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K1A 0S5

Bid Fax: (819) 997-9776

**Revision to a Request for Supply  
Arrangement - Révision à une demande  
pour un arrangement en matière  
d'approvisionnement**

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

Ce document est par la présente révisé; sauf  
indication contraire, les modalités de l'invitation  
demeurent les mêmes.

**Comments - Commentaires**

**Vendor/Firm Name and Address**

**Raison sociale et adresse du  
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**Issuing Office - Bureau de distribution**

Marine Machinery and Services / Machineries et  
services maritimes

11 Laurier St. / 11, rue Laurier

6C2, Place du Portage

Gatineau

Québec

K1A 0S5

<b>Title - Sujet</b> TIES CCG Supply Arrangement	
<b>Solicitation No. - N° de l'invitation</b> F7012-190001/A	<b>Date</b> 2020-01-20
<b>Client Reference No. - N° de référence du client</b> F7012-190001	<b>Amendment No. - N° modif.</b> 001
<b>File No. - N° de dossier</b> 029ml.F7012-190001	<b>CCC No./N° CCC - FMS No./N° VME</b>
<b>GETS Reference No. - N° de référence de SEAG</b> PW-\$\$ML-029-27552	
<b>Date of Original Request for Supply Arrangement</b> 2019-12-23 <b>Date de demande pour un arrangement en matière d'app. originale</b>	
<b>Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2020-02-13</b>	<b>Time Zone Fuseau horaire</b> Eastern Standard Time EST
<b>Address Enquiries to: - Adresser toutes questions à:</b> Guay, Yvan	<b>Buyer Id - Id de l'acheteur</b> 029ml
<b>Telephone No. - N° de téléphone</b> (819) 420-2907 ( )	<b>FAX No. - N° de FAX</b> (819) 956-0897
<b>Delivery Required - Livraison exigée</b>	
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b>	
<b>Security - Sécurité</b> This revision does not change the security requirements of the solicitation. Cette révision ne change pas les besoins en matière de sécurité de l'invitation.	

**Instructions: See Herein**

**Instructions: Voir aux présentes**

<b>Acknowledgement copy required</b>	<b>Yes - Oui</b>	<b>No - Non</b>
<b>Accusé de réception requis</b>	<input type="checkbox"/>	<input type="checkbox"/>
<b>The Offeror hereby acknowledges this revision to its Offer.</b> <b>Le proposant constate, par la présente, cette révision à son offre.</b>		
<b>Signature</b>	<b>Date</b>	
Name and title of person authorized to sign on behalf of offeror. (type or print) Nom et titre de la personne autorisée à signer au nom du proposant. (taper ou écrire en caractères d'imprimerie)		
<b>For the Minister - Pour le Ministre</b>		

This Amendment 001 to the Request for Supply Arrangement (RFSA) is issued to provide the Questions and Answers Set 1, extend the closing date to 13 February 2020 and amend the solicitation.

### Questions and Answers Set 1

#### Question 1:

Section 4.2 of SOW allows to propose a Senior or Intermediate level Candidate for different areas of expertise. However, in accordance with Section 5.0 of Annex E, neither of the intermediate candidates would be technically evaluated. Can you please clarify whether provision of an Intermediate level candidate instead of Senior level candidate would still satisfy the requirements of Section 4.2 of SOW. If the Intermediate level Candidates are not evaluated, are their CVs still required to be submitted, or can they be submitted on as-requested basis?

#### Answer 1:

As per RFSA Annex "E", Section 4.0, Mandatory Technical Criteria #5 & Annex "A", Section 4.2, Canada confirms that the provision of an Intermediate level candidate or candidates instead of a Senior level candidate is acceptable and the resumes of these Intermediate level candidates will be evaluated. For the Annex "E" Mandatory Technical Criteria #7, the Senior level meet the criteria of the Intermediate level. The resumes of Intermediate level candidates submitted only in Mandatory Technical Criteria #7 will not be evaluated because the Senior level qualifies also the Intermediate level.

#### At Solicitation Annex "E", page 3 of 3, Section 5.0:

**Delete:** The Intermediate Engineer, Technical Specialist and Technologist will not be technically evaluated.

#### **Insert:**

The resumes of Intermediate Engineers and or Intermediate Technical Specialists submitted under a given Area of Expertise as per Annex "A" Section 4.2 and Annex "E" Mandatory Technical Criteria #5 will be evaluated. For Annex "E" Mandatory Technical Criteria #7, the Senior level qualifies also the Intermediate level. The resumes of Intermediate level candidates in response to Mandatory Technical Criteria #7 will not be evaluated.

#### Question 2:

When identifying the Supplier's required experience for Sub-Types of Work (as per Section 3.1 of SOW), does this experience have to be obtained by the same people identified as Candidates, or the supplier as a single entity?

#### Answer 2:

The Supplier as a single entity must demonstrate the Supplier's required experience for the Sub-Types of Work as per section 3.1 of the Annex "A", SOW and Mandatory Technical Criteria #2 of Annex "E", Section 4.0. An extra demonstration of experience for Sub-Types of Work is not required from the Candidates.

#### Question 3:

Part 3.1 of the main RFSA document (page 9 of 33) states that: "In the technical arrangement, Suppliers should explain and demonstrate how they propose to meet the requirements and how they will carry out the Work." Can you please clarify whether an approach to work is required to satisfy this statement?

#### Answer 3:

RFSA page 9 of 33, Part 3.1, Section I, Technical Arrangement is completed with the following statement: "The Technical Evaluation Plan is at Annex "E". The Annex "E", Section 4.0 contains the Mandatory Technical Requirements which requires the demonstration of how these mandatory technical requirements are met.

**Question 4:**

As a current TIES approved contractor how much of the tender process is required so that we can be remain an approved supplier from 31/03/2020 onwards?  
Is it a completely new tender process, or can another extension be granted to our existing arrangement?

**Answer 4:**

RFSA page 4 of 33, Section 1.2.3. Previous Supply Arrangement (SA) Holders, "Previous Supply Arrangement (SA) Holders for SA F7048-090005 are required to re-qualify and comply with the requirements of this renewal solicitation to obtain a Supply Arrangement." This is the renewal solicitation for the supply arrangement. Another extension to your existing arrangement will not be granted.

**Question 5:**

I would like to request a copy of the templates for the TIES CCG Supply Arrangement.

**Answer 5:**

The Template of the Mandatory Technical Criteria is in Annex "E" Section 4.0 and the Templates for the Occupational Categories are in Annex "E" Section 5.0.

Canada requests the Supplier to complete the Updated Templates provided at the end of this Amendment to Solicitation for inclusion at Annex "E, Sections 4.0 and 5.0:

- Mandatory Technical Criteria Template;
- Occupational Categories Template;
- Areas of Expertise Offered Template;
- Field of Specialty Offered Template; and
- Sub-Types of Work Offered Template.

An electronic version in MS Word is available upon request to [yvan.guay@tpsgc-pwgsc.gc.ca](mailto:yvan.guay@tpsgc-pwgsc.gc.ca).

**At Solicitation Annex "E", page 3 of 3, Section 5.0:**

**Delete:** For the Senior Technical Specialist and the Senior Technologist, Supplier must refer to SOW Section 4.4, in order to populate the above Table.

**Insert:** For the Occupational Categories, Updated Templates at the end of Amendment 1 to Solicitation. Canada requests the Supplier to complete the Updated Templates provided at the end of the Amendment 1 to Solicitation:

- Mandatory Technical Criteria Template;
- Occupational Categories Template;
- Areas of Expertise Offered Template;
- Field of Specialty Offered Template; and
- Sub-Types of Work Offered Template.

**Question 6:**

I am wondering if there is a specific template to be used to present an offer of services – the SOW does not seem to describe or refer to a specific area to find this. That is not clear. Are we allowed to develop our own template?

**Answer 6:**

See Answer 5.

**Question 7:**

In Annex E Section 5.0 - Demonstration of Candidates' Education, Certification and Experience. The last line on the page states "The Intermediate Engineer, Technical Specialist and Technologist will not be technically evaluated." Does this mean that their experience will not be considered to meet the

requirements of the Areas of Expertise and Field of Specialty? Therefore will the experience only be considered for Senior Engineer, Technical Specialist and Technologist.

**Answer 7:**

See Answer 1.

**Question 8:**

Section 4.1.b says that "The Supplier may submit up to six (6) Candidates to qualify in a given Area of Expertise offered". However, in Annex E, Section 4 - Mandatory Technical Criteria, item 5 in the Table "The Supplier must provide the required Occupational Category for each Area of Expertise offered, as per SOW Section 4.2". It is not clear that if we have to provide CV's for for each of the Occupational Categories (Senior Engineer, Technical Specialist and Technologist, Intermediate Engineer, Technical Specialist and Technologist) or if we can provide multiple CV's for each category (i.e. 2 Senior Engineers).

**Answer 8:**

RFSA Annex "A" Section 4.1b. The Supplier is requested to provide up to 6 CV of the required occupational categories for an Area of Expertise offered. The Supplier is not required to provide a resume for each occupational category (Senior Engineer, Technical Specialist and Technologist, Intermediate Engineer, Technical Specialist and Technologist) for each area of expertise. The RFSA Annex "E" Section 4.0, MTC #4 will be updated as per this clarification.

See Amended Templates for Annex "E", Section 4.0 below.

**Question 9:**

Unlike the previous TIES, this RFP states that the Supplier must qualify at least one of its own employees within the required Occupational Category for each Area of Expertise offered. This appears to disqualify some SMEs, including those who have previously qualified and been able to successfully provide services on multiple projects through subcontractor arrangements. Will the Crown consider deleting the requirement to have employees within each Occupational Category? Alternatively, will the Crown consider amending the requirement to "employees and/or subcontractors"?

**Answer 9:**

Canada requires that the supplier provide an employee for a minimum of one (1) Field of Specialty within a given Area of Expertise and an employee and/or subcontractor for the remaining Fields of Specialty in that same Area of Expertise. The RFSA Annex "E" Section 4.0, MTC #4 will be updated as per this clarification.

See Amended Templates for Annex "E", Section 4.0 below.

## TEMPLATES

**At Solicitation Annex “E”, page 3 of 3, Section 4.0:**

**Delete: “Table”**

**Insert: Mandatory Technical Criteria Template**

#	Mandatory Technical Criteria	Compliant		Reference to applicable page and paragraph of the Bidder's Proposal	Result
		Yes	NO		
Areas of Expertise					
1	The Supplier must qualify in at least two (2) of the twelve (12) Areas of Expertise, as per SOW Section 2.1.				
Supplier's Profile					
2	The Supplier must provide the two (2) Types of Work for each Area of Expertise offered, as per SOW 3.1.				
3	For each Type of Work, the Supplier must meet the minimum number of Sub-Types of Work for each Area of Expertise offered, as per SOW 5.1.				
Candidates' Education, Certification and Experience					
4A	The Supplier must qualify a minimum one (1) of its own employee within the required Occupational Category in a minimum of one (1) Field of Specialty within a given Area of Expertise offered as per SOW Section 4.1a.				
4B	The Supplier's employee or subcontractor must meet the Candidates Education, Certification and Experience of the required Occupational Category for the Fields of Specialty offered within a given Area of Expertise offered, as per SOW Section 4.1a, b, c and d.				
5	The Supplier must provide the required Occupational Category for each Area of Expertise offered, as per SOW Section 4.2.				
6	The Supplier must meet the minimum number of Fields of Specialty for each Area of Expertise offered, as per SOW Section 4.3.				
7	The Supplier must meet the Mandatory Requirements for Education, Certification and Experience for each Occupational Category, as per SOW Section 4.4.				

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## Occupational Categories Template

### Senior Engineer Template

<b>Occupational Category: Senior Engineer</b>		
<b>Candidate's Name:</b> _____		<b>Employee of the Supplier:</b> YES: __ NO: __
<b>Mandatory Technical Criteria</b>		
a. University Degree in engineering within the Area of Expertise and/or Field of Specialty.		Education . Name and level of degree . Name of institution . Year of completion . (If outside Canada, add also city and country)
b. Professional license to practice as a Professional Engineer within the Area of Expertise and/or Field of Specialty.		Certification . Name of organization . Name of Province
c. - If Undergraduate Degree, minimum of 10 years of experience in engineering within the Area of Expertise and/or Field of Specialty; or  - If Postgraduate Degree, minimum of 8 years of experience in engineering within the Area of Expertise and/or Field of Specialty.		
Month & Year (Start to finish)	Employer/Position/Title  <b><i>Names of Area of Expertise and/or Field of Specialty</i></b>	Experience <b><i>Where, When and How Acquired?</i></b>  <b><i>Demonstration of Area of Expertise and/or Field of Specialty</i></b>

## Senior Technical Specialist Template

<b>Occupational Category: Senior Technical Specialist</b>		
<b>Candidate's Name:</b> _____		<b>Employee of the Supplier:</b> YES: __ NO: __
<b>Mandatory Technical Criteria</b>		
<p>a. College Diploma in technology, engineering or science within the Area of Expertise and/or Field of Specialty; or</p> <p>- University Degree in engineering or science within the Area of Expertise and/or Field of Specialty.</p>		<p>Education</p> <p>. Name and level of degree</p> <p>. Name of institution</p> <p>. Year of completion</p> <p>. (If outside Canada, add also city and country)</p>
<p>b. Accreditation to a chartered provincial association related to the Area of Expertise and/or Field of Specialty, where applicable.</p> <p>- In the (2.) Marine Mechanical Engineering, (3.) Marine Electrical Control and Power Systems, and (4.) Hovercraft Systems areas of expertise, certified as a "First-class Marine Engineer, Motor Ship and Steamship" by Transport Canada or by any other international organisation recognized by Transport Canada.</p>		<p>Certification</p> <p>. Name of organization</p> <p>. Name of Province</p>
<p>c. - If College Diploma, minimum of 12 years of experience in technology, engineering or science within the area of Expertise and/or Field of Specialty; or</p> <p>- If Undergraduate Degree, minimum of 10 years of experience in engineering or science within the Area of Expertise and/or Field of Specialty; or</p> <p>- If Postgraduate Degree, minimum of 8 years of experience in engineering or science within the Area of Expertise and/or Field of Specialty.</p>		
Month & Year (Start to finish)	<p>Employer/Position/Title</p> <p><b><i>Names of Area of Expertise and/or Field of Specialty</i></b></p>	<p>Experience</p> <p><b><i>Where, When and How Acquired?</i></b></p> <p><b><i>Demonstration of Area of Expertise and/or Field of Specialty</i></b></p>

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### Senior Technologist Template

<b>Occupational Category: Senior Technologist</b>		
<b>Candidate's Name:</b> _____		<b><u>Employee of the Supplier:</u></b> YES: __ NO: __
<b>Mandatory Technical Criteria</b>		
a. College Diploma in technology, engineering or science within the Area of Expertise and/or Field of Specialty;		Education . Name and level of degree . Name of institution . Year of completion . (If outside Canada, add also city and country)
b. - Accreditation to a chartered provincial association related to the Area of Expertise and/or Field of Specialty, where applicable.  - In the (2.) Marine Mechanical Engineering, (3.) Marine Electrical Control and Power Systems, and (4.) Hovercraft Systems areas of expertise, certified as a "Second-class Marine Engineer, Motor Ship and Steamship" by Transport Canada or by any other international organisation recognized by Transport Canada.		Certification . Name of organization . Name of Province
c. If College Diploma, minimum of 10 years of experience in technology, engineering or science within the area of Expertise and/or Field of Specialty.		
Month & Year (Start to finish)	Employer/Position/Title	Experience <b><i>Where, When and How Acquired?</i></b>



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### Intermediate Engineer Template

<b>Occupational Category: Intermediate Engineer</b>		
<b>Candidate's Name:</b> _____		<b><u>Employee of the Supplier:</u></b> YES: __ NO: __
<b>Mandatory Technical Criteria</b>		
a. University Degree in engineering within the Area of Expertise and/or Field of Specialty.		Education . Name and level of degree . Name of institution . Year of completion . (If outside Canada, add also city and country)
b. Professional license to practice as a Professional Engineer within the Area of Expertise and/or Field of Specialty.		Certification . Name of organization . Name of Province
c. - If Undergraduate Engineering Degree, minimum of 5 years of experience in engineering within the Area of Expertise and/or Field of Specialty; or  - If Postgraduate Degree, minimum of 3 years of experience in engineering within the Area of Expertise and/or Field of Specialty.		
Month & Year (Start to finish)	Employer/Position/Title  <b><i>Names of Area of Expertise and/or Field of Specialty</i></b>	Experience <b><i>Where, When and How Acquired?</i></b>  <b><i>Demonstration of Area of Expertise and/or Field of Specialty</i></b>

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### Intermediate Technical Specialist Template

<b>Occupational Category: Intermediate Technical Specialist</b>		
<b>Candidate's Name:</b> _____		<b>Employee of the Supplier:</b> YES: __ NO: __
<b>Mandatory Technical Criteria</b>		
a. - College Diploma in technology, engineering or science within the Area of Expertise and/or Field of Specialty; or  - University Degree in engineering or science within the Area of Expertise and/or Field of Specialty.		Education . Name and level of degree . Name of institution . Year of completion . (If outside Canada, add also city and country)
b. -Accreditation to a chartered provincial association related to the Area of Expertise and/or Field of Specialty, where applicable.  - In the (2.) Marine Mechanical Engineering, (3.) Marine Electrical Control and Power Systems, and (4.) Hovercraft Systems areas of expertise, certified as a "First-class Marine Engineer, Motor Ship and Steamship" by Transport Canada or by any other international organisation recognized by Transport Canada.		Certification . Name of organization . Name of Province
c. - If College Diploma, minimum of 7 years of experience in technology, engineering or science within the area of Expertise and/or Field of Specialty; or  - If Undergraduate Degree, minimum of 5 years of experience in engineering or science within the Area of Expertise and/or Field of Specialty; or  - If Postgraduate Degree, minimum of 3 years of experience in engineering or science within the Area of Expertise and/or Field of Specialty.		
Month & Year (Start to finish)	Employer/Position/Title  <b><i>Names of Area of Expertise and/or Field of Specialty</i></b>	Experience <b><i>Where, When and How Acquired?</i></b>  <b><i>Demonstration of Area of Expertise and/or Field of Specialty</i></b>

### Intermediate Technologist Template

Not required.

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### Areas of Expertise Offered Template

#	Areas of Expertise	Offered	
		Yes	No
1	Naval Architecture		
2	Marine Mechanical Engineering		
3	Marine Electrical Control and Power Systems		
4	Hovercraft Systems		
5	Non-Destructive Test Analysis		
6	Shore-Based Marine Communication and Navigation Systems		
7	Marine Informatics Technology		
8	Infrastructure		
9	Shore-Based Mechanical, Electrical and Power Systems		
10	Aids to Navigation		
11	Vessel and Shore-Based Environmental Services		
12	Integrated Logistics Support		

**Template for the Fields of Specialty Offered of Area of Expertise #1, Naval Architecture**

#	Fields of Specialty	Offered		Mandatory Requirement of the Field of Specialty
		Yes	No	
1	Ship hull structure, structural arrangement and strength, vibration and passive fire protection			Must meet a minimum of seven (7) of these fourteen (14) Fields of Specialty to qualify in this Area of Expertise.
2	Ship design, construction, modernization and repair			
3	Propulsion, rudders, propellers and steering system design			
4	Vessel stability, open water and ice			
5	Hull systems including areas such as accommodation outfit, launch and recovery systems, doors, door closures and closing appliances, corrosion control			
6	Materials and materials maintenance as applied to the construction of ship's hull and outfit systems, paint coatings			
7	Ship condition surveys and advice			
8	Interpretation of federal acts and regulations, international conventions, codes and Classification society rules pertaining to design, construction and operation of ships in all Voyage Classes and ASPPR types and classes			
9	Design standards and classification rules applicable to the CCG vessel fleet			
10	Ship structure, design and analysis, advanced structure analysis techniques			
11	Open-water and ice maneuvering			
12	Sea keeping and towing			
13	Cargo gear and lifting systems, such as cranes, davits, A-frames, booms and winches			
14	Anchor and mooring gear			

**Template for the Fields of Specialty of Area Offered of Expertise #2, Marine Mechanical Engineering**

#	Fields of Specialty	Offered		Mandatory Requirement of the Field of Specialty
		Yes	No	
1	Diesel Prime mover			Must meet a minimum of six (6) of these eleven (11) Fields of Specialty to qualify in this Area of Expertise.
2	Maneuvering systems such as thrusters, azimuth drives and bubble			
3	Propulsion controls, instrumentation, alarms and monitoring			
4	Propeller pitch control, shafting, reduction gear and pod propulsion			
5	Steering gear			
6	Fire protection systems			
7	Auxiliary and domestic systems such as refrigeration; hydraulics; compressors; purifiers;			

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	potable and waste water; heating, ventilation, air conditioning (HVAC); dynamic positioning systems			
8	Pumps, valves and piping systems			
9	Deck machinery and cargo equipment, such as fishing gear, towing equipment, capstans, windlasses			
10	Vibration and stress analysis, including ice-prop milling			
11	Waterborne noise management (ICES and others)			

**Template for the Fields of Specialty Offered of Area of Expertise #3, Marine Electrical Control and Power Systems**

#	Fields of Specialty	Offered		Mandatory Requirement of the Field of Specialty
		Yes	No	
1	Electrical power generation and distribution (propulsion and ship service)			Must meet a minimum of six (6) of these twelve (12) Fields of Specialty to qualify in this Area of Expertise.
2	Electrical load analysis			
3	Arch flash analysis			
4	Harmonics analysis			
5	Circuit breaker coordination study			
6	Control, instrumentation, alarm and monitoring			
7	Battery technology			
8	Alternative technologies (e.g. solar power, fuel cells)			
9	Combined technology power systems integration (e.g. hybrid technology)			
10	Electrical surveys			
11	On board electrical monitoring and testing (e.g. data logging/instrumentation for trials)			
12	Lighting			

**Template for the Fields of Specialty Offered of Area of Expertise #4, Hovercraft Systems**

#	Fields of Specialty	Offered		Mandatory Requirement of the Field of Specialty
		Yes	No	
1	Mission profile determination and design trade-off analysis			Must meet each of these ten (10) Fields of Specialty to qualify in this Area of Expertise.
2	Canadian acts, regulations, international conventions, codes and Classification society rules pertaining to the design, construction and operation			
3	Deck and skirt systems – Structural analysis			
4	Propulsion systems and controls and speed			
5	Lift forces and systems			
6	Structures and components			
7	Auxiliary systems requirements & cargo handling			
8	Stability and maneuverability			
9	Fuel ballast management system (trim and heel)			
10	Propeller design			

**Template for the Fields of Specialty Offered of Area of Expertise #5, Non-Destructive Test Analysis**

#	Fields of Specialty	Offered		Mandatory Requirement of the Field of Specialty
		Yes	No	
1	Ultrasonic			Must meet a minimum of three (3) of these eleven (11) Fields of Specialty to qualify in this Area of Expertise.
2	Magnetic particle			
3	Liquid/dye penetrant			
4	Radiography			
5	Eddy-current			
6	Visual time-lapse analysis			
7	Thermography			
8	Hydrostatic testing			
9	Vacuum box leak testing			
10	Positive material identification			
11	Vibration analysis			

**Template for the Fields of Specialty Offered of Area of Expertise #6, Shore-Based Marine Communication and Navigation Systems**

#	Fields of Specialty	Offered		Mandatory Requirement of the Field of Specialty
		Yes	No	
1	Radio communications and direction finder systems, Digital Selective Calling systems, satellite communications systems			Must meet a minimum of seven (7) of these fourteen (14) Fields of Specialty to qualify in this Area of Expertise.
2	Situational awareness and position reporting systems			
3	Identification and tracking, GPS/DGPS systems, radar, electronic chart systems			
4	Antennae and filtering (tuning)			
5	Marine telecommunication systems, cellular phones, integrated communication systems			
6	Digital techniques including voice digitization, compression, multiplexing and switching			
7	Meteorological systems, Navtex (Meteorological info in text form), weather fax, ice imagery			
8	Instrumentation and monitoring systems			
9	Uninterruptible power supplies			
10	Vessel traffic marine information systems			
11	Radar beacons			
12	Radio beacons			
13	Radio frequency multiplexers			
14	Programmable logic controllers			

**Template for the Fields of Specialty Offered of Area of Expertise #7, Marine Informatics Technology**

#	Fields of Specialty	Offered		Mandatory Requirement of the Field of Specialty
		Yes	No	
1	Voice, data, and universal communications networks			Must meet a minimum of eight (8) of these fifteen (15) Fields of Specialty to qualify in this Area of Expertise.
2	Computer systems (hardware, software and related technologies)			
3	Emerging telecommunications and information technologies and their application			
4	Telecommunication services and related regulatory environment and standards			
5	Wide area network/satellite/carrier service procurement			
6	Information systems standards			
7	Wired and wireless networks, hardware, software, power, cooling, monitoring, security and management			
8	Remote patch management over unreliable connectivity			
9	Network design best practices			
10	Communications control systems			
11	Remote monitoring and maintenance			
12	Technical database administration			
13	Custom programs and applications			
14	IT security			
15	Disaster recovery and business continuity			

**Template for the Fields of Specialty Offered of Area of Expertise #8, Infrastructure**

#	Fields of Specialty	Offered		Mandatory Requirement of the Field of Specialty
		Yes	No	
1	Applicable regulations and codes, e.g. national building, electrical, fire, CSA S-37			Must meet this First (1 <sup>st</sup> ) Field of Specialty; and
2	Varying tower structures (guyed, freestanding; steel, aluminum; foundations; obstruction lighting; fall arrest, anti-climb; grounding; etc.)			Must also meet a minimum of four (4) of these remaining seven (7) Fields of Specialty to qualify in this Area of Expertise.
3	Communications buildings/trailers (turnkey services incl. electrical, HVAC, grounding, etc.)			
4	Site grounding systems			
5	Other structures such as helicopter pads (timber, concrete), ice shields, fencing			
6	Land surveying, geomatics, erosion			
7	Marine structures such as docks, wharves, offshore piers, weirs, breakwaters, dolphins			
8	Foundations and foundation stabilization			

**Template for the Fields of Specialty Offered of Area of Expertise #9, Shore-Based Mechanical, Electrical & Power Systems**

#	Fields of Specialty	Offered		Mandatory Requirement of the Field of Specialty
		Yes	No	
1	Regulations and codes as applicable (e.g. Canadian Standards Association (CSA), building electrical code, Environment Canada fuel storage regulations)			Must meet this First (1 <sup>st</sup> ) Field of Specialty; and
2	Electrical distribution, small (building) and large (site overhead/buried/submarine power supply cables)			Must also meet a minimum of four (4) of these remaining eight (8) Fields of Specialty to qualify in this Area of Expertise.
3	Battery technology			
4	Power generation and control systems, such as diesel generator sets and small wind power generation			
5	Solar power systems, alternative technologies (e.g. fuel cells)			
6	Combined technology power systems integration			
7	Fuel storage infrastructure (fuel tanks and piping, pressure vessels)			
8	Alarm sensors and equipment monitoring systems			
9	Heavy equipment (e.g. cranes, winches)			

**Template for the Fields of Specialty Offered of Area of Expertise #10, Aids to Navigation (ATON)**

#	Fields of Specialty	Offered		Mandatory Requirement of the Field of Specialty
		Yes	No	
1	Night-time visual ATON such as range lights, sector lights, and beacons (LED, incandescent, other)			Must meet a minimum of three (3) of these six (6) Fields of Specialty to qualify in this Area of Expertise.
2	Audible ATON such as fog detectors and fog horns			
3	Floating ATON: buoy and buoy mooring systems (design, maintenance and performance; metallic, synthetic)			
4	Material sciences for ATON: corrosion, welding, failure and repair			
5	Visual ATON recognition science, considering environmental factors, colour chromaticity, size and shape recognition			
6	Painting and coatings technology in a marine environment for shore (towers) and marine (buoys, anti-fouling) applications			



**Template for the Fields of Specialty Offered of Area of Expertise #11, Vessel and Shore-Based Environmental Services**

#	Fields of Specialty	Offered		Mandatory Requirement of the Field of Specialty
		Yes	No	
1	Applicable national and international environmental laws and regulations (Canadian Environmental Protection Act, CSA, International Maritime Organization etc.)			Must meet this First (1 <sup>st</sup> ) Field of Specialty; and  Must also meet a minimum of four (4) of these remaining seven (7) Fields of Specialty to qualify in this Area of Expertise.
2	Hazardous materials and substances (e.g. heavy metals, asbestos)			
3	Contaminant detection and remediation (e.g. potable water, chemical, petro, mold, soil, air, coatings)			
4	Coating application, inspection, and certification			
5	Environmental management framework (carbon footprint, environmental loading assessment)			
6	Emissions and fuels (e.g. low sulphur, bio-fuels)			
7	Environmental sensors (e.g. anemometers, humidity)			
8	Compliance audit experience			

**Template for the Fields of Specialty Offered of Area of Expertise #12, Integrated Logistics Support**

#	Fields of Specialty	Offered		Mandatory Requirement of the Field of Specialty
		Yes	No	
1	Technical data management, including planning, cataloguing, indexing and disposition plans			Must meet a minimum of three (3) of these six (6) Fields of Specialty to qualify in this Area of Expertise.
2	Configuration management (CM) including: planning, configuration identification activities, requirements management and traceability, audit planning and reporting, CM of software			
3	Supply chain management including materiel acquisition and planning, spares optimization analysis and planning, facilities assessment and planning, packaging, handling, storage and transport			
4	Maintenance management including maintenance requirements analysis and planning using accepted methodologies such as SAE JAI 011 compliant reliability centered maintenance (RCMII), predictive maintenance programs, and implementation activities with Maximo, other asset management systems and/or Oracle databases			
5	Project planning, monitoring and/or control methodologies and performance analysis of technical/engineering projects			
6	Technical training management expertise in asynchronous and synchronous communication (e-learning); task analysis; terminal and enabling objectives; criterion tests; development and design of review tests; identifying training requirements and			

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	course schedules; and, development and design for evaluation of technical training			
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**Template for the Sub-Types of Work Offered of Engineering and Technical Services for an Area of Expertise offered**

#	Sub-Types of Work	Offered		Mandatory Requirement of the Sub-Types of Work
		Yes	No	
1	Prepare detailed architecture and engineering designs			Must meet a minimum of six (6) of these twelve (12) Sub-Types of Work to qualify in this Type of Work for a given Area of Expertise.
2	Prepare field/laboratory tests: test plan/procedure development, scale and/or full size trials, instrumentation, data collection, measurement, observation, material testing techniques such as Non-Destructive Test (NDT) analysis, diagnostics, troubleshooting, analysis and recommendations			
3	Prepare technical analyses such as stress analysis (structural, fatigue, vibration), failure investigation services, physical, numerical modeling, analysis and recommendations			
4	Create/revise engineering/production specifications, drawings, sketches, reports, technical standards, technical policies and related presentation materials			
5	Review technology trends, technology assessments			
6	Conduct options analysis: research, assess, develop and define options to address system functional requirements			
7	Conduct analyses, develop business cases and justification using cost/benefit analyses, economic analyses, life cycle cost or a similar technique			
8	Evaluate new technologies and systems			
9	Perform simulation/modeling such as 3D modelling and Finite Element Analysis (Except building a Prototype or assembling models in wood, plastic, metal, or other material)			
10	Prepare design verification and validation procedures and documentation			
11	Perform, analyze and produce report on engineering surveys and inspections on future related implementation work			
12	Conduct technical risk assessments			

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### Template for the Sub-Types of Work of In-Service Support for an Area of Expertise offered

#	Sub-Types of Work	Offered		Mandatory Requirement of the Sub-Types of Work
		Yes	No	
1	Perform in-service technical inspections/surveys and/or user surveys to provide advice and recommendations			Must meet a minimum of four (4) of these eight (8) Sub-Types of Work to qualify in this Type of Work for a given Area of Expertise.
2	Prepare specifications/reports for system operation, modification, maintenance, repair, refurbishment or upgrades			
3	Investigate/create/analyze/update maintenance requirements, plans, work procedures, documentation, methods and data requirements			
4	Investigate/analyze/update asset configuration management, technical aspects of supply chain management and technical data management policies, processes and procedures at or below the asset/system level			
5	Perform equipment reliability, maintainability, optimization, and/or supportability analysis			
6	Conduct functional and physical configuration audits			
7	Conduct planning, evaluation and assessment of systems requirements			
8	Develop lay-up or disposal plans			