



RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:
Réception des soumissions - TPSGC / Bid
Receiving - PWGSC
1550, Avenue d'Estimauville
1550, D'Estimauville Avenue
Québec
Québec
G1J 0C7

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

Title - Sujet Autonomous Hydrographic Vehicles	
Solicitation No. - N° de l'invitation F3712-160018/A	Date 2016-09-09
Client Reference No. - N° de référence du client F3712-160018	
GETS Reference No. - N° de référence de SEAG PW-\$QCL-036-16867	
File No. - N° de dossier QCL-6-39093 (036)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2016-10-25	
Time Zone Fuseau horaire Heure Avancée de l'Est HAE	
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Gagnon, Mathieu	Buyer Id - Id de l'acheteur qcl036
Telephone No. - N° de téléphone (418) 649-2883 ()	FAX No. - N° de FAX (418) 648-2209
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: Pêches & Océans Canada Services hydrographique du Canada 850, Route de la Mer Mont-Joli Québec G0K 1P0 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
601-1550, Avenue d'Estimauville
Québec
Québec
G1J 0C7

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

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Solicitation No. - N° de l'invitation
F3712-160018/A
Client Ref. No. - N° de réf. du client
F3712-160018

Amd. No. - N° de la modif.
File No. - N° du dossier
QCL-6-39093

Buyer ID - Id de l'acheteur
qc1036
CCC No./N° CCC - FMS No./N° VME

PART 1 - GENERAL INFORMATION

1.1 Requirement

The requirement is detailed under Annex A – Requirement.

1.2 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 from receipt of the results of the bid solicitation process. The debriefing may be in writing, by telephone or in person.

1.3 Trade Agreements

"The requirement is subject to the provisions of the North American Free Trade Agreement (NAFTA), and the Agreement on Internal Trade (AIT)."

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* (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) issued by Public Works and Government Services Canada.

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 (2016-04-04) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.

2.1.1 SACC Manual Clauses

SACC Manual Clause B1000T (2014-06-26), Condition of Material – Bid

2.2 Submission of Bids

Bids must be submitted only to Public Works and Government Services Canada (PWGSC) Bid Receiving Unit by the date, time and place indicated on page 1 of the bid solicitation.

You can also submit your bid by facsimile at (1) 418-648-2209, by the date, time and place indicated on page 1 of the bid solicitation.

2.3 Enquiries - Bid Solicitation

All enquiries must be submitted in writing to the Contracting Authority no later than **(7) calendar 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 question(s) or may request that the Bidder do so, so that the proprietary nature of the question(s) is eliminated, and the enquiry can be answered to all Bidders. Enquiries not submitted in a form that can be distributed to all Bidders may not be answered by Canada.

2.4 Applicable Laws

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

Solicitation No. - N° de l'invitation
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QCL-6-39093

Buyer ID - Id de l'acheteur
qc1036
CCC No./N° CCC - FMS No./N° VME

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.

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 (1 hard copy)
Section II: Financial Bid (1 hard copy)
Section III: Certifications (1 hard copy)

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

Canada requests that bidders follow the format instructions described below in the preparation of their bid:

- (a) use 8.5 x 11 inch (216 mm x 279 mm) paper;
- (b) use a numbering system that corresponds to the bid solicitation.

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 Policy on Green Procurement (<http://www.tpsgc-pwgsc.gc.ca/ecologisation-greening/achats-procurement/politique-policy-eng.html>). To assist Canada in reaching its objectives, bidders should:

- 1) use 8.5 x 11 inch (216 mm x 279 mm) paper containing fibre certified as originating from a sustainably-managed forest and containing minimum 30% recycled content; and
- 2) use an environmentally-preferable format including black and white printing instead of colour printing, printing double sided/duplex, using staples or clips instead of cerlox, duotangs or binders.

Section I: Technical Bid

In their technical bid, bidders should explain and demonstrate how they propose to meet the requirements and how they will carry out the Work.

- Technical bid must be accompanied with the technical documentation proving the conformity of the product asked the annex A.

Section II: Financial Bid

Bidders must submit their financial bid in accordance with the Basis of Payment. The total amount of Applicable Taxes must be shown separately.

3.1.1 Exchange Rate Fluctuation

SACC Manual clause C3011T (2013-11-06), Exchange Rate Fluctuation

Section III: Certifications

Bidders must submit the certifications and additional information required under Part 5.

PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION

4.1 Evaluation Procedures

- (a) Bids will be assessed in accordance with the entire requirement of the bid solicitation including the technical and financial evaluation criteria.
- (b) An evaluation team composed of representatives of Canada will evaluate the bids.

4.1.1 Technical Evaluation

Each bid will be reviewed to determine whether it meets the mandatory requirements of the bid solicitation. Any element of the bid solicitation identified with the words "must" or "mandatory" is a mandatory requirement. Bids that do not comply with each and every mandatory requirement will be declared non-responsive and be disqualified.

Mandatory technical criteria and point rated technical criteria are included in Tables 4.1.1.1 and 4.1.1.2 below. The mandatory technical criteria and point rated technical criteria will be evaluated based on similar projects.

Similar projects means:

A project for the design, the manufacture and the commissioning of a marine autonomous vehicle for hydrographic survey operations (AHSV) with a value of \$ 100,000.00 (CAD) or more.

For each similar project, bidders must provide **at least** the following information:

- Title of the project;
- Project Value;
- Characteristics of the AHSV;
- Project description and the final result;
- Name of the user/customer, including name, telephone number and email of a contact person who can confirm the information;
- Exact dates of the project (month and year of start and end / delivery).

A verification with the user of the project in reference to attest the accuracy of the information could be made. If the user is not available within the required delays or refute the information provided by the bidder, the bid will be declared non-responsive.

Detail description of the AHSV means:

The following list of the major components to be replaced:

- Make and model of the AHSV;
- Make and model of the hydrographic survey systems;
- Make and model of the automation systems (navigation controls)
- Make and model of the power systems (electric)
- Make and model of the propulsion systems

If the information provided is not sufficient to confirm the relevance of the proposed propulsion system, the bid could be declared non-responsive.

Table 4.1.1.1: Mandatory technical criteria and point rated technical criteria for the assessment of the expertise of the company and its project team and the performance of proposed equipment.

Minimum required = 30/65 points

Evaluation Criteria	Mandatory Criteria	Pojnt Rated Criteria
1- Bidder's relevant expertise	The Bidder must have achieved a minimum of 2 similar projects over the past 5 years.	<ul style="list-style-type: none"> - The Bidder has completed 2 similar project over the last 5 years = 5 points - The Bidder has completed 3 to 5 similar projects over the last 5 years = 10 points - The Bidder has completed 5 similar projects over the last 5 years = 15 points
2- Experience of the Project Manager	Must have completed a minimum of 1 similar project as a Project Manager, while employed by the Bidder, over the last 3 years.	<ul style="list-style-type: none"> - Has completed 1 to 3 similar projects as a Project Manager over the last 5 years = 3 points - Has completed more than 3 similar projects as a Project Manager over the last 5 years = 5 points
3- Experience of the Hydrographic Equipment Senior Technician	Must have completed a minimum of 1 similar project as a Hydrographic Equipment Senior Technician, while employed by the Bidder, over the last 3 years.	<ul style="list-style-type: none"> - Has completed 1 to 3 similar projects as a Hydrographic Equipment Senior Technician over the last 5 years = 5 points - Has completed more than 3 similar projects as a Hydrographic Equipment Senior Technician over the last 5 years = 10 points
4- Experience of the Marine Automation Senior Technician	Must have completed a minimum of 1 similar project as a Marine Automation Senior Technician, while employed by the Bidder, over the last 3 years.	<ul style="list-style-type: none"> - Has completed 1 similar project as a Marine Automation Senior Technician over the last 5 years = 5 points - Has completed 2 to 3 similar projects as a Marine Automation Senior Technician over the last 5 years = 10 points - Has completed more than 3 similar projects as a Marine Automation Senior Technician over the last 5 years = 15 points
5- Past utilization of the proposed vehicle (regardless of criteria 6 and 7 below)		<ul style="list-style-type: none"> - Has been used in 1 to 5 similar projects, over the last 3 years = 3 points - Has been used in more than 5 similar projects, over the last 3 years = 5 points
6- Past performance of the proposed hydrographic system		<ul style="list-style-type: none"> - Has been used in 1 to 5 similar projects, over the last 3 years = 3 points - Has been used in more than 5 similar projects, over the last 3 years = 5 points
7- Past performance of the proposed marine automation system		<ul style="list-style-type: none"> - Has been used in 1 to 5 similar projects, over the last 3 years = 3 points - Has been used in more than 5 similar projects, over the last 3 years = 5 points
8- Understanding of the technical requirement	Must provide a detailed description of the proposed AHSV.	<ul style="list-style-type: none"> - Has provided all the technical data sheets of the major components = 0 to 5 points (1 point per technical data sheet)

Table 4.1.1.2: Point rated technical criteria for the assessment of the AHSV's functionalities and other deliverables included in the Bid. The criteria of the table below are taken from the requirements with a digital score rating in section 2 to 13 of the Technical Statement of Requirement of Annex A.

Minimum required = 40/80 points

Reference of the TSOR	Description	Point Rated Criteria
Section 2.9	The vehicles meet the design and buoyancy requirements of ISO standards for the type and size of these boats.	1 point if included
Section 3.1.1.2	Maximum transit speed (under normal conditions) equal to or more than 8 knots.	1 point if included
Section 3.1.2.2	Survey speed (under normal conditions) equal to or more than 5 knots	1 point if included
Section 3.1.3.2	Autonomy: at survey speed, up to 10 hours with Zero (0) or one (1) battery switch.	1 point if included
Section 3.1.6.2	Maintain course, made good over ground, when proceeding at 5 knots With cross wind of 15 knots.	1 point if included
Section 3.1.8	The control system is able to download the programmed lines provided by a third-party software (such as Hypack) for the collection of hydrographic data.	1 point if included
Section 3.1.9.2	Following a predetermined line and being able to stay on course with a deviation of less than one (1) meter.	1 point if included
Section 3.2.1.2	Operation when the air temperature is from -10 °C to +35 °C.	1 point if included
Section 3.2.3.2	Operation when the wave height is 1.0 meter or more.	1 point if included
Section 3.2.4.2	Operation in winds over 15 knots	1 point if included
Section 3.3.2	The vehicles are equipped with four (4) slings of sufficient capacity to lift in normal loading condition.	1 point if included
Section 4.1.2.2	Overall width of 1,5 meters or less	1 point if included
Section 4.1.3.2	Draft of 0,3 meters or less.	1 point if included
Section 4.1.4.2	Air draft (from the water surface without antennas) of 1,3 meters or less.	1 point if included
Section 4.1.5.2	Maximum operational weight basis (including hydrographic equipment) of 150 kg or less.	2 points if included
Section 4.1.6.2	Payload of 80 kg or more.	1 point if included
Section 5.1.3	Each compartments will be equipped with lighting.	1 point if included
Section 5.1.4	Each compartment will have a ventilation unit capable of maintaining the temperature at a maximum level of 40 °C.	1 point if included
Section 5.2	All lighting equipment will be using LED.	1 point if included
Section 5.3	Protective fenders will be used around de vehicle. Those fenders must prevent damages that the AHSV may suffer will docking to another boat or the wharf.	1 point if included
Section 6.2.3	The AHSV will have an automatic and autonomous anti-collision system	3 points if included
Section 6.2.4	The AHSV will have an automatic and autonomous anti-grounding system	3 points if included
Section 7.1.2	A fire extinguishing system will be installed in the engine compartment	2 points if included
Section 7.2	AHSV's propellers are counter-rotating.	1 point if included
Section 7.3.2	The AHSV will have a complete automatic control (autonomous).	5 points if included
Section 7.3.3	The AHSV will have a semi-automatic control (assisted)	2 points if included
Section 7.8.1	Navigation lights are permanently attached to the vehicle. In that case, wires must be protected in addition to being waterproof and using LED lighting	1 point if included

Section 7.8.3.2	Electric alarm, automatically activated when the automatic system is activated.	1 point if included
Section 7.9.2	All watertight hull sections (other than those mentioned in 7.9.1 of the TSOR) will be equipped with a bilge pump with sufficient capacity.	1 point if included
Section 7.11.1	For increased security in the survey area, at least one video camera will be installed on catamarans to allow close monitoring and to facilitate the conduct of the AHSV. The cameras will be remotely activated and controlled by the operator;	2 points if included
Section 7.11.2	To monitor the hydrographic survey system (multibeam), a camera will be installed under the AHSV to observe the underwater equipment.	1 point if included
Section 8.1.1	Will allow to perform automatic recording on a predetermined area along lines pattern.	3 points if included
Section 8.1.2	Will be capable of recording all operations	1 point if included
Section 8.1.4.2	Will be able to accept GeoTIFF and SHP file format.	2 points if included
Section 8.1.5	Will have a function to remember the last ending point for continuing the survey.	1 point if included
Section 8.1.6	Will have a programming function set to ending point at the end of the job, including: Returning at the starting point, returning at predetermined point and stop at the ending point.	1 point if included
Section 8.1.2	Will have the real time adjustment function.	1 point if included
Section 8.2.1.1	Real time information transmit to the operator for QC control.	1 point if included
Section 8.2.1.3	Video cameras data transmission.	1 point if included
Section 8.2.1.4	Possibility to interact with the acquisition pc on board in real time (wireless).	1 point if included
Section 8.2.2.1	Control and monitor of engines	1 point if included
Section 8.2.2.2	Alarms info including: engine power, flooding in compartments, minimum battery charge, comms loss, network and pc problems.	1 point if included
Section 8.3.1	The automated survey recording system will be compatible with the MBES installed and Caris software suite (HIPS/SIPS format).	3 points if included
Section 8.4.1	Collision analysis system for collision avoidance system.	3 points if included
Section 8.4.2	Minimum depth alarm for the grounding avoidance system.	3 points if included
Section 8.4.3	Data quality control check for bad acquisition data.	1 point if included
Section 8.5.1	Collision avoidance system alarm and emergency preprogrammed command, including: stop, stay in place, got to...	1 point if included
Section 8.5.2	Grounding avoidance system alarm and preprogrammed command, including: stop, reverse and stop.	1 point if included
Section 8.5.3	Define working zone with emergency stop if the AHSV try to exit.	1 point if included
Section 8.5.4	Define non-permitted area.	1 point if included
Section 11.4	A shrink-wrap packaging will be provided to protect the vehicle during transport and storage.	1 point if included
Section 12.3.2	The bidder provided a spare parts list, a description and their prices.	1 point if included
Section 12.4.1	For the four (4) years following the end of the warranty, the Contractor shall provide and annual software maintenance plan including updates and improvements of all software used by all AHSV control systems and hydrographic survey (included in the bid price)	5 points if included
Section 12.4.2	The Contractor will provide a service visit after the first season of operation of the AHSV. Where appropriate, the visit will be done at the CHS regional office in Mont-Joli and the cost will be included in the bid price.	3 points if included

4.1.2 Financial Evaluation

- (a) Bidders must submit their financial bid in accordance with Annex B, Basis of Payment.
- (b) The price of the bid will be evaluated in Canadian dollars, Applicable Taxes excluded, FOB destination, Canadian customs duties and excise taxes included.

Unless the bid solicitation specifically requires bids to be submitted in Canadian currency, bids submitted in foreign currency will be converted to Canadian currency for evaluation purposes. The rate given by the Bank of Canada in effect on the bid solicitation closing date, or on another date specified in the bid solicitation, will be applied as a conversion factor to the bids submitted in foreign currency.

- (c) Bidders must provide prices DDP (Incoterm 2000). Bids will be assessed on a DDP (Incoterm 2000) basis.
- (d) The total bid price evaluation price will be the price of Total C of the Summary Table available at Annex B - Basis of Payment.

4.1.3 Mandatory Technical Criteria

Bids will be assessed in accordance with the entire requirement of the bid solicitation including compliance with the mandatory certifications and table of deliverable requirements as detailed in Parts 2, 4, 5 & 6. Only those bids which are found to meet all the mandatory requirements within the specified time frames will be deemed responsive.

4.1.4 Table of Mandatory Requirements to be met by bid closing

Notwithstanding deliverable requirements specified anywhere else within this solicitation and its associated Technical Specification, the following are the only mandatory deliverables that must be submitted with the Bid at the time of bid closing. The following are mandatory and the Bidder must be compliant on each item to be considered responsive

Item	Description	Completed and attached
1	Annex B – Basis of payment completed	
2	Curriculum vitae of the Project Manager	
3	Curriculum vitae of the Hydrographic Equipment Senior Technician	
4	Curriculum vitae of the Marine Automation Senior Technician	
5	Detailed description of the proposed ASHV	

4.1.5 Table of Requirements to be provided after bid closing

The following information, which supports the bid, may be requested by the Contracting Authority from the bidder and it must be provided within **two (2)** working days of the written request:

Item	Description	Completed and Attached
1	Federal Contractors Program for Employment Equity - Certification, as per clause 5.2.2, Part 5	Prior to contract award
2	Schedule of Milestones, as per clause 6.6.4, Part 6	Prior to contract award

4.2 Basis of Selection

4.2.1 Basis of Selection – Highest Combined Rating of Technical merit and Price, SACC Manual Clause A0027T (2007-07-16)

1. To be declared responsive, a bid must:
 - a. comply with all the requirements of the bid solicitation;
 - b. meet all mandatory technical evaluation criteria; and
 - c. obtain the required minimum of 30 points overall for the technical criteria evaluation for the assessment of the expertise of the company and its project team and the performance of proposed equipment (table 4.1.1.1) which are subject to point rating. The rating is performed on a scale of 65 points.
 - d. obtain the required minimum of 35 points overall for the technical criteria evaluation for the assessment of the AHSV's functionalities and other deliverables (table 4.1.1.2) which are subject to point rating. The rating is performed on a scale of 80 points.
2. Bids not meeting (a) or (b) or (c) or (d) will be declared non-responsive. Neither the responsive bid that receives the highest number of points nor the one that proposed the lowest price will necessarily be accepted. The responsive bid with the lowest evaluated price per point will be recommended for award of a contract.
3. The selection will be based on the highest responsive combined rating of technical merit and price. The ratio will be 65 % for the technical merit and 35 % for the price.
4. 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 40% will be granted for the assessment of the expertise of the company and its project team and the performance of proposed equipment (See Table 4.1.1.1).
 - total number of points obtained / maximum number of points available multiplied by the ratio of 25% will be granted for the assessment of the AHSV's functionalities and other deliverables (See Table 4.1.1.2).

5. To establish the pricing score, each responsive bid will be prorated against the lowest evaluated price and the ratio of 35%.
6. For each responsive bid, the technical merit score and the pricing score will be added to determine its combined rating.
7. 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.

Example: (the maximum number of points for the technical competencies is 145, including 65 for the expertise and 80 for the functionalities and other deliverables)

Highest combined score; - for the financial aspect (35%); - for technical - References aspects of Table 4.1.1.1 (40%); - for technical - Functionalities and other deliverable aspects of Table 4.1.1.2 (25%)						
Bidders	A	Pass "Yes" or "No"	B	Pass "Yes" or "No"	C	Pass "Yes" or "No"
Submitted prices	584 000,00 \$		789 000,00 \$		966 000,00 \$	
Technical scores for the assessment of the expertise of the Bidder and its project team and the performance of proposed equipment (Table 4.1.1.1) Minimum required = 30 points	29	No	41	Yes	44	Yes
Technical scores for the technical criteria evaluation for the assessment of the AHSV's functionalities and other deliverables (Table 4.1.1.2) minimum required = 35 points	68	Yes	73	Yes	77	Yes
Calculation	A		B		C	
Score for the prices	Lowest submitted price, divided by the submitted price, multiplied by 35					
	35,00		25,91		21,16	
Technical scores - References (Table 4.1.1.1)	Score, divided by 65, multiplied by 40					
	17,85		25,23		27,08	
Technical scores - Fonctionnalités and other deliverables (Table 4.1.1.2)	Score, divided by 80, multiplied by 25					
	21,25		22,81		24,06	
Total	74,10		73,95		72,30	
In this example, the Contract would be awarded to Bidder "B" because it is the compliant bidder with the highest combined score. (Bidder "A" does not have the minimum score required for the technical - References aspect (Table 4.1.1.1))						

PART 5 – CERTIFICATIONS AND ADDITIONAL INFORMATION

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

The certifications provided by Bidders to Canada are subject to verification by Canada at all times. Unless specified otherwise, 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 made knowingly or unknowingly, 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 and to cooperate with any request or requirement imposed by the Contracting Authority will render the bid non-responsive or constitute a default under the Contract.

5.1 Certifications Required with the Bid

Bidders must submit the following duly completed certifications as part of their bid.

5.1.1 Integrity Provisions - Declaration of Convicted Offences

In accordance with the *Ineligibility and Suspension Policy* (<http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>), the Bidder must provide with its bid the required documentation, as applicable, to be given further consideration in the procurement process.

5.2 Certifications Precedent to Contract Award and Additional Information

The certifications and additional information listed below should be submitted with the bid, but may be submitted afterwards. If any of these required certifications or additional information is not completed and submitted as requested, the Contracting Authority will inform the Bidder of a time frame within which to provide the information. Failure to provide the certifications or the additional information listed below within the time frame provided will render the bid non-responsive.

5.2.1 Integrity Provisions – Required Documentation

In accordance with the *Ineligibility and Suspension Policy* (<http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>), the Bidder must provide the required documentation, as applicable, to be given further consideration in the procurement process.

5.2.2 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 at the bottom of the page of the [Employment and Social Development Canada \(ESDC\) - Labour's](http://www.esdc.gc.ca/en/jobs/workplace/human_rights/employment_equity/federal_contractor_program.page?&_ga=1.229006812.1158694905.1413548969) website (http://www.esdc.gc.ca/en/jobs/workplace/human_rights/employment_equity/federal_contractor_program.page?&_ga=1.229006812.1158694905.1413548969).

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.

The Bidder must provide the Contracting Authority with a completed annex [Federal Contractors Program for Employment Equity - Certification](#), before contract award. If the Bidder is a Joint Venture, the Bidder must provide the Contracting Authority with a completed annex Federal Contractors Program for Employment Equity - Certification, for each member of the Joint Venture.

5.2.3 Additional Certifications Precedent to Contract Award

5.2.3.1 Status and Availability of Resources

SACC Manual clause [A3005T](#) (2010-08-16), Status and availability of Resources

5.2.3.2 Education and Experience

SACC Manual clause [A3010T](#) (2010-08-16) Education and Experience

PART 6 - RESULTING CONTRACT CLAUSES

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

6.1 Security Requirements

There is no security requirement applicable to the Contract.

6.2 Requirement

The Contractor must provide the items detailed under the "Requirement" at Annex "A".

6.3 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](https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) (https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) issued by Public Works and Government Services Canada.

6.3.1 General Conditions

[2010A](#) (2016-04-04), General Conditions - Goods (Medium Complexity), apply to and form part of the Contract.

6.3.2 Supplemental General Conditions

[4003](#) (2010-08-16), Licensed Software, apply to and form part of the Contract.

[4004](#) (2013-04-25), Maintenance and Support Services for Licensed Software, apply to and form part of the Contract.

[4006](#) (2010-08-16), Contractor to Own intellectual Property Rights in Foreground Information, apply to and form part of the Contract.

6.4 Term of Contract

The Contractor grants to Canada the irrevocable option to extend the term of the Contract by up to 3 additional 1 year period(s) under the same conditions. The Contractor agrees that, during the extended period of the Contract, it will be paid in accordance with the applicable provisions as set out in the Basis of Payment.

Canada may exercise this option at any time by sending a written notice to the Contractor at least 180 calendar days before the expiry date of the Contract. The option may only be exercised by the Contracting Authority, and will be evidenced for administrative purposes only, through a contract amendment.

6.4.1 Period of the Contract

The contract period is from Contract award date until the end of the warranty period or the service period (at the later date) inclusively.

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qc1036
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6.4.2 Delivery Date

All the deliverables (except options) must be received no later than March 17, 2017. If applicable, optional Work must be received no later than March 17, 2020

6.4.4 Delivery Points

Delivery of the requirement will be made to delivery point specified in the Contract.

Delivered Duty Paid (DDP), Mont-Joli, province of Québec, Canada, as per Incoterms 2000 for shipments from a commercial contractor.

6.5 Authorities

6.5.1 Contracting Authority

The Contracting Authority for the Contract is:

Name: Mathieu Gagnon
Title: Supply Chief (Marine)
Organization: Public Works and Government Services Canada
Supply and Compensation Directorate, Québec Region

Telephone: 418-649-2883
Facsimile: 418-648-2209
E-mail address: mathieu.gagnon@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.

6.5.2 Technical Authority

The Technical Authority for the Contract is: (Will be added at contract award)

Name: _____
Title: _____
Organization: _____
Address: _____
Telephone: ____-____-_____
Facsimile: ____-____-_____
E-mail: _____.

The Technical Authority named above 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.

6.5.3 Contractor's Representative

Name: _____
Title: _____
Organization: _____

Address: _____
Telephone: ____-____-____
Facsimile: ____-____-____
E-mail: _____.

6.6 Payment

6.6.1 Basis of Payment

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid firm unit prices, as specified in in Annex B for a cost of \$ _____ (insert the amount at contract award). Customs duties are included and Applicable Taxes are extra.

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.

6.6.2 Limitation of Price

SACC Manual clause [C6000C](#) (2011-05-16) Limitation of Price

6.6.3 SACC Manual Clauses

SACC Manual clause [C2000C](#) (2007-11-30) Taxes - Foreign-based Contractor
SACC Manual clause [A0222T](#) (2014-06-26) Evaluation of Price - Canadian / Foreign Bidders

6.6.4 Milestone Payments – Not subject to holdback, *SACC Manual* clause [H3010C](#) (2016-01-28)

Canada will make milestone payments in accordance with the Schedule of Milestones detailed in the Contract and the payment provisions of the Contract 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.

Schedule of Milestones:

The schedule of milestones for which payments will be made in accordance with the Contract is as follows:

Milestone No.	Description or "Deliverable"	Firm Amount	Due Date or "Delivery Date"
1	Approbation of the final concept by CHS-MPO as per the Technical Statement of Requirement	(Will be entered as 5% of the total price of the first 2 AHSV)	(To be establish after contract award)
2	Completions of each of the first 2 AHSV	(Will be entered as 25% of the contract price of each of the first 2 AHSV)	(To be establish after contract award)
3	Delivery of the first 2 AHSV, including respective trailers	(Will be entered as 60% of the contract price of each of the first 2 AHSV)	(To be establish after contract award)
4	Acceptation of test and trials, completion of training and supply of all documentation for the first 2 AHSV	(Will be entered as 10% of the contract price of the first 2 AHSV)	(To be establish after contract award)
5	Supply of each of the optional AHSV, in whole or in part, as per described in Table B) Optional Work, of Annex B – Basis of Payment	(Will be entered as 100% of the contract price of each option)	(To be establish after contract award)

6.7 Invoicing Instructions

1. The Contractor must submit invoices in accordance with the section entitled "Invoice Submission" of the general conditions. Invoices cannot be submitted until all work identified in the invoice is completed.
2. Invoices must be distributed as follows:

DFOInvoicing-MPOfacturation@dfo-mpo.gc.ca



AND

An electronic copy must be transmitted to the Contracting Authority identified under the section entitled "Authorities" of the Contract.

6.8 Certifications and Additional Information

6.8.1 Compliance

Unless specified otherwise, the continuous compliance with the certifications provided by the Contractor in its bid or precedent to contract award, and the ongoing cooperation in providing additional information are conditions of the Contract and failure to comply will constitute the Contractor in default. Certifications are subject to verification by Canada during the entire period of the Contract.

6.8.2 Federal Contractors Program for Employment Equity - Default by the Contractor

The Contractor understands and agrees that, when an Agreement to Implement Employment Equity (AIEE) exists between the Contractor and Employment and Social Development Canada (ESDC)-Labour, the AIEE must remain valid during the entire period of the Contract. If the AIEE becomes invalid, the name of the Contractor will be added to the "[FCP Limited Eligibility to Bid](#)" list. The imposition of such a sanction by ESDC will constitute the Contractor in default as per the terms of the Contract.

6.9 Applicable Laws

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

6.10 Priority of Documents

If there is a discrepancy between the wording 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 [2010A](#) (2016-04-04), General Conditions - Goods (Medium Complexity);
- (c) Annex A, Requirement;
- (d) Annex B, Basis of payment;
- (e) the Contractor's bid dated _____.

6.11 Inspection and Acceptance

The Technical Authority or representative is the Inspection Authority. All reports, deliverable items, documents, goods and all services rendered under the Contract are subject to inspection by the Inspection Authority or representative. Should any report, document, good or service not be in accordance with the requirements of the Statement of Work and to the satisfaction of the Inspection Authority, as submitted, the Inspection Authority will have the right to reject it or require its correction at the sole expense of the Contractor before recommending payment.

6.12 SACC Manual Clauses

SACC Manual clause B7500C (2006-06-16), Excess Goods
SACC Manual clause G1005C (2016-01-28), Insurance

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Buyer ID - Id de l'acheteur
qc1036
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Annex 'A'

Requirement

See attached document entitled:

**Supply of Autonomous Hydrographic Surface Vehicles (AHSV)
September 7, 2016 – Version 5.”**

Annex B

BASIS OF PAYMENT

A) Scheduled Work :

Item	Description	Quantity	Unit Price	Total firm price (CAD)
1	Completion (with approval from CHS -DFO) of the full AHSV design, as specified in the Technical Statement of Requirement.	1	_____ \$ (Chaque)	_____ \$
2	Supply of AHSV as described in sections 1 to 8 of the Technical Statement of Requirement. (Final cost prorated)	2	_____ \$ (Chaque)	_____ \$
3	Tests and trials AHSV as described in Section 9 of the Technical Statement of Requirement (TSOR). (Final cost prorated)	2	_____ \$ (Chaque)	_____ \$
4	AHSV delivery, trailer and documentation, as described in Sections 10 and 11 of the Technical Statement of Requirement (TSOR). (Final cost prorated)	2	_____ \$ (Chaque)	_____ \$
5	Supply security and training services, as described in Section 12 of the Technical Statement of Requirement (TSOR). (Final cost prorated)	2	_____ \$ (Chaque)	_____ \$
6	Provision of a full trailer as described in section 13 of the Technical Statement of Requirement (TSOR). (Final cost prorated)	2	_____ \$ (Chaque)	_____ \$
Subtotal A :				_____ \$

B) Optional Work:**

Item	Description	Quantity**	Unit Price	Total firm price (CAD)
7	Supply* of the optional AHSV and optional services, as per described in the Technical Statement of Requirement. (Final price to be prorated)	5	_____ \$ (each)	_____ \$
8	Supply* of the optional AHSV, excluding trailers, and hydrographic systems (hull with propulsion systems, autonomous navigation system, the remote control console, the batteries and associated component), as per described in the Technical Statement of Requirement. (Final price to be prorated)	5	_____ \$ (each)	_____ \$
9	Supply* of the optional multibeam echosounder compact wideband system, including all components described in Appendix 1 of the Technical Statement of Requirement. (Final price to be prorated)	5	_____ \$ (each)	_____ \$
10	Supply* of complete optional trailer as per described in section 13 of the Technical Statement of Requirement. (Final price to be prorated)	5	_____ \$ (each)	_____ \$
11	Optional tests and trials of the AHSV, as per described in section 9 of the Technical Statement of Requirement. (Final price to be prorated)	5	_____ \$ (each)	_____ \$
12	Delivery of AHSV and trailers as described in Section 11 of the Technical Statement of Requirement. (Final cost prorated)	5	_____ \$ (each)	_____ \$
13	Annual Maintenance Plan "Software" as per described in section 12.4.1 of the Technical Statement of Requirement. (Final price to be prorated)	20 (5 x 4 years)	_____ \$ (each)	_____ \$
14	Servicing visit as per described in section 12.4.2 of the Technical Statement of Requirement (Final price to be prorated)	5	_____ \$ (each)	_____ \$
15	Supply of optional training as per described in section 12.5 of the Technical Statement of Requirement (Final price to be prorated)	5	_____ \$ (each)	_____ \$
16	Supply* of spare parts (Include an amount of 40 000,00\$)			40 000,00 \$
Subtotal B :				_____ \$

Summary:

Subtotal A	Subtotal B	Total C - Firm Price (CAD) (Bid evaluation price)
_____ \$	_____ \$	_____ \$

* Customs duties are included and all applicable taxes are extra, if applicable.

** Canada may exercise all or part of the options under the terms of clauses 6.4 of Part 6.



Fisheries and Oceans
Canada

Pêches et Océans
Canada



DEPARTMENT OF FISHERIES AND OCEANS

ANNEX A

Technical Statement of Requirements (TSOR)

Requisition number F3712-160018

**Provision of Autonomous Hydrographic Surface Vehicles
(AHSV).**

September 7th, 2016 – Version 5



Document Control

Record of Amendments

#	Date	Description	Initials
1	June 3, 2016	First draft	BT/EL
2	August 9, 2016	2 nd draft commented by Mathieu Gagnon	MG
3	August 26 th , 2016	3 rd draft	RC/BT
4	September 7 th , 2016	4 th draft (following the comments of MG and review by CHS)	BT/MJ/EL/RC
5	September 9 th	5 th draft (final review by CHS & PSPC)	EL/RC/MG

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ABBREVIATIONS

ABYC	American Boat and Yacht Council
AC	Alternating Current
AHSV	Autonomous Hydrographic Surface Vehicle
AIS	Automated Identification System
ASTM	American Society for Testing and Materials
CFM	Contractor Furnished Material
CHS	Canadian Hydrographic Service
CSA	Canadian Shipping Act
CSA	Canadian Standards Association
COLREGS	Collision Regulations
DC	Direct Current
DFO	Department of Fisheries and Oceans
ECDIS	Electronic Chart Display and Information System
FRP	Fibre/Glass Reinforced Plastic
GPRS	General Packed Radio System
GPS	Global Positioning System
GSM	Government Supplied Material
IP	Internet Protocol
ISO	International Organization for Standardization
MBES	Multibeam Echosounder System
PC	Personal Computer
PVC	Polyvinylchloride
RTK	Real-Time Kinematic
TA	Technical Authority (As defined by the Contract)
TCMSB	Transport Canada Marine Safety Bureau
TSOR	Technical Statement of Requirements
UV	Ultraviolet
VHF	Very High Frequency
WMO	World Meteorological Organization
XTE	Cross Track Error

LIST OF REFERENCE DOCUMENTS

REFERENCE	TITLE
TP 1332	Construction Standards for Small Boats https://www.tc.gc.ca/eng/marinesafety/tp-tp1332-menu-521.htm
ISO 12217	Small Boat – Stability and Buoyancy Assessment and Categorization
Canada Shipping Act	Small Vessel Regulations
Canada Shipping Act	Collision Regulations (COLREGS)
ABYC	American Boat and Yacht Council Standards
Canadian Standards Association (CSA) CSA W47.2-M1987	Certification of Companies for Fusion Welding of Aluminium
(CSA) C22.2 No. 183.2-M1983 (R1999)	Standards for DC Electrical Installations on Boats
CT-043-EQ-EG-001-E	Canadian Coast Guard Welding Specification, March 2014

1. PURPOSE

The Canadian Department of Fisheries and Oceans (DFO) buys manages and operates numerous vessels in support of its departmental programs and other missions.

This actual requirement is for two (2) Autonomous Hydrographic Surface Vehicles (AHSV) electrically propelled, measuring between 2.0 to 3.0 metres, with the possibility to acquire up to five (5) additional AHSV. The AHSV must be **catamaran** type, necessary for stability during survey operations. Working environment will be for ports and coastal hydrographic operations. This item must fit in the present requirement specifications.

Based on the pricing, the Canadian Hydrographic Service (CHS) reserves the right to choose the number of AHSV and options.

The primary role of these vehicles will be the support of the CHS survey operations in Canada's three ocean coastal as well as internal and open waters. These vessels could be based in Burlington (Ontario), Mont-Joli (Quebec), Dartmouth (Nova Scotia), and Sydney (British Columbia).

In the following technical sections 2 to 13 inclusively, under the "RANK" column, all items ranked with "M" are mandatory, while those ranked with "NM" are not mandatory, but will be used for the technical evaluation.

2. DESIGN AND CONSTRUCTION

Unless stated otherwise all components, equipment and material must be contractor supplied.

DESIGN AND CONSTRUCTION REQUIREMENT		RANK
2.1 Ergonomic Design – General	Hazardous operating conditions must be prevented by arranging machinery and equipment in a safe manner: providing guards for all electrical, mechanical and thermal hazards to staff and survey equipment; and providing guards or covers for any controls that might accidentally be activated by contact of staff. Human engineering factors considered in design must include accessibility, visibility, readability and installation efficiency. Equipment must be accessible for use, inspection, cleaning and maintenance.	M
2.2 Vibration		M
2.2.1	The AHSV and all components must be free of local vibration that could damage vessel structure, machinery and systems, or interfere with the operation and maintenance of machinery or sonar systems.	M
2.2.2	Mounts for movable components, including items moved for stowage, towing or transport must be provided with resilient material as necessary to prevent rattling.	M
2.2.3	Loosening of fasteners under vibration must be prevented by the use of self-locking fasteners, as applicable.	M
2.3 Equipment Protection	During construction and before delivery, the Contractor is responsible for the care of all equipment. All parts, especially those having working surfaces or passages intended for lubricating oil, must be kept clean and protected during manufacture, storage, assembly and after installation. Equipment must at all times be protected against dust, moisture or foreign matter and must not be subject to rapid temperature changes or to temperature extremes.	M
2.4 Site Cleanliness	During construction, all chips, shavings, refuse, dirt and water must be removed at the completion of the work shift or sooner. The Contractor must ensure measures are taken to avoid wear and damage incident, and to prevent corrosion or other deterioration during the construction of the AHSV. Equipment subject to freezing must be kept drained, except during test and trials. Equipment must be kept clean and protected from the environment prior to installation.	M

<p>2.5 Structural Strength All structures and components must be of sufficient strength to withstand the lateral and vertical impact-loading that equates to the conditions of the operational requirements. Hull scantlings must adhere to requirements of TP 1332.</p>	M
<p>2.6 Standards The AHSV must be designed, constructed, inspected and certified to meet the requirements of the following standards, regulations and codes:</p>	
<p>2.6.1 Transport Canada Marine Safety Regulation TP 1332 (current edition) Construction Standards for Small Boats. This standard references ISO and ABYC standards covering structure, fuel, electrical, stability and drainage requirements;</p>	M
<p>2.6.2 CSA C22.2 No. 183.2-M1983 (R1999) Standards for DC Electrical Installations on Boats and ABYC 'E' Electrical Standards;</p>	M
<p>2.6.3 The Contractor must supply the AHSV as per this TSOR and where this TSOR interferes or contravenes the above standard, the above TCMSB TP 1332 standard will take precedence;</p>	M
<p>2.6.4 The Contractor must supply a certificate of approval insuring the proposed AHSV complies with TCMSB TP 1332, to ensure compliance with the current Canadian Coast Guard, Maritime Services Policies.</p>	M
<p>2.7 Materials</p>	
<p>2.7.1 All materials must be corrosion resistant and suitable for use in a salt water environment as detailed in the Operational Requirements. All materials normally subjected to sunlight must resist degradation caused by ultraviolet radiation. Galvanized materials are unacceptable.</p>	M
<p>2.7.2 Direct contact of electrolytically dissimilar metals is not allowed. Electrolytic corrosion must be prevented by insulating dissimilar materials from each other with gaskets, washers, sleeves, or bushings of suitable insulating material.</p>	M
<p>2.7.3 Stainless steel type 316L or 316 must be used for all stainless steel applications except as noted. Alloy 316L must be used in any welded underwater components.</p>	M

2.7.4	Fittings and clamps must be stainless steel. Bolts used in all fittings must be Type 316 stainless steel.	M
2.7.5	Where flexible connections are required for steering or other components, suitable hose with permanently crimped, detachable reusable type fittings must be used.	M
2.7.6	All materials and equipment must be stored, installed and tested in accordance with the manufacturer's guidelines, recommendations and requirements.	M
2.8	Fasteners	
2.8.1	All fasteners must be of corrosion resistant materials.	M
2.8.2	Cadmium plated parts and fasteners, including washers, must not be used.	M
2.8.3	Direct attachment of alloys containing copper to aluminium is not permitted except for an electrical bonding strap.	M
2.8.4	Where nuts will become inaccessible after assembly of the AHSV, nuts must be captured or anchored to allow reassembly and prevent backing off.	M
2.8.5	Unless otherwise specified, self-locking nuts must be installed to prevent loosening of fasteners due to shock and vibration.	M
2.8.6	Fasteners in deck traffic areas must be flush-mounted to eliminate tripping and snagging hazards.	M

2.9 Design Category The AHSV must meet the design and buoyancy requirements of ISO Standards for the type and dimensions of these vehicles.	NIM
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3. OPERATIONAL REQUIREMENTS

	RANK
<p>3.1 General Unless otherwise stated, performance is for conditions of zero sea state and no wind, in salt water with Normal Load and complement. The AHSV must be designed and constructed for ease of maintenance and repair, long life, and to be easily supportable by local commercial facilities and suppliers. The AHSV are expected to have a service life of at least 5 years, with an expected usage of between 300 and 500 hours per year and meet the following minimum operational requirements:</p>	
<p>3.1.1 Maximum speed during transit (at normal load condition):</p>	
<p>3.1.1.1 Less than eight (8) knots;</p>	M
<p>3.1.1.2 Eight (8) knots or more.</p>	NM
<p>3.1.2 Survey Speed (at normal load condition):</p>	
<p>3.1.2.1 Less than five (5) knots;</p>	M
<p>3.1.2.2 Five (5) knots or more.</p>	NM
<p>3.1.3 Endurance: At survey speed up to 10 hrs with:</p>	
<p>3.1.3.1 Two (2) battery switches;</p>	M
<p>3.1.3.2 Zero (0) or one (1) battery switch.</p>	NM
<p>3.1.4 Capability to stay stable (roll and pitch up to 15°) in Beaufort Force 3;</p>	M
<p>3.1.5 Steer and manoeuvre effectively at 5 knots in Beaufort Force 3;</p>	M
<p>3.1.6 Maintain course, made good over ground, when proceeding at 5 knots on these conditions: 3.1.6.1 Without cross wind;</p>	M
<p>3.1.6.2 With cross wind of 15 knots.</p>	NM
<p>3.1.7 Operate carefully in depths of 0.5 meter.</p>	M

3.1.8	Control system will be enable to upload lines plans from a third party software (like Hypack) for hydrographic data collection;	NM
3.1.9	Following a predetermined line and able to follow the line at XTE :	
	3.1.9.1 From 1 to 2 meters;	M
	3.1.9.2 Less than 1 meter.	NM
3.1.10	Able to turn back on the line smoothly.	M
3.2	Environmental Conditions	
	Capable of operating day or night in the following conditions:	
3.2.1	Operate in ambient air temperature range:	
	3.2.1.1 From +10°C to +35°C;	M
	3.2.1.2 From -10°C to +40°C.	NM
3.2.2	Operate in water temperature between: 0°C to +25°C;	M
3.2.3	Operate in wave heights:	
	3.2.3.1 Less than one (1,0) meter (Beaufort Force 3);	M
	3.2.3.2 One (1,0) meter or more.	NM
3.2.4	Operate in wind speeds:	
	3.2.4.1 Up to 15 knots;	M
	3.2.4.2 More than 15 knots.	NM
3.3	Launching, Recovery and Transportation	
3.3.1	The AHSV must be readily road transportable on a trailer, must be able to be launched and recovered using the trailer at existing launch ramps (minimal width 3 meters, maximum slope 20 degrees).	M
3.3.2	The AHSV must be equipped with a four (4) legs, webbing lifting bridle of sufficient rating to lift the vessel in normal load condition, supplied by the Contractor.	NM

The location and arrangement of lifting gear must be such that it does not pose a safety hazard to the operator and does not interfere with AHSV operation. All bridle lifting lugs must be reinforced and proof tested in accordance with CSA Tackle Regulations. Lifting points must not be located below the deck or within lockers or compartments. Lifting points must be located so that the bridle does not snag on the AHSV structure, outfit or machinery. Lifting slings provided must be webbing strap type certified to safely lift the AHSV in the Normal Loaded condition. Test margin 150% for four straps, or per CSA if higher standard.

4. PHYSICAL CHARACTERISTICS

PHYSICAL CHARACTERISTICS REQUIREMENT		RANK
4.1	<i>AHSV Particulars</i>	
4.1.1	Length overall between – 2.0 to 3.0 metres;	M
4.1.2	Maximum breadth overall:	
4.1.2.1	Up to a maximum of 1,8 meter;	M
4.1.2.2	1,5 meter or less.	NM
4.1.3	Draft:	
4.1.3.1	Up to a maximum of 0,5 meter;	M
4.1.3.2	0,30 meter or less.	NM
4.1.4	Air draft (from the water surface without antennas):	
4.1.4.1	Up to a maximum of 1,8 meters;	M
4.1.4.2	1,3 meter or less.	NM
4.1.5	Base maximum weight – (excluding the hydrographic equipment).	
4.1.5.1	Up to a maximum of 250 kg	M
4.1.5.2	150 kg or less.	NM
4.1.6	Payload:	
4.1.6.1	Minimum of 50 kg;	M
4.1.6.2	80 kg or more.	NM

5. AHSV CONFIGURATION

AHSV CONFIGURATION REQUIREMENT		RANK
5.1	General Arrangement	
5.1.1	Payload mounting to be located inside a waterproof compartment with easy access from the emerged part of the AHSV.	M
5.1.2	The equipment space area must contain enough space for all survey gear.	M
5.1.3	Each room space will have a light inside.	NM
5.1.4	Each room space will be equipped with ventilation unit suitable to maintain the temperature at a manageable level (maximum of 40 °C).	NM
5.1.5	All lights switches and breakers must be within easy reach of the operator.	M
5.2	Utility Lighting All lighting will be on LED (power management is critical due to volume of electronics).	NM
5.3	Hull Particularity Protection bumper will be installed all around the hull. These bumpers will provide the necessary protection from damage to AHSV that may occur when lying alongside a vessel or a pier.	NM

6. OUTFIT GENERAL

OUTFIT GENERAL REQUIREMENT		RANK
6.1 Survey Electronics Outfit	The Contractor must supply the hydrographic survey equipment with these requirements as follows:	
6.1.1	Compact Multi Beam Echo-Sounder System including all components described in appendix 1	M
6.2 Emergency Systems	The AHSV will have certain emergency alarms and systems, especially:	
6.2.1	Emergency specific alarm send to the operator for system fail including engine, floods in compartments, minimum battery charge, communication loss, network and computer problems;	M
6.2.2	Emergency lights and sound when AHSV lost control;	M
6.2.3	Automatic Collision avoidance system (will have the capacity to instruct the operator and proceed autonomously with avoidance manoeuvres);	NM
6.2.4	Automatic grounding avoidance system (will have the capacity to instruct the operator and proceed autonomously with avoidance manoeuvres);	NM

7. SYSTEMS GENERAL

SYSTEMS GENERAL REQUIREMENT		RANK
7.1 Propulsion	Propulsion will be two DC electric motors.	
7.1.1	The Contractor must ensure the motors are mounted in accordance with the manufacturer's recommendations;	M
7.1.2	The engine room will have a fire suppression system installed.	NM
7.2 Propellers	The ASHV propellers will be counter-rotating. The propellers will be properly sized for the intended operations.	NM
7.3 Controls	The AHSV will operate with the following modes. The operator will have access to easily switch from one mode to another.	
7.3.1	Manual control mode;	NM
7.3.2	Full automatic control mode (autonomous);	NM
7.3.3	Semi-automatic mode (assisted).	NM
7.4 Gauges	The Contractor must supply and install equipment included in the manufacturers' standard gauge packages. He also must supply appropriate cables and harnesses for the specified equipment. The gauge packages must contain at a minimum the following gauges:	
7.4.1	A voltmeter;	M
7.4.2	Batteries charge indicator for the propulsion system;	M
7.4.3	Batteries charge indicator for the Survey system;	M
7.4.4	The gauges info has to be transmitted to the Operator.	M
7.5 Verification of Installation	Installation and initial start-up of the electric propulsion, including controls, lubrication and battery connections	M

are to be verified by an authorized technician of the appropriate engine manufacturer.	
7.6 Engine Break In If necessary, the Contractor is to respect the engine manufacturer's break-in procedures.	M
7.7 Electrical Systems (battery, cables and charging systems) The electrical system design, component selection and installation must be in accordance with Canadian Standards Association C22.2 NO. 183.2-M1983 (R1999) "Standards for D.C. Electrical Installations on Boats", and TP 1332 and/or ABYC 'E' as referenced by TP1332. All electrical equipment and hardware must be installed in accordance with the manufacturer's specifications :	
7.7.1 Instrumentation;	M
7.7.2 Bilge Pumps;	M
7.7.3 Electronics;	M
7.7.4 Communications;	M
7.7.5 Ancillary Items;	M
7.7.6 All electrical equipment must be readily accessible for performing maintenance;	M
7.7.7 Two marine quality 12V power outlets must be installed in the survey equipment compartment;	M
7.7.8 Battery switches must be approved by a certification agency and must be mounted to prevent snagging or accidental switching;	M
7.7.9 Battery compartment must be weather tight and fitted with a suitable means of gas venting including for 'sealed' batteries;	M
7.7.10 Cables for all electrical distribution must be ample in size for the particular service of marine grade tinned boat cable;	M
7.7.11 The electrical system design, component selection and installation must be in accordance with TP1332 and/or ABYC 'E' as referenced by TP1332. All electrical equipment and hardware must be installed in accordance with the manufacturer's specifications;	M
7.7.12 Breaker panels must be appropriately sized for the equipment detailed in this TSOR with a minimum of two (2) spares and enough room to add wiring;	M
7.7.13 All fitted electrical equipment must be capable of operating simultaneously without causing interference	M

	to any electronic equipment;	
7.7.14	All operation switches for equipment must be labelled;	M
7.7.15	A 20 amp marine battery charger is to be supplied and installed. It must be used to charge both battery banks when the AHSV is on shore power;	M
7.7.16	A shore power connection must be fitted on each AHSV with a marine grade service rated 10 meters shore power cable, capable of supplying 120V AC, 30 amperes, single-phase service.	M
7.8 Navigation Components		
7.8.1	Navigation lights will be permanently fitted to the AHSV. Where necessary, protected wiring must be waterproof and LED lighting must be used;	NM
7.8.2	The Contractor must supply and install the following electronics. All antennas must be mounted on cabin top with fold down connections for road travel except for the two antennas as part of the attitude and inertial positioning system. These antennas will be installed permanently with a fix mast according with the manufacture directives. Such as installing the GPS antennas with fix mounts on the longitudinal axys and spaced at least 2m apart and at the same vertical height;	M
7.8.3	The Contractor will supply and install an electric horn that meets the requirements of Collision Regulations.	
	7.8.3.1 The horn must be operated remotely on the remote operator's console ;	M
	7.8.3.2 The horn will be automatically activated by the avoidance systems.	NM
7.9 Drainage and Bilge Systems		
7.9.1	An electric bilge pump with sufficient capacity must be fitted in each of the main hulls. The bilge pumps must be located so that they take suction from the lowest point of the hull. The wire gauge for all bilge pumps must be a minimum of 10 gauges;	M
7.9.2	Any additional watertight division of the hull will be serviced by a bilge pump sufficient capacity.	NM
7.9.3	Valves and handles must be made of non-corroding materials and must be located where they are readily accessible for operation, maintenance or removal;	M
7.9.4	Any water retaining isolated compartment without pump must have a piped drain to the aft bilge with a stainless steel ball valve. The valve must be readily accessible for testing or draining the forward bilge to	M

the aft pump.	
7.10 Painting and Corrosion Protection	
7.10.1 Aluminium components must have a clear coat painted finish on all exterior and interior surfaces, comprised of suitable etch primers, and topcoat. Contractor must follow the preparation and application requirements defined by the paint supplier;	M
7.10.2 Prior to delivery, the Contractor must ensure that all interior or exposed surfaces are free of cosmetic blemishes, including all construction marks, scratches, gouges and stains.	M
7.11 Video surveillance system	
7.11.1 For increased security in the survey area, at least one video camera will be installed on AHSV to allow close monitoring and to facilitate the conduct of the AHSV. The cameras will be remotely activated and controlled by the operator;	NM
7.11.2 To monitor the hydrographic survey system (multibeam), a camera will be installed under the AHSV to observe the underwater equipment.	NM

8. AUTOMATED SYSTEMS

The Contractor must supply the following systems:

AUTOMATED SYSTEMS REQUIREMENT		RANK
8.1	<i>Friendly Planning Module</i>	
8.1.1	Will allow to execute an automatic survey on predetermined area with lines pattern;	NM
8.1.2	Will be able to record all jobs;	NM
8.1.3	Must have a geographical display;	M
8.1.4	Will be able to take many file formats:	
8.1.4.1	BSB, S-57, DXF	M
8.1.4.2	Geotiff, SHP	NM
8.1.5	Will have a function to remember the last ending point for continuing the survey;	NM
8.1.6	Will have a programming function to set ending points at the end of the job, including: returning at the starting point, returning at predetermined point, stop at the ending point;	NM
8.1.7	Will allow real time adjustments.	NM
8.2	<i>Communication Module</i>	
8.2.1	5 GHz High rate wireless communication up to 5 Nm:	M
8.2.1.1	Real time information transmit to the operator for QC control;	NM
8.2.1.2	Real time monitoring of the acquisition data, including, Sounding data, Sound velocity data, INS – POSVIEW, Visualisation of the data collected, visualisation of CUBE bathymetric surface, Caris Onboard.	M
8.2.1.3	Transmission of video camera data;	NM
8.2.1.4	Possibility to interact with the acquisition pc on board in real time (wireless).	M
8.2.2	IP Radio communication up to 15 Km, GPRS:	
8.2.2.1	Control and monitor of engines;	NM

8.2.2.2	Alarms info including: engine power, flooding in compartments, minimum battery charge, comms loss, network and pc problems.	NM
8.3	Survey Module	
8.3.1	The automated recording software system will be compatible with the MBES installed and the data format compatible with Caris software suite (HIPS/SIPS);	NM
8.3.2	Automated near real-time computing hydrographic data CARIS Onboard. CHS uses Caris software Suite for data processing.	M
8.4	Analysis Module	
8.4.1	Collision analysis system for collision avoidance system;	NM
8.4.2	Min depth alarm for the grounding avoidance system;	NM
8.4.3	Data quality control check for bad acquisition data.	NM
8.5	Safety and Emergency	
8.5.1	Collision avoidance system alarm and emergency preprogrammed command, including :stop, stay in place, go to...);	NM
8.5.2	Grounding avoidance system alarm and preprogrammed command, including :stop, reverse and stop.;	NM
8.5.3	Define working zone with emergency stop if the AHSV try to exit;	NM
8.5.4	Define non-permitted area.	NM

9. TESTS & TRIALS

The Contractor must conduct their own inspections, tests and trials to verify successful completion of the Work in accordance with this TSOR and the proper operation of the AHSV and all associated equipment. The requirements for inspections, tests and trials and associated deliverable documentation are defined in the Contract and Annexes to the contract including any test, trials or sample reports attached thereto. All discrepancies identified through the inspection, test and trials processes must be corrected prior to delivery.

TESTS & TRIALS REQUIREMENT		RANK
9.1	Tests – General	
9.1.1	The Contractor must inspect and test the following items, as a minimum, for adherence to the contract requirements and proper operation (proper operation means that the equipment can be started, operated, connected together and demonstrated to function in a normal fashion, as applicable). All discrepancies must be corrected prior to delivery. The required inspections and tests are minimums and are not intended to supplant any controls, examinations, inspections or tests normally employed by the Contractor to assure the quality of the AHSV:	
9.1.1.1	Weight;	M
9.1.1.2	Construction Quality;	M
9.1.1.3	Lifting Gear;	M
9.1.1.4	Propulsion Engines;	M
9.1.1.5	Steering System;	M
9.1.1.6	Electrical System;	M
9.1.1.7	Electronics.	M
9.2	Final Trials – General	
9.2.1	The Contractor must notify the Contracting Authority and the Technical Authority Canada no less than one month prior to the final trials. Final trials must be performed in the presence of the Technical Authority. During these trials, the Contractor must provide information and sufficient evidence to the technical	M

	authority in order for him to assimilate and understand the operation and characteristics of AHSV.	
9.2.2	Sea trials must be conducted by the Contractor at their facilities to demonstrate the AHSV and their equipment conform to the requirements as stated in the contract. All expenses incident to the trials must be borne by the Contractor. A technical staff provided by the Contractor must operate the AHSV during sea trials.	M
9.2.3	All Sea Trial instrumentation and equipment must be furnished and operated by the Contractor. Trial instrumentation, where applicable, must not replace AHSV instruments.	M
9.2.4	The Contractor must submit a Test & Trials Plan, including a description of all of the acceptance trials to be performed for each AHSV. The AHSV must operate in the Normal Loaded Condition. As a minimum, the following trials must be conducted for each AHSV:	M
9.2.4.1	Survey electronics outfit trials – A technical representative from CHS must be present during sea trials to ensure verification of the SYSTEM, operations and potential modifications to achieve successful sea trials and acceptance by DFO Canada;	M
9.2.4.2	Speed Trials – The speed trials must be done over a course of at least half nautical mile in length. Two runs must be made over the course, one in each direction with the speeds for the two runs averaged. The use of GPS data (averaged) is acceptable;	M
9.2.4.3	Endurance Trial – The AHSV must operate in the Normal Loaded Condition, at maximum speed for no more than the maximum time allowed if it has not operated for the minimum break-in period, typically five (5) hours;	M
9.2.4.4	Astern Propulsion – The AHSV must be operated and manoeuvred using astern propulsion to establish the astern performance. During the backing performance tests the throttles must be set to provide 1/3 of the rated engine power;	M
9.2.4.5	Steering Gear – Tests must be conducted on the steering gear to demonstrate the adequacy of the steering system under all operations. Manoeuvring tests must be performed to ensure that each AHSV meets the stated requirements. Manoeuvring trials must be conducted in the Normal Load Condition and repeated in the Full Load Condition.	M
9.2.5	The Contractor must provide a Tests & Trials Sheet for each AHSV and include this sheet in the technical publications (see Section 10.2).	M
9.2.6	At the conclusion of sea trials, each AHSV must be thoroughly cleaned and inspected. The Contractor must repair any damage to the AHSV or ancillary equipment resulting from sea trials to the satisfaction of DFO Canada.	M
9.2.7	For the purpose of the trials, Normal Loaded Condition must be considered to be the basic AHSV, fitted	M

	with all normal equipment and the complete MBES system as stipulated on this TSOR.	
9.2.8	Final Inspection must not be performed until all tests have been satisfactorily completed with data available for review. The AHSV must be ready for delivery in all respects, except for final preparation of shipment. The Contractor must provide personnel, as required, to resolve questions and to demonstrate equipment operation maintenance accessibility, removal and installation.	M
9.2.9	Final Inspection – Upon delivery, the Technical Authority, or a representative of the Technical Authority will conduct the final delivery inspection. The Contractor must document the results of the delivery and provide these results to the Technical Authority and the Contracting Authority for Acceptance as per the Contract. The Contractor must repair any damage to the AHSV equipment resulting from shipping to the satisfaction of Canada.	M

10. DOCUMENTATION

DOCUMENTATION REQUIREMENT		RANK
10.1 General	All documentation to be included in the Technical Publications must be provided in English or in French.	M
10.2 Technical Publications		
10.2.1	The Contractor must provide, upon delivery of the AHSV, complete set of technical publications of a comprehensive owner/operator manual that provides a physical and functional description of the AHSV, it's machinery and equipment, AC and DC electrical system schematics as well as delivery testing and sea trial results (Appendix A).	M
10.2.2	The Contractor is to provide copies of the technical publications as follows :	
10.2.2.1	One (1) complete hard copy and one (1) electronic copy of technical publications to be delivered with each AHSV;	M
10.2.2.2	One (1) complete hard copy and one (1) electronic copy of technical publications to be delivered to the Technical Authority.	M
10.3 Additional Deliverable Documentation		
10.3.1	The following additional documentation must be supplied in the manuals delivered for each AHSV:	
10.3.1.1	A trailers valid Motor Vehicle Registration Certificate for the Province where the AHSV will be delivered;	M
10.3.1.2	Testing Check Sheets;	M
10.3.1.3	All documents from the survey equipment system, including :MBES, Motion sensor, data acquisition software.	M
10.3.2	The General Information Section must include a description of the arrangement and function of all structures, systems, fittings and accessories that comprise each AHSV, with illustrations as appropriate:	
10.3.2.1	Operating procedures;	M
10.3.2.2	Basic operating characteristics (such as temperatures, pressures, flow rates);	M
10.3.2.3	Installation criteria and drawings, assembly and disassembly instructions with comprehensive illustrations showing each step;	M

10.3.2.4 Recommended planned maintenance;	M
10.3.2.5 Complete troubleshooting procedures;	M

11. SHIPPING AND DELIVERY

Prior to shipping, the AHSV is to be cleaned, appropriately protected and covered in accordance with the instructions specified in this section.

SHIPPING AND DELIVERY REQUIREMENT		RANK
11.1 General	Prior to shipping, the AHSV must be secured on their respective trailers, cleaned, preserved and covered in accordance with this section. All areas of the AHSV are to be cleaned prior to covering for shipping. Bilges are to be dry and free of oil and debris.	M
11.2 Propulsion System	The propulsion systems must be preserved in accordance with the manufacturer's recommendations for storage of up to one year in an environment that will be subjected to freezing temperatures.	M
11.3 Batteries	The batteries are to be disconnected. All contact points with the AHSV are to be padded.	M
11.4 Cover	A shrink wrap cover will be provided to protect the AHSV during shipping and storage.	NM
11.5 Means of Delivery	The Contractor must deliver the AHSV/trailer combination. The trailer supplied for the AHSV must not be utilized as means of delivery.	M

12. WARRANTY AND SERVICE PROVISIONS

WARRANTY AND SERVICE PROVISION REQUIREMENT		RANK
12.1 Warranty	The Contractor must provide support and maintenance of equipment and software for twelve months following trials, acceptance tests and delivery of AHSV to CHS.	M
12.2 Components and Equipment Support	The Contractor must provide an on-call service within 48 hours. The Contractor must be able to intervene (deliver parts, formulate solutions, move) within a timeframe agreed with CHS, but this period shall not exceed 30 days.	M
12.3 Spare Parts		M
12.3.1	To facilitate replacement and inter-changeability of parts, as well as maintenance procedures and operator training, the Contractor must standardize on selection of equipment, fittings and fabrication methods within all AHSV supplied;	M
12.3.2	The Contractor will provide a spare parts list, with description and price.	NM
12.4 Maintenance Plan		
12.4.1	For the four (4) years following the end of the warranty, the Contractor shall provide and annual software maintenance plan including updates and improvements of all software used by all AHSV control systems and hydrographic survey (included in the bid price);	NM
12.4.2	The Contractor will provide a service visit after the first season of operation of the AHSV. Where appropriate, the visit will be done at the CHS regional office in Mont-Joli and the cost will be included in the bid price.	NM
12.5 Formation		
12.5.1	The Contractor must provide comprehensive training on the operation, maintenance and upgrading of AHSV. Training (3-6 persons identified by the Technical Authority) will be offered for each AHSV delivered, at the customer's offices and be of sufficient duration to cover all aspects of the system. The Contractor shall also make a general presentation (maximum 2 hours) on the AHSV and its features to an audience of up to a hundred people.	M

13. TRAILER

TRAILER REQUIREMENTS		RANK
13.1 Construction and Equipment	The Contractor must supply a trailer to fit the AHSV, either a welded galvanized or Aluminum construction and be rated at least 20% over the anticipated total weight of the AHSV (including all components, batteries, multibeam sonar, the motion sensor). The trailer must be certified commercial requirements in accordance with the Ministère des Transports du Québec regulations for towing the AHSV, and be constructed and equipped with the following:	
13.1.1	Trailer, welded frame or aluminum construction with spare tire on rim (mounted to front of trailer), safety chains and stainless steel "Bearing Buddies" with grease nipples;	M
13.1.2	Turn signal submersible style LED lighting, with 7-prong flat wiring connector (note requirement for other connector if required for the equipment listed for trailer);	M
13.1.3	Manual, two speed bow winch assembly with winch webbing strap, non-corroding safety hook, bow chock, and swivel tongue jack, minimum 1500 lbs. with wheel;	M
13.1.4	Heavy-duty 'stand-on' diamond plate step fenders with mud flaps;	M
13.1.5	Hitch to accommodate a 2 inch ball;	M
13.1.6	Bunks must be lined with ½ thick polymers UHMW;	M
13.1.7	A water, debris and dust resistant cover (rigid or flexible) must be provided to ensure protection of the AHSV while traveling on the road.	M
13.1.8	Trailer to be supplied with four ratchet tie down straps with hooks securing AHSV on the trailer;	M
13.1.9	Class I weight distributing hitch compliant;	M
13.1.10	Radial tires approved for trailers. The tires must have a capacity equal or superior to the load capacity of the trailers.	M
13.2 Registration Information	The contractor must record the trailer sales and registration information and provide the information in each AHSV manual.	M

APPENDIX 1

Hydrographic multibeam data acquisition system

1. General Terms

- a. System proposed must be “off-the-shelf” commercially available;
- b. The system must be a Multibeam Sonar, complete, portable and tightly Integrated with GNSS-aided Inertial Navigation System [sonar head with integrated global navigation satellite system (GNSS) aided inertial navigation system (INS) Applanix RTK ready, sonar processor unit, acquisition/display software, ruggedized and environmentally sealed acquisition computer, sound velocity profilers , GNSS antenna brackets], allowing for a rapid installation on vessels.

2. Technical Description

2.1 System Features

- a. The multibeam sonar must be a “beam-forming multibeam sonar”. Suppliers proposing interferometric or bathymetric sidescan sonar will not be considered.
- b. The system multibeam sonar must have an operating depth rating of at least 100 metres and rated IP67;
- c. The system must be a fully integrated multibeam sonar and INS and GNSS navigation solution, meaning the sonar and the inertial motion unit (IMU) must be cohesive with known lever arm measures and integrated with GNSS positioning;
- d. The system must include an integrated sound velocity probe near the sonar head.
- e. The system must include a stand-alone sound velocity sensor (with control software) capable of profiling the water column up to a minimum of 100m.
- f. The system must utilize the WAAS (wide area augmentation system) satellite based augmentation system (SBAS) correction service for real-time GNSS differential corrections or commercial alternative such as MarineStar or C-Nav;
- g. The system must utilize the CMR+ protocol to perform real-time kinematic precise positioning (RTK);
- h. The sonar must be fixed between the 2 hulls of the AHSV and the draft must be adjustable to reach depths between 0.3 to 0.6 meters. The pole must also be retractable to allow the boarding of the AHSV on the trailer.
- i. The system topside electronics must be water and dust tight (IP65 or better) to protect against environmental conditions;
- j. The system must include all ruggedized and environmentally sealed (IP65 or better) acquisition computer hardware, connection cables and peripherals necessary for operation;
- k. The system must include all software necessary for navigation and acquisition of data;
- l. The system must include Hysweep or QINSy data logging software license;

- m. The system must provide imagery (acoustic backscatter intensity) data of the seafloor.
- n. Both the logged bathymetric data and imagery must be provided in a format compatible with the CARIS (HIPS/SIPS) software package

2.2 Size/Weight

- a. The system must be installed aboard AHSV covered by this contract;
- b. The system must be in a fixed mounted configuration and respect criteria's listed in 2.1h;
- c. The system (including all peripherals and mounting brackets) must be completely packaged in ruggedized portable transport case(s) when disassembled;
- d. The complete system must not weigh more than 30 kg.

2.3 Electronics/Software

- a. The system electronics must provide 2°x2° or smaller beam widths at nadir in at least the high frequency mode/range.
- b. The operational frequency must be between 300 and 400 kHz (1°x2° at 400 kHz);
- c. The system swath width/coverage must be up to 130° or more.
- d. The system must include roll-stabilization;
- e. The system must use the IEEE 1588 Precise Time Protocol (PTP) or similar to maintain a coherent sense of time for all system components.
- f. The system's time base (for synchronizing a computer subsystem and ancillary equipment) must be synchronized to Universal Time Coordinated (UTC) via Global Positioning System (GPS) 1 pulse per second (1 PPS).
- g. The system ping rate must be chosen by the sonar itself based on depth and swath sector or by the set sonar operating range.
- h. The sonar must allow the manual changing (controlled within manufacturers proprietary or third-party software) of parameters within the design operating ranges such as swath width.
- i. The system must have automated functionality (controlled within manufacturers proprietary or third-party software) such as auto-ranging, power, and gain.
- j. The system must operate in water temperatures ranging from at least -2° C to +30° C.
- k. The system must be supplied with software to support a computer-controlled interface for remote acquisition and display of data.
- l. Contractor must provide a minimum of 12 months subscription for all software licenses necessary to operate and maintain the sonar system.

Beaufort Wind Scale Identifier

Force	Wind Speed		Descriptive Term	Effects Observed at Sea	Effects Observed on Land
	Km/h	Knots			
0	Less than 1	Less than 1	Calm	Sea surface like a mirror, but not necessarily flat.	Smoke rises vertically.
1	1 - 5	1 - 3	Light air	Ripples with the appearance of scales are formed, but without foam crests.	Direction of wind shown by smoke drift, but not wind vanes.
2	6 - 11	4 - 6	Light breeze	Small wavelets, still short but more pronounced. Crests do not break. When visibility good, horizon line always very clear.	Wind felt on face. Leaves rustle. Ordinary vane moved by wind.
3	12 - 19	7 - 10	Gentle breeze	Large wavelets. Crests begin to break. Foam of glassy appearance. Perhaps scattered whitecaps.	Leaves and small twigs in constant motion. Wind extends light flag.
4	20 - 28	11 - 16	Moderate breeze	Small waves, becoming longer. Fairly frequent whitecaps.	Raises dust and loose paper. Small branches are moved.
5	29 - 38	17 - 21	Fresh breeze	Moderate waves, taking a more pronounced long form. Many whitecaps are formed. Chance of some spray.	Small trees with leaves begin to sway. Crested wavelets form on inland waters.
6	39 - 49	22 - 27	Strong breeze	Large waves begin to form. The white foam crests are more extensive everywhere. Probably some spray.	Large branches in motion. Whistling heard in telephone wires. Umbrellas used with difficulty.
7	50 - 61	28 - 33	Near gale	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind.	Whole trees in motion. Inconvenience felt in walking against wind.
8	62 - 74	34 - 40	Gale	Moderately high waves of greater length. Edges of crests begin to break into the spindrift. The foam is blown in well-marked streaks along the direction of the wind.	Breaks twigs off trees. Generally impedes progress. Walking into wind almost impossible.
9	75 - 88	41 - 47	Strong gale	High waves. Dense streaks of foam along the direction of the wind. Crests of waves begin to topple, tumble and roll over. Spray may affect visibility.	Slight structural damage occurs, e.g. roofing shingles may become loose or blow off.
10	89 - 102	48 - 55	Storm	Very high waves with long overhanging crests. Dense white streaks of foam. Surface of the sea takes a white appearance. The tumbling of the sea becomes heavy and shock-like. Visibility affected.	Trees uprooted. Considerable structural damage occurs.
11	103 - 117	56 - 63	Violent storm	Exceptionally high waves. Sea completely covered with long white patches of foam. Visibility affected.	Widespread damage.
12	118 - 133	64 - 71	Hurricane	Air filled with foam and spray. Sea entirely white with foam. Visibility seriously impaired.	Rare. Severe widespread damage to vegetation and significant structural damage possible.