>Max 25</b>
<b>A</b>	Professional with a minimum of 5 years' experience.	<b>5 pts</b>
<b>B</b>	Professional with a minimum of 10 years' experience	<b>15 pts</b>
<b>C</b>	Professional with a minimum of 15 years' or more experience	<b>25 pts</b>

#### 4.3.5 FSRs and/or Technicians responsible for Technical Support, Commissioning and Training

Note: Bidders must provide the resume of the Field Service Representatives and/or Technicians that will be responsible for providing technical support, commissioning and training for the proposed Retractable Azimuth Thruster Systems.

Also, Bidders must provide information on the date and place of technical support, commissioning and training of previous Retractable Azimuth Thruster Systems by the person in charge, an overview of the work accomplished, as well as the name and registration number of the Vessels. These specific individuals shall be employed by the Bidder.

	<b>Experience of the FSRs and/or Technicians for Technical Support, Commissioning and Training:</b>	<b>Max 25</b>
<b>A</b>	Professionals with a minimum of 5 years' experience.	<b>5 pts</b>
<b>B</b>	Professionals with a minimum of 10 years' experience.	<b>15 pts</b>
<b>C</b>	Professionals with a minimum of 15 years' or more experience.	<b>25 pts</b>

#### 4.3.6 Thruster System Technical Requirements

Note: Bidders must provide the effective nominal thrust, per Thruster, of their proposed Class approved, IACS Classification ABS 1C or equivalent, Retractable Azimuth Thruster System solution.

	<b>Retractable Azimuth Thruster System Nominal Thrust:</b>	<b>Max 25</b>
<b>A</b>	Nominal Thrust 85kN - 90kN, per Thruster	<b>5 pts</b>
<b>B</b>	Nominal Thrust 91kN - 95kN, per Thruster	<b>15 pts</b>
<b>C</b>	Nominal Thrust 96kN or higher, per Thruster	<b>25 pts</b>

**TOTAL POINTS: 150**

**MINIMUM REQUIRED : 90**

### **PART 5 - CERTIFICATIONS**

Bidders must provide the required certifications and documentation to be awarded a contract.

The certifications provided by bidders to Canada are subject to verification by Canada at all times. Canada will declare a bid non-responsive, or will declare a contractor in default, if any certification made by the Bidder is found to be untrue whether during the bid evaluation period or during the contract period.

The Contracting Authority will have the right to ask for additional information to verify the Bidder's certifications. Failure to comply with this request will also render the bid non-responsive or will constitute a default under the Contract.

#### **5.1 Mandatory Certifications Required with the Proposal**

The Bidder must submit the following duly completed mandatory certifications as part of its bid.

##### **5.1.1 Code of Conduct and Certifications - Related documentation**

By submitting a bid, the Bidder certifies that the Bidder and its affiliates are in compliance with the provisions as stated in Section 01 Code of Conduct and Certifications - Bid of Standard Instructions 2003. The related documentation therein required will assist Canada in confirming that the certifications are true.

Pursuant to section 01 of Standard Instructions 2003, Bidders who are incorporated, including those bidding as a joint venture, must provide a complete list of names of all individuals who are currently directors of the Bidder. Bidders bidding as sole proprietorship, including those bidding as a joint venture, must provide the name of the owner.

### **5.1.2 Federal Contractors Program for Employment Equity - Bid Certification**

By submitting a bid, the Bidder certifies that the Bidder, and any of the Bidder's members if the Bidder is a Joint Venture, is not named on the Federal Contractors Program (FCP) for employment equity "FCP Limited Eligibility to Bid" list available from Human Resources and Skills Development Canada (HRSDC) - Labour's website :

[http://www.labour.gc.ca/eng/standards\\_equity/eq/emp/fcp/list/inelig.shtml](http://www.labour.gc.ca/eng/standards_equity/eq/emp/fcp/list/inelig.shtml)

Canada will have the right to declare a bid non-responsive if the Bidder, or any member of the Bidder if the Bidder is a Joint Venture, appears on the "FCP Limited Eligibility to Bid" list at the time of contract award.

Canada will also have the right to terminate the Contract for default if a Contractor, or any member of the Contractor if the Contractor is a Joint Venture, appears on the "FCP Limited Eligibility to Bid" list during the period of the Contract.

### **5.1.3 Education and Experience**

By submission of a bid, the Bidder certifies that all the information provided in the résumés and supporting material submitted with its bid, particularly the information pertaining to education, achievements, experience and work history, has been verified by the Bidder to be true and accurate. Furthermore, the Bidder warrants that every individual proposed by the Bidder for the requirement is capable of performing the Work described in the resulting contract.

### **5.1.4 Status and Availability of Resources**

By submission of a bid, the Bidder certifies that, should it be awarded a contract as a result of the bid solicitation, every individual proposed in its bid will be available to perform the Work as required by Canada's representatives and at the time specified in the bid solicitation or agreed to with Canada's representatives. If for reasons beyond its control, the Bidder is unable to provide the services of an individual named in its bid, the Bidder may propose a substitute with similar qualifications and experience. The Bidder must advise the Contracting Authority of the reason for the substitution and provide the name, qualifications and experience of the proposed replacement. For the purposes of this clause, only the following reasons will be considered as beyond the control of the Bidder: death, sickness, maternity and parental leave, retirement, resignation, dismissal for cause or termination of an agreement for default.

If the Bidder has proposed any individual who is not an employee of the Bidder, the Bidder certifies that it has the permission from that individual to propose his/her services in relation to the Work to be performed and to submit his/her résumé to Canada. The Bidder must, upon request from the Contracting Authority, provide a written confirmation, signed by the individual, of the permission given to the Bidder and of his/her availability.

### 5.1.5 Former Public Servant

Contracts awarded to former public servants (FPS) in receipt of a pension or of a lump sum payment must bear the closest public scrutiny, and reflect fairness in the spending of public funds. In order to comply with Treasury Board policies and directives on contracts awarded to FPS, bidders must provide the information required below with its proposal. Failure to provide the required information will render the proposal non-responsive.

#### 5.1.5.1 Definitions

For the purposes of this clause, "*former public servant*" is any former member of a department as defined in the Financial Administration Act, R.S., 1985, c. F-11, a former member of the Canadian Armed Forces or a former member of the Royal Canadian Mounted Police. A former public servant may be:

- (a) an individual;
- (b) an individual who has incorporated;
- (c) a partnership made of former public servants; or
- (d) a sole proprietorship or entity where the affected individual has a controlling or major interest in the entity.

*"lump sum payment period"* means the period measured in weeks of salary, for which payment has been made to facilitate the transition to retirement or to other employment as a result of the implementation of various programs to reduce the size of the Public Service. The lump sum payment period does not include the period of severance pay, which is measured in a like manner.

*"pension"* means a pension or annual allowance paid under the Public Service Superannuation Act (PSSA), R.S., 1985, c.P-36, and any increases paid pursuant to the Supplementary Retirement Benefits Act, R.S., 1985, c.S-24 as it affects the PSSA. It does not include pensions payable pursuant to the Canadian Forces Superannuation Act, R.S., 1985, c.C-17, the Defence Services Pension Continuation Act, 1970, c.D-3, the Royal Canadian Mounted Police Pension Continuation Act, 1970, c.R-10, and the Royal Canadian Mounted Police Superannuation Act, R.S., 1985, c.R-11, the Members of Parliament Retiring Allowances Act, R.S., 1985, c.M-5, and that portion of pension payable to the Canada Pension Plan Act, R.S., 1985, c.C-8.

#### 5.1.5.2 Former Public Servant in Receipt of a Pension

As per the above definitions, is the Bidder a FPS in receipt of a pension? **Yes ( ) No ( )**

If so, the Bidder must provide the following information, for all FPS in receipt of a pension, as applicable:

- (a) name of former public servant;
- (b) date of termination of employment or retirement from the Public Service.

By providing this information, Bidders agree that the successful Bidder's status, with respect to being a former public servant in receipt of a pension, will be reported on departmental websites as

part of the published proactive disclosure reports in accordance with Contracting Policy Notice: 2012-2 and the Guidelines on the Proactive Disclosure of Contracts.

### **5.1.5.3 Work Force Adjustment Directive**

Is the Bidder a FPS who received a lump sum payment pursuant to the terms of the Work Force Adjustment Directive? **Yes** ( ) **No** ( )

If so, the Bidder must provide the following information:

- (a) name of former public servant;
- (b) conditions of the lump sum payment incentive;
- (c) date of termination of employment;
- (d) amount of lump sum payment;
- (e) rate of pay on which lump sum payment is based;
- (f) period of lump sum payment including start date, end date and number of weeks;
- (g) number and amount (professional fees) of other contracts subject to the restrictions of a work force adjustment program.

For all contracts awarded during the lump sum payment period, the total amount of fees that may be paid to a FPS who received a lump sum payment is \$5,000, including Applicable Taxes.

## **PART 6 - FINANCIAL AND OTHER REQUIREMENTS**

### **6.1 Financial Capability**

A9033T, 2012-07-16, Financial Capability

### **6.2 Contract Financial Security**

E5000C, 2010-01-11, Performance bonds

**6.2.1** If this bid is accepted, the Bidder shall be required to provide the performance bond form [PWGSC-TPSGC 505](#) in accordance with 7.13 within (7) seven calendar days after the date of notification of contract award to the winning bidder.

**6.2.2.** If, for any reason, Canada does not receive, within the specified period, the required Contract Financial Security, Canada may accept another offer, seek new bids, negotiate a contract or not accept any bids, as Canada may deem advisable.

### **6.3 Insurance Requirements**

The Bidder must provide with its proposal a letter from an insurance broker or an insurance company licensed to operate in Canada stating that the Bidder, if awarded a contract as a result of the bid solicitation, can be insured in accordance with the Insurance Requirements specified in Annex E.





## **PART 7 - RESULTING CONTRACT CLAUSES**

The following clauses and conditions apply to and form part of any contract resulting from the bid solicitation.

### **7.1 Requirement**

- 7.1.1** For the engineering, delivery, installation and commissioning of two new Thruster Systems (TS) that will provide the same functionality as the old system and will meet or exceed the requirements contained in Annex A - Statement of Requirements (SOR),
- 7.1.2** To carry out, within the Work Period of the Contract, all unscheduled work authorized by the Contracting Authority as per Annex G, Procedure For Processing Unscheduled Work.
- 7.1.3** Work location: Quebec City, Province of Quebec, Canada.

### **7.2 Standard Clauses and Conditions**

All clauses and conditions identified in the Contract by number, date and title are set out in the *Standard Acquisition Clauses and Conditions Manual* issued by PSPC: <https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>

#### **7.2.1 General Conditions**

2030 (2018-06-21), General Conditions - Higher Complexity - Goods, apply to and form part of the Contract.

2030 (2018-06-21), General Conditions - Higher Complexity - Goods, are hereby amended as follows;

### **Section 27 - Licenses to Intellectual Property Rights in Foreground and Background Information. Add the following information.**

1. As Canada has contributed to the cost of developing the Foreground Information, the Contractor grants to Canada a license to exercise all Intellectual Property Rights in the Foreground Information for Canada's activities. Subject to any exception described in the Contract, this license allows Canada to do anything that it would be able to do if it were the owner of the Foreground Information, other than exploit it commercially and transfer or assign ownership of it. The Contractor also grants to Canada a license to use the Background Information to the extent that it is reasonably necessary for Canada to exercise fully all its rights in the deliverables and in the Foreground Information.
2. These licenses are non-exclusive, perpetual, irrevocable, worldwide, fully-paid and royalty-free. Neither license can be restricted in any way by the Contractor providing any form of

notice to the contrary, including the wording on any shrink-wrap or click-wrap license or any other kind of packaging, attached to any deliverable.

3. For greater certainty, Canada's licenses include, but are not limited to:

Without restricting the scope of any license or other right in the Background Information that Canada may otherwise hold, the right, in relation to any custom-designed or custom-manufactured part of the Work, to exercise such of the Intellectual Property Rights in the Background Information as may be required for the following purposes:

for the use, operation, maintenance, repair or overhaul of the custom-designed or custom-manufactured parts of the Work;

in the manufacturing of spare parts for maintenance, repair or overhaul of any custom-designed or custom-manufactured part of the Work by Canada if those parts are not available on reasonable commercial terms to enable timely maintenance, repair or overhaul;

for Software that is custom designed for Canada, the right to use any source code the Contractor must deliver to Canada under the Contract.

## **Section 22 – Warranty**

1. Despite inspection and acceptance of the Work by or on behalf of Canada and without restricting any other provision of the Contract or any condition, warranty or provision imposed by law, the Contractor warrants that, for 16 months, the Work will be free from all defects in design, material or workmanship, and will conform to the requirements of the Contract. The warranty period begins on the date of delivery, or if acceptance takes place at a later date, the date of acceptance. With respect to Government Property not supplied by the Contractor, the Contractor's warranty will extend only to its proper incorporation into the Work.
2. In the event of a defect or non-conformance in any part of the Work during the warranty period, the Contractor, at the request of Canada to do so, must as soon as possible repair, replace or otherwise make good at its own option and expense the part of the Work found to be defective or not in conformance with the requirements of the Contract.
3. The Work or any part of the Work found to be defective or non-conforming will be returned to the Contractor's plant for replacement, repair or making good. However, when in the opinion of Canada it is not expedient to remove the Work from its location, the Contractor must carry out any necessary repair or making good of the Work at that location. In such cases, the Contractor will be paid the fair and reasonable Cost (including reasonable travel and living expenses) incurred in so doing, with no allowance for profit, less an amount equal to the Cost of rectifying the defect or non-conformance at the Contractor's plant.
4. Canada must pay the transportation cost associated with returning the Work or any part of the Work to the Contractor's plant pursuant to subsection 3. The Contractor must pay the transportation cost associated with forwarding the replacement or returning the Work or

part of the Work when rectified to the delivery point specified in the Contract or to another location directed by Canada.

5. The Contractor must remedy all data and reports pertaining to any correction or replacement under this section, including revisions and updating of all affected data, manuals, publications, software and drawings called for under the Contract, at no cost to Canada.
6. If the Contractor fails to fulfill any obligation described in this section within a reasonable time of receiving a notice, Canada will have the right to remedy or to have remedied the defective or non-conforming work at the Contractor's expense. If Canada does not wish to correct or replace the defective or non-conforming work, an equitable reduction will be made in the Contract Price.
7. The warranty period is automatically extended by the duration of any period or periods where the Work is unavailable for use or cannot be used because of a defect or non-conformance during the original warranty period. The warranty applies to any part of the Work repaired, replaced or otherwise made good pursuant to subsection 2, for the greater of the warranty period remaining, including the extension.

### **Performance Period (Warranty)**

Following vessel's commissioning and final acceptance of the new propulsion system, the contractor shall enter into a sixteen (16) months performance period. During this period, the contractor shall be responsible for the continued functionality, performance, and additional tuning of the new propulsion system upgrades such that the systems meet the functional requirements stated within this statement of requirement. During this period, the contractor shall also be responsible to replace all defective parts, in addition to perform all work and additional equipment purchases that may be required to correct certain anomalies in the original design of the propulsion system.

In addition to providing remote assistance, the contractor shall be available to travel to the vessel within 48 hours' notice during this period. One (1) visit to the vessel during ice breaking season shall be included in the bid firm price during the performance period to tune the systems to the peak demands experienced during the vessel operations. The contractor shall be responsible for travel to the vessel's home port (Quebec City), and the Coast Guard will cover any follow-on travel costs to reach the vessel. For the visit, the contractor must be willing to be flown onto the vessel via helicopter and commence testing while the vessel is underway. Because the vessel will operate in the Arctic Ocean during this period, this visit might be exceptionally long, up to seven (7) days. During this time only, lodging and meals will be provided to the contractor's technician(s) directly onboard the vessel, at the CCG expenses.

### **7.2.2 Supplemental General Conditions**

1029 (2018-12-06), Ship Repairs, apply to and form part of the Contract

### **7.3 Security Requirement**

There is no security requirement applicable to this Contract.

### **7.4 Term of Contract**

#### **7.4.1 Work Period**

1. Work must commence as follows:

For phase 1: November 2020

For phase 2: November 2021

2. The Contractor certifies that he has sufficient materiel and human resources allocated or available to deliver the Requirement and that the above work period provides an adequate period to perform the work required to deliver the Requirement.

### **7.5 Deliverables**

All deliverables must be delivered as requested in the SOR and the Contract.

### **7.6 Authorities**

#### **7.6.1 Contracting Authority**

The Contracting Authority for the contract is:

Rejean Giguere

Department of Public Services and Procurement Canada (PSPC) acquisition Sector,

800, rue de La Gauchetière Ouest, bureau 7300

Montreal, Quebec, H5A 1L6

Email: [rejean.giguere@tpsgc-pwgsc.gc.ca](mailto:rejean.giguere@tpsgc-pwgsc.gc.ca)

The Contracting Authority is responsible for the management of the Contract and any changes to the Contract must be authorized in writing by the Contracting Authority. The Contractor must not perform work in excess of or outside the scope of the Contract based on verbal or written requests or instructions from anybody other than the Contracting Authority.

#### **7.6.2 Technical Authority**

The Technical Authority is: (information will be provided at contract award)

The Technical Authority is the representative of the department or agency for whom the Work is being carried out under the Contract and is responsible for all matters concerning the technical content of the Work under the Contract. Technical matters may be discussed with the Technical

Authority; however the Technical Authority has no authority to authorize changes to the scope of the Work. Changes to the scope of the Work can only be made through a contract amendment issued by the Contracting Authority.

### **7.6.3 Inspection Authority – Same as Technical Authority**

The Inspection Authority is the representative of the department or agency for whom the Work is being carried out under the Contract and is responsible for the inspection of the Work and acceptance of the finished work. The Inspection Authority may be represented on-site by a designated inspector and any other Government of Canada Inspector who may from time to time be assigned in support of the designated inspector.

### **7.6.4 Contractor's Representative** *(information will be provided at contract award)*

Name:

Title:

Company:

Address:

Telephone:

E-mail:

## **7.7 Payment**

### **7.7.1 Basis of Payment - Firm Price**

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid a firm price in accordance with the Basis of Payment in Annex C (Appendix 1).

### **7.7.2 Limitation of Price**

Canada will not pay the Contractor for any design changes, modifications or interpretations of the Work unless they have been approved, in writing, by the Contracting Authority before their incorporation into the Work.

### **7.7.3 Method of Payment - Milestone Payment**

Canada will make milestone payments not more frequently than once a month in accordance with the Schedule of Milestones for Payment, Appendix 1 to Annex C, if:

- (a) an accurate and complete claim for payment using PWGSC-TPSGC 1111, Claim for Progress Payment, and any other document required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;
- (b) all the certificates appearing on form PWGSC-TPSGC 1111 have been signed by the

respective authorized representatives;

- (c) all work associated with the milestone and as applicable any deliverable required has been completed and accepted by Canada.

#### **7.7.4 SACC Manual Clauses**

H4500C - Lien - Section 427 of the Bank Act, 2010-01-11

C2000C - Taxes - Foreign-based Contractor, 2007-11-30

C0711C - Time Verification, 2008-05-12

#### **7.8 Invoicing Instructions**

1. The Contractor must submit a claim for payment using form PWGSC-TPSGC 1111, Claim for Progress Payment. Each claim must show:
  - (a) all information required on form PWGSC-TPSGC 1111;
  - (b) all applicable information detailed under the section entitled "Invoice Submission" of the general conditions;
  - (c) the description and value of the milestone claimed as detailed in the Contract;
  - (d) quality assurance documentation when applicable and/or as requested by the Contracting Authority.
2. The Goods and Services Tax or Harmonized Sales Tax (GST/HST), as applicable, must be calculated on the total amount of the claim.
3. The Contractor must prepare and certify one original and one (1) copy of the claim on form PWGSC-TPSGC 1111, and forward it to the Contracting and Technical Authority identified under the section entitled "Authorities" of the Contract for appropriate certification after inspection and acceptance of the Work takes place.
4. The Contracting Authority will then forward the original of the claim to the Technical Authority for certification and onward submission to the Payment Office for the remaining certification and payment action.
5. The Contractor must not submit claims until all work identified in the claim is completed.

#### **7.9 Certifications**

##### **7.9.1 Compliance**

Compliance with the certifications and related documentation provided by the Contractor in its bid is a condition of the Contract and subject to verification by Canada during the term of the Contract. If the Contractor does not comply with any certification, provide the related documentation or if it is

determined that any certification made by the Contractor in its bid is untrue, whether made knowingly or unknowingly, Canada has the right, pursuant to the default provision of the Contract, to terminate the Contract for default.

#### **7.10 Applicable Laws**

The Contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in the Province of Quebec.

#### **7.11 Priority of Documents**

If there is a discrepancy between the wordings of any documents that appear on the list, the wording of the document that first appears on the list has priority over the wording of any document that subsequently appears on the list:

- (a) The Articles of Agreement;
- (b) The General Conditions 2030, (2018-06-21), Higher Complexity - Goods;
- (c) The Supplemental General Conditions 1029, (2018-12-06), Ship Repairs;
- (d) Annex A, Statement of Requirements (SOR);
- (e) Annex C, Basis of payment;
- (f) Appendix 1 to Annex C, Schedule of Milestones for Payment;
- (g) Other Annexes;
- (h) The Contractor's Proposal dated \_\_\_\_\_.

## **7.12 Insurance Requirements**

The Contractor must comply with the insurance requirements specified in Annex E. The Contractor must maintain the required insurance coverage for the duration of the Contract. Compliance with the insurance requirements does not release the Contractor from or reduce its liability under the Contract.

The Contractor is responsible for deciding if additional insurance coverage is necessary to fulfill its obligation under the Contract and to ensure compliance with any applicable law. Any additional insurance coverage is at the Contractor's expense, and for its own benefit and protection.

The Contractor must forward to the Contracting Authority, no later than 7 (seven) calendar days following the Contract award notification date to the supplier, a Certificate of Insurance evidencing the insurance coverage and confirming that the insurance policy complying with the requirements is in force. Coverage must be placed with an Insurer licensed to carry out business in Canada. The Contractor must, if requested by the Contracting Authority, forward to Canada a certified true copy of all applicable insurance policies.

## **7.13 Financial Security**

### **7.13.1 Term of Financial Security**

Any bond, bill of exchange, letter of credit or other security provided by the Contractor to Canada in accordance with the terms of the Contract must not expire before 90 days after the end of the Warranty Period indicated in the Contract.

The Contracting Authority may, at its sole discretion, require an extension to the period of the security, for which the Contractor may apply for financial compensation.

The Contracting Authority may, at its sole discretion, return the security to the Contractor before the expiration, provided however that no risk will accrue to Canada as a result of this.

### **7.13.2 Contract Financial Security**

- 7.13.2.1 The Contractor must provide the Contracting Authority with financial security within seven (7) calendar days after the date of notification of contract award to the supplier. The financial security must be in the form of a security deposit as defined in clause 6.2 in the amount of fifteen (15) percent of the Contract.
- 7.13.2.2 If, for any reason, Canada does not receive the security deposit in the amount set out above within the specified period, the Contractor will be in default. Canada may, at its discretion, terminate the Contract for default pursuant to the Contract default provision.
- 7.13.2.3 If the security deposit is in the form of government guaranteed bonds with coupons, all coupons that are unmaturing at the time the security deposit is provided must be attached to the bonds. The Contractor must provide written instructions concerning the action to be taken with respect to coupons that will mature while the bonds are



pledged as security, when such coupons are in excess of the security deposit requirement.

- 7.13.2.4 If the security deposit is in the form of a bill of exchange, Canada will deposit the bill of exchange in an open account in the Consolidated Revenue Fund. Bills of exchange that are deposited to the credit of the Consolidated Revenue Fund will bear simple interest, calculated on the basis of the rates which are in effect during the period the deposit is held.

These rates are published monthly by the Department of Finance and are set to be equal to the average yield on 90-day Treasury Bills, less 1/8 of 1 percent. Interest will be paid annually or, when the security deposit is returned to the Contractor, if earlier. The Contractor may, however, request Canada to hold and not cash the bill of exchange, in which case no interest will become payable.

- 7.13.2.5 Canada may convert the security deposit to the use of Canada if any circumstance exists which would entitle Canada to terminate the Contract for default, but any such conversion will not constitute termination of the Contract.

- 7.13.2.6 When Canada so converts the security deposit:

- a. the proceeds will be used by Canada to complete the Work according to the conditions of the Contract, to the nearest extent that it is feasible to do so and any balance left will be returned to the Contractor on completion of the warranty period; and
- b. if Canada enters into a contract to have the Work completed, the Contractor will:
  - i. be considered to have irrevocably abandoned the Work; and
  - ii. remain liable for the excess cost of completing the Work if the amount of the security deposit is not sufficient for such purpose. "Excess cost" means any amount over and above the amount of the Contract Price remaining unpaid together with the amount of the security deposit.

- 7.13.2.7 If Canada does not convert the security deposit to the use of Canada before completion of the entire contract period, including any extension and warranty period, Canada will return the security deposit to the Contractor within a reasonable time after such date.

- 7.13.2.8 If Canada converts the security deposit for reasons other than bankruptcy, the financial security must be re-established to the level of the amount stated above so that this amount is continued and available until completion of the entire contract period, including any extension and warranty period.

- 7.13.2.9 Security Deposit Definition

1. In this Article, "security deposit" means
  - a. a bill of exchange that is payable to the Receiver General for Canada and certified by an approved financial institution or drawn by an approved financial institution on itself;

or

- b. a government guaranteed bond; or
  - c. an irrevocable standby letter of credit, or
  - d. such other security as may be considered appropriate by the Contracting Authority and approved by Treasury Board;
2. "approved financial institution" means
- a. any corporation or institution that is a member of the Canadian Payments Association;
  - b. a corporation that accepts deposits that are insured by the Canada Deposit Insurance Corporation or the Régie de l'assurance-dépôts du Québec to the maximum permitted by law;
  - c. a credit union as defined in paragraph 137(6) of the Income Tax Act;
  - d. a corporation that accepts deposits from the public, if repayment of the deposits is guaranteed by a Canadian province or territory; or
  - e. the Canada Post Corporation.
3. "government guaranteed bond" means a bond of the Government of Canada or a bond unconditionally guaranteed as to principal and interest by the Government of Canada that is:
- a. payable to bearer;
  - b. accompanied by a duly executed instrument of transfer of the bond to the Receiver General for Canada in accordance with the Domestic Bonds of Canada Regulations;
  - c. registered in the name of the Receiver General for Canada.
4. "irrevocable standby letter of credit"
- a. means any arrangement, however named or described, whereby a financial institution (the "Issuer"), acting at the request and on the instructions of a customer (the "Applicant"), or on its behalf,
    - i. will make a payment to or to the order of Canada, as the beneficiary;
    - ii. will accept and pay bills of exchange drawn by Canada;

- iii. authorizes another financial institution to effect such payment, or accept and pay such bills of exchange; or
  - iv. authorizes another financial institution to negotiate, against written demand(s) for payment, provided that the conditions of the letter of credit are complied with.
- b. must state the face amount which may be drawn against it;
  - c. must state its expiry date;
  - d. must provide for sight payment to the Receiver General for Canada by way of the financial institution's draft against presentation of a written demand for payment signed by the authorized departmental representative identified in the letter of credit by his/her office;
  - e. must provide that more than one written demand for payment may be presented subject to the sum of those demands not exceeding the face amount of the letter of credit;
  - f. must provide that it is subject to the International Chamber of Commerce (ICC) Uniform Customs and Practice (UCP) for Documentary Credits, 2007 Revision, ICC Publication No. 600. Pursuant to the ICC UCP, a credit is irrevocable even if there is no indication to that effect; and
  - g. must be issued (Issuer) or confirmed (Confirmer), in either official language, by a financial institution that is a member of the Canadian Payments Association and is on the letterhead of the Issuer or Confirmer. The format is left to the discretion of the Issuer or Confirmer.

#### **7.14 Limitation of Contractor's Liability for Damages to Canada**

- 7.14.1 This section applies despite any other provision of the Contract and replaces the section of the general conditions entitled "Liability". Any reference in this section to damages caused by the Contractor also includes damages caused by its employees, as well as its subcontractors, agents, and representatives, and any of their employees.
- 7.14.2 Whether the claim is based in contract, tort (including negligence), or another cause of action, the Contractor's liability for all damages suffered by Canada caused by the Contractor's performance of or failure to perform the Contract is limited to \$10 million per incident or occurrence to an annual aggregate of \$20 million for losses or damage caused in any one year of carrying out the Contract, each year starting on the date of coming into force of the Contract or its anniversary. This limitation of the Contractor's liability does not apply to:
  - a) any infringement of intellectual property rights;
  - b) any breach of warranty obligations; or

- c) any liability of Canada to a third party arising from any act or omission of the Contractor in performing the Contract.
- 7.14.3 Each Party agrees that it is fully liable for any damages that it causes to any third party in connection with the Contract, regardless of whether the third party makes its claim against Canada or the Contractor. If Canada is required, as a result of joint and several liability, to pay a third party in respect of damages caused by the Contractor, the Contractor must reimburse Canada for that amount.
- 7.14.4 The Parties agree that nothing herein is intended to limit any insurable interest of the Contractor nor to limit the amounts otherwise recoverable under any insurance policy. The Parties agree that to the extent that the insurance coverage required to be maintained by the Contractor under this Contract or any additional insurance coverage maintained by the Contractor, whichever is greater, is more than the limitations of liability described in sub article (7.14.2), the limitations provided herein are increased accordingly and the Contractor shall be liable for the higher amount to the full extent of the insurance proceeds recovered.
- 7.14.5 If, at any time, the total cumulative liability of the Contractor for losses or damage suffered by Canada caused by the Contractor's performance of or failure to perform the Contract, excluding liability described under subsection 7.14.2(a), (b), and (c) exceeds \$40 million, either Party may terminate the Contract by giving notice in writing to the other Party and neither Party will make any claim against the other for damages, costs, expected profits or any other such loss arising out of the termination, but no such termination or expiry of the Contract shall reduce or terminate any of the liabilities that have accrued to the effective date of the termination.
- 7.14.6 The date of termination pursuant to this Article, shall be the date specified by Canada in its notice to terminate, or, if the Contractor exercises the right to terminate, in a notice to the Contractor from Canada in response to the Contractor's notice to terminate. The date of termination shall be in Canada's discretion to a maximum of 12 months after service of the original notice to terminate served by either Party pursuant to sub article 7.14.5, above.
- 7.14.7 In the event of a termination under this Article, the Contract will automatically remain in force subject to all of the same terms and conditions until the date of termination and the Contractor agrees that it will be paid in accordance with the applicable provisions as set out in the Basis of Payment, Annex B and that the Contractor's liability remains as specified in subarticles (7.14.1) through (7.14.4), above.
- 7.14.8 Nothing shall limit Canada's other remedies, including Canada's right to terminate the Contract for default for breach by the Contractor of any of its obligations under this Contract, notwithstanding that the Contractor may have reached any limitation of its liability hereunder.

### **7.15 Project Schedule**

The project schedule must be delivered in accordance with Annex A, SOR.

The Contractor must revised the project schedule on an as required basis and submit to Canada for review and concurrence every month. If the revision is due to authorized unscheduled work, the revision must include the unscheduled work, all related schedule impact on the work and impact to the delivery date of the requirement should it be the case.

### **7.16 Post Contract Award Meeting**

A Post Contract Award Meeting will be convened and chaired by the Contracting Authority at the Contractor's facility at a time to be determined. At the meeting the Contractor will introduce the project management personnel supported by an organization chart, and Canada will introduce the Authorities of the Contract. A review of the term and conditions of the Contract will be conducted by the Contracting Authority.

The Contractor's costs of holding a Post Contract Award Meeting must be included in the price of the bid. Travel and living expenses for Government Personnel will be arranged and paid for by the Canada.

### **7.17 Progress Report**

1. The Contractor must submit monthly reports on the progress of the Work in an electronic format to the Technical Authority and to the Contracting Authority.
2. The progress report must contain two (2) Parts:
  - (a) PART 1: The Contractor must answer the following three questions:
    - i. is the project schedule being impacted and if impacted why?
    - ii. is the project delivery date being impacted and if impacted why?
    - iii. is the project within budget?
    - iv. is the project free of any areas of concern in which the assistance or guidance of Canada may be required?
  - (b) PART 2: A narrative report, brief, yet sufficiently detailed to enable the Technical Authority to evaluate the progress of the Work, containing as a minimum:

a description of the progress of each task and of the Work as a whole during the period of the report. Sufficient sketches, diagrams, photographs, etc., must be included, if necessary, to describe the progress accomplished.

## **7.18 Subcontractor(s)**

The Contracting Authority shall be notified, in writing, of any subcontractors the contractor may require to perform the Work as well as any changes that may occur during the period of the contract. When the Contractor subcontracts work, a copy of the subcontract purchase order is to be passed to the Contracting Authority. In addition, the Contractor must monitor progress of subcontracted work and inform the Inspection Authority on pertinent stages of work to permit inspection when considered necessary by the Inspection Authority.

## **7.19 Insulation Materials - Asbestos Free**

All materials used to insulate or re-insulate any surfaces on board the vessel must meet Transport Canada Marine standards, for commercial marine work, and, for all work, be free from asbestos in any form. The Contractor must ensure that all machinery and equipment located below or adjacent to surfaces to be re-insulated are adequately covered and protected before removing existing insulation.

## **7.20 SACC Manual Clauses**

B9035C - Progress Meetings, 2008-05-12

B5007C - Procedures for Design Change or Additional Work, 2010-01-11

D3015C - Dangerous Goods/Hazardous Products, 2014-09-25

A0285C - Workers Compensation, 2007-05-25

## **7.21 Trade Qualifications**

The Contractor must use qualified, certificated (if applicable) and competent tradespeople and supervision to ensure a uniform high level of workmanship. The Technical Authority may request to view and record details of the certification and/or qualifications held by the Contractor's tradespeople. This request should not be unduly exercised but only to ensure qualified tradespeople are on the job.

## **7.22 Welding Certification**

1. The Contractor must ensure that welding is performed by a welder certified by the Canadian Welding Bureau (CWB) in accordance with the requirements of the following Canadian Standards Association (CSA) standards:

CSA W47.1-09 (R2014) Certification for Companies for Fusion Welding of Steel  
(Minimum Division Level 2.1)

2. In addition, welding must be done in accordance with the requirements of the applicable drawings and specifications.
3. Before the commencement of any fabrication work, and upon request from the Technical Authority, the Contractor must provide approved welding procedures and/or a list of welding personnel intended to be used in the completion of the work. The list must identify the CWB

welding procedure qualifications attained by each of the personnel listed and must be accompanied by a copy of each person's current CWB welding certification.

### **7.23 Permits, Licenses and Certificates**

The Contractor must obtain and maintain all permits, licenses and certificates of approval required for the work to be performed under any applicable federal, provincial or municipal legislation. The Contractor is responsible for any charges imposed by such legislation or regulations. Upon request, the Contractor must provide a copy of any such permit, license or certificate to Canada.

### **7.24 ISO 9001:2008 - Quality Management Systems**

In the performance of the Work described in the Contract, the Contractor must comply with the requirements of:

ISO 9001:2008 - Quality management systems - Requirements, published by the International Organization for Standardization (ISO), current edition at date of submission of Contractor's bid. The Contractor's quality management system must address each requirement contained in the standard; however, the Contractor is not required to be registered to the applicable standard.

### **7.25 Dispute Resolution**

The parties agree to follow the procedures below for the settlement of any disputes which may arise throughout the life of this Contract prior to seeking redress through court procedures:

- (a) Disputes arising from this Contract will in the first instance be resolved by the Contracting Authority and the Contractor's Contract Administrator within 15 working days or such additional time as may be agreed to by both parties.
- (b) Failing resolution under (a) above, the Manager of the Montreal Procurement Division at PSPC and the Contractor's Representative Supervisor will attempt to resolve the dispute within an additional fifteen (15) working days.
- (c) Failing resolution under (a) or (b) above, the Director of the Montreal Procurement Division at PSPC, and the Contractor's Senior Management will attempt to resolve the dispute within an additional thirty (30) working days.
- (d) Notwithstanding the above procedure, either party may seek a decision through the courts at any time during the dispute.

### **7.26 Discretionary Audit**

The Contractor's certification that the price or rate is not in excess of the lowest price or rate charged anyone else, including the Contractor's most favored customer, for the like quality and quantity of the goods, services or both, is subject to verification by government audit, at the discretion of Canada, before or after payment is made to the Contractor.

If the audit demonstrates that the certification is in error after payment is made to the Contractor, the Contractor must, at the discretion of Canada, make repayment to Canada in the amount found to be in excess of the lowest price or rate or authorize the retention by Canada of that amount by way of deduction from any sum of money that may be due or payable to the Contractor pursuant to the Contract.

If the audit demonstrates that the certification is in error before payment is made, the Contractor agrees that any pending invoice will be adjusted by Canada in accordance with the results of the audit. It is further agreed that if the Contract is still in effect at the time of the verification, the price or rate will be lowered in accordance with the results of the audit.

#### **7.27 Failure to Deliver**

Time is of the essence of the Contract. Changes in the Completion date not caused by Canada are Contractor defaults, will prejudice Canada and are at the Contractor's expense. The Completion date will not be extended without consideration being provided by the Contractor acceptable to Canada in the form of adjustment to the price, warranty or services to be provided.



## ANNEX A – STATEMENT OF REQUIREMENT (SOR)

AS PER ATTACHED DOCUMENT.

THE FOLLOWING REQUIREMENTS ARE ALSO INCLUDED IN THE SOR:

1. The CCG supports the Government of Canada's Policy on Green Procurement. Bidders must specify how they meet the guidelines published by the Government of Canada's Policy on Green Procurement as stated by the Government of Canada Supply Manual, Annex 2.2, Green Procurement Environmental Factors and Evaluation Indicators found here:

<https://buyandsell.gc.ca/policy-and-guidelines/supply-manual/section/2/20>

2. The new thruster systems shall use biodegradable synthetic oils in order to limit the damages on the environment in case of a leak.



**ANNEX C - BASIS OF PAYMENT - FIRM PRICE**

**Annex C will form the Basis of Payment for the resulting Contract and must be completed at the bid submission stage. It must be submitted with you bid.**

**C1 Contract Firm Price:**

**For the execution of work set out in Annex A (SOR), applicable taxes not included:**

<b>CONTRACT FOR THE CCGS AMUNDSEN</b>	<b>Total amount:</b>
<b>TOTAL :</b>	<b>\$</b>

**C2 Price for unscheduled work:**

The Contractor will be paid for unscheduled work on an as and when required basis, as authorized by Canada and as per Annex G, Procedure for Processing Unscheduled Work:

a)	For Engineering work: Firm hourly rate, applicable taxes not included.	\$ _____
b)	For Other Related work: Firm hourly rate, applicable taxes not included.	\$ _____
c)	For welding work: Firm hourly rate, applicable taxes not included.	\$ _____

**Prorated Prices for unscheduled work:**

Hours and prices for unscheduled work shall be based on comparable historical data applicable to similar work at the same facility, or shall be determined by prorating the quoted Work costs in the Contract when in similar areas of the vessel.

**Overtime**

There will be no overtime payment for Known Work. Any request for payment must be accompanied by a copy of the overtime authorization and a report containing the overtime performed pursuant to the written authorization.

**C3 Price for in-service support:**

The Contractor will be paid for in-service support work on an as and when required basis, as authorized by Canada and as per the pricing information below:

a)	For scheduled maintenance of the system including parts, for year 1 following warranty expiration date: Firm Fixed Price, applicable taxes not included.	\$ _____
b)	For scheduled maintenance of the system including parts, for year 2: Firm Fixed Price, applicable taxes not included.	\$ _____
c)	For scheduled maintenance of the system including parts, for year 3: Firm Fixed Price, applicable taxes not included.	\$ _____
d)	For scheduled maintenance of the system including parts, for year 4: Firm Fixed Price, applicable taxes not included.	\$ _____
e)	For scheduled maintenance of the system including parts, for year 5: Firm Fixed Price, applicable taxes not included.	\$ _____

**C4 Price for spare parts:**

The Contractor will be paid for spare parts on an as and when required basis, as authorized by Canada and as per the pricing information provided below:

**Bidders shall include pricing for spare parts for year one following warranty expiration date. Pricing for the following years will be negotiated with the contractor following contract award.**

**APPENDIX 1 TO ANNEX C – SCHEDULE OF MILESTONES FOR PAYMENT**

#	DELIVERABLES:	% paid of the total contract amount
<b>P1</b>	<ul style="list-style-type: none"> <li>• Presentation of the Preliminary Design Package (PDP);</li> <li>• Review of the PDP by Canada.</li> <li>• Delivery of all drawings and other design or installation documents;</li> <li>• Programming data details (PLC);</li> <li>• Review and approval by Canada;</li> <li>• Approval of the Classification Society.</li> </ul>	<b>10 %</b>
<b>P2</b>	<p><b>Purchase / preparation of equipments completed :</b></p> <ul style="list-style-type: none"> <li>• Purchase of all required equipments and components;</li> <li>• Pre-assembly of the equipment at factory;</li> <li>• Proposal of a spare parts list.</li> </ul>	<b>20 %</b>
<b>P3</b>	<p><b>Factory Acceptance Tests (FAT) completed :</b></p> <ul style="list-style-type: none"> <li>• Functionnal proof of the entire system;</li> <li>• Approval by Canada;</li> <li>• Approval by a Classification Society.</li> </ul>	<b>20 %</b>
<b>P4</b>	<p><b>Installation work completed :</b></p> <ul style="list-style-type: none"> <li>• Removal of equipment and cabling that is no longer useful;</li> <li>• Test report on conserved cables;</li> <li>• Passage of the new cables;</li> <li>• Installation and connection of all equipments;</li> <li>• Adjustment, programming and calibration of all equipments;</li> <li>• Operation of the equipments and individual protections checked;</li> <li>• Approval by Canada.</li> </ul>	<b>20 %</b>
<b>P5</b>	<p><b>Ship's commissioning completed :</b></p> <ul style="list-style-type: none"> <li>• Dock/sea trials;</li> <li>• Fine tuning of the entire system and bugs fix;</li> <li>• Production of a report on the ship's performance;</li> <li>• Final approval by Canada;</li> <li>• Approval by the CCG Classification Society.</li> </ul>	<b>20 %</b>
<b>P6</b>	<p><b>Training and Final Documentation completed :</b></p> <ul style="list-style-type: none"> <li>• Delivery of the final version of the drawings;</li> <li>• Delivery of all technical manuals;</li> <li>• Training of the CCG personnel.</li> </ul>	<b>5 %</b>
<b>P7</b>	<b>Final payment at the end of the guarantee period</b>	<b>5%</b>

## **ANNEX E - INSURANCE REQUIREMENTS**

### **E1 Ship Repairers' Liability Insurance**

1. The Contractor must obtain Ship Repairer's Liability Insurance and maintain it in force throughout the duration of the Contract, in an amount usual for a contract of this nature, but for not less than \$10,000,000 per accident or occurrence and not less than \$20,000,000 in the annual aggregate.
2. The Ship Repairer's Liability insurance must include the following:
  - a. Additional Insureds: Canada is added as an additional insured, but only with respect to liability arising out of the Contractor's performance of the Contract. The interest of Canada as additional insured should read as follows: Canada, represented by Public Works and Government Services Canada.
  - b. Waiver of Subrogation Rights: Contractor's Insurer to waive all rights of subrogation against Canada as represented by Environment Canada and Public Works and Government Services Canada for any and all loss of or damage to the vessel, however caused.
  - c. Notice of Cancellation: The Insurer will endeavor to provide the Contracting Authority thirty (30) days written notice of cancellation.
  - d. Contractual Liability: The policy must, on a blanket basis or by specific reference to the Contract, extend to assumed liabilities with respect to contractual provisions.
  - e. Cross Liability/Separation of Insured: Without increasing the limit of liability, the policy must protect all insured parties to the full extent of coverage provided. Further, the policy must apply to each Insured in the same manner and to the same extent as if a separate policy had been issued to each.

### **E2 Commercial General Liability Insurance**

1. The Contractor must obtain Commercial General Liability Insurance, and maintain it in force throughout the duration of the Contract, in an amount usual for a contract of this nature, but for not less than \$10,000,000 per accident or occurrence and not less than \$20,000,000 in the annual aggregate.
2. The Commercial General Liability Insurance policy must include the following:
  - (a) Additional Insureds: Canada is added as an additional insured, but only with respect to liability arising out of the Contractor's performance of the Contract. The interest of Canada should read as follows: Canada, as represented by Public Works and Government Services Canada.
  - (b) Bodily Injury and Property Damage to third parties arising out of the operations of the Contractor.

- (c) Products and Completed Operations: Coverage for bodily injury or property damage arising out of goods or products manufactured, sold, handled, or distributed by the Contractor and/or arising out of operations that have been completed by the Contractor.
- (d) Personal Injury: While not limited to, the coverage must include Violation of Privacy, Libel and Slander, False Arrest, Detention or Imprisonment and Defamation of Character.
- (e) Cross Liability/Separation of Insureds: Without increasing the limit of liability, the policy must protect all insured parties to the full extent of coverage provided. Further, the policy must apply to each Insured in the same manner and to the same extent as if a separate policy had been issued to each.
- (f) Blanket Contractual Liability: The policy must, on a blanket basis or by specific reference to the Contract, extend to assumed liabilities with respect to contractual provisions.
- (g) Employees and, if applicable, Volunteers must be included as Additional Insured.
- (h) Employers' Liability (or confirmation that all employees are covered by Worker's compensation (WSIB) or similar program)
- (i) Broad Form Property Damage including Completed Operations: Expands the Property Damage coverage to include certain losses that would otherwise be excluded by the standard care, custody or control exclusion found in a standard policy.
- (j) Notice of Cancellation: The Insurer will endeavour to provide the Contracting Authority thirty (30) days written notice of policy cancellation.
- (k) If the policy is written on a claims-made basis, coverage must be in place for a period of at least 12 months after the completion or termination of the Contract.
- (l) Owners' or Contractors' Protective Liability: Covers the damages that the Contractor becomes legally obligated to pay arising out of the operations of a subcontractor.
- (m) Non-Owned Automobile Liability - Coverage for suits against the Contractor resulting from the use of hired or non-owned vehicles.
- (n) Advertising Injury: While not limited to, the endorsement must include coverage piracy or misappropriation of ideas, or infringement of copyright, trademark, title or slogan.
- (o) All Risks Tenants Legal Liability - to protect the Contractor for liabilities arising out of its occupancy of leased premises.
- (p) Amendment to the Watercraft Exclusion to extend to incidental repair operations on board watercraft.

- (q) Sudden and Accidental Pollution Liability (minimum 120 hours): To protect the Contractor for liabilities arising from damages caused by accidental pollution incidents.
- (r) Litigation Rights: Pursuant to subsection 5(d) of the Department of Justice Act, S.C. 1993, c. J-2, s.1, if a suit is instituted for or against Canada which the Insurer would, but for this clause, have the right to pursue or defend on behalf of Canada as an Additional Named Insured under the insurance policy, the Insurer must promptly contact the Attorney General of Canada to agree on the legal strategies by sending a letter, by registered mail or by courier, with an acknowledgement of receipt.

For the province of Quebec, send to:

Director Business Law Directorate,  
Quebec Regional Office (Ottawa),  
Department of Justice,  
284 Wellington Street, Room SAT-6042,  
Ottawa, Ontario, K1A 0H8

For other provinces and territories, send to:

Senior General Counsel,  
Civil Litigation Section, Department of Justice  
234 Wellington Street, East Tower  
Ottawa, Ontario K1A 0H8

A copy of the letter must be sent to the Contracting Authority. Canada reserves the right to co-defend any action brought against Canada. All expenses incurred by Canada to co-defend such actions will be at Canada's expense. If Canada decides to co-defend any action brought against it, and Canada does not agree to a proposed settlement agreed to by the Contractor's insurer and the plaintiff(s) that would result in the settlement or dismissal of the action against Canada, then

Canada will be responsible to the Contractor's insurer for any difference between the proposed settlement amount and the amount finally awarded or paid to the plaintiffs (inclusive of costs and interest) on behalf of Canada.

### **E3 Errors and Omissions Liability Insurance**

The Contractor must obtain Errors and Omissions Liability (a.k.a. Professional Liability) insurance, and maintain it in force throughout the duration of the Contract, in an amount usual for a contract of this nature but for not less than \$1,000,000 per loss and in the annual aggregate, inclusive of defence costs.

If the policy is written on a claims-made basis, coverage must be in place for a period of at least 12 months after the completion or termination of the Contract.



The following endorsement must be included:

Notice of Cancellation: The Insurer will endeavor to provide the Contracting Authority thirty (30) days written notice of cancellation.

## **ANNEX G - PROCEDURE FOR PROCESSING UNSCHEDULED WORK**

### **1. Purpose**

The Unscheduled Work Procedure has been instituted for the following purposes:

- a. To establish a uniform method of dealing with requests for Unscheduled Work;
- b. To obtain the necessary Technical Authority approval and Contracting Authority authorization before Unscheduled Work commences;
- c. To provide a means of maintaining a record of Unscheduled Work requirements including Serial Numbers, dates, and accumulated cost the Contractor shall have a cost accounting system that is capable of assigning job numbers for each Unscheduled Work requirement so that each requirement can be audited individually.

### **2. Definitions and Particulars**

- a. An Unscheduled Work Procedure is a contractual procedure whereby changes to the scope of Work under the Contract may be defined, priced and contractually agreed to. Such changes may arise from;
  - i. "Work Arising" from opening up of machinery and/or surveys of equipment and material, or
  - ii. "New Work" not initially specified but required on the Vessel.
- b. The procedure does not allow for the correction of deficiencies in the Contractor's Proposal.
- c. No unscheduled work may be undertaken by the Contractor without written authorization of the Contracting Authority except under emergency circumstances described in Sub. Paragraph 3(b). Unscheduled Work.
- d. Work undertaken without written Contracting Authority authorization will be considered the Contractor's responsibility and cost.
- e. The appropriate PWGSC form is the final summary of the definition of the Unscheduled Work requirement, and the costs negotiated and agreed to.

### **3. Procedures**

- a. The procedure involves the electronic form PWGSC-TPSGC 1379 (10/2011) for refit and repair and will be the only form for authorizing all Unscheduled Work.
- b. Emergency measures required to prevent loss or damage to the Vessel which would occur if this procedure were followed, shall be taken by the Contractor on its own authority. The responsibility for the cost of such measures shall be determined in accordance with the terms

and conditions of the Contract.

- c. The Technical Authority will initiate a work estimate request by defining the Unscheduled Work requirement. It will attach drawings, sketches, additional specifications, other clarifying details as appropriate, and allocate their Serial Number for the request.
- d. Notwithstanding the foregoing, the Contractor may propose to the Technical Authority in writing, either by letter or some type of Defect Advice Form (this is the Contractor's own form) that certain Unscheduled Work should be carried out.
- e. The Technical Authority will either reject or accept such Proposal, and advise the Contractor and Contracting Authority. Acceptance of the Proposal is not to be construed as authorization for the work to proceed. If required, the Technical Authority will then define the Unscheduled Work requirement in accordance with Sub. Paragraph 3.(c).
- f. The Contractor will electronically submit its Proposal to the Contracting Authority together with all price support, any qualifications, remarks or other information requested.

The price support shall demonstrate the relationship between the scope of work, the Contractor's estimated costs and its selling price. It is a breakdown of the Contractor's unit rates, estimates of person hours by trade, estimate of material cost per item, for both the contractor and all of its subcontractors, estimates of any related impact and an evaluation of the contractor's time required to perform the Unscheduled Work.

- g. The Contractor shall provide copies of purchase orders and paid invoices for Subcontracts and/or materials, including stocked items, in either case. The Contractor shall provide a minimum of two quotations for Subcontracts or materials. If other than the lowest, or sole source is being recommended for quality and/or delivery considerations, this shall be noted. On request to the Contractor, the Contracting Authority shall be permitted, to meet with any proposed Subcontractor or material supplier for discussion of the price and always with the Contractor's representative present.
- h. After discussion between the Contracting Authority and the Contractor and if no negotiation is required, the Contracting Authority will seek Technical Authority confirmation to proceed by signing the form. The Contracting Authority will then sign and authorize the Unscheduled Work to proceed.
- i. In the event the Technical Authority does not wish to proceed with the work, it will cancel the proposed Unscheduled Work through the Contracting Authority in writing.
- j. In the event the negotiation involves a Credit, the appropriate PWGSC form will be noted as "credit" accordingly.
- k. In the event that the Technical Authority requires Unscheduled Work of an urgent nature or an impasse has occurred in negotiations, the commencement of the Unscheduled Work should not be unduly delayed and should be processed as follows, in either case. The Contractor will complete the appropriate PWGSC 1379 form indicating the offered cost and pass it to the Contracting Authority. If the Technical Authority wishes to proceed, the Technical Authority and the Contracting Authority will sign the completed PWGSC form with

the notation, "CEILING PRICE SUBJECT TO DOWNWARD ADJUSTMENT", and allocate a Serial Number having the suffix "A". The work will proceed with the understanding that following an audit of the Contractor's actual costs for completing the described work, the cost will be finalized at the ceiling price or lower, if justified by the audit. A new PWGSC form will then be completed with the finalized costs, signed and issued with the same Serial Number without the suffix "A", and bearing a notation that this form is replacing and cancelling the form having the same Serial Number with the suffix "A".

NOTE: PWGSC forms bearing Serial Numbers with a suffix "A" shall not to be included in any contract amendments, and therefore no payment shall be made until final resolution of the price and incorporation into the contract.

#### 4. Amendment to Contract or Formal Agreement.

The Contract will be amended from time to time in accordance with the Contract terms to incorporate the costs authorized on the appropriate PWGSC forms.

**ANNEX J – PROPOSED CLASSIFICATION SOCIETY**

This confirms that the bidder has entered into an agreement with the classification society identified below to complete the work as required in Annex A, SOR:

Name of classification society \_\_\_\_\_

Signature of authorized signatory of classification society \_\_\_\_\_

Print Name of authorized signatory of classification society \_\_\_\_\_

Print Title of authorized signatory of classification society \_\_\_\_\_

Address for authorized signatory of classification society \_\_\_\_\_

\_\_\_\_\_

Telephone no. for authorized signatory of classification society \_\_\_\_\_

Name of Bidder \_\_\_\_\_

Date signed \_\_\_\_\_

## ANNEX K - FEDERAL CONTRACTORS PROGRAM FOR EMPLOYMENT EQUITY – BID CERTIFICATION

I, the Bidder, by submitting the present information to the Contracting Authority, certify that the information provided is true as of the date indicated below. The certifications provided to Canada are subject to verification at all times. I understand that Canada will declare a bid non-responsive, or will declare a contractor in default, if a certification is found to be untrue, whether during the bid evaluation period or during the contract period. Canada will have the right to ask for additional information to verify the Bidder's certifications. Failure to comply with such request by Canada will also render the bid non-responsive or will constitute a default under the Contract.

For further information on the Federal Contractors Program for Employment Equity, visit HRSDC-Labour's website.

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

(YYYY/MM/DD)

If left blank, the date will be deemed to be the bid solicitation closing date

Complete both A and B.

A. Check only one of the following:

- ( ) A1. The Bidder certifies having no work force in Canada.
- ( ) A2. The Bidder certifies being a public sector employer.
- ( ) A3. The Bidder certifies being a federally regulated employer being subject to the Employment Equity Act.
- ( ) A4. The Bidder certifies having a combined work force in Canada of less than 100 employees (combined work force includes: permanent full-time, permanent part-time and temporary employees [temporary employees only includes those who have worked 12 weeks or more during a calendar year and who are not full-time students]).

A5. The Bidder has a combined workforce in Canada of 100 or more employees; and

- ( ) A5.1. The Bidder certifies already having a valid and current Agreement to Implement Employment Equity (AIEE) in place with HRSDC-Labour.

OR

- ( ) A5.2. The Bidder certifies having submitted the Agreement to Implement Employment Equity (LAB1168) to HRSDC-Labour. As this is a condition to contract award, proceed to completing the form Agreement to Implement Employment Equity (LAB1168), duly signing it, and transmit it to HRSDC-Labour.

B. Check only one of the following:

B1. The Bidder is not a Joint Venture.

**OR**

B2. The Bidder is a Joint venture and each member of the Joint Venture must provide the Contracting Authority with a completed annex Federal Contractors Program for Employment Equity - Certification. (Refer to the Joint Venture section of the Standard Instructions)

**ANNEX L - DIRECTORS/OWNERS OF THE BIDDER (Code of Conduct)**

<b>NAME</b>	<b>TITLE</b>



## ANNEX M – MANDATORY PROPOSAL DELIVERABLES CHECKLIST

Notwithstanding deliverable requirements specified within the bid solicitation and its associated Technical Specification (Annex A), mandatory deliverables that must be submitted with the Bidder's proposal to be deemed responsive are summarized below.

The Bidder must submit a completed Annex "M" Deliverables/ Certifications.

The following are mandatory and the Bidder's submission will be evaluated against the requirements as defined herein. The Bidder must be determined to be compliant on each item to be considered responsive.

Item	Description	Completed	Location in the bid
1	Request for Proposal document, page 1, completed and signed		
2	Annex J, Proposed Classification Society		
3	Points Rated Technical Criteria, article 4.3		
4	Mandatory Technical Criteria, article 4.2		
5	Annex L, Directors/Owners of the Bidders (code of conduct), article 5.1.1		
6	Annex K, Federal Contractors Program for Employment Equity – article 5.1.2		
7	Annex N - Former Public Servant in Receipt of a Pension, article 5.1.5.2		
8	Annex O, Work Force Adjustment Directive, article 5.1.5.3		
9	Letter stating that the Bidder can be insured, article 6.3		
10	Statement for ISO 9001-2008, Article 4.2.10		

## ANNEX N – FORMER PUBLIC SERVANT (FPS) IN RECEIPT OF A PENSION

### 5.1.5.2 Former Public Servant in Receipt of a Pension

As per the above definitions, is the Bidder a FPS in receipt of a pension? **Yes ( ) No ( )**

If so, the Bidder must provide the following information, for all FPS in receipt of a pension, as applicable:

- (a) name of former public servant;
- (b) date of termination of employment or retirement from the Public Service.

By providing this information, Bidders agree that the successful Bidder's status, with respect to being a former public servant in receipt of a pension, will be reported on departmental websites as part of the published proactive disclosure reports in accordance with **Contracting Policy Notice:**

**2012-2** and the Guidelines on the Proactive Disclosure of Contracts.

<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/A/A3025C/2>

## ANNEX O – WORK FORCE ADJUSTMENT DIRECTIVE

### 5.1.5.3 Work Force Adjustment Directive

Is the Bidder a FPS who received a lump sum payment pursuant to the terms of the Work Force Adjustment Directive? **Yes** ( ) **No** ( )

If so, the Bidder must provide the following information:

- (a) name of former public servant;
- (b) conditions of the lump sum payment incentive;
- (c) date of termination of Employment;
- (d) amount of lump sum payment;
- (e) rate of pay on which lump sum payment is based;
- (f) period of lump sum payment including start date, end date and number of weeks;
- (g) number and amount (professional fees) of other contracts subject to the restrictions of a work force adjustment program.

For all contracts awarded during the lump sum payment period, the total amount of fees that may be paid to a FPS who received a lump sum payment is \$5,000, including Applicable Taxes.

ANNEX A – STATEMENT OF REQUIREMENTS (SOR) FOR THE  
PROCUREMENT OF RETRACTABLE AZIMUTH THRUSTER SYSTEMS WITH  
ASSOCIATED EQUIPMENT, ELECTRONIC COMPONENTS, CONTROLS AND  
POWER EQUIPMENT FOR THE CCGS AMUNDSEN

Prepared by the National Vessel Life Extension Program

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## 1.0 General

### 1.1 Intent

These project requirements have been supplied to the Contractor, by Canadian Coast Guard (CCG), for the purpose of outlining the technical and performance requirements for the new Class approved Retractable Azimuth Thruster DP System, to be procured to replace the existing 1200kW HRP 6111RT Retractable Azimuth Thruster System, installed onboard the CCGS Amundsen.

The Amundsen is a Type 1200, Arctic Class 3 Medium Icebreaker, operating year-round performing Arctic Operations and Science Research.

The intent of this Statement of Requirements (SOR) is to provide information such that the Contractor, with this guidance and their own experience and knowledge, can return the Retractable Azimuth Thruster System and associated equipment to complete functionality in all respects.

The Retractable Azimuth Thruster System renewal work scope has been separated into two phases:

#### ***Phase 1***

Phase 1 involves the replacement of the following electronic components, controls, and power equipment:

- Thruster Control Bridge Consoles
- DC-AC power conversion variable frequency drives
- DP System Platform (navigation equipment is to be retained)
- Alarm and Monitoring System

Phase 1 also includes the overhaul or replacement of the two (2) existing Elettra electric drive motors.

Phase 1 will be conducted during an alongside work period at the Canadian Coast Guard Base in Quebec City.

This scope of work will consist of:

- Installation
- Testing
- Commissioning
- Dock and Sea Trials
- Crew Operations Training
- Crew Maintenance Training

Commissioning, Sea Trials will be completed in the dry-dock work period, after the replacement Thruster System mechanical components have been installed.

#### ***Phase 2***

Phase 2 of this project involves the supply of the mechanical components of the Forward and Aft Retractable Azimuth Thrusters as well as all interfacing to the existing electronic components, controls, and power equipment.

Phase 2 will be completed during a dry-dock work period.

The Thruster System mechanical components will be installed by a separate Shipyard contract with assistance from the Thruster Supplier, followed by commissioning.

All tests and trials must be conducted with CCG support and CCG crew.



The Design and Manufacturing of the Retractable Azimuth Thruster Units, electronic components and power equipment, integration to the Vessel, required modifications, and tests and trials must be in accordance with the rules and regulations of a Classification Society approved by Transport Canada Marine Safety (CS-TCMS) as per Section 2(1) of the Marine Machinery Regulations (Canada Shipping Act, 2001) and Transport Canada Marine Safety. The Approved Classification Societies under the Act are:

- American Bureau of Shipping
- Bureau Veritas
- Det norske Veritas
- Lloyds Register
- and Germanischer Lloyd

The Contractor must remove all obsolete equipment, develop all documentation in English and French, and obtain CS-TCMS and TA-CCG approval. The Contractor must manufacture all equipment in an ISO 9001:2008 facility, complete Factory Acceptance Testing prior to delivery. The Contractor must supply all equipment as prescribed in the Preliminary Schedules provided in Sections 3.4 and 4.2.

The Contractor must supply, deliver all electronic components, control systems, power, and mechanical equipment. The Contractor must interface the system with the existing equipment onboard the vessel.

The Contractor must supply and deliver the Thruster System, perform commissioning and trials, and provide crew training in the Quebec Region in English and/or French.

The Contractor must use Class approved Marine and Commercial Off the Shelf (COTS) components. All auxiliary components required to complete this installation must be designed and tested in accordance with the applicable Class standard.

The CCG supports the Government of Canada's Policy on Green Procurement which ensures that the procurement and disposal of assets is performed in a manner that protects the environment and is in support of sustainable development objectives. The Contractor must specify how they meet the guidelines published by the Government of Canada's Policy on Green Procurement as stated in the Government of Canada Supply Manual, Annex 2.2, Green Procurement: Environmental Factors and Evaluation Indicators found here:

<https://buyandsell.gc.ca/policy-and-guidelines/supply-manual/section/2/20>

All necessary surveys, inspections, designs, drawings, certification, regulatory approval, and associated deliverables required to install the Thruster System for Vessel integration must be done by a certified Naval Architect and/or Professional Engineer and submitted in English and French.

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*NOTE: The Thruster System design must fit within the existing Vessel Thruster Well footprint. The bottom plate is integral to the Vessel's Ice Class and must be included in the Thruster System design.*

*The design of all structural reinforcements will be responsibility of the Contractor. A Certified Naval Architect, employed or Sub-contracted by the Contractor, must review existing steel work and review and approve all structural reinforcements.*

*The Thruster System electrical and mechanical design must be approved by CS-TCMS and TA-CCG, prior to being finalized for Construction. All costs associated with CS-TCMS approval, certification, and Class approval for all equipment up to final commissioning will be the responsibility of the Contractor.*

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## 1.2 Vessel Particulars

Type of Vessel	Medium Icebreaker, Arctic Research Vessel
Official Number	383347
Date Built	1979, Burrard Dry-dock - Vancouver, British Columbia
Hull Shape	Monohull
Ice Class	Arctic Class 3
LOA	98.33m
LBP	87.9m
Breadth	19.51m
Maximum Draft	7.16m
Freeboard	3.7m
Maximum Speed	16 knots
Gross Tonnage	5910

## 1.3 System Background

The existing Class approved, 1200kW HRP 6111RT Retractable Azimuth Thruster System was installed on the CCGS Amundsen in 2006. The Thrusters were integrated with the Beier Radio IVSC 2000DP-1 Dynamic Positioning System Platform and Vessel Alarm and Monitoring System by Navis Controls and Techsol.

## 1.4 Existing System Technical Data

Prime Mover (Elettra)	Z-configuration, horizontal electric motor: 440VAC, 3 Phase, 60Hz
Input Power	1200kW
Input Speed	1800rpm
Reduction Ratio	5.25:1
Nominal Thrust	125kN
Propeller Diameter	1750mm
Propeller Material	Nickel Aluminum Bronze
Nozzle	19A
Lower Position	Azimuth Thruster
Upper Retracted Position	Non-operational
Time for Retracting	120s
Nominal Pressure	150bar
Max. Pump Pressure	300bar
Idle Pressure	30bar
Steering Speed	3rpm
System	Closed Loop

The CCGS Amundsen power distribution consists of:

- 6 x 2200kW Main Engines and Generators
- 2 x 5100kW DC Electric Motors, twin FP Ice Class Propellers
- 1 x 500kW Bow Thruster powered by 3 x 750 kW Ships Service Diesel-Electric Generators
- 3 Main Switchboards

The available main power source is 870VDC @ 2000ADC maximum, per Thruster.

Technical details, equipment dimensions and Vessel general arrangement drawings are available on Buy & Sell as a Technical Data Package (TDP) for the RFP.

### 1.5 Project Overview

The Contractor must be the Prime Contractor and maintain full responsibility for the complete supply of the new Retractable Azimuth Thruster System equipment, ancillaries, controls, electronics, components, control systems, power equipment and AMS. The Contractor must have previous experience with research and icebreaker Vessels, of the same class or higher, with previous success in delivering Retractable Azimuth Thrusters with DP capabilities, employing the latest available technology.

The Contractor must provide objective evidence that their production system conforms the Government of Canada's Policy on Green Procurement as stated in the Government of Canada Supply Manual, Annex 2.2, Green Procurement: Environmental Factors and Evaluation Indicators provided.

The Contractor must offer pre-project services, Vessel specific design, project services, Class approval, commissioning, sea trials, crew training and 24/7 service in English and French.

### 1.6 Deliverables Overview

The system procurement must include the delivery of the following IAW the schedules listed in Section 3.4 and 4.2:

1. Detailed engineering design, production work, FATs
2. Class approved design, engineering, and installation documentation (English and French)
3. Phase 1: Delivery of the Thruster System electronic components, controls, and power equipment to the Quebec City CCG Base
4. Phase 1: Removal of obsolete components, electronics installation, integration, servicing, and commissioning
5. Phase 2: Delivery of the Thruster System and components to the Quebec City CCG Base
6. Final Thruster System Integration, Commissioning, Dock and Sea Acceptance trials (travel TBD and paid separately)
7. Crew training (travel TBD and paid separately)
8. Supply of all spares and servicing for one (1), two (2), five (5) and ten (10) year OEM recommended maintenance intervals. The ten (10) year maintenance interval is to be a major overhaul.
9. Comprehensive list of all Spare Parts separated in their respective OEM maintenance intervals. (English and French)
10. Bill of Materials and equipment information in prescribed electronic Excel format (English and French)
11. Operations, Training and Maintenance Manuals, Red-Lined and Final Documentation Packages (English and French)

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*NOTE: The proposal for the maintenance spares must be provided in a separate table that includes the description, unit price and quantity. It must also include installation and servicing costs related to all Thruster System, electrical, mechanical, and auxiliary equipment supplied.*

*The Contractor must include an estimate of the labour rates for the given Level of Effort in order to estimate the cost for the FSR(s) to perform the OEM recommended maintenance for the next ten (10) years.*

*The cost for the spares supplied will be added to the total price by the evaluation team in the bid evaluation process.*

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## 1.7 List of Acronyms

AMS	Alarm and Monitoring System
BOM	Bill of Materials
CA	Contract Authority (PSPC)
CCG	Canadian Coast Guard
COTS	Commercial Off the Shelf
CSA	Canadian Standards Association
DC-AC	Direct Current-Alternating Current
DP	Dynamic Positioning
EC	Engineering Change
FAT	Factory Acceptance Test
HIL	Hardware in the Loop
IAS	Integrated Alarm System
IAW	In Accordance With
IEEE	Institute of Electrical and Electronic Engineers
ILS	Integrated Logistics Support
LOA	Length Overall
MCR	Machine Control Room
OEM	Original Equipment Manufacturer
PCS	Propulsion Control System
PLC	Programmable Logic Controller
PSPC	Public Services and Procurement Canada
RFP	Request for Proposal
QA	Quality Assurance
SAT	Sea Acceptance Trials
SOR	Statement of Requirements
TA-CCG	Technical Authority – Canadian Coast Guard (Owners Representative)
TBD	To Be Decided
TI	Inspection Authority – Technical Inspector
CS-TCMS	Classification Society approved by Transport Canada Marine Safety
TSR	Total System Responsibility
VFD	Variable Frequency Drive
VLE	Vessel Life Extension

## 2.0 Applicable Documents

The following documentation has been provided as guidance for this proposal. Additional information may be available upon request.

### 2.1 Government Documents

Item	Document Number	Title
1	2000-02-H-003_Rev F	Amundsen FWD Thruster Room Structure (CAD)
2	2000-02-H-005_Rev E	Amundsen AFT Thruster Room Structure (CAD)
3	2000-02-H-003_Rev F	Amundsen FWD Thruster Room Structure (pdf)
4	2000-02-H-005_Rev E	Amundsen AFT Thruster Room Structure (pdf)
5		Amundsen HRP Technical Specification
6		Amundsen HRP One Line
7		Amundsen Propulsion Armature Loop
8		Amundsen Aft Control Panel Layout
9		Amundsen Forward Control Panel Layout
10		Amundsen HRP Controls Cable Diagram
11		Amundsen HRP Hydraulic Power Pack
12		Amundsen HRP Outer Well Structure – AFT Unit
13		Amundsen HRP Outer Well Structure – FWD Unit
14		Amundsen Baldor – Connection Diagram 1600 HP Drive-1
15		Amundsen Baldor – Connection Diagram 1600 HP Drive-2
16		Amundsen Baldor – Connection Diagram 1600 HP Drive-2
17		Amundsen EMotor – Name Plate
18		Amundsen EMotor – Speed Torque
19		Amundsen EMotor - Thermal Damage
20		Amundsen EMotor - Type HS Motor Frame ET6810L WP-1 Enclosure
21		Amundsen Dynamic Positioning System Beier Radio IVCS 2000 DP-1 Manual
22		Amundsen Retractable Azimuth Thruster System Condition Assessment - November 2019
23		Government of Canada - Annex 2.2 Green Procurement Environmental Factors and Evaluation Indicators

## 2.2 Non-Government Documents

Item	Standard or Regulation	Title
1	CSA W47.1 1983	Canadian Welding Bureau Standards for the fusion welding of steel
2	CSA W47.2-M1987(R1998)	Canadian Welding Bureau Standard for the fusion welding of aluminum and aluminum alloys
3	IEEE 45	Recommended Practice for Electric Installations on Shipboard
4	IEC 60092-504	Electrical Installations in Ships – Part 504: Special Features – Control and Instrumentation
5	CSA C22.1	98 Canadian Electrical Code Standard Part I Safety Standard for Electrical Installations
6	CSA C22.2 No. 0-10	General Requirements – Canadian Electrical Code Part II
7	ULC –S102.4-1987(R1998)	Underwriters Laboratory of Canada Standard for Test for Fire and Smoke Characteristics of Electrical Wiring and Cable
8	DGTE-69 (70-000-000-EU-JA-001)	Specification for the Installation of Shipboard Electronic Equipment
9	IEC 60034-1	Rotating electrical machines: Rating and performance
10	IEC 60529	Degrees of Protection Provided by Enclosures (IP Code)
11	IEC 60533	Electrical and Electronic Installations in Ships – Electromagnetic compatibility
12	ISO 2412:1982	Shipbuilding – Colours of indicator lights
13	ISO 9001:2008	Quality Management Systems – Requirements
14	ISO 10816-6	Mechanical vibration -- Evaluation of machine vibration by measurements on non-rotating parts
15	ISO 12944	Corrosion Protection of steel structures by protective paint systems
16	MOSH	Maritime Occupational Health and Safety Regulations (MOSH)
17	SOLAS	International Convention for the Safety of Life at Sea (SOLAS), and the Canadian Supplement to the SOLAS Convention
18	Classification Society Rules	Rules of a recognized Classification Society as identified under Section 2(1) of the Marine Machinery Regulations. e.g. Lloyd’s Register Part 5 (Main and Auxiliary Machinery), Lloyd’s Register Part 6 (Control and Electrical); Lloyd’s Register’s Rules for the Manufacture, Testing and Certification of Materials
19	Canada Shipping Act 2001	Canada Shipping Act 2001 and Subsequent regulations pertaining to a ship having general as specified under Section 5.4 of this specification
20	Transport Canada TP 127E	Transport Canada TP 127E Ships Electrical Standards
21	MIL-STD-1521B	Technical Reviews and Audits for Systems / Equipment
22	PMBOK Guide – 5th Edition	Work Breakdown Structure
23	ANSI-649B: 2011	Configuration Management Plan
24	IEC 60300-3-12:2011	Dependability Management – Application Guide – Integrated Logistic Support
25	IACS Recommendation 71	Guide for the Development of Shipboard Technical Manuals
26	IACS Unified Procedure 31	Inclining Test Unified Procedure
27	IACS Electrical Installations	Test Specification for Type Approval
28	IACS Recommendation 26	List of Recommended Spare Parts
29	ASTM F1321-14	Standard Guide for Conducting a Stability Test

### 2.3 Order of Precedence

In the event of a conflict between the contents of this document and the applicable portions of the referenced technical documents, the Contractor must inform the TA-CCG of the differences and request for clarification.

Information supplied in the Statement of Requirements will hold precedence over the Annexes.

The listed standard and regulations are provided as recommended guidance documents. They have been supplied to form a minimum standard. If potential Contractors intend to apply a different standard, it must meet CS-TCMS standards and be submitted to the PSPC for TA-CCG approval.

## 3.0 Phase 1: Thruster System Electronic Components, Controls and Power Equipment Replacement / Overhaul

### 3.1 Alongside Installation

The Thruster System electronic components, controls and power equipment replacement solution must be installed while the Vessel is afloat, under the Canadian Coast Guard's custody, while docked at the Coast Guard Base in Quebec City, QC.

The Contractor must provide a list of all Subcontractors to be employed. The Contractor is the Prime Contractor and will be responsible for contracting and managing all sub-trade requirements.

### 3.2 Alongside Refit Directives

#### 3.2.1 **Occupational Health and Safety**

3.2.1.1 The Contractor and all Sub-contractors must follow Occupational Health and Safety (OHS) procedures in accordance with applicable federal and provincial OHS regulations, ensuring that Contractor activities are carried out in a safe manner and do not endanger the safety of any personnel.

3.2.1.2 The Contractor and the Contractor's employees, including any Sub-contractors must attend a safety orientation meeting of the Vessel prior to the commencement of any work in order to familiarize the Contractor's employees with Vessel specific hazards and permit systems for work protocols as well as procedures for Security, Hazard Prevention, Hazard Intervention and Pre-Job Safety Assessments. The Contractor will have access to an uncontrolled copy of the Fleet Safety and Security Manual.

3.2.1.3 The Contractor must comply with the Fleet Safety and Security Manual, DFO/5737 and shipboard work instructions in addition to the applicable Canada Labour Code regulations while performing work involving the following:

- Hot Work
- Work Aloft
- Confined Space Entry
- Gas Freeing for Entry and Hot Work
- Lock Out/Tag Out
- Pre-Job Safety Assessments

3.2.1.4 For the purpose of the Lock Out/Tag Out procedure the Contractor must supply locks and locking devices for the Contractor's employees in addition to those provided by the Chief Engineer for the Vessel's crew.

3.2.1.5 The Contractor and Contractor's employees will not have access to the Vessel's washrooms and crew mess facilities. The Contractor must provide the necessary amenities for the Contractor's and Sub-contractors employees as required.

**3.2.2 Access to Worksite**

3.2.2.1 The Contractor must ensure that all employees and Sub-contractor employees always have company identification during the contract period.

**3.2.3 Workplace Hazardous Materials Information System (WHIMS)**

3.2.3.1 The Contractor must provide the TA with Material Safety Data Sheets (MSDS) for all Contractor supplied WHIMS controlled products.

3.2.3.2 The TA-CCG will provide the Contractor with access to MSDS for all controlled products on the Vessel for all specified work items.

**3.2.4 Smoking in the Workspace**

3.2.4.1 The Contractor must ensure compliance with the Non- Smokers' Health Act. The Contractor must ensure that every employee, and any person acting on behalf of an employer, must ensure that persons refrain from smoking in any workspace under the control of the employer. The Contractor must ensure that there is absolutely no smoking onboard the Vessel.

**3.2.5 Clean and Hazard Free Worksite**

3.2.5.1 Before the Contractor starts any work on the Vessel the Contractor's Quality Assurance Representative, and the TA-CCG must walk through each space and area where work is to take place, including access and removal routes and areas adjacent to those where the work is to be done as a result of this specification. The Contractor's Quality Assurance Representative must take digital pictures of each area showing the outfit therein and download the photos in JPG format onto a USB device. Each picture must be dated and labeled as to the location on the Vessel. Copies of this USB are to be provided to the TA-CCG for reference purposes within 48 hours of the start of the contract.

3.2.5.2 The Contractor, during the work period must maintain those areas of the Vessel which Contractor personnel use to access those areas where work is to be undertaken, in a clean condition, free from debris and remove garbage daily.

3.2.5.3 Areas that pose a hazard as a result of the specification work are to be secured and clearly identified by the Contractor with signage to advise and protect all personnel from the hazard in accordance with applicable Canada Labour Code requirements.

3.2.5.4 Upon completion of this contract, the Contractor must be responsible for the removal of all garbage generated from the work of this specification and for returning the Vessel to the state of cleanliness in which the Vessel was at the start of the contract period.

3.2.5.5 Once all known work and final clean-up has been completed the Contractor's QA Representative, the TA must perform a 'walk through' of the Vessel to view all areas where work was performed by the Contractor. Any deficiencies or damage noted must be recorded and compared to the photos and if deemed to have been caused by the Contractor as a result of the work the damage must be repaired by the Contractor at no cost to the Coast Guard.



### **3.2.6 Fire Protection**

3.2.6.1 The Contractor must ensure the isolation, removal and installation of fire detection and suppression systems or any components thereof, is performed by a qualified technician. When the fire detection or fire suppression system is deactivated or disabled by the Contractor during the contract, the system(s) must be recertified by a qualified technician as fully functional. A signed and dated original copy of the certificate must be delivered to the TA before the end of the contract.

3.2.6.2 The Contractor must notify the TA and obtain written approval from the TA prior to disturbing, removing, isolating, deactivating / disabling, or locking out any part of the fire detection or suppression systems, including heat and smoke sensors.

3.2.6.3 The Contractor must always ensure protection against fire, including when working on the Vessel's fire detection and / or suppression system(s). This may be accomplished as suggested below and only with the written permission of the TA:

- Disabling only one portion of a system at a time.
- By maintaining system function using spares while work is in progress.
- Other means acceptable to and approved by the TA.

3.2.6.4 The Contractor must note that failure to take the necessary precautions while performing work on the Vessel's fire suppression system(s) could result in the accidental discharge of the fire suppression agent(s). The Contractor must recharge and certify at their cost, container(s) or systems that are discharged as a result of such work.

### **3.2.7 Touch-up / Disturbed Paint**

3.2.7.1 Unless stated otherwise, all new or disturbed steelwork must have two coats of marine primer, compatible with the Vessel's existing coating schedule.

3.2.7.2 The Contractor must prepare all new and disturbed steelwork to the paint manufacturer's standards prior to painting.

### **3.2.8 CCG Employees and Others on the Vessel**

3.2.8.1 CCG/DFO employees and other personnel such as Manufacturer's representatives and/or TCMS or Class surveyors may carry-out other work including work items not included in this specification, onboard the Vessel during this work period. Every effort will be made by the TA-CCG to ensure this work and the associated inspections and/or surveys do not interfere with the Contractor's work. The Contractor will not be responsible for coordinating the related inspections or payment of inspection fees for this work unless otherwise specified.

### **3.2.9 Test Results and Data Book**

3.2.9.1 The Contractor must develop a Test and Trials Plan which must include as a minimum, all tests and trials stated in the specification. This plan must be provided for TA-CCG review, 2 week(s) prior to the originally scheduled Tests and Trials commencement.

3.2.9.2 All tests, measurements, calibrations, and readings must be recorded, signed by the person taking the measurements, dated, and provided in report format both in hard copy and electronic format on USB, to the TA-CCG and TCMS.

3.2.9.3 Recorded dimensions must be to a precision of three decimal places (unless otherwise stated) in the measuring system currently in use on the Vessel.

3.2.9.4 The Contractor must provide to the TA-CCG calibration certificates for all instrumentation used in the Test and Trials Plan showing that the instruments have been calibrated in accordance with the Manufacturer's instructions.

3.2.9.5 Hard copy reports must be bound, type written on letter size paper and indexed by specification number. Electronic copies must be in unprotected Adobe PDF format, except for drawings which will be in AutoCAD format and provided on USB media. The Contractor must provide 3 hard copies and 1 electronic copy of all reports.

3.2.9.6 All documentation from the contract period must be inserted in a data book and delivered to the TA on completion of the contract.

### **3.2.10 Contractor Supplied Materials and Tools**

3.2.10.1 The Contractor must ensure all materials are new and unused.

3.2.10.2 The Contractor must ensure replacement material such as jointing, packing, insulation, small hardware, oils, lubricants, cleaning solvents, preservatives, paints, coatings etc. are in accordance with the equipment manufacturer's drawings, manuals and/or instructions and are approved for use by TCMS and TA-CCG. The Contractor is responsible for all costs ensuring materials meet TCMS and TA-CCG requirements.

3.2.10.3 Where no item is specified or where a substitution must be made, the TA-CCG must approve the substituted item in writing. The Contractor must provide information about materials used, certificate of grade and quality of various materials to the TA prior to use. The Contractor is responsible for all costs ensuring materials meet TCMS and TA-CCG requirements.

3.2.10.4 The Contractor must include in their bid all cost associated with all equipment, devices, tools, and machinery such as cranes, staging, scaffolding, and rigging necessary for the completion of the work in this specification.

3.2.10.5 The Contractor must include in their bid all cost associated with providing waste disposal services for any oil, oily waste or other hazardous or controlled waste generated by the work of this specification. The Contractor must provide waste disposal certificates for all the above generated waste and the disposal certificates must indicate that the disposal was in accordance with Federal, Provincial and Municipal regulations in effect.

### **3.2.11 Government Supplied Materials and Tools**

3.2.11.1 The Contractor must include in their bid all cost associated with tools supplied.

3.2.11.2 Where tools are supplied by the TA-CCG they must be returned by the Contractor in the same condition as when they were borrowed. Borrowed tools must be inventoried and signed for by the Contractor on receipt and return to the TA-CCG. Any costs associated with repairs to borrowed tools are the responsibility of the Contractor.

3.2.11.3 Any Government supplied material (GSM) must be received by the Contractor and stored in a secure warehouse or storeroom having a controlled environment appropriate for the equipment as per manufacturer's instructions. Any costs associated to material while in Contractor's possession is Contractor's responsibility.

### **3.2.12 Restricted Areas**

3.2.12.1 The Contractor must discuss with the TA-CCG to determine if Vessel spaces are out of bounds.

3.2.12.2 The Contractor must give the TA-CCG 24 hours advance notice prior to working in any accommodation areas or office spaces. This will allow CCG adequate time to move personnel and secure the areas.

### **3.2.13 Contractor Inspections and Protection of Equipment and the Worksite**

3.2.13.1 The Contractor must coordinate an inspection with the TA-CCG on the condition and location of items to be removed prior to carrying out the specified work or to gain access to a location to carry out the work.

3.2.13.2 The Contractor must repair or replace any item so damaged in this process. Materials used in any replacement or repairs must meet the criteria for Contractor supplied material noted above in Section 3.2.10.

3.2.13.3 The Contractor must protect all equipment and surrounding areas from damage. Work areas are to be protected from the ingress of water, welding, and blasting grit, etc. Temporary covers to work areas must be installed.

### **3.2.14 Recording of Work in Progress**

3.2.14.1 The TA-CCG may record any work in progress using various means including, but not limited to photography and video, digital or film.

### **3.2.15 List of Confined Spaces**

3.2.15.1 The Contractor may request a list of the Vessel's identified confined spaces at the Pre-Refit meeting.

### **3.2.16 Lead Paint and Paint Coatings**

3.2.16.1 The Contractor must not use lead-based paints.

3.2.16.2 CCG Vessels have been painted with lead-based paints in the past and as a result some of the Contractor's processes such as grinding, welding, and burning may release this lead from the coatings. The Contractor must ensure that work areas are tested for lead content and that the work is performed in accordance with applicable regulations.

3.2.16.3 The Contractor must provide HC product approval for underwater hull surface paints controlled by HC and the Pest Management Regulatory Agency.

### **3.2.17 Asbestos Containing Materials**

3.2.17.1 The Contractor must not use any asbestos containing materials.

3.2.17.2 Handling of any asbestos containing materials must be performed by personnel trained and certified in the removal of asbestos in accordance with Federal, Provincial and Municipal regulations in effect and in accordance with the Fleet Safety and Security Manual. The Contractor must provide the TA-CCG with disposal certificates for all asbestos containing material removed from the Vessel

indicating that the disposal was in accordance with Federal, Provincial and Municipal regulations in effect.

### **3.2.18 Removed Materials and Equipment**

3.2.18.1 All removed equipment as a result of this specification must be disposed of by the Contractor as per applicable provincial regulations unless specified by the TA-CCG or Chief Engineer.

### **3.2.19 Welding Certification**

3.2.19.1 For any work requiring the application of fusion welding for steel structures the Contractor and/or the sub-contractor welders must be certified by the Canadian Welding Bureau in accordance with CSA Standards W47.1-03, latest revision – Certification of Companies for Fusion Welding of Steel Division 2 Certification as a minimum. Current copies of certification must be provided to the TA-CCG.

### **3.2.20 Electrical Installations**

3.2.20.1 All electrical installations and repairs must be carried out in accordance with the latest revisions of Transport Canada Marine Safety Electrical Standard TP127E and IEEE Standard 45 Recommended Practice for Electrical Installation on Ships.

## **3.3 Electronic Components, Controls and Power Equipment Requirements**

The Thruster System electronic components, controls and power equipment replacement must meet the following objectives:

- Replace the Thruster System electronic components and controls to ensure supportability and operational continuity for a minimum period of ten (10) years.
- Replace, interface, and provide commissioning for the:
  - Automation and Control System
  - DC-AC Power Conversion Variable Frequency Drives (VFDs)
  - DP System Platform (maintaining the navigation equipment onboard)
  - Alarm and Monitoring System
- Overhaul or replace the existing two (2) electric drive motors.

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*NOTE: The Contractor has the option to overhaul the existing motors for application or replace the electric drive motors to accommodate their design. All costs for both overhaul and/or replacement must be provided in response to the RFP.*

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The replacement and commissioning must be approved by one (1) of the Classification Societies approved by Canada TCMS and TA-CCG. The electronics, controls and power equipment must be factory tested in the presence of a Classification Society Surveyor and TA-CCG for the purpose of obtaining a Classification Society Inspection Certificate.

The electronic components, controls and power equipment must be supplied with modern PLC based controls, AMS and safety systems that are Type Approved by an approved Classification Society as identified in Section 2(1) of the Marine Machinery Regulations under the Canada Shipping Act (2001) and TA-CCG.

The Contractor must deliver local technical support and a full operations and maintenance training course on the electronics and components, DC-AC power conversion VFDs, DP System, AMS and electric drive motors to the CCG in French and English.

The Contractor is responsible to secure all information, details, devices, wiring and dimensions from the Vessel and ensure that they are accurate.

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*NOTE: All costs associated with the development of the Thruster System electronic components, controls and power equipment design and installation, after the Electrical Survey scheduled by the CCG, will be at the Contractor's expense.*

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### 3.4 Electronic Components, Controls and Power System Delivery and Installation Preliminary Schedule

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*NOTE: The Contractor must generate a Preliminary Schedule against the Vessel's availability schedule provided below. This schedule is considered tentative and the CCG will work with the successful Bidder to determine an achievable schedule.*

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Milestone	Deliverable	Date
1	Preliminary Delivery Schedule	In response to the RFP
2	The Contractor must be available for a Set to Work meeting prior to beginning design work.	Within one (1) month of Contract Award
3	Preliminary Design Documents, provided to the TA-CCG for review and approval, IAW Section 7: <ul style="list-style-type: none"> <li>• Electronic components, controls and power equipment complete system design and testing</li> <li>• Technical Specifications for electronics, controls, and power equipment</li> <li>• General Arrangements, Equipment Layout, Electrical One Line Diagram, Electrical Wiring Schematics, Cabling Diagrams, System Block Diagrams, Cable Schedules</li> <li>• System interconnection drawings and Engineering Change and Integration drawings with all non-OEM components</li> <li>• Control System interface and connections, User interface</li> <li>• Alarm and Monitoring System (AMS) design and documentation</li> <li>• Power Supply Arrangement</li> <li>• Description of safety functions</li> <li>• Installation and Lifting Plans</li> <li>• Service and Repair Plan for the electric drive motors</li> <li>• Obsolete Component Removal Plans</li> </ul>	Within four (4) months of Contract Award

4	<p>Partial Design Documentation Package, provided to the TA-CCG for review and approval, IAW Section 7:</p> <ul style="list-style-type: none"> <li>• Operations Manual</li> <li>• Commissioning Procedures</li> <li>• Training Manual</li> <li>• Maintenance Manual</li> <li>• Factory Acceptance and Site Acceptance Test Plans</li> <li>• Electric Motors Proof of Performance Criteria</li> <li>• Document Management Plan</li> <li>• Quality Assurance Management Plan</li> </ul>	Within four (4) months of Contract Award
5	<ul style="list-style-type: none"> <li>• Bill of Materials Spreadsheet and Spare Parts List, IAW Section 7.6, provided to the TA-CCG for review and approval.</li> <li>• Spare Parts List must reflect quantities to meet the first ten (10) years of the OEM recommended maintenance schedule.</li> </ul>	Within four (4) months of Contract Award
6	<p>Installation Work Period:</p> <ul style="list-style-type: none"> <li>• Removal of obsolete components</li> <li>• Electronic components, controls, and power equipment replacement complete</li> <li>• Electric Motor Replacement or Overhaul</li> <li>• System Commissioning</li> </ul>	October 2020 – December 2020
7	Factory Acceptance Test Certificates, Motor Performance Reports and Regulatory Class Inspection documentation, provided to the TA-CCG for approval, IAW Section 7.9.	October 2020
8	As-Fitted Red-Lined Documentation Package, provided to the TA-CCG for approval, IAW Section 7.10.5.	Est. September 2021
9	<p>Final Commissioning</p> <p>Certification by a Classification Society that is recognized by Canada and by TCMS in Section 2(1) of the Marine Machinery Regulations and TA-CCG approval.</p>	Est. December 2021
10	<ul style="list-style-type: none"> <li>• Delivery of Spare Parts.</li> <li>• Crew Training – Electronics, Controls and Power Equipment Operations and Maintenance, IAW Section 7.5. Location: Quebec City, QC.</li> </ul>	Within one (1) month of final commissioning and acceptance by TA-CCG
11	Final Documentation Package, provided to the TA-CCG for review and approval, IAW Section 7.10.6.	Within one (1) month of final commissioning and acceptance by TA-CCG

### 3.5 Electronic Components, Controls and Power Equipment Replacement Technical Requirements

The Contractor must design and deliver a replacement, minimal risk solution for the Thruster System electronic components, controls and power equipment fitted to the CCGS Amundsen.

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*NOTE: The equipment is to fit within the existing Vessel support structure and maximize the use of the existing cables and navigation equipment.*

*The Contractor will be responsible for all costs up to final commissioning, associated with equipment certifications and CS-TCMS Class Approvals.*

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The following equipment must be replaced with high quality Marine components:

- Thruster System electronic components and controls on the Bridge:
  - Autonomous, integrated automation control system with manual controls, alarms, lights and indicators
  - New Thruster control interfacing
  - Electrical scope between equipment
  - Thruster control power UPSs
  - Thruster infrastructure PLC I/O
  - DP System controls, software, and interface modules
  - Drive Motor Panels
  - AMS Stations
- Integrated Propulsion Mimic Panels, Thruster System Start and Transfer Controls and AMS Stations in the Machine Control Room (MCR)
- DC-AC power conversion variable frequency drives, controllers and AMS in the Propulsion Control Room
- Electric drive motors and speed/position encoders

The DC-AC power conversion variable frequency drives are to be delivered with the latest available technology, pre-assembled in cabinets for installation. The cabinets must fit within the existing DC-AC power conversion and variable frequency drive footprint, 2315mm x 2213mm x 816mm. The cabinets must be equipped with transport bars, brackets and lifting hooks.

The existing Beier Radio IVSC 2000DP-1 Dynamic Positioning System, with DP-1 capability, must be replaced with a fully functional DP System Platform with interface to:

- New Retractable Azimuth Thruster Control System
- Bow Thruster Control System
- Existing navigation equipment
- Auxiliary equipment I/O's
- Alarm and Monitoring System (AMS)

All information required to offer an optimum DP Platform must be developed and programmed into the DP System solution.

All required cabling, wiring and associated parts for the electronics components and power equipment replacement to complete the scope of work must be supplied by the Contractor. The communication between all components is to be provided by the Contractor.

The existing electrical cables and conductors may be kept and adapted to the new control system, providing that all statutory requirements have been met. The Contractor is to verify the suitability and condition of any cables to be reused.

It is the Contractor’s responsibility to identify all Engineering Changes (EC) to be made so that the new electronic system integrates and functions seamlessly to the existing Vessel systems and new Thruster System controls, mechanical assembly, HPU, ECU and controls replacement.

The Contractor must produce a final set of combined engineering drawings in English and French, for the Thruster System and electronics.

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*NOTE: The following requirements serve as the minimum requirements for the electronic components, power equipment replacement and electric motor overhaul.*

*The Contractor’s response to the RFP must indicate how each requirement listed below is achieved or exceeded.*

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**3.5.1 Electronic Components, Controls and Power Equipment Replacement**

Item	Requirement
1	<p>The replacement must include, as a minimum, the following:</p> <p><u>Bridge Integrated Electronic Controls</u></p> <ul style="list-style-type: none"> <li>• Vessel’s Integrated Automation System (IAS) interface to: <ul style="list-style-type: none"> <li>○ Power/Energy Management System (hardwired)</li> <li>○ DP System Platform (hardwired)</li> <li>○ UPS System (hardwired)</li> <li>○ External Command Transfer System (hardwired)</li> <li>○ DC-AC Drives (hardwired)</li> <li>○ Electric Motors (hardwired)</li> <li>○ Autopilot System (hardwired)</li> <li>○ Joystick (hardwired)</li> <li>○ Bridge Alarm System (hardwired)</li> <li>○ Alarm AMS (Modbus RS 485)</li> <li>○ Speed Log/GPS (NMEA 0183)</li> <li>○ Remote Access (Ethernet)</li> </ul> </li> <li>• Redundant System with self-diagnostics, HIL testing, monitoring, hold area/electronic anchor, minimum power consumption and instant DP control</li> <li>• Customizable Control Modes</li> <li>• Local Thruster Controls, Transfer to DP Control, DP Controls</li> <li>• Emergency Stops</li> <li>• Ethernet Architecture</li> <li>• All individual alarms</li> <li>• UPSs</li> </ul> <p><u>Bridge and Machine Control Room AMS Stations</u></p> <ul style="list-style-type: none"> <li>• AMS high quality touch screens with an interface to IAS</li> <li>• Customized and selectable, including:</li> </ul>



Item	Requirement
	<ul style="list-style-type: none"> <li>○ Power Consumption</li> <li>○ Speed and Pitch Indication</li> <li>○ Thruster Position in degrees of rotation</li> <li>○ Thruster Overload</li> <li>○ Hydraulic Oil Low</li> <li>○ High Temperature</li> </ul> <p><u>Machine Control Room Controls and Monitoring Supervision Station</u></p> <ul style="list-style-type: none"> <li>● Power Available</li> <li>● Propulsion Power Limit Active</li> <li>● Unit Deployed and Coupled to Drive</li> <li>● Hydraulics On</li> <li>● Cooling Valves Open, Pump On</li> <li>● System Pitch at Zero, Unit Centered</li> <li>● Power On, Thruster Ready</li> <li>● Transfer to Bridge Controls</li> <li>● Propulsion Mimic Panels</li> </ul>
2	<p><u>DC-AC Power Conversion VFDs</u></p> <ul style="list-style-type: none"> <li>● Integrated air-cooled system</li> <li>● Interface to Vessel's AMS &amp; Controls</li> <li>● Interface to Vessel's propulsion DC network</li> <li>● Interface to Thruster Electric motors</li> <li>● Control cabinets IP44, bottom cable entry, 3 x 440V/60Hz</li> </ul> <p>The power, speed and ramp rate must be developed to be compatible with the power conversion VFDs and electric drive motors.</p>

### 3.5.2 Electric Motor Overhaul

Item	Requirement
1	<p>If the Contractor intends to use the existing motor, the maintenance must include, at a minimum, the following overhaul work scope for the two (2) electric motors:</p> <ul style="list-style-type: none"> <li>● Visual Inspections – Inspect for signs of corrosion and dirt buildup on individual components, observation of motor windings for overheating. Maintain that relays and contacts are dust and rust free.</li> <li>● Motor Winding Test – Disassemble motor and conduct a motor winding test for winding anomalies or failures. Test the wind insulation.</li> <li>● Bearing Replacement – Perform bearing and motor alignment. Monitor for overheating.</li> <li>● Vibration and Insulation Tests</li> <li>● Infrared Thermography – Determine thermal pattern and maximum temperature for motor operation. Ensure there is enough air flow, insulation, voltage stability and there has not been any degradation to the stator.</li> <li>● Ensure electrical protection is in place.</li> <li>● Assess cooling system effectiveness.</li> <li>● Replace heavy-duty speed/position encoders with latest technology and onboard diagnostics.</li> </ul>

Item	Requirement
	<ul style="list-style-type: none"> <li>• Review motor control mechanism connection to power source, direct on-line starter, relays, and automatic starts and stops. Ensure the following features: start in low voltage conditions, speed and reverse control operations, protection from over current and overload faults, speed control and motor torque.</li> <li>• Assess condition of auto transformer cabinet: automatic and remote start, ammeter, hour counter, indication lamp “heater on”, emergency stop.</li> <li>• Service, chemical clean and repair all parts as required.</li> <li>• Document all findings, tests, servicing, and repairs.</li> <li>• Produce a Spares List in Excel format (English and French).</li> <li>• Produce a Predictive Maintenance Schedule (English and French).</li> </ul>

#### 4.0 Phase 2: Retractable Azimuth Thruster System Replacement

##### 4.1 General Thruster System Design Requirements

The new Retractable Azimuth Thruster System and ancillaries must meet the following objectives:

1. Produce an effective nominal thrust of 85kN or higher, per Thruster.
2. IACS Ice Class ABS IC or equivalent.  
(IACS Ice Class ABS 1C equivalent classes may be referenced under Item 4 of the ASPPR Type Ship Equivalencies Table found here: <https://www.tc.gc.ca/eng/marinesafety/tp-tp13670-tables-2154.htm>)
3. Maximum capacity permissible to fit within the available space envelope currently used by the existing Thruster System and ancillary equipment (as defined by the supplied GA’s), utilizing the existing electrical power supply.
4. Sustainable and supportable for a minimum period of ten (10) years.
5. Fully automated, self-aligning, with sensor technology and AMS.
6. Installed through bottom of the Vessel, by way of the existing Thruster Wells.
7. Power transmission to couple to existing electric drive motors – please refer to Section 3.3, Electronic Components, Controls and Power Equipment Requirements.
8. Applies environmentally friendly lubricants, gear box oils, and hydraulic fluids.

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*NOTE: The CCG’s intent is to procure a production model. It is understood that the production model may have to be modified to fit within the available space envelope of the Vessel. All modifications to the production model are to be disclosed in response to the RFP.*

*The Contractor must ensure that the bottom plate weight is accounted in the design. All structural reinforcements are the responsibility of the Contractor. The reinforcements must be approved by a certified Naval Architect and/or Professional Engineer as well as the TA-CCG.*

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The Contractor must provide a descriptive operating philosophy for the new Thruster System and all drawings must be approved by Class and TA-CCG.

The Contractor must be able to deliver a full operations and maintenance training course on the Thruster System to the CCG in French or English.

The Contractor must be available to commission the Thruster System during the dry-dock Shipyard installation.

The new Thruster System design, installation plans, and commissioning must be approved by one (1) of the Classification Societies approved by Canada TCMS and TA-CCG. The Thruster System must be factory tested in the presence of a Classification Society surveyor for the purpose of obtaining a Classification Society Inspection Certificate.

The Thruster System must be supplied with modern PLC based controls, AMS and safety systems that are Type Approved by an approved Classification Society as identified in Section 2(1) of the Marine Machinery Regulations under the Canada Shipping Act (2001) and TA-CCG.

The Contractor is responsible to secure all information, details, devices, wiring and dimensions from the Vessel and ensure that they are accurate.

#### 4.2 Thruster System Preliminary Delivery Schedule

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*NOTE: The Contractor must generate a preliminary schedule against the schedule provided below. This schedule is considered tentative and the CCG will work with the successful Bidder to determine an achievable schedule.*

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Milestone	Deliverable	Date
1	Preliminary Delivery Schedule Preliminary Design Documentation, provided to the TA-CCG for review and approval, IAW Section 7 <ul style="list-style-type: none"> <li>• Thruster General Arrangements – AutoCAD format</li> <li>• Equipment Layout, Equipment Weight, Electrical One-Line Diagram, Cabling Diagram</li> <li>• Thruster Technical Specifications</li> <li>• Control System Interface and Connections: Thruster select, RPM/pitch command/feedback, Thruster Azimuth command/feedback, DP standard signals, analog IN/OUT signals, digital IN/OUT signals, Modbus</li> <li>• Power Interface and Connections: Bus tie/generator breaker status, generator KW load indication, Thruster breaker status, Thruster load feedback, Modbus</li> <li>• Alarm and Monitoring System (AMS) Inputs/Outputs</li> </ul>	In response to the RFP
2	The Contractor must be available for a Set to Work meeting prior to beginning design work.	Within one (1) month of Contract Award
3	Preliminary Design Documentation, provided to the TA-CCG for review and approval, IAW Section 7: <ul style="list-style-type: none"> <li>• Technical Specifications for Thruster System</li> <li>• Drawings: General Arrangements, Equipment Layout, Electrical One-Line and Cabling Diagram</li> <li>• System interconnection drawings and Engineering Change and Integration drawings with all non-OEM components</li> <li>• Cable Schedules, Equipment Transit Routes</li> <li>• Installation and Lifting Instructions</li> </ul>	Within six (6) months of Contract Award

	<ul style="list-style-type: none"> <li>• Document Management Plan</li> <li>• Quality Assurance Management Plan</li> <li>• Factory and Trial Acceptance Test Plans</li> </ul>	
4	CS-TCMS certified and approved Retractable Azimuth Thruster System Vessel Design and Engineering Change Specifications and Integration Packages, provided to the TA-CCG for review and approval, IAW Section 7.10.5.	Within twelve (12) months of Contract Award
5	CS-TCMS certified and approved Retractable Azimuth Thruster System Installation Packages, provided to the TA-CCG for review and approval, IAW Section 7.10.3.	Within twelve (12) months of Contract Award
6	Thruster Control Stations for the Bridge supplied with Technical Data, Installation Instructions and Dimensional Drawings, provided to the TA-CCG for review and approval.	Within twelve (12) months of Contract Award
7	Factory Acceptance Test Plans provided to the TA-CCG for review and approval, IAW 7.10.1.	Within twelve (12) months of Contract Award
8	Factory Acceptance Test Certificates and Class Inspection documentation provided to the TA-CCG for review and approval, IAW Section 7.9.	Within twelve (12) months of Contract Award
9	<p>Partial Documentation Package, provided to the TA-CCG for review and approval, IAW Section 7.10:</p> <ul style="list-style-type: none"> <li>• Dock Trials and Sea Trial Plans</li> <li>• Operations Manual</li> <li>• Commissioning Procedures</li> <li>• Training Manual</li> <li>• Maintenance Manual</li> </ul>	Within twelve (12) months of Contract Award
10	<ul style="list-style-type: none"> <li>• Bill of Materials Spreadsheet and List of Spare Parts List, provided for review and approval to the TA-CCG, IAW Section 7.6.</li> <li>• Spare Parts List must reflect quantities to meet the first ten (10) years of the OEM recommended maintenance schedule.</li> </ul>	Within twelve (12) months of Contract Award
11	Certification by a Classification Society that is recognized by Canada and by TCMS in Section 2(1) of the Marine Machinery Regulations, IAW Section 7.9.	Within twelve (12) months of Contract Award
12	<p>Thruster System Delivery, complete with assembled:</p> <ul style="list-style-type: none"> <li>• 2 x Retractable Azimuth Thruster in Z-configuration</li> <li>• 2 x Hydraulic Power Units with skids, vibration mountings</li> <li>• 2 x Electronic Control Units with skids, vibration mountings</li> <li>• 2 x Mechanical Coupling Arrangement (from Thruster to Electric Drive Motors)</li> <li>• Outer well structures, top flanges, cover plates and structural piece</li> <li>• Integration, hardware/software, and equipment including required systems transition pieces</li> <li>• Automated Controls, Instrumentation and Equipment</li> <li>• Alarm and Monitoring System</li> <li>• Programming instructions and copies of programs for all PLCs and control units</li> <li>• Interface to Auxiliary Equipment, Onboard Systems and fitted AMS</li> </ul>	September 2021

13	Final Commissioning  Certification by a Classification Society that is recognized by Canada and by TCMS in Section 2(1) of the Marine Machinery Regulations and TA-CCG approval.	Est. December 2021
14	As-Fitted Red-Lined Documentation Package, IAW Section 7.10.5.	Within one (1) week of commissioning the Thruster System and acceptance by TA-CCG
15	<ul style="list-style-type: none"> <li>• Delivery of Spare Parts.</li> <li>• Crew Training – Thruster System Operations and Maintenance, IAW Section 7.5. Location: Quebec City, QC.</li> </ul>	Within one (1) month of commissioning the Thruster System and acceptance by TA-CCG
16	Final Documentation Package, IAW Section 7.10.6	Within one (1) month of commissioning the Thruster System and acceptance by TA-CCG

#### 4.3 Retractable Azimuth Thruster System Replacement Technical Requirements

The Contractor must design and deliver a completely integrated, minimal risk, replacement Retractable Azimuth Thruster Systems for the currently fitted Retractable Azimuth Thruster Systems fitted to the CCGS Amundsen.

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*NOTE: The CCG intends to maintain the existing Thruster wells and support structure to retain the Vessel Ice Class.*

*The Contractor must examine the structure, cover plates, outer wells, and flanges for re-use. The Contractor must ensure the weight of the hull plate is included in the Thruster System structural design.*

*The approximate dimensions of the existing Thruster Well are 1884mm x 2220mm x 2355mm. The equipment shall be delivered to allow access into the existing compartment without modifications.*

*Direct access into the compartment is limited to the following dimensions: Deck hatches at 762mm x 732mm and doorways of 762mm x 1600mm.*

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The Thruster System design must:

- Produce an effective nominal thrust of 85kN or higher, per Thruster.
- Meet IACS Ice Class ABS IC or equivalent and be certified by one of the classified societies in IACS.
- Be supplied with a hull cover plate that meets the Vessel’s Ice Class requirements.
- Be delivered pre-drilled with necessary bolt holes. The Thruster structural components must be supplied with transport bars, brackets and lifting eyes for shackles.
- Be fully automated and hydraulically retractable, allowing 360° rotation.
- Be delivered pre-assembled, in retracted position, fitted to top flanges and brackets.
- Be designed such that all equipment can be installed through the existing bottom hull opening.
- Be provided watertight integrity and be fitted with backup seal system for safety.
- Be supplied with an electrical protection system.
- Have mechanical locking capabilities in both the retracted and deployed operating positions.
- Be equipped with an automated mechanical guide system, with sensors and AMS.
- Be programmed to automatically align the Thrusters for full retraction, with the cover plate closing and sealing to the hull structure.

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*NOTE: The following requirements serve as the minimum requirements for the Thruster System replacement. The Contractor’s must indicate how each requirement listed below is achieved or exceeded.*

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Item	Requirement
1	Thruster System: <ul style="list-style-type: none"> <li>• Effective nominal thrust of 85kN or higher, per Thruster.</li> <li>• The Thruster must meet IACS Ice Class ABS IC or equivalent and be certified by one of the classified societies in IACS.</li> <li>• The Thruster equipment must be delivered in assemblies/sub-assemblies to permit installation through the bottom of the Vessel, by way of the Thruster well</li> <li>• Paint: 2-component, multi-layer coating, suitable for operations in saltwater</li> <li>• Equipped with underwater support bars and top flange, arranged to give the thruster full support while lowering, and to counteract the thrust forces in the lower operating position</li> <li>• Upper support brackets fitted with hydraulic operated lock-hooks, to prevent the thruster from uncontrolled lowering in its retracted position</li> <li>• Capable of operating in conditions where ice may be encountered</li> <li>• Heavy-duty hydraulic cylinders with steel chromium-plated rods to accomplish the vertical travel of the thruster</li> <li>• Hydraulic Power Units (HPUs), Electronic Control Units (ECUs), Control Cabinets and auxiliary equipment delivered complete with internal wiring, mounted on a skid</li> <li>• All Thruster System ancillary external cabling and wiring, piping and cable glands, hydraulic hoses (loose delivered) according to SAE/ISO/DIN standards</li> </ul>

Item	Requirement
2	Retracting System: <ul style="list-style-type: none"> <li>• Time for Lowering &lt; 300 s</li> <li>• Time for Retracting &lt; 300 s</li> <li>• Automated and self-aligning</li> <li>• Max. ship speed during lowering/retracting not less than 4 knots</li> <li>• Transiting speed with the Thrusters deployed is not less than 6 knots</li> <li>• Retractable steering gearbox foundation, hydraulic cylinders, inboard guiding system, outboard guiding system and locking arrangement</li> </ul>
3	Fixed Pitch Propeller (FPP): <ul style="list-style-type: none"> <li>• Propeller Material: IACS Ice Class ABS IC or equivalent</li> <li>• Blade Finishing: IACS Ice Class ABS IC or equivalent</li> <li>• Protected by an anode system</li> </ul>
4	Nozzle: <ul style="list-style-type: none"> <li>• Upper bolted connection to steering pipe</li> <li>• Lower bolted connection to propeller gearbox</li> <li>• Steel Grade A material with Stainless Steel 316L or equivalent inner plating</li> <li>• Support brackets for mounting hull closing plates</li> </ul>
5	Propeller Gearbox: <ul style="list-style-type: none"> <li>• Gearbox Material: Cast Iron</li> <li>• Spiral Bevel Gears: Case Hardened, finished to Class 6 (ISO17485, DIN 3965)</li> <li>• Bearings: Anti-Friction</li> </ul>
6	Propeller Shaft Sealing System: <ul style="list-style-type: none"> <li>• Mechanically protected with a rope guard fitted between the propeller gearbox and propeller hub</li> <li>• Accessible for maintenance without dismounting the gearbox</li> <li>• All drainage contained and protected from the risk of leakage</li> </ul>
7	Transmission Shafting and Motor Coupling Arrangement: <ul style="list-style-type: none"> <li>• Z-configuration, floating shaft (from Thruster to existing Electric Drive Motors):               <ul style="list-style-type: none"> <li>○ Flange fit to the existing electric motor output shaft</li> <li>○ Intermediate shaft in two bearing blocks</li> <li>○ Pin-coupling to engage to the input shaft of the Thruster upper gearbox when the Thruster is fully lowered</li> <li>○ Air operated disc type holding brake with calipers</li> <li>○ Quick connect clutch, automated with ECU</li> <li>○ Hydraulic actuators for engaging and disengaging the coupling</li> </ul> </li> <li>• Gaskets for the flange, including the necessary fasteners (loose delivered)</li> </ul>
8	Lubrication: <ul style="list-style-type: none"> <li>• All mechanical components supplied with a pressure oil circulation and filtration system that mitigates contamination</li> <li>• Lubrication pump set: electric drive, fan cooled, with pressure and temperature transmitters, pressure and temperature gauges and pressure filters</li> </ul>
9	Header Tank: <ul style="list-style-type: none"> <li>• Gravity type</li> <li>• Accessible for inspection/maintenance</li> <li>• Delivered complete with level indicator, ventilation cap and low-level switch</li> <li>• Interface pipes (loose delivered)</li> </ul>

#### 4.3.1 Thruster System Ancillaries

The following requirements serve as the minimum standard for the replacement Thruster System Ancillaries.

Item	Requirement
1	<p>The hydraulic system must include the following scope of supply:</p> <ul style="list-style-type: none"> <li>• Pump with variable displacement, built-up booster pump and controlling valve</li> <li>• 440 VAC, 3 phase, 60 Hz power supply</li> <li>• Power per pump drive not to exceed 30 kW</li> <li>• Starters for all electric components</li> <li>• HPU: pumps, safety valves, control valves, oil tank, oil cooler, pressure and temperature sensors, low level switch and single return filter with by-pass and “clogged filter” indicator</li> <li>• Flush valve for all hydraulic systems</li> <li>• Counterbalance block with flexible hoses (loose supply)</li> <li>• Resilient mounts for the pump/motor</li> </ul>

#### 4.3.2 Thruster System Controls and Alarm and Monitoring System

The following serve as the minimum requirements for the replacement Thruster System Controls and Alarm and Monitoring System.

Item	Requirement
1	<p>The Control Stations for the Bridge, at a minimum, must contain interface with Bridge systems, including:</p> <ul style="list-style-type: none"> <li>• Intuitive Start-up, Automation, Autopilot, DP Interface</li> <li>• Control and monitoring facilities: <ul style="list-style-type: none"> <li>○ Steering, RPM and Load Control</li> <li>○ Joystick Control</li> <li>○ DP Control</li> <li>○ Control lever for control of thrust and rotation</li> <li>○ Jog-switch for non-follow-up emergency steering</li> <li>○ Selector switch “Follow-up / Non Follow-up / DP Control”</li> <li>○ Selector switch Hydraulic Pump “On / Off”</li> <li>○ Hydraulic pump running indication</li> <li>○ Thrust angle indicator</li> <li>○ Signal lamp “clutch disengaged”</li> <li>○ Propeller rpm indicator</li> <li>○ Panel selector switch “PORT/STBD”</li> </ul> </li> <li>• Dimmer for illuminated instruments</li> <li>• Electrical protection system</li> <li>• Wiring between consoles and cabinets (loose delivered)</li> </ul>
2	<p>The Thruster System Integrated Control System must be redundant with:</p> <ul style="list-style-type: none"> <li>• Integrated presentation on high quality touch screens: <ul style="list-style-type: none"> <li>○ Set points and thrust feedback</li> <li>○ Range of operation parameters</li> <li>○ Start/Stop buttons for Thruster</li> <li>○ Buttons for lowering/retracting</li> </ul> </li> </ul>



Item	Requirement
	<ul style="list-style-type: none"> <li>○ Mode selectors</li> <li>○ Local/Backup indicators</li> <li>○ Display of Alarms/Alarm Log <ul style="list-style-type: none"> <li>▪ Main power supply failure</li> <li>▪ Emergency power failure</li> <li>▪ Follow-up steering failure</li> <li>▪ Lube oil level HRP thruster low</li> <li>▪ Lube oil temp. HRP thruster high</li> <li>▪ Hydraulic oil temperature high</li> <li>▪ Hydraulic oil level low</li> <li>▪ Hydraulic pressure low</li> <li>▪ Hydraulic pump electric motor phase loss</li> <li>▪ Hydraulic pump electric motor overload</li> </ul> </li> <li>○ Service Menu</li> <li>○ Dimmer controls</li> <li>● Push buttons for backup control of thrust</li> <li>● Push buttons for Emergency Stop with cover</li> <li>● An interface that is customized and scalable</li> <li>● Ethernet communication between the Thruster control cabinets and the Control Stations on the Bridge</li> <li>● Redundant Ethernet and redundant CANBus between the Thruster control cabinets and the Control Stations on the Bridge</li> <li>● Electrical protection system</li> <li>● Group alarms interfaced with the Vessel Integrated Automation System (IAS)</li> </ul>
3	<p>The Thruster Electronic Control Cabinets must have:</p> <ul style="list-style-type: none"> <li>● IP54 designed enclosures</li> <li>● Approved Type PLC</li> <li>● Touch display with control and AMS functions</li> <li>● System setup, adjustment, and local control capability</li> <li>● Control transfer capability from MCR to Bridge via integrated electronics</li> <li>● Local control for deployment and retraction (self-aligning) with I/O capabilities</li> <li>● Electrical protection system</li> <li>● Bottom cable entry via cable glands (230VAC, 24VDC)</li> </ul>
4	<p>The front door of the ECU Cabinet must, at a minimum, be provided with:</p> <ul style="list-style-type: none"> <li>● Control Diagrams attached to interior of the cabinet door</li> <li>● Safety disconnect switch</li> <li>● Buttons for local steering control</li> <li>● Selector switch local start/stop/remote start</li> <li>● Running and local control lights</li> <li>● Hour counter</li> <li>● Ampere meter</li> <li>● IP54 design enclosure with bottom cable entry (3 x 440V/60Hz power supply)</li> <li>● Electrical protection system</li> <li>● Internal wiring installed</li> </ul>

### 4.3.3 Instrumentation

The following serve as the minimum requirements for the replacement Thruster System Instrumentation:

Item	Requirement
1	<p>The instrument switches must be:</p> <ul style="list-style-type: none"> <li>• Type cam operated and rotary</li> <li>• Equipped with clearly marked plates in French, to indicate their position</li> <li>• Provided with positioning devices to hold them securely in the selected position (with the exception of spring-return switches)</li> </ul> <p>All handles must be approved for their application.</p>
2	<p>The indicator lights must be:</p> <ul style="list-style-type: none"> <li>• Integral transformer type, where the lamp voltage is 6V or less</li> <li>• Provided with a coloured lens to convey the desired indication</li> <li>• The colour must be integral with the lens and externally applied</li> <li>• The preferred colour scheme must follow: <ul style="list-style-type: none"> <li>○ Red: Alarm</li> <li>○ Clear: Synchronizing and Ground Indication</li> <li>○ White: Power Available</li> <li>○ Blue: Circuit Breaker Closed</li> <li>○ Amber: Circuit Breaker Open and Special Purpose</li> <li>○ Green: Normal – Auto circuit complete, running</li> </ul> </li> </ul>
3	<p>The fuse holders must be provided with dead-front fuse holders for potential transformers, control circuit transformers, ground detector lights, etc.</p> <p>All fuses must be CSA approved, listed for the service intended and must be capable of interrupting the maximum fault current available at their point of application.</p>
4	<p>Relays that have sensitive characteristics, precision mechanisms and/or adjustments must be enclosed in moisture and dust-proof cases. Contactors, auxiliary relays, and similar devices that do not have such properties must be considered adequately protected when mounted.</p>
5	<p>Single turn potentiometers should be provided with pointer knobs.</p> <p>Multi-turn potentiometers should be provided with turn counting dials.</p>
6	<p>All control wiring must be:</p> <ul style="list-style-type: none"> <li>• Extra flexible, heat resistant, flame retardant, thermoplastic insulated type rated 105° C</li> <li>• Minimum No. 16 AWG</li> <li>• Marked with crimper connectors</li> <li>• Neatly formed, secured, and tied in groups for organization, identification and to prevent strain to connections</li> <li>• Individually wired or groups of wires must be formed with a radius, not square cornered</li> <li>• Sheathed such that the wire is protected from damage</li> <li>• Configured not to exceed the allowable bend per Manufacturer’s recommendation</li> <li>• Encased in plastic tubing around hinges and secured at each end of the hinge loop to the panel</li> <li>• Identified at each end with approved type wire markers</li> <li>• Indicative of the location of both terminations of the wire, as displayed on the wiring diagram</li> <li>• Protected with bushings or edging on the structure or tubing on the wires to ensure the wiring is protected around angles, sharp corners or through the structure or sheet metal barriers</li> <li>• Accessible from the front of the Control Cabinets</li> </ul>
7	<p>All terminal blocks must be:</p>

Item	Requirement
	<ul style="list-style-type: none"> <li>• The termination points for of all control cables</li> <li>• Marked with designations</li> <li>• Provided in a readily accessible location where individual sections may be separated into shipping sections</li> </ul>
8	The Control Cabinets and consoles must be designed to incorporate and reconnect existing wiring systems. The Contractor identify any wiring that will become redundant based on the new design.
9	<p>The Control Cabinets must have nameplates, in English and French, identifying:</p> <ul style="list-style-type: none"> <li>• Name of the Cabinet</li> <li>• Manufacturer</li> <li>• Serial Number</li> <li>• Date of Manufacture</li> </ul> <p>The type of nameplates must be supplied in French and suit the location in the Vessel as specified.</p> <ul style="list-style-type: none"> <li>• Plastic: <ul style="list-style-type: none"> <li>○ Laminated plastic nameplates, black with white core engraved through to the center core, must be provided for all devices located on the exterior surfaces of the Control Cabinet.</li> <li>○ Nameplates must be secured to the switchboard with machine screws.</li> <li>○ Warning or caution nameplates must be laminated plastic, red with white core engraved through to the center core.</li> </ul> </li> <li>• Engraved on Metal: <ul style="list-style-type: none"> <li>○ Must be used in machinery spaces and where exposed to the weather or susceptible to covering by paint, oil or grease. Nameplates exposed to weather must be stainless steel or brass. Engraved metal nameplates must be of stainless steel or brass with lettering accentuated by means of black wax unless otherwise noted and secured with stainless steel or brass machine screws.</li> <li>○ A complete list of nameplates, detailing size of plate, size of lettering and inscription must be submitted to the Inspection Authority and the CCG Project Manager for review prior to ordering.</li> </ul> </li> </ul>

#### 4.3.4 *Dynamic Positioning Platform*

1. The Thruster System must be interfaced with the upgraded DP-1 Dynamic Positioning System.
2. Control System Interface and Connections and Alarm and Monitoring System (AMS) Inputs/Outputs must be delivered IAW Section 3.4 and 4.2.

## 5.0 General Technical

### 5.1 Physical Operating Conditions for Equipment

The Retractable Azimuth Thruster System equipment must meet the following operating conditions.

Item	Environmental Condition	Requirements	Standard (Reference) or Comments
1	Accelerations due to ice features	All machinery fastening capable of withstanding loads imposed by longitudinal impact, vertical and transverse impact accelerations arising as a result of impacts with ice features. <ul style="list-style-type: none"> <li>• Wind Velocity of 80 knots</li> <li>• Sea State 6</li> </ul>	Class Requirements
2	Operating Temperatures	All components 0°C to + 30°C <ul style="list-style-type: none"> <li>• 95% relative humidity at temperatures to 45 degree C, and</li> <li>• 75% relative humidity at all other temperatures.</li> </ul>	CCG Requirement
3	Shock and Vibration	Procedure according to IEC 60068-2-6 Test Fc <ul style="list-style-type: none"> <li>• to 13.2Hz with displacement amplitude of +/- 1.0mm</li> <li>• 13.2 to 80.0Hz acceleration amplitude of +/- 0.7g with a maximum acceleration of 0.7g</li> </ul> <p>Natural frequencies at supports for equipment and parts of equipment must not be within the 0 to 80Hz range except that where they cannot be kept outside this range by constructional design methods, the vibration must be damped so that undue amplification is avoided.</p> <p>Locking Devices: All external components must be fitted with locking mechanisms.</p>	IACS Electrical Installations: Test Specification for Type Approval (Test #7)
4	Salt Mist for the Electric and Electronic equipment	Procedure according to IEC 60068-2-52 Test Kb.	IACS Electrical Installations: Test Specification for Type Approval (Test #12)
5	Water ingress (Watertight) for the Electric and Electronic equipment	All Electronic Enclosures must be rated minimum IP44.	CCG Requirement
6	Electromagnetic Interference, Radiated and Conducted Emission	IEC 61000-4, CISPR 16-2	IACS Electrical Installations: Test Specification for Type Approval (Tests #13-20)
7	Vessel Inclination	Ship inclination of up to 35° roll on either side, with a cycle frequency of 10 seconds, and 10° pitch with a cycle frequency of 5 seconds and maximum linear acceleration of 1.0g. Permanent list of 22.5° port or starboard, and permanent trim of 10° fore and aft.	IEC 60092-504

## 6.0 Electrical

### 6.1 General

The requirements specified in this section apply to all electrical work in these project requirements:

The electrical workmanship involved in the supply of equipment must be to the standards of TP127E and IEEE 45 with approval by CS-TCMS and TA-CCG.

The Contractor must supply equipment that conforms to the requirements of IEC 60529 (IP Codes).

The Contractor must comply with all aspects of Section 36 of TP127E - Drawings and Data for Submission IAW CS-TCMS approvals for Electrical Modifications.

### 6.2 Electrical Single Line Diagram

An electrical one-line diagram depicting the new Retractable Azimuth Thruster System arrangement and any modifications to the MCCs and distribution panels must be provided by the Contractor IAW Section 3.4 and 4.2.

As-fitted drawings are to be supplied for each component after Commissioning, to the TA-CCG for review and approval.

## 7.0 Integrated Logistics Support (ILS)

The Contractor must deliver all documentation below IAW the schedule listed in Section 3.4 and 4.2 for review and approval by the TA-CCG.

### 7.1 General

The Contractor ILS activities must form an integral part of all Thruster System planning, development, engineering and design, production, design qualification testing, quality assurance, set to work, commissioning, trials and training efforts associated with this SOR.

All files must be transferred via electronic USB media.

All files must be clearly labeled with the CCG project number, file names and drawing numbers. If a complete listing exceeds the label size, a "readme.txt" file in ASCII format must be provided. A printed copy of the Readme file must accompany the USB. Files must be labeled "As Fitted" for those drawings that have been approved and finalized.

### 7.2 Document Management Plan

The Contractor must develop and submit for acceptance by the TA-CCG, a Document Management Plan in their format, for document revision control.

### 7.3 Quality Assurance Management Plan

The Contractor must develop and submit for acceptance by the TA-CCG a Quality Assurance (QA) Management Plan prepared according to the latest issue (at contract date) of ISO 9001:2008 or a Quality Management System modeled on ISO 9001:2008. The QA Management Plan must describe how the Contractor will conform to the specified quality requirements of the Contract and specify how the quality activities will be conducted, including quality assurance of subcontractors.

#### 7.4 Spares List and Maintenance Manuals

Item	Requirement
1	The Contractor must prepare and deliver, an Operations Manual and a Maintenance Manual in English and French for review and approval by the TA-CCG.
2	The Contractor must develop a Spares List, in English and French for review and approval by the TA-CCG.
3	The Contractor must supply a list of spares required to meet the first five (5) years of regular maintenance.
4	The Contractor must design, develop, and supply special purpose tools and test equipment, if it is not readily available, for the maintenance and overhaul of the Thruster System and associated equipment. The special purpose test equipment must be supplied to the TA-CCG for review and approval.
5	The Contractor must make maximum use of existing OEM technical publications. The Contractor must, if required, modify with the OEMs authorization the technical publications to reflect Canadian specific equipment, nomenclature, part numbers, modifications, and maintenance procedures IAW current industrial best practices.

#### 7.5 Crew Training, Content and Material

Item	Requirement
1	The Contractor must deliver the Thruster System and all associated equipment IAW current industrial best practices.
2	The Training Manual must be provided in English and French. It must meet both operation and system maintenance requirements to a level suitable for operators and on-board maintenance personnel. The training material and content must be reviewed and approved by the TA-CCG.
3	The Contractor must provide instructional training to the CCG operating crew on Thruster System Operations in English and French for a minimum period of 4 days (2 sessions/Vessel's Crew) in Quebec City, QC.
4	The Operations training must include, without being limited to, the Thruster System capabilities, features, and components with a complex set of simulated realistic training scenarios. The Operations training must include, at a minimum: <ul style="list-style-type: none"> <li>• Thruster System Operating Philosophy, Start-up and Shutdown</li> <li>• Various operating modes</li> <li>• Emergency Operation</li> <li>• Preventative measures for operation in ice</li> <li>• Instrumentation</li> <li>• Limits of operation, safety and shutdowns</li> <li>• Alarms</li> <li>• System troubleshooting and hands-on operational training</li> </ul>
5	The Contractor must provide training to the CCG maintenance crew in English and French on the Thruster System Maintenance for a minimum of 4 days (2 sessions/Vessel's crew), within one month of commissioning the Thruster System.
6	The Maintenance training must include: <ul style="list-style-type: none"> <li>• Operations Training</li> </ul>

Item	Requirement
	<ul style="list-style-type: none"> <li>• A review of the preventative maintenance for each system/component as well as a section presenting maintenance task data sheets</li> <li>• The Thruster System and its various equipment routine inspections, maintenance and adjustments</li> <li>• The Thruster shutdown and long-term storage protections</li> <li>• Overhaul training, training with the use of all special purpose tools and test equipment</li> </ul>

## 7.6 Documentation

All documentation must be submitted to the TA-CCG, IAW Section 3.4 and 4.2, for review and approval.

Item	Requirement
1	<p>The Contractor must prepare and deliver the following documentation in English and French:</p> <ul style="list-style-type: none"> <li>• Technical Specifications for the Thruster System</li> <li>• Engineering Change Specifications and Integration Packages</li> <li>• Installation Packages</li> <li>• Dock Trials and Sea Trials Plans</li> <li>• Operations Manuals</li> <li>• Commissioning Procedures</li> <li>• Training Manuals</li> <li>• Maintenance Manuals</li> <li>• Fault Finding and Troubleshooting Guide</li> <li>• Repair and General Overhaul of all Equipment</li> <li>• Lubrication and Oil Reference Tables</li> <li>• Paint Specifications</li> <li>• Design and As-Fitted Drawing Packages</li> <li>• Vibration, Heat Rejection Analysis</li> <li>• List of Spare Parts</li> <li>• Bill of Materials (specified excel format)</li> </ul>
2	<p>The Contractor must produce three (3) hard copies and two (2) soft, copies of all documentation on USB media. All soft (electronic) copies of documentation must be provided in the original editable source file format, e.g. Microsoft Word and in Adobe PDF format.</p>
3	<p>The Contractor must provide Bill of Materials Spreadsheet for all system components and a Spare Parts List with the following assigned fields, in both English and French, in Excel format:</p> <ul style="list-style-type: none"> <li>• Item Name</li> <li>• Item Description</li> <li>• Manufacturer</li> <li>• Manufacturer's Part Number</li> <li>• Vendor (if different from manufacturer)</li> <li>• Vendor's Catalogue Number (if different from the Manufacturer's Part Number)</li> <li>• Fitted quantity (number installed in the asset)</li> <li>• Unit of Issue (each, box of 100, etc.)</li> <li>• Shelf Life (in months, if applicable)</li> <li>• Material Safety Data Sheet Number (if applicable)</li> <li>• Unit Price</li> </ul>

Item	Requirement
	<ul style="list-style-type: none"> <li>Recommended Quantity (in same units as Unit of Issue)</li> </ul> <p>The Material Safety Data Sheets must be provided for any required material in Adobe PDF format.</p>
4	The Contractor must provide Class Certification and Approval documentation for the Thruster System and equipment, and test certificates for all materials, in Adobe PDF format.
5	<p>The Contractor must provide drawings indicating Alarm and Monitoring System (AMS) Inputs/Outputs to tie into the existing AMS.</p> <p>Signal interface list between the Thruster System and the Vessel's AMS in the original editable source file format, including data on the electrical signal characteristics such as voltage, current, frequency, digital input/output, and analog input/output, sensor or field device data, signal and connector identification, etc.</p>
6	The Contractor must provide Factory Acceptance Test documentation in Adobe PDF format.
7	The Contractor must provide two (2) electronic copies of the final system specific software required for all diagnostics, support and complete system operation of the Thruster System.

### 7.7 Drawing Packages

The Contractor must prepare all the working drawings necessary for the project requirements. All drawings must be submitted to the TA-CCG, IAW Section 3.4 and 4.2, for review and approval.

The Contractor must provide, at a minimum, the following drawings over the course of the contract as prescribed by the schedule:

Item	Requirement
1	<p>The Contractor must provide Drawing Packages, for TA-CCG review and approval, that include, at a minimum:</p> <ul style="list-style-type: none"> <li>General Arrangement Drawings</li> <li>Structural Drawings</li> <li>Construction drawings of all individual components</li> <li>Dimensional drawings of all components, control stations, cabinets</li> <li>Equipment Layouts</li> <li>Thruster Force Diagrams</li> <li>Control System Interface and Connections</li> <li>Alarm and Monitoring System (AMS) Inputs/Outputs</li> <li>Piping and Instrumentation Diagrams</li> <li>Internal Wiring Electrical Schematics</li> <li>Electronic Circuit Card Schematics</li> <li>Lifting Arrangements</li> <li>Installation Drawings</li> <li>Electrical One-line Diagrams</li> <li>Cable Schedules</li> <li>System Interconnection Drawings</li> </ul>
2	<p>The drawings supplied become the property of the CCG for Maintenance, not Production, upon delivery. Drawings must not be electronically protected "Read Only" files.</p> <p>The CCG reserves the right to use the all technical information for planning and issuing contract work for repair.</p>



Item	Requirement
3	<p>The Contractor must apply the CCG National CAD Standard [MECTS-#2860606-v1-National_Cad_Standards].</p> <p>All drawings must be standard ANSI paper size and must be in AutoCAD DWG format (latest release).</p> <ul style="list-style-type: none"> <li>• A complete list of layer names and brief description of each layer use must accompany all files. Where possible, layer names, layer colour codes, and layer line types must be standardized across the various drawings.</li> <li>• A complete list of symbols (block) names with a description of each symbol must be provided. Blocks must be provided in electronic format suitable for use with AutoCAD 2000.</li> <li>• Special effort must be made to ensure that drafting in AutoCAD is accurate: i.e. appropriate lines are indeed horizontal and vertical; lines that should intersect do but not over-intersect and ensure that entities are placed on correct layers.</li> <li>• Final “As-Fitted” prints/plots must not contain markings or corrections by hand (i.e. marker, pen, pencil, etc.). Drawings containing mark-ups must be revised and re-printed/plotted.</li> <li>• Schematic drawings of systems must include all pertinent system information, including sizes, dimensions, labeling, equipment locations, and all information relating to system fittings.</li> </ul>
4	<p>The Contractor must furnish all drawings required by Sub-Contractors, trades and other consultants.</p>
5	<p>The Contractor must have in place a complete system of documenting and controlling all drawing revisions affected by the work of this project.</p>

#### **7.7.1 Guidance Drawings**

All technical guidance drawings are issued to the Contractor for guidance purposes only. It must be the responsibility of the Contractor to develop working drawings and to ensure that all such drawings receive applicable regulatory approval. The Contractor must note that not all technical guidance drawings supplied are “As-Fitted” drawings. It must be the responsibility of the Contractor to physically verify all affected items.

#### **7.7.2 As-Fitted Drawings**

The Contractor must mark-up the final production drawings and deliver an As-Fitted Red-Lined Documentation Package IAW Section 3.4 and 4.2.

### **7.8 Manuals**

All manuals must be provided to the TA-CCG for review and approval, IAW Section 3.4 and 4.2.

#### **7.8.1 General**

1. All technical manuals must conform as a minimum to the IACS Recommendation 71: Guide for the Development of Shipboard Technical Manuals.
2. The technical manuals must be individually bound in hard cover, 3-ring book format, with pages sized at 8 ½” x 11”. Drawings of a larger size must be concertina folded to suit. The covers, labels and cover page must contain the following information: Equipment Identification; Equipment Manufacturer; and Date.
3. Plastic tabbed indices must be provided for all sections of the manuals. Major equipment components must be sub-divided into separate sections of the manuals.

4. A master index must be provided at the beginning of each binder, indicating all items included in each section and Sub-section.
5. A list of names, addresses and telephone numbers of contacts associated with the equipment manufacturers must be for maintenance and information data purposes.
6. A copy of the final reviewed and approved “As-Fitted” drawing(s) must be provided within the Maintenance Manual.
7. One (1) copy of each manual must be provided in electronic format, Adobe PDF file format.
8. Five (5) copies of manuals and data sheets must be supplied in English and French for all Contractor Furnished Equipment items.
9. All listings, files, manuals, and associated documentation materials must be delivered to and become the property of the CCG.

### 7.8.2 Operations Manuals

Item	Requirement
1	<p>The Operations Manuals, supplied in English and French, must include, at a minimum:</p> <ul style="list-style-type: none"> <li>• Full Retractable Azimuth Thruster System Operating Philosophy and equipment operating sequence</li> <li>• Step by step procedures to follow in commissioning the equipment</li> <li>• Schematic wiring diagram for the as-fitted equipment</li> <li>• All pertinent equipment performance criteria</li> </ul>
2	<p>Where software/hardware systems are fitted, the operation manual must include, at a minimum, the following:</p> <ul style="list-style-type: none"> <li>• System level diagrams describing the overall scheme of the software/hardware system</li> <li>• The functional specifications, which describe in detail the functional capabilities of the system and each software components</li> <li>• Software and programming tools</li> <li>• Copies of programs and programming instructions for all PLCs and control units</li> <li>• Project specific program listings including all comments describing the details of the code functions</li> </ul>

### 7.8.3 Maintenance Manuals

Item	Requirement
1	<p>The Maintenance Manuals, supplied in English and French, must include, at a minimum:</p> <ul style="list-style-type: none"> <li>• Mechanical and Electrical equipment including all wiring</li> <li>• Manufacturer’s maintenance instructions for each item of the equipment requiring maintenance activity.</li> <li>• Maintenance data must be populated in maintenance task data sheets, grouped in routine, calendar based and operating hours. The data sheets must include: <ul style="list-style-type: none"> <li>○ Task identification</li> <li>○ Task interval or frequency</li> <li>○ Reference technical documents</li> <li>○ Task precautions and comments</li> <li>○ Instructions in manuals (if applicable)</li> <li>○ Safety considerations</li> <li>○ Job plan steps</li> <li>○ Work allocation – occupations and estimated hour</li> </ul> </li> </ul>

Item	Requirement
	<ul style="list-style-type: none"> <li>○ Material Safety Data Sheet – if any applicable to task; and</li> <li>○ Required maintenance resources – material, parts, tools and test equipment.</li> <li>• Instructions must include installation instructions, part numbers, part lists, master drawings and exploded views with part identification for all mechanical, electrical and electronic parts, name of suppliers</li> <li>• Repair instructions</li> <li>• Commissioning procedures</li> <li>• Summary list of each item of the equipment requiring lubrication, indicating the name of the equipment item, location of all points of lubrication, type of lubricant recommended, and frequency of lubrication; and</li> <li>• Troubleshooting, fault finding, repair and general overhaul sections must be included for all equipment in the maintenance manual under separate headings.</li> </ul>

#### 7.8.4 Training Manuals

Item	Requirement
1	The Training Manual, supplied in English and French, must meet Thruster System operations and system maintenance requirements to a level suitable for the operators and on-board maintenance crew. The manual must include, at a minimum, the Thruster System operating philosophy, capabilities, features, and components. The manual must serve as a reference for Thruster System operations and maintenance training.

#### 7.9 Factory Acceptance Plans, Tests, Inspection Records and Certificates

The Contractor must be responsible for maintaining a complete and accurate record of all tests and trials conducted throughout manufacturing and on the Vessel during commissioning. Prior to the commencement of a trial, all relevant documentation and associated test plans, sheets, including manufacturing test data, must be complete and attached to the trials' agenda.

The intention of the CCG is to supply the Retractable Azimuth Thruster System as Government Supplied Equipment to the successful bidder of the installation contract. Assistance to the prime Contractor completing the installation is not part of this SOR. All factory testing must be completed prior to the Thruster System being delivered to CCG.

It will be the Contractor's responsibility to ensure attendance of all Class and CS-TCMS Inspectors to view equipment, certify and witness all testing.

All Factory Acceptance Plans, Tests, Inspection Records and Certificates must be provided to the TA-CCG for review and approval, IAW Section 3.4 and 4.2.

Item	Requirement
1	There must be a separate binder for each major section of work performed that must contain all testing, inspection records and certificates for the system in question. The tests, inspections and certificates are to be indexed.
2	The records must be organized in such a way that check-off lists for readings and observations required during the tests and trials are appended to the applicable agenda sheets prior to commencement of the tests and trials.

Item	Requirement
3	All tests and trials data must be transcribed onto clean typewritten copies and a trials booklet prepared containing all relevant data gathered during the tests and trials program. The original must be signed by CS-TCMS, the Inspection Authority, and the Contractor and where necessary by the Sub-Contractors and/or FSR's who witnessed the tests. The originals must be Submitted to the CCG Project Manager along with four (4) copies of the book prior to acceptance of the Vessel.

## 7.10 Documentation Packages

All documentation packages must be provided to the TA-CCG for review and approval, IAW Section 3.4 and 4.2.

### 7.10.1 Factory Acceptance Test Plans

The Contractor must develop and deliver a Thruster System Factory Acceptance Test Plan, in English and French.

The plans may be provided in Contractor's format.

Item	Requirement
1	<p>The Contractor must develop and deliver for approval a Thruster System Factory Acceptance Test Plan that will address as a minimum the following:</p> <ul style="list-style-type: none"> <li>• The list of prerequisite mandatory inspection reports required to proceed with the Thruster System Factory set to work.</li> <li>• The detailed list of supplies and systems required must be supplied by the Contractor without being limited to: <ul style="list-style-type: none"> <li>○ electrical power supply</li> <li>○ communication systems require</li> <li>○ AMS connections required</li> <li>○ the sequential order of equipment starting and activation with prestart verification points and first run verification points</li> <li>○ the list of prerequisite mandatory inspection reports required to proceed with the Thruster System Factory Acceptance Tests (FAT)</li> </ul> </li> </ul>

### 7.10.2 Dock Trials and Sea Trials Plans

The Contractor must develop and deliver Thruster System Dock and Sea Trials Plans, in English and French, that will be integrated into the planning of the future VLE's Contract.

A CCG Crew will be provided to operate the Thruster System and associated equipment during trials.

The plans must include a schedule that provides and estimated duration in days for each main activity. The plans must be developed in MS Project format and one (1) hard and one (1) soft copy must be provided for review and approval to the TA as per Section 3.4.

Item	Requirement
1	<p>The Contractor must develop and deliver for TA-CCG review and approval the Thruster System Dock and Sea Trials Plans that will address, as a minimum, the following:</p> <ul style="list-style-type: none"> <li>• The list of prerequisite mandatory inspection reports required in order to proceed with the Thruster System trials</li> </ul>

Item	Requirement
	<ul style="list-style-type: none"> <li>• The detailed list of supplies and systems required to be supplied by the Contractor without being limited to: <ul style="list-style-type: none"> <li>○ electrical power supply</li> <li>○ communication systems required</li> <li>○ alarm &amp; monitoring system communications required</li> </ul> </li> <li>• The list of the personnel required to be supplied by the Contractor for: <ul style="list-style-type: none"> <li>○ The Thruster System operation</li> <li>○ The readings and data collection</li> <li>○ The Vessel's operation</li> </ul> </li> <li>• The list of the mandatory attendance without being limited to: <ul style="list-style-type: none"> <li>○ CCG-TA</li> <li>○ Regulatory Bodies</li> </ul> </li> <li>• The coordination with CCG for the Vessel's availability and weather conditions.</li> <li>• The list of approved test and data sheets to be filled during the trial.</li> <li>• The security, safety and coordination requirements if the Vessel is alongside or in the dry-dock, which will address to the minimum the following aspects: <ul style="list-style-type: none"> <li>○ Security and safety aspects of the workers onboard and ashore while carrying the set to work and tests</li> <li>○ Safety, security and stability aspects of the Vessel and VLE Contractor equipment while carrying the set to work and tests</li> <li>○ Confirmation of Thruster System and associated equipment and components commissioning</li> <li>○ Coordination with the VLE Contractor concurrent activities</li> </ul> </li> <li>• The sequential order and type of trials to be conducted on the equipment and on the Thruster System and their respective performances to be obtained.</li> <li>• The sequential order of equipment starting and activation with prestart verification points and first run verification points.</li> <li>• The sequential order of the Thruster System testing of emergency safety limits verifications and adjustments.</li> </ul>
2	<p>The Contractor must supply Dock and Sea Trial Reports that must include, as a minimum, the following:</p> <ol style="list-style-type: none"> <li>1. Description of the system and the test set up environment.</li> <li>2. Copies of the Trials Plans, the Trials Procedures and the Trials Acceptance Procedure.</li> <li>3. Copies of all the test reports.</li> <li>4. A summary of the status of the equipment, any changes / modifications that were made during the set up and details of any failures experienced, and the remedial action that was taken to restore the equipment to its specified operating conditions.</li> <li>5. A section detailing faulty devices or equipment "set-to-work", which must include as a minimum: <ul style="list-style-type: none"> <li>○ Test / measurement plan of the equipment with expected results</li> <li>○ Faulty Test / measurement records</li> <li>○ Remedy actions</li> <li>○ Test Records after remedy</li> <li>○ Confirmation of acceptance of the faulty device or equipment</li> </ul> </li> <li>6. Summary of any recommendations.</li> </ol>

### 7.10.3 Installation Package

The Contractor must prepare the Installation Package, in English and French.

The package must be reviewed and approved by the TA-CCG, IAW Section 4.2.

Item	Requirement
1	<p>The Thruster System Installation Packages and drawings may be prepared in the Contractor's format and must address, at a minimum, the following:</p> <ol style="list-style-type: none"><li>1. Utilize a mutually acceptable numbering format and Subject headers as this specification will be tendered as part of a larger specification package</li><li>2. Provide enough detail to be suitable for use in an invitation to tender for shipyard use including a Bill of Materials for shipyard implementation</li><li>3. Provide enough detail of installation of all equipment and cabling (including connection verification plans and welding schedules) such that a shipyard can provide firm price quotations for labour and materials</li><li>4. Provide details of modifications to the existing hull structure to permit the integration of the new Thruster System seats and other required support structures</li><li>5. Validation of the strip out prior to the beginning of the new Thruster System integration and installation work</li><li>6. The electrical distribution and connections from the to the Thruster System and associated equipment to be done by the selected Shipyard</li><li>7. The auxiliary system installations and connections to the Thruster System and associated equipment to be done by the selected Shipyard</li><li>8. The connection of the Thruster System and associated equipment with the control systems and AMS</li><li>9. The Vessel's structural modification in preparation of the installation of the Thruster System and associated equipment to be done by the selected Shipyard</li><li>10. The surface preparation and coating system for:<ul style="list-style-type: none"><li>o the Thruster System</li><li>o the Thruster System associated equipment</li><li>o the Vessel's new and disturbed areas</li></ul></li><li>11. The installation of the Thruster System and associated equipment on their respective seating to be performed by the selected shipyard.</li></ol>

#### 7.10.4 Engineering Change (EC) Specifications and Integration Packages

The Contractor must prepare the Engineering Change Specifications and Integration Package, in English and French, for the Thruster System integration to the Vessel IAW the best industrial practices.

The Contractor may prepare the Engineering Change Specifications and Integration Package in Contractor's format.

The documents must use metric units for the Vessel integration deliverables, unless the source of the original documentation is non-metric, and no changes to that original documentation is being made.

Both preliminary and final versions of the package must be reviewed and approved by the TA, per Section 3.4 and 4.2, for compliance to the SOR.

Item	Requirement
1	<p>The Contractor must address the following in the EC Specifications and Integration Package:</p> <ol style="list-style-type: none"><li>1. Existing Thruster System electronics, components, power equipment, mechanical systems and related equipment strip out specification.</li><li>2. Vessel's structural changes in way of the new Thruster System and associated equipment.</li><li>3. Vessel's auxiliary system requirements for the new Thruster System and associated equipment.</li><li>4. Vessel's power supply for the new Thruster System and associated equipment.</li><li>5. Vessel's Propulsion Control System (PCS).</li><li>6. Vessel's Alarm and Monitoring System (AMS).</li><li>7. Vessel's General Arrangement and layout drawings in way of the new Thruster System and associated equipment.</li><li>8. The Bill of Materials (BOM) needed to proceed with all vessel alterations (removals, relocations and additions) in order to meet the requirement of this SOR for the Vessel's modifications and complete Thruster System installation.</li></ol>

**7.10.5 As-Fitted Red-Lined Documentation Package**

The Contractor must supply an As-Fitted Red-Lined Documentation Package, for review and approval to the TA-CCG, in English and French, IAW Section 3.4 and 4.2.

Item	Requirement
1	<p>The As-Fitted Red-Lined Documentation Package must include:</p> <ol style="list-style-type: none"><li>1. Technical Specifications for the Thruster System</li><li>2. Installation Packages</li><li>3. Engineering Change Specifications and Integration Packages</li><li>4. Quality Assurance Acceptance Records</li><li>5. Factory Acceptance Test Plans</li><li>6. Factory Acceptance Tests</li><li>7. Factory Acceptance Test Certificates</li><li>8. Dock Trials and Sea Trials Plans</li><li>9. Dock and Sea Trial Reports</li><li>10. Operations Manual</li><li>11. Commissioning Procedures</li><li>12. Training Manual</li><li>13. Maintenance Manual</li><li>14. Drawing Packages</li><li>15. Vibration, Heat Rejection Analysis</li><li>16. Spare Parts List</li><li>17. Bill of Materials List in specified Excel format</li><li>18. Inspection Records and Certificates</li><li>19. Classification Society Inspection Certificates</li><li>20. TCMS appropriate and applicable Certifications and Approvals</li><li>21. Shipping and Handling Documents</li></ol>



### 7.10.6 Final Documentation Package

The Contractor must supply a Final Documentation Package, for review and approval to the TA-CCG, in English and French, IAW Section 3.4 and 4.2.

Item	Requirement
1	<p>The Final Documentation Package must include:</p> <ol style="list-style-type: none"><li>1. Technical Specifications for the Thruster System</li><li>2. Installation Packages</li><li>3. Engineering Change Specifications and Integration Packages</li><li>4. Quality Assurance Acceptance Records</li><li>5. Factory Acceptance Test Plans</li><li>6. Factory Acceptance Tests</li><li>7. Factory Acceptance Test Certificates</li><li>8. Dock Trials and Sea Trials Plans</li><li>9. Dock and Sea Trial Reports</li><li>10. Operations Manual</li><li>11. Commissioning Procedures</li><li>12. Training Manual</li><li>13. Maintenance Manual</li><li>14. Drawing Packages</li><li>15. Vibration, Heat Rejection Analysis</li><li>16. Spare Parts List</li><li>17. Bill of Materials List in specified Excel format</li><li>18. Inspection Records and Certificates</li><li>19. Classification Society Inspection Certificates</li><li>20. TCMS appropriate and applicable Certifications and Approvals</li><li>21. Shipping and Handling Documents</li></ol>