



RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:
Bid Receiving Public Works and Government
Services Canada/Réception des soumissions
Travaux publics et Services gouvernementaux
Canada
1713 Bedford Row
Halifax, N.S./Halifax, (N.É.)
B3J 1T3
Nova Scotia
Bid Fax: (902) 496-5016

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

Vendor/Firm Name and Address
Raison sociale et adresse du
fournisseur/de l'entrepreneur

Issuing Office - Bureau de distribution
Atlantic Region Acquisitions/Région de l'Atlantique
Acquisitions
1713 Bedford Row
Halifax, N.S./Halifax, (N.É.)
B3J 3C9
Nova Scot

Title - Sujet Neptune Array	
Solicitation No. - N° de l'invitation W7707-175892/A	Date 2016-12-01
Client Reference No. - N° de référence du client W7707-17-5892	
GETS Reference No. - N° de référence de SEAG PW-\$HAL-309-9997	
File No. - N° de dossier HAL-6-77077 (309)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2016-12-21	Time Zone Fuseau horaire Atlantic Standard Time AST
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input checked="" type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: MacNeil, Blaine A.	Buyer Id - Id de l'acheteur hal309
Telephone No. - N° de téléphone (902) 496-5180 ()	FAX No. - N° de FAX (902) 496-5016
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: DEPARTMENT OF NATIONAL DEFENCE SEE HEREIN DARTMOUTH NOVA SCOTIA B3A 3C5 Canada	

Instructions: See Herein

Instructions: Voir aux présentes

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

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PART 1 - GENERAL INFORMATION

1.1 Introduction

The bid solicitation is divided into seven parts plus attachments and annexes, as follows:

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

1.2 Summary

Defence Research and Development Canada (DRDC) has a requirement for the design, build, and testing of a seabed acoustic surveillance array for deployment on and underwater observatory. Specifically, the Ocean Networks Canada (ONC) Neptune Observatory. The array is intended to be deployed in either the Clayoquot Slope or Cascadia Basin node sites. The requirement includes two dry-end processing/date storage systems, and a wireless access gateway to simplify array deployment while operating.

As described on the ONC website, "the North East Pacific Time-series Underwater Networked Experiments (NEPTUNE) Observatory is located off the west coast of Vancouver Island, British Columbia. The subsea infrastructure, an 840-km long loop of fibre optic cable connected to instruments, enables scientists to study phenomena through continuous long-term, high temporal resolution observations not afforded by traditional ship-based ocean exploration." Further details are available on the website: <http://www.oceannetworks.ca/installations/observatories/neptune-ne-pacific>.

All work is unclassified and the contractor will not have any access to classified information. When on site, the contractor will be escorted at all times.

The requirement is subject to the provisions of the Agreement on Internal Trade (AIT).

The requirement is subject to a preference for Canadian goods and/or services.

This procurement is subject to the Controlled Goods Program. The Defence production Act defines Canadian Controlled Goods as certain goods listed in Canada's Export Control List, a regulation made pursuant to the Export and Import Permits Act (EIPA).

The Federal Contractors Program (FCP) for employment equity applies to this procurement; see Part 5 – Certifications and Additional Information, Part 7 - Resulting Contract Clauses and the annex titled Federal Contractors Program for Employment Equity - Certification.

1.3 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.

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.

Subsection 5.4 of 2003, Standard Instructions - Goods or Services - Competitive Requirements, is amended as follows:

Delete: 60 days

Insert: 90 days

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.

Due to the nature of the bid solicitation, bids transmitted by facsimile to PWGSC will not be accepted.

2.3 Former Public Servant

Contracts awarded to former public servants (FPS) in receipt of a pension or of a lump sum payment must bear the closest public scrutiny, and reflect fairness in the spending of public funds. In order to comply with Treasury Board policies and directives on contracts awarded to FPSs, bidders must provide the information required below before contract award. If the answer to the questions and, as applicable the information required have not been received by the time the evaluation of bids is completed, Canada will inform the Bidder of a time frame within which to provide the information. Failure to comply with Canada's request and meet the requirement within the prescribed time frame will render the bid non-responsive.

Definitions

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

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

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

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

Former Public Servant in Receipt of a Pension

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

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

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

By providing this information, Bidders agree that the successful Bidder's status, with respect to being a former public servant in receipt of a pension, will be reported on departmental websites as part of the published proactive disclosure reports in accordance with [Contracting Policy Notice: 2012-2](#) and the [Guidelines on the Proactive Disclosure of Contracts](#).

Work Force Adjustment Directive

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

If so, the Bidder must provide the following information:

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

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

2.4 Enquiries - Bid Solicitation

All enquiries must be submitted in writing to the Contracting Authority no later than five (5) 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.

2.5 Applicable Laws

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

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

2.6 Maximum Funding

The maximum funding available for the Contract resulting from the bid solicitation is **\$1,725,000.00**. Bids valued in excess of this amount will be considered non-responsive. This disclosure does not commit Canada to pay the maximum funding available.

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 (3 hard copies)

Section II: Financial Bid (1 hard copy)

Section III: Certifications (1 hard copy)

If there is a discrepancy between the wording of the soft copy and the hard copy, the wording of the hard copy will have priority over the wording of the soft 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 demonstrate their understanding of the requirements contained in the bid solicitation and explain how they will meet these requirements. Bidders should demonstrate their capability and describe their approach in a thorough, concise and clear manner for carrying out the work.

The technical bid should address clearly and in sufficient depth the points that are subject to the evaluation criteria against which the bid will be evaluated. Simply repeating the statement contained in the bid solicitation is not sufficient. In order to facilitate the evaluation of the bid, Canada requests that Bidders address and present topics in the order of the evaluation criteria under the same headings. To avoid duplication, Bidders may refer to different sections of their bids by identifying the specific paragraph and page number where the subject topic has already been addressed.

Section II: Financial Bid

- 3.1.1** Bidders must submit their financial bid in accordance with the Basis of Payment in Annex C. The total estimated cost must not exceed the maximum funding specified in Part 2, Article 6. The total amount of applicable taxes must be shown separately.

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 evaluation criteria.
- (b) An evaluation team composed of representatives of Canada will evaluate the bids.
- (c) The evaluation team will determine first if there are two or more bids with a valid Canadian Content certification. In that event, the evaluation process will be limited to the bids with the certification; otherwise, all bids will be evaluated. If some of the bids with a valid certification are declared non-responsive, or are withdrawn, and less than two responsive bids with a valid certification remain, the evaluation will continue among those bids with a valid certification. If all bids with a valid certification are subsequently declared non-responsive, or are withdrawn, then all the other bids received will be evaluated.

4.1.1 Technical Evaluation

4.1.1.1 Mandatory Technical Criteria

Mandatory technical criteria are included in **Annex B**.

4.1.1.2 Point Rated Technical Criteria

4.1.1.2.1 Bidder Experience

Except where expressly provided otherwise, the experience described in the bid must be the experience of the Bidder itself (which includes the experience of any companies that formed the bidder by way of a merger but does not include any experience acquired through a purchase of assets or an assignment of contract). The experience of the Bidder's affiliates (i.e. parent, subsidiary, or sister corporations), subcontractors, or suppliers will not be considered.

4.1.1.2.2 Supporting Information

In the event that the Bidder fails to submit any supporting information pursuant to a specific bid section that includes mandatory technical evaluation criteria, the Contracting Authority may request it thereafter in writing, including after the closing date of the bid solicitation. It is mandatory that the Bidder provide the supporting documentation within three (3) days of the written request or within such period as specified or agreed to by the Contracting Authority in the written notice to the Bidder.

4.1.1.2.3 Point Rated Technical Evaluation

Point rated technical evaluation criteria are included in **Annex B**.

4.2 Basis of Selection

SACC Manual Clause A0036T, Basis of Selection – Highest Rated Within Budget:

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 50 points overall for the technical evaluation criteria which are subject to point rating. The rating is performed on a scale of 100 points.
2. Bids not meeting (a) or (b) or (c) will be declared non responsive. The responsive bid with the highest number of points will be recommended for award of a contract, provided that the total evaluated price does not exceed the budget available for this requirement.

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 specified 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 website (http://www.esdc.gc.ca/en/jobs/workplace/human_rights/employment_equity/federal_contractor_program.page?&_ga=1.229006812.1158694905.1413548969#afed).

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 Canadian Content Certification

This procurement is conditionally limited to Canadian services.

Subject to the evaluation procedures contained in the bid solicitation, bidders acknowledge that only bids with a certification that the service offered is a Canadian service, as defined in clause A3050T, may be considered.

Failure to provide this certification completed with the bid will result in the service offered being treated as a non-Canadian service.

The Bidder certifies that:

() the service offered is a Canadian service as defined in paragraph 2 of clause A3050T.

5.2.3.2 Status and Availability of Resources

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

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

5.2.3.3 Education and Experience

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

PART 6 - SECURITY, FINANCIAL AND OTHER REQUIREMENTS

6.1 Security Requirement

All work is unclassified and the contractor will not have any access to classified information. When on site, the contractor will be escorted at all times.

6.2 Controlled Goods Requirement

SACC Manual clause A9130T (2014-11-27) Controlled Goods Program

PART 7 - RESULTING CONTRACT CLAUSES

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

7.1 Statement of Work

Defence Research and Development Canada (DRDC) has a requirement for the design, build, and testing of a seabed acoustic surveillance array for deployment on and underwater observatory. Specifically, the Ocean Networks Canada (ONC) Neptune Observatory. The array is intended to be deployed in either the Clayoquot Slope or Cascadia Basin node sites. The requirement includes two dry-end processing/date storage systems, and a wireless access gateway to simplify array deployment while operating.

As described on the ONC website, "the North East Pacific Time-series Underwater Networked Experiments (NEPTUNE) Observatory is located off the west coast of Vancouver Island, British Columbia. The subsea infrastructure, an 840-km long loop of fibre optic cable connected to instruments, enables scientists to study phenomena through continuous long-term, high temporal resolution observations not afforded by traditional ship-based ocean exploration." Further details are available on the website: <http://www.oceannetworks.ca/installations/observatories/neptune-ne-pacific>.

All work is unclassified and the contractor will not have any access to classified information. When on site, the contractor will be escorted at all times.

The requirement is subject to the provisions of the Agreement on Internal Trade (AIT).

The requirement is subject to a preference for Canadian goods and/or services.

7.2 Standard Clauses and Conditions

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

7.2.1 General Conditions

2040 (2016-04-04), General Conditions - Research & Development, apply to and form part of the Contract.

7.3 Security Requirements

All work is unclassified and the contractor will not have any access to classified information. When on site, the contractor will be escorted at all times.

7.4 Term of Contract

7.4.1 Period of the Contract

The period of the Contract is detailed in Annex A, section 7, Date of Delivery.

7.5 Authorities

7.5.1 Contracting Authority

The Contracting Authority for the Contract is:

Name: Blaine MacNeil
Title: Supply Specialist
Public Works and Government Services Canada
Atlantic Region
Acquisitions Branch - Halifax
1713 Bedford Row
Halifax, NS
B3J 3C9

Telephone: (902) 496-5180
Facsimile: (902) 496-5016
E-mail address: blaine.macneil@pwgsc-tpsgc.gc.ca

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

7.5.2 Project Authority

The Project Authority for the Contract is: (to be named upon contract award)

Name: _____
Title: _____

Organization: _____

Address: _____

Telephone: ____-____-____

Facsimile: ____-____-____

E-mail address: _____

The Project Authority is the representative of the department or agency for whom the Work is being carried out under the Contract and is responsible for all matters concerning the technical content of the Work under the Contract. Technical matters may be discussed with the Project Authority; however, the Project Authority has no authority to authorize changes to the scope of the Work. Changes to the scope of the Work can only be made through a contract amendment issued by the Contracting Authority.

7.5.3 Contractor's Representative

Bidder is to provide details for a contact:

Name: _____

Organization: _____

Phone: _____

Email: _____

7.6 Proactive Disclosure of Contracts with Former Public Servants

By providing information on its status, with respect to being a former public servant in receipt of a *Public Service Superannuation Act* (PSSA) pension, the Contractor has agreed that this information will be reported on departmental websites as part of the published proactive disclosure reports, in accordance with Contracting Policy Notice: 2012-2 of the Treasury Board Secretariat of Canada.

7.7 Payment

7.7.1 Basis of Payment

See Annex C, Basis of Payment.

7.7.2 Limitation of Price

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

7.7.3 Progress Payments H1003C (2010-01-11)

1. Canada will make progress payments in accordance with the payment provisions of the Contract, no more than once a month, for cost incurred in the performance of the Work, up to 90 per cent of the amount claimed and approved by Canada if:

a. an accurate and complete claim for payment using form 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. the amount claimed is in accordance with the basis of payment;

c. the total amount for all progress payments paid by Canada does not exceed 90 percent of the total amount to be paid under the Contract;

d. all certificates appearing on form PWGSC-TPSGC 1111 have been signed by the respective authorized representatives.

2. The balance of the amount payable will be paid in accordance with the payment provisions of the Contract upon completion and delivery of the item if the Work has been accepted by Canada and a final claim for the payment is submitted."

3. Progress payments are interim payments only. Canada may conduct a government audit and interim time and cost verifications and reserves the rights to make adjustments to the Contract from time to time during the performance of the Work. Any overpayment resulting from progress payments or otherwise must be refunded promptly to Canada.

7.8 Invoicing Instructions – Progress Claim

1. The Contractor must submit a claim for payment using form PWGSC-TPSGC 1111, Claim for Progress Payment.
Each claim must show:
 - a. all information required on form PWGSC-TPSGC 1111;
 - b. all applicable information detailed under the section entitled "Invoice Submission" of the general conditions;
 - c. a list of all expenses;
 - d. expenditures plus pro-rated profit or fee;
 - e. a copy of time sheets to support the time claimed;
 - f. a copy of the invoices, receipts, vouchers for all direct expenses, travel and living expenses;
 - g. a copy of the monthly progress report.
2. Applicable Taxes must be calculated on the total amount of the claim before the holdback is applied. At the time the holdback is claimed, there will be no Applicable Taxes payable as it was claimed and payable under the previous claims for progress payments.
3. The Contractor must prepare and certify one original and two (2) copies of the claim on form PWGSC-TPSGC 1111, and forward it to the Project Authority identified under the section entitled "Authorities" of the Contract for appropriate certification after inspection and acceptance of the Work takes place.
The Project Authority will then forward the original and two (2) copies of the claim to the Contracting Authority for certification and onward submission to the Payment Office for the remaining certification and payment action.
4. The Contractor must not submit claims until all work identified in the claim is completed.

7.9 Certifications and Additional Information

7.9.1 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.

7.9.2 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.

7.9.3 Canadian Content Certification

SACC Manual clause A3060 (2008-05-12) Canadian Content Certification

7.10 Applicable Laws

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

7.11 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 2040 (2016-04-04) Research and Development;
- (c) Annex A, Statement of Work;
- (d) Annex B, Evaluation Criteria;
- (e) Annex C, Basis of Payment;
- (f) the Contractor's bid dated _____

7.12 Defence Contract

SACC Manual clause A9006C (2012-07-16) Defence Contract

7.13 Insurance

SACC Manual clause G1005C (2016-01-28) Insurance

7.14 Controlled Goods Program

SACC Manual clause A9131C (2014-11-27), Controlled Goods Program
SACC Manual clause B4060C (2011-05-16), Controlled Goods

ANNEX "A"

STATEMENT OF WORK

Please see the attachment "Statement of Work"

ANNEX "B"

EVALUATION CRITERIA

1. MANDATORY EVALUATION CRITERIA

In their proposals, bidders must demonstrate they meet the following mandatory criteria. Failure to meet any of the mandatory criteria will render the bid non-compliant and it will be given no further consideration.

	CRITERIA	MET	NOT MET
M1	The Contractor must have demonstrated experience <u>designing</u> underwater acoustic surveillance arrays (Contractor must provide, at a minimum, one example of a contract completed within the last 72 months).		
M2	The Contractor must have demonstrated experience <u>building</u> underwater acoustic surveillance arrays (Contractor must provide, at a minimum, one example of a contract completed within the last 72 months).		
M3	The Contractor must have demonstrated experience <u>developing software</u> for underwater acoustic surveillance arrays (Contractor must provide, at a minimum, one example of a contract completed within the last 72 months).		

2. POINT-RATED EVALUATION CRITERIA

	POINT-RATED EVALUATION CRITERIA	Minimum	Maximum
P1	The Contractor must have demonstrated company experience working on similar size and complexity projects, designing and building underwater acoustic surveillance arrays. Point Rating: 1-2 Projects (10 Points); 3-5 Projects (15 Points); and Greater than 5 Projects (20 Points).	10	20
P2	The Contractor must submit a detailed work plan with the Bid Proposal that: 1. demonstrates a clear understanding of the contract requirements; 2. proposes a reasonable plan to address the requirements; and 3. includes a discussion of risks and risk mitigations. Point Rating: No work plan provided (0 Points); Work plan shows a good understanding of the requirements, a good work plan and a good discussion of risks and mitigations (20 Points); Work plan shows a very good understanding of the requirements, a very good work plan and a very good discussion of risks and mitigations (25 Points); and Work plan shows an excellent understanding of the requirements, an excellent work plan and an excellent discussion of risks and mitigations (30 Points).	15	30
P3	The Contractor must submit a configuration management plan with the Bid Proposal that describes how the configuration of the array components (software and hardware) will be managed.	5	10

	<p>Point Rating: No Configuration Plan provided (0 Points); A reasonable Configuration Plan provided (5 Points); and A reasonable Configuration Plan provided, which has been used for at least one previous project (10 Points).</p>		
P4	<p>The Project Manager must demonstrate a minimum of 3 years of Project Management experience in the last 6 years.</p> <p>Point Rating: Less than 3 years Project Management experience (0 Points); 3-10 years Project Management experience (5 Points); and Greater than 10 years Project Management experience (10 Points).</p>	5	10
P5	<p>The Field Service Representative(s) must demonstrate a minimum of 2 previous experiences in providing support to an underwater array deployment.</p> <p>Point Rating: Less than 2 previous deployments (0 Points); 2-5 previous deployments (5 Points); and Greater than 5 previous deployments (10 Points).</p>	5	10
P6	<p>The Electrical Engineer(s) must have relevant, demonstrated, experience with the design, build and troubleshooting of both analogue and digital electrical systems.</p> <p>Point Rating: No analogue or digital experience (0 Points); Experience with either analogue or digital electrical systems (5 Points); and Experience with analogue and digital electrical systems (10 Points).</p>	5	10
P7	<p>The Computer Programmer(s) must have relevant, demonstrated, experience with embedded systems and software application development.</p> <p>Point Rating: No experience with embedded systems and software application development (0 Points); Experience with either embedded systems or software application development (5 Points); and Experience with embedded systems and software application development (10 Points).</p>	5	10
TOTAL		50	100

ANNEX "C"

BASIS OF PAYMENT

1. LABOUR: at the following firm, all inclusive rates, without mark-up.

CATEGORY (OR NAME)	FIRM HOURLY RATE
_____	\$ _____
_____	\$ _____
_____	\$ _____
_____	\$ _____
	Est.: \$ _____

2. TRAVEL AND LIVING EXPENSES:

The Contractor will be reimbursed its authorized travel and living expenses reasonably and properly incurred in the performance of the Work, at cost, without any allowance for profit and/or administrative overhead, in accordance with the meal, private vehicle and incidental expenses provided in Appendices B, C and D of the Treasury Board Travel Directive (http://www.tbs-sct.gc.ca/pubs_pol/hrpubs/TBM_113/td-dv_e.asp), and with the other provisions of the directive referring to "travellers", rather than those referring to "employees" are applicable. All travel must have prior authorization of the Project Authority. All payments are subject to government audit.

Est.: \$ _____

3. EQUIPMENT: at laid down cost without markup
(Specify type of equipment, if applicable)

Est.: \$ _____

4. MATERIALS AND SUPPLIES: at laid down cost without markup
(Specify what categories of materials and supplies, if applicable)

Est.: \$ _____

5. SUBCONTRACTS: at actual cost without markup
(Identify subcontractors)

Est.: \$ _____

6. ANY OTHER DIRECT CHARGES: at actual cost without markup
(Specify what categories of direct charges, if applicable)

Est.: \$ _____

7. PROFIT: at a firm rate of __% of item 1 Labour (total estimated) above

Est.: \$ _____

Estimated Cost to a Limitation of Expenditure: \$ _____

(Applicable Taxes extra)

With the exception of the firm rate(s) and price(s), the amounts shown in the various items specified above are estimates only. Minor changes to these estimates will be accepted for billing purposes as the Work proceeds, provided that these changes have the prior approval of the Project Authority and provided that the estimated cost does not exceed the aforementioned Limitation of Expenditure.

ANNEX "D" to PART 5 OF THE BID SOLICITATION

FEDERAL CONTRACTORS PROGRAM FOR EMPLOYMENT EQUITY – CERTIFICATION

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

For further information on the Federal Contractors Program for Employment Equity visit [Employment and Social Development Canada \(ESDC\) – Labour's website](#).

Date: _____ (YYYY/MM/DD) (If left blank, the date will be deemed to be the bid solicitation closing date.)

Complete both A and B.

A. Check only one of the following:

- ☐ A1. The Bidder certifies having no work force in Canada.
- ☐ A2. The Bidder certifies being a public sector employer.
- ☐ A3. The Bidder certifies being a federally regulated employer being subject to the Employment Equity Act.
- ☐ A4. The Bidder certifies having a combined work force in Canada of less than 100 permanent full-time and/or permanent part-time employees.

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

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

OR

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

B. Check only one of the following:

- ☐ B1. The Bidder is not a Joint Venture.

OR

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

ANNEX "E"

CLAIM FOR PROGRESS PAYMENT

Please see the attached form.

STATEMENT OF WORK

W7707-175892

1. TITLE

DEVELOPMENT OF A SEABED ACOUSTIC SURVEILLANCE ARRAY FOR THE NEPTUNE UNDERWATER OBSERVATORY

2. BACKGROUND

This contract has been initiated as part of the Canadian Arctic Underwater Sentinel Experimentation (CAUSE) Project, led by DRDC Atlantic Research Centre. The CAUSE Project aims to de-risk and demonstrate sensor systems that could be used to provide wide area underwater and under-ice surveillance capabilities.

The requirement for this contract is to design, build, and test a seabed acoustic surveillance array for deployment on an underwater observatory. Specifically, the Ocean Networks Canada (ONC) NEPTUNE Observatory. The array is intended to be deployed in either the Clayoquot Slope or Cascadia Basin node sites. The requirement includes two dry-end processing/data storage systems, and a wireless access gateway to simplify array deployment while operating.

As described on the ONC website, “the North East Pacific Time-series Underwater Networked Experiments (NEPTUNE) Observatory is located off the west coast of Vancouver Island, British Columbia. The subsea infrastructure, an 840-km long loop of fibre optic cable connected to instruments, enables scientists to study phenomena through continuous long-term, high temporal resolution observations not afforded by traditional ship-based ocean exploration.” Further details are available on the website: <http://www.oceannetworks.ca/installations/observatories/neptune-ne-pacific>.

3. ACRONYMS

CAUSE	Canadian Arctic Underwater Sentinel Experimentation
DRDC	Defence Research and Development Canada
h/p	hydrophone
ICD	Interface Control Document
NEPTUNE	North-East Pacific Time-Series Underwater Networked Experiments
ONC	Ocean Networks Canada
ROV	Remotely Operated Vehicle
SOW	Statement of Work
SS	Shore Station
TA	Technical Authority
UAC	Underwater Array Controller
WAG	Wireless Access Gateway

4. APPLICABLE DOCUMENTS & REFERENCES

None

5. TASKS

STATEMENT OF WORK

5.1 Design

Overview:

In this task, the Contractor is to design a seabed acoustic surveillance array for deployment on the underwater NEPTUNE Observatory. This includes development of a sensor array, underwater array controller (UAC), Wireless Access Gateway (WAG), and two Shore Stations (SS).

Technical Specifications:

The array must meet the technical specifications in Annex A.

Task Details:

The Contractor must design a seabed acoustic surveillance array, which satisfies the required technical specifications. The complete system is depicted in Figure 1 as a cartoon to illustrate the main components.

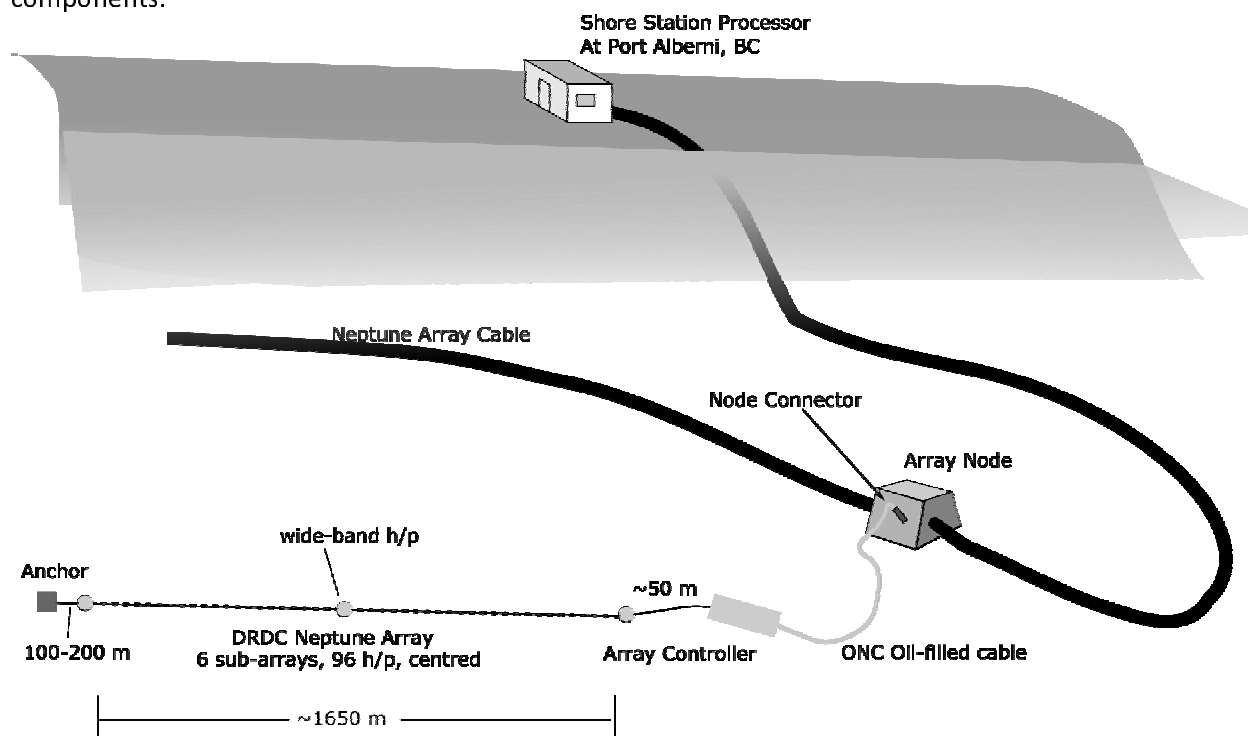


Figure 1. Cartoon of the NEPTUNE array components. The WAG is not shown.

The Contractor must design a SS (computer workstation and storage) to receive and store the data collected by the array and to distribute the data through external network connections. The SS is also required to have the capability to assess the array system health and operation. It must have software to display time series and power spectral data as described in Annex A. The SS will normally reside in the Port Alberni NEPTUNE Observatory array terminus, but one or both of the units may be on board the deployment vessel at the time of deployment.

The Contractor must also design a WAG to facilitate a “live” deployment of the array. The WAG must communicate by wireless (thereby eliminating the need for slip rings on a winch) between a SS on board the deployment vessel and the array. The WAG must be able to mount on a winch and power the array for the deployment period. The WAG may be required to communicate with the SS, while housed in a

STATEMENT OF WORK

water proof canister attached to the deployment ROV. The exact need for this requirement will be determined by consultation with the deployment contractor. Software on the on board SS will monitor both acoustic and non-acoustic array sensors to provide information during array deployment.

To design the array, the Contractor will need to meet with DRDC Atlantic Research Centre representatives, who have set the technical specifications, and with Ocean Networks Canada (ONC), who operate the NEPTUNE Observatory. DRDC is in the process of establishing a Deployment Contract with ONC, under which ONC would deploy and operate the array on the NEPTUNE Observatory. ONC would provide the necessary specifications on the NEPTUNE Observatory and the deployment to enable the design of the array. In particular, ONC will specify the power, connectivity, and cable requirements for the NEPTUNE Observatory.

The Contractor must produce a preliminary design document. The preliminary design document must include: design details of the array, addressing at a minimum how the array meets the technical specifications in Annex A; summary of trade-offs and options that were considered during the design; summary of potential risks and issues with the design; a cost estimate to complete Task 5.2 Build & Test; and identification of long lead procurement items.

The Contractor must produce an interface control document (ICD) for the preliminary design. The ICD must document the interfaces to the array, detailing inputs and outputs to the system. The Contractor must produce an updated ICD for the final design.

The Contractor must hold a system design review meeting. The preliminary design document and ICD will be reviewed by DRDC and discussed at the system design review meeting. DRDC will provide feedback to the Contractor on the preliminary design document and ICD.

The Contractor must demonstrate unproven aspects of the array design, through proof of concept mock-up and testing of electronic components (e.g., hydrophones, pre-amps, line drivers...). The results of these tests must be provided to DRDC.

The Contractor must produce a final system design document, incorporating feedback from the design review meeting and the proof of concept testing. The final system design document must include: design details of the array, addressing at a minimum how the array meets the technical specifications, and incorporating feedback from the design review meeting (or justification for not incorporating feedback from the design review meeting); summary of trade-offs and options that were considered during the design; summary of potential risks and issues with the design; an updated cost estimate to complete Task 5.2 Build & Test; design choices and details of the WAG; design and software requirements of the SS; and identification of long lead procurement items.

The Contractor must produce progress reports that must include at a minimum a summary of the work in the period, the status of deliverables, financial summary (planned spending, actual spending, forecast to complete), and a summary of any issues and risks. Progress reports must be produced monthly (frequency can be adjusted with agreement of the DRDC TA).

Task Deliverables, Timelines and Meetings:

Deliverables and due dates for this task are covered in Section 6 and 7. Meetings for this task are covered in Section 11.

STATEMENT OF WORK

5.2 Build & Test

Overview:

Upon acceptance of Task 5.1, DRDC will authorize Task 5.2. In this task the Contractor must build and test a seabed acoustic surveillance array per the final design document (deliverable 6.1.5).

Note: If long lead procurement items are identified in Task 5.1, DRDC may choose to initiate a contract amendment (to cover only the procurement of those long lead items) in advance of acceptance of Task 5.1.

Task Details:

The Contractor must build a seabed acoustic surveillance array according to the final design approved in Task 5.1.

The Contractor must build two Shore Station (SS) processors with a minimum of 16 TB robust data storage. The SS must have WiFi capabilities to allow them to be used with the Wireless Access Gateway (WAG) during array deployment. The SS must have software to test the array, determine that it is operating properly, display time and spectral data, display non-acoustic sensor information, process acoustic sensors during deployment and integrate the display with the non-acoustic sensor information, store the data from the array, and provide data streams and control interfaces to remote users through a network connection. The Contractor must document the SS software. The Contractor must provide the latest version of the software used for all components of the array.

The Contractor must build a WAG to facilitate the array deployment. The WAG will power the array for the deployment duration, allow a wireless connection to display live streaming data and provide control of the array. The WAG may possibly be required to be mounted on the deployment ROV and communicate through the ROV cable. This possibility depends on the exact choice of deployment scenario and cannot yet be fixed. The Contractor and DRDC will work with the Deployment Contractor to determine the exact requirements of the WAG. The Contractor must document the operation of the WAG and its design and operation.

The Contractor should note that past experience with such arrays has dictated that the array should be live during deployment. This allows for the strain, depth, orientation sensors, and hydrophones to feed data to the ship during deployment. Provision must be made for running the array, usually from batteries with a wireless link (WAG), while deployment is occurring. Processing for this task may be carried out on the second SS.

The Contractor must produce a technical documentation package for the array, SS, and WAG that includes a bill of materials, design drawings (component, assembly and interface drawings), configuration management of software and hardware components, and the results of testing on the components and sub-systems.

The Contractor must produce a User Manual for the array, SS, and WAG that includes physical details (weights, lengths, volumes, etc.), a complete listing of the array system commands, example configuration files, details of the server/client operations, and details of the operation of test software. The software documentation can be included in this User Manual.

The Contractor must produce a test plan that includes pull testing, temperature cycling and pressure testing of the array to meet the technical specifications. These tests must be repeated a minimum of

STATEMENT OF WORK

three times. The size of the test facilities will likely be a constraint in testing the array (e.g., testing may need to be done in sections); the approach to address this constraint must be addressed in the test plan. DRDC facilities may also be involved, which requires approval and scheduling.

The Contractor must produce test procedures detailing how the tests in the test plan will be conducted.

The Contractor must conduct the tests per the test plan and procedures and report the results of those tests to DRDC.

The Contractor must produce progress reports that must include at a minimum a summary of the work in the period, the status of deliverables, financial summary (planned spending, actual spending, forecast to complete), and a summary of any issues and risks. Progress reports must be produced monthly (frequency can be adjusted with agreement of the DRDC TA).

Task Deliverables, Timelines and Meetings:

Deliverables and due dates for this task are covered in Section 6 and 7. Meetings for this task are covered in Section 11.

5.3 Support

Overview:

In this task the Contractor is to provide technical support for the array during the pre-deployment, deployment, and after the array is operational. A Deployment Contractor will be responsible for deploying the array, connecting the array to the NEPTUNE network and for pre-deployment testing of the array. Of note, the pre-deployment testing (which is different from the testing in Task 5.2) is planned by the Deployment Contractor.

Task Details:

The Contractor will be required to have a field service representative onsite for portions of the pre-deployment testing and during the array deployment on the NEPTUNE network. The Contractor will also be required to attend deployment planning meetings with DRDC and the Deployment Contractor. Following each field support activity, the Contractor must provide a brief trip report summarizing the work that was done, and highlighting any issues or follow-on work that must be done.

At the request of DRDC, the Contractor is to provide technical support for the array after the array is deployed and operating on the NEPTUNE Observatory. This task would include responding to technical questions and troubleshooting; either remotely (by phone or email) or onsite (field service representative support). Following each field support activity, the Contractor must provide a brief report summarizing the work that was done, and highlighting any issues or follow-on work that must be done.

Task Deliverables, Timelines and Meetings:

Deliverables and due dates for this task are covered in Section 6 and 7. Meetings for this task are covered in Section 11.

6. DELIVERABLES

STATEMENT OF WORK

Number	Task Reference	Description of the Deliverables	Quantity and Format
6.1	5.1	Deliverables for Task 5.1 Design:	
6.1.1	5.1	Preliminary Design Document	Quantity: 1 Format: Report delivered electronically (MS Word and Adobe Acrobat PDF).
6.1.2	5.1	Interface Control Document (ICD)	Quantity: 2 – preliminary design, updated for final design. Format: Report delivered electronically (MS Word and Adobe Acrobat pdf).
6.1.3	5.1	System Design Review Meeting	Quantity: 1 Format: Meeting at DRDC Atlantic or Contractor's facility.
6.1.4	5.1	Proof of Concept Test Results	Quantity: 1 Format: Report delivered electronically (MS Word and Adobe Acrobat pdf).
6.1.5	5.1	Final System Design Document	Quantity: 1 Format: Report delivered electronically (MS Word and Adobe Acrobat pdf).
6.1.6	5.1	Progress Reports	Quantity: Monthly Format: Report delivered electronically (MS Word and Adobe Acrobat pdf).
6.2	5.2	Deliverables for Task 5.2 Build & Test:	
6.2.1a	5.2	Seabed Acoustic Surveillance Array	Quantity: 1 Format: Array per the final design document.
6.2.1b	5.2	Shore Station (SS) Processors	Quantity: 2 Format: PC computer with large and robust storage 16 TB minimum.
6.2.1c	5.2	Wireless Access Gateway (WAG)	Quantity: 1 Format: stand-alone power supply and wireless access point for the array capable of being mounted on a winch.
6.2.2	5.2	Technical Documentation Package for the Array, SS and WAG	Quantity: 1 Format: Report delivered electronically (MS Word and Adobe Acrobat pdf).
6.2.3	5.2	User Manual for the Array, SS, and WAG	Quantity: 1 Format: Report delivered electronically (MS Word and Adobe Acrobat pdf).
6.2.4	5.2	Software for the Array, SS, and WAG	Quantity: 1 Format: Hard drive or DVD containing the latest revision of the software.
6.2.5	5.2	Test Plan	Quantity: 1 Format: Report delivered electronically (MS Word and Adobe Acrobat pdf).

STATEMENT OF WORK

6.2.6	5.2	Test Procedures	Quantity: 1 Format: Report delivered electronically (MS Word and Adobe Acrobat pdf).
6.2.7	5.2	Test Report	Quantity: 1 Format: Report delivered electronically (MS Word and Adobe Acrobat pdf).
6.2.8	5.2	Progress Reports	Quantity: Monthly Format: Report delivered electronically (MS Word and Adobe Acrobat pdf).
6.3	5.3	Deliverables for Task 5.3 Support:	
6.3.1	5.3	Technical Support during pre-deployment / deployment activities	Quantity: up to 3 field support trips Format: Travel to site, provision of field support, and production of a trip report, summarizing the work that was done, and highlighting any issues or follow-on work that must be done.
6.3.2	5.3	Technical Support during operation of the array	Quantity: up to 10 technical support requests Format: Remote technical support (by phone or email); onsite technical support (travel to site, provision of field support, and production of a report). The report, whether for remote or onsite technical support shall summarize the work that was done, and highlighting any issues or follow-on work that must be done.

7. DATE OF DELIVERY

Deliverable	Delivery date
6.1	Deliverables for Task 5.1 Design:
6.1.1	Within 1 month of contract award for Task 5.1
6.1.2	Within 1 month of contract award for Task 5.1
6.1.3	Within 2 months of contract award for Task 5.1
6.1.4	Within 3 months of contract award for Task 5.1
6.1.5	Within 3 months of contract award for Task 5.1
6.1.6	Monthly
6.2	Deliverables for Task 5.2 Build & Test:
6.2.1	On or before 2017-05-01

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6.2.2	On or before 2017-05-01
6.2.3	On or before 2017-05-01
6.2.4	On or before 2017-05-01
6.2.5	Within 1 month of contract award for Task 5.2
6.2.6	Within 3 months of contract award for Task 5.2
6.2.7	On or before 2017-05-01
6.2.8	Monthly
6.3	Deliverables for Task 5.3 Support:
6.3.1	On or before 31 Oct 2017
6.3.2	Between 1 Nov 2017 and 31 March 2019

8. LANGUAGE OF WORK

English

9. LOCATION OF WORK

Task	Location of Work
5.1	The work must be performed on Contractor site.
5.2	The work must be performed on Contractor site. Testing of the array will be performed at a test facility that will be determined in the test plan. Some aspects of testing could involve DRDC facilities such as the barge and high-pressure tank.
5.3	The work must be performed at the Ocean Networks Canada site, or for remote technical support from the Contractor site.

10. TRAVEL

The Contractor is required to travel to the following location under the following tasks:

Task	Location	Duration	Frequency
5.1	DRDC Atlantic; 9 Grove Street, Dartmouth, NS	Up to 2 days	Up to 2
5.1	Ocean Networks Canada; Victoria, BC	Up to 2 days	1

STATEMENT OF WORK

5.2	DRDC Atlantic; 9 Grove Street, Dartmouth, NS	Up to 2 days	Up to 4
5.2	Ocean Networks Canada; Victoria, BC	Up to 2 days	Up to 2
5.2	Test Facility/Location; Address To Be Determined in Test Plan	Up to 5 days	Up to 2
5.3	Ocean Networks Canada; Victoria, BC and/or Port Alberni, BC	Up to 10 days	Up to 5
5.3	DRDC Atlantic; 9 Grove Street, Dartmouth, NS	Up to 2 days	Up to 3

The Treasury Board Travel Directive will apply for any travel, accommodation and living expenses.

11. MEETINGS

- Kick-off Meetings will be held at the start of Task 5.1 and Task 5.2.
- Close out Meetings will be held at the end of Task 5.1 and Task 5.2.
- Informal Technical Meetings will be held when required during Task 5.1 and Task 5.2 (this includes meetings with DRDC Atlantic Research Centre and the Deployment Contractor).
- A Design Review Meeting will be held during Task 5.2 (see Deliverable 6.1.3).
- Quarterly Progress Meetings will be held during Task 5.2 (unless otherwise agreed with the DRDC TA).

12. GOVERNMENT SUPPLIED MATERIAL (GSM)

None

13. GOVERNMENT FURNISHED EQUIPMENT (GFE)

None

14. SPECIAL CONSIDERATIONS

If required, access will be provided to the DRDC Atlantic pressure tank, acoustic calibration tank, and acoustic calibration barge to support Task 5.2.

15. SECURITY

All work is unclassified and the Contractor will not have access to any classified information. When on site, the Contractor will be escorted at all times.

16. INTELLECTUAL PROPERTY (IP) OWNERSHIP

- ☐ Not applicable
- ☐ Canada to Own Intellectual Property Rights in Foreground Information - See attached IP checklist.
- ☒ Contractor to Own Intellectual Property Rights in Foreground Information - See attached IP checklist.

STATEMENT OF WORK

17. EMPLOYER/EMPLOYEE RELATIONSHIP (Mandatory for all on-site service contracts)

☒ Not applicable

☐ Applicable – See attached Employer/Employee Relationship checklist.

18. CONTROLLED GOODS

☐ Not applicable

☒ Applicable

Note: there is the potential for controlled goods or controlled goods technical data to be used or developed through the contract.

STATEMENT OF WORK

19. TECHNICAL AUTHORITY INFORMATION

Name: Erin MacNeil

Title/Section: Project Manager for CAUSE / Technology Demonstration Section
Defence Research and Development Canada – Atlantic Research Centre

Address: 9 Grove Street, P.O. Box 1012, Dartmouth, Nova Scotia, B2Y 3Z7

Telephone: (902) 426-3100 x343

Fax: (902) 426-9654

Email address: erin.macneil@drdc-rddc.gc.ca and erin.macneil@forces.gc.ca

Name: Garry Heard

Title/Section: Science Lead for NEPTUNE Array / Underwater Sensing Section
Defence Research and Development Canada – Atlantic Research Centre

Address: 9 Grove Street, P.O. Box 1012, Dartmouth, Nova Scotia, B2Y 3Z7

Telephone: (902) 426-3100 x310

Fax: (902) 426-9654

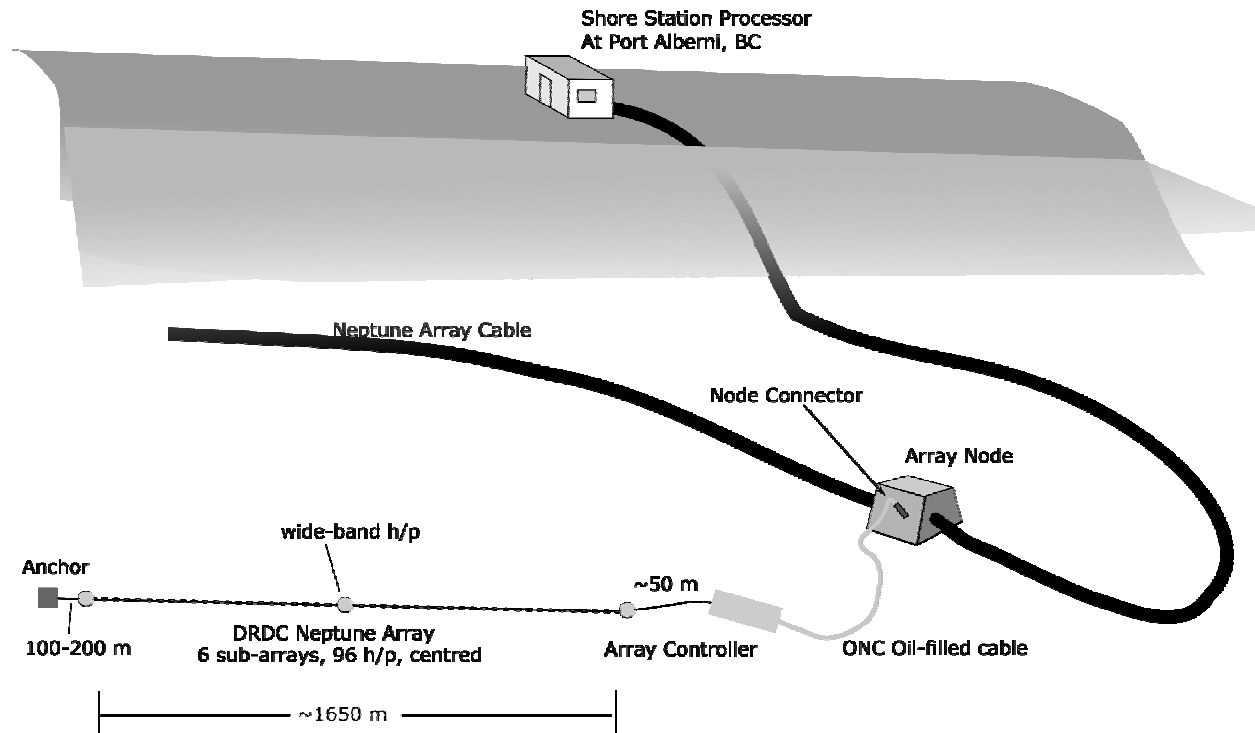
Email address: garry.heard@drdc-rddc.gc.ca and garry.heard@forces.gc.ca

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Annex A: Technical specification

Concept Drawing



#	Specification	Criteria
1	Sensor Array: Low-Frequency Digital Hydrophones	<p>The sensor array must use hydrophones with an integrated 24-bit A/D that provides a minimum of 18 bits real resolution. If necessary, the A/D may be positioned within two wavelengths of the hydrophone (rather than in immediate contact with the transducer) so that it may serve a small, local cluster of transducers (or allow for a hydrophone group to be used to minimize flow noise).</p> <p>The hydrophones must support simultaneous, bidirectional communications of data, and commands over the array bus.</p> <p>The hydrophones must be phase matched to within $\pm 5^\circ$ at 1 kHz.</p> <p>The hydrophones must be gain matched (preamplifier) to within ± 0.2 dB.</p> <p>The hydrophones (h/p) must operate over the frequency range of 5-1400 Hz (-3 dB bandwidth), with 3 kHz sampling rate.</p> <p>The hydrophones must meet or exceed the following requirements:</p> <p>a. Number – Minimum 96 hydrophones arranged in 6</p>

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		<p>harmonically spaced nested sub-apertures, such that end-fire ambiguity of direction is avoided. See the suggested spacing and layout provided in Annex B.</p> <ul style="list-style-type: none"> b. Sensitivity $> -202 \text{ dB//1V/uPa}$ c. Self-Noise – below standard SS0 noise levels are required. The hydrophones must operate with a system noise less than $30 \text{ dB re } 1\mu\text{Pa}/\sqrt{\text{Hz}}$ @ 1 kHz, $35 \text{ dB re } 1\mu\text{Pa}/\sqrt{\text{Hz}}$ @ 100 Hz, $45 \text{ dB re } 1\mu\text{Pa}/\sqrt{\text{Hz}}$ @ 10 Hz, $55 \text{ dB re } 1\mu\text{Pa}/\sqrt{\text{Hz}}$ @ 5 Hz, or better. d. Dynamic Range – 105 dB or greater excluding gain change e. Max Unclipped Tonal – 178 dB at 0 dB post-amp gain. Exact level TBD by design. Must allow for recording data at the noise floor limit (and below). f. Preamplifier gain – Fixed gain. Level TBD, but nominally 20 dB g. post-amp. Adjustable pre-amp gain stages to match h/p sensitivity and max. un-clipped level. Gain – three steps required. Suggested values: $0, 20, 40 \text{ dB}$. Gains must be real-time configurable during sampling. h. Electrical Cross-talk – electrical cross-talk between channels must be better than -90 dB at 1 kHz. i. Simultaneous sampling across all h/p's to within $1 \mu\text{s}$ or better.
2	Sensor Array: Strain Gauge Sensors	The sensor array must include Strain Gauge Sensors to measure deployment stresses. A minimum of 12 strain sensors will be distributed along the length of the array. The strain sensors must have the ability to operate in real-time and be turned on and off through the Shore Station or the real-time deployment monitoring system while the array is sampling.
3	Sensor Array: Depth Sensors	The sensor array must include Depth Sensors. The sensor array must incorporate a minimum of 5 depth sensors distributed along the length of the sensor array. The depth sensors must operate to a maximum depth of 2800 m and must be able to be turned on or off as desired. Accuracy of $\pm 10 \text{ m}$ or better is required.
4	Sensor Array: Orientation Sensors	The sensor array must contain a minimum of five orientation sensors that will be employed during deployment/recovery and at intervals during operations. The orientation sensors must operate in 3D with both gravity and the Earth's magnetic field as the directional references. Angular resolutions shall be 5 degrees or better. The orientation sensor must operate in real-time with an update rate of at least once per second. The orientation sensors must have the ability to be turned on or off through the Shore Station or deployment system.
5	Sensor Array: Overall Length	The overall length of the sensor array from first to last h/p will be approximately 1600 m subject to the final array design. Additional cable will be required at both ends of the array. The array terminator will extend 15 m past the last hydrophone and the array receiver will be located at least 30 m in front of the first hydrophone in the array. Additional, mooring, anchor lines/chains, etc. will be added as required.
6	Sensor Array: Low-frequency	The sensor array hydrophones must have a Bandwidth of 5-

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	Bandwidth and Apertures	<p>1400 Hz, but the array will focus on lower frequencies. The nominal array design is for 6 nested octave-spaced apertures with design frequencies near:</p> <ol style="list-style-type: none"> 1. 10Hz 2. 20Hz 3. 40Hz 4. 80Hz 5. 160Hz 6. 320Hz. <p>A minimum sound speed of 1450 m/s is assumed. The suggested spacing supplied in Annex B is useable from 1440 - 1500 m/s.</p>
7	Low-Frequency Sensor Array: Number of Digital Hydrophones	<p>The sensor array must have a minimum of 96 hydrophones to create sub-arrays with (from lowest frequency to highest) 24, 28, 28, 28, 28, and 28 h/p's. The layout supplied in Annex B shows how this can be accomplished.</p>
8	Sensor Array High Frequency Digital Hydrophones	<p>The sensor array must incorporate 3 hydrophones that operate at a sample rate of at least 30 kHz and must be at the following locations on the sensor array:</p> <ol style="list-style-type: none"> 1. Near the first element on the sensor array. 2. The middle element of the sensor array. 3. Near the final element of the sensor array. <p>The intention is to provide as much bandwidth as practical with these three high-frequency hydrophones subject to an overall maximum data throughput rate that will be determined in conjunction with ONC.</p> <p>Since the maximum sampling rate must be confirmed with ONC, the following is an example of the desirable characteristics of the high-frequency hydrophones:</p> <ol style="list-style-type: none"> a. Sampling rate ~126 kSps b. Bandwidth (-3 dB) 100 Hz to 60 kHz c. Gain Matching ± 0.2 dB. d. Phase Matching: TBD, but as tight as possible. e. Self Noise: better than: 35 dB/1μPa/$\sqrt{\text{Hz}}$ @ 100 Hz, 30 dB/1μPa/$\sqrt{\text{Hz}}$ @ 1 kHz, and 28 dB/1μPa/$\sqrt{\text{Hz}}$ @ 10 kHz f. Max Unclipped receive level: 178 dB/1μPa/$\sqrt{\text{Hz}}$ g. Pre-amp gain: real-time configurable 20, 40, & 60 dB h. Dynamic range better than 105 dB i. ADC resolution: 24-bits j. Simultaneous sampling to the tightest practical standard. This may require in-situ measurement of cable signaling speed to achieve a tight standard in the widely separated hydrophones.
9	Sensor Array: Power	<p>The sensor array and array control unit must minimize power consumption. The array and control unit must require a maximum of 25W when at 100% operation.</p> <p>The interface to the NEPTUNE Observatory cable is not included in the 25W value. The array must include a high-efficiency DC-to-DC convertor allowing operation from 24—400 VDC. The specific requirements will be determined in</p>

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		consultation with Ocean Networks Canada.
10	Sensor Array: Breaking Strength	The sensor array strength member must have a breaking strength of at least 7500 lbs
11	Sensor Array: Bending Radius	The sensor array must have a bending radius suitable for wrapping around the deployment winch. The deployment winch specification is not currently known. The array should aim for a bending radius of 0.6 m, but must not exceed 2 m bending radius. Consultation with the Deployment Contractor will be required to set this parameter.
12	Sensor Array: Array Volume	The sensor array volume must be minimized and not exceed 12 m ³ when packaged excluding the anchor gear and array receiver.
13	Sensor Array: Array Weight	The sensor array must be as lightweight as possible and not exceed 1500 kg excluding the anchor gear and array receiver.
14	Sensor Array: Operating Depth	The sensor array's operating depth must be greater than or equal to 2800 m.
15	Sensor Array: Array Receiver Interface to the NEPTUNE Observatory	The sensor array receiver must interface to the NEPTUNE Observatory. At this time, it is not clear what type of node the array will connect to. It is expected that an Ethernet interface will be used for data and control. A VPN will likely be established to connect to the dry-end servers. The NEPTUNE Observatory interface requirements will be provided by DRDC during the design task.
17	Sensor Array: Sensor Array's Shore Station Interface to the NEPTUNE Observatory	The sensor array's Shore Station must interface with the NEPTUNE Observatory to support uninterrupted command, control, and data streaming from the sensor array. The NEPTUNE Observatory interface requirements will be provided by DRDC during the design task.
18	Sensor Array: Life Expectancy	The sensor array must be designed to have a deployed life expectancy of 3 years or more following deployment.
19	Sensor Array: Underwater Array Controller	<p>The sensor array must be able to receive commands and format data for transmission to the Shore Station. The underwater array controller must interface with the array bus and all elements on the array bus (hydrophones, orientation, depth, strain, etc.). The interface must provide control of all elements on the array bus as well as data collection from all elements. The underwater array controller must buffer and frame data from all array elements. The data frames must be optimized for a real-time data stream that must be transported across the NEPTUNE Observatory to the sensor array's Shore Station. The data frames must contain header information that ensures the segments of the data stream coming from the array sensor elements are identified and processed in the sequence they were recorded. Additionally, the data frames must contain appropriate meta-data such as timestamps, gain, sample rates, sample sizes, sample counts, calibration values, and units.</p> <p>The Array Controller will connect to the NEPTUNE array through an oil-filled cable with a wet-mateable connector. This cable must be obtained from ONC.</p> <p>The underwater array controller must also interface with the NEPTUNE Observatory to support:</p> <ol style="list-style-type: none"> 1. a bidirectional communication channel to the shore station (for both command and data), 2. power to the array controller and the sensor array as

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		<p>well as,</p> <p>3. timing signals for the underwater array controller and sensor array elements.</p> <p>The underwater array controller must collect and report health monitoring information on all sensor array elements as well as the array controller and include basic data integrity checks of the array in real-time. The health will be assessed by the voltage and current measurements, relative levels of signals, histograms of the bit level counts, and other methods to be suggested by the Contractor.</p> <p>The underwater array controller must have a configuration file that has default values for all parameters needed to configure the array, set the data collection parameters and start collecting data with those parameters.</p>
20	Sensor Array: Shore Station	<p>The sensor array must include two above water Shore Stations.</p> <p>The above water Shore Station must interface with the NEPTUNE Observatory. The interface must allow the Shore Station to remotely command and collect data from sensor array elements.</p> <p>The Shore Station must allow five read-only clients to connect to the sensor array's real-time data stream.</p> <p>The Shore Station must allow a single control client to be able to connect to the Shore Station remotely and control the array through the Shore Station interface. The single control client will also have access to a real-time data stream from the array (in addition to the 5 read-only clients the Shore Station supports).</p> <p>The Shore Station must allow automatic recording of the real-time data stream from the sensor array as well as health monitoring information from both the array and underwater array controller- all of which must be recorded and stored locally on the Shore Station or Networked Attached Storage.</p> <p>The automatic recording must be an operator choice that is indicated by a parameter in the Shore Station configuration file.</p> <p>If the automatic recording capability is enabled by the configuration file, then the Shore Station shall automatically save the sensor array data to a series of files whose properties are additional entries in the Shore Station configuration file. These properties shall include:</p> <ul style="list-style-type: none"> a) maximum file size in Megabytes, b) root filename, c) location (i.e., path) to store the files. <p>The automatic recording capability must support a file convention that automatically increments the filename sequential numbering for ease of identification of file groups for post processing. Additionally the automatic recording must support starting and stopping files on frame boundaries in the sensor array real-time data stream.</p>

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		<p>The Shore Station must have a software application running locally to it that must provide a GUI including:</p> <ol style="list-style-type: none"> 1. The software application must allow for full control of the sensor array and the data stream and allow for parameter changes to array elements while the sensor array is operational and collecting data. 2. The software application must include the following basic signal processing capabilities and displays: <ol style="list-style-type: none"> A. Real-time data display for all sensor array hydrophone elements in the time domain. The display must support users selecting individual sensor array elements up to and including all sensor array elements for display. The display must support both manual and auto scaling of both axes as well as manual setting of the display limits. B. Real-time data display of all array hydrophones in the frequency domain. The display must support users selecting individual sensor array elements up to and including all elements for display. The display must support common frequency domain display options such as window size (includes zero-padding if desired), window shading, averaging, and FFT size. The display must support both manual and automatic scaling of both axes as well as manual range selection. C. Additional derived indicators to be displayed include frame synchronization, parity, voltages, and currents. D. Real-time, filtered, displays of orientation, depth, strain, and total acoustic noise from sensors within the array. 3. The software application must support playback of recorded data files from the sensor array through both the time domain and frequency domain displays specified in 2. above. 4. The software application must support a display for data recording of the real-time data stream from the sensor array to a local file. The display must support the following options for data recording: <ol style="list-style-type: none"> a) Input for a maximum file size. b) Input for selecting and entering the filename. c) Input for selecting a location to store the files. 5. The software application must include a display for the sensor array's parameters. The display will allow the user to view the current parameters as well as modify them. The user must be able to save the configuration file. The display will also allow the user to apply changes to the sensor array operation. Parameter
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		<p>changes must take effect without having to power off the sensor array or stop data collection with the exception of a configuration change that includes a power down to the sensor array. Some parameter changes may require a file to be prematurely terminated and a new file started.</p> <p>6. Furthermore, the shore station must have a watchdog application that monitors the sensor array state and, if necessary will attempt to restart the data collection process with the default configuration parameters.</p>
21	Array Wireless Access Gateway	<p>Data from the array sensors will be used to guide the deployment process. The array and Shore station processing and displays must be operational during the deployment. A local processor on the deployment vessel will be used to process and display the array information during deployment.</p> <p>This requirement means that the Contractor must supply a battery-powered wireless driver for the array in small enough format that it can be attached to the deployment winch (thereby eliminating the need for slip rings). This wireless driver must be capable of providing power to operate the array during the deployment period.</p> <p>The non-acoustic sensors will require some pre-processing such as filtering and will then be displayed to the operator. The acoustic channels will also need to be pre-processed, perhaps to estimate the total noise power and filter the response time, and then displayed to the operator. The intention is that this processing will be carried out on a SS.</p>

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Annex B – Suggested Hydrophone Spacing and Layout

Neptune Array
Layout

Frequencies	10	20	40	80	160	320	~DI=	14.3	30 kHz or higher sampling				
Nominal lambda/2	75.00	37.50	18.75	9.38	4.69	2.34							
hp spacing	67.50	33.75	16.88	8.44	4.22	2.11							
octave	1	2	3	4	5	6	Special						
hp count	1	1											
2	2	1							Displacement	Length	Spacing		
3	3	2								-810.00	0	0.00	
4	4	3								-800.00	10.00	10.00	
5	5	4								-742.50	67.50	57.50	
6	6	5								-675.00	135.00	67.50	
7	7	6								-607.50	202.50	67.50	
8	8	7								-540.00	270.00	67.50	
9	9	8								-472.50	337.50	67.50	
10	10	9								-438.75	371.25	33.75	
11	11	10								-405.00	405.00	33.75	
12	12	11								-371.25	438.75	33.75	
13	13	12								-337.50	472.50	33.75	
14	14	13								-303.75	506.25	33.75	
15	15	14								-270.00	540.00	33.75	
16	16	15								-236.25	573.75	33.75	
17	17	16								-219.38	590.63	16.88	
		17								-202.50	607.50	16.88	
										-185.63	624.38	16.88	

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18	10	5				-168.75	641.25	16.88
19		6				-151.88	658.13	16.88
20	11	7				-135.00	675.00	16.88
21		8	1			-118.13	691.88	16.88
22			2			-109.69	700.31	8.44
23	12	9	3			-101.25	708.75	8.44
24			4			-92.81	717.19	8.44
25		10	5			-84.38	725.63	8.44
26			6			-75.94	734.06	8.44
27	12	11	7			-67.50	742.50	8.44
28			8	1		-59.06	750.94	8.44
29				2		-54.84	755.16	4.22
30		12	9	3		-50.63	759.38	4.22
31				4		-46.41	763.59	4.22
32			10	5		-42.19	767.81	4.22
33				6		-37.97	772.03	4.22
34	14	13	11	7		-33.75	776.25	4.22
35				8	1	-29.53	780.47	4.22
36					2	-27.42	782.58	2.11
37			12	9	3	-25.31	784.69	2.11
38					4	-23.20	786.80	2.11
39				10	5	-21.09	788.91	2.11
40					6	-18.98	791.02	2.11
41		14	13	11	7	-16.88	793.13	2.11
42					8	-14.77	795.23	2.11
43				12	9	-12.66	797.34	2.11
44					10	-10.55	799.45	2.11
45			14	13	11	-8.44	801.56	2.11
46					12	-6.33	803.67	2.11

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47	14	13	-4.22	805.78	2.11
48		14	-2.11	807.89	2.11
49	13	15	0	810.00	2.11
50		16	2.11	812.11	2.11
51		17	4.22	814.22	2.11
52		18	6.33	816.33	2.11
53		19	8.44	818.44	2.11
54		20	10.55	820.55	2.11
55		21	12.66	822.66	2.11
56		22	14.77	824.77	2.11
57		23	16.88	826.88	2.11
58		24	18.98	828.98	2.11
59		25	21.09	831.09	2.11
60		26	23.20	833.20	2.11
61		27	25.31	835.31	2.11
62		28	27.42	837.42	2.11
63		22	31.64	841.64	4.22
64		23	35.86	845.86	4.22
65	16	24	40.08	850.08	4.22
66		25	44.30	854.30	4.22
67		26	48.52	858.52	4.22
68		27	52.73	862.73	4.22
69		28	56.95	866.95	4.22
70		22	65.39	875.39	8.44
71	14	23	73.83	883.83	8.44
72		24	82.27	892.27	8.44
73		25	90.70	900.70	8.44
74		26	99.14	909.14	8.44
75	18	27	107.58	917.58	8.44

30+ kHz
sampling

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76			28			116.02	926.02	8.44
77				22		132.89	942.89	16.88
78	15	19		23		149.77	959.77	16.88
79				24		166.64	976.64	16.88
80		20		25		183.52	993.52	16.88
81				26		200.39	1010.39	16.88
82	16	21		27		217.27	1027.27	16.88
83				28		234.14	1044.14	16.88
84		22				267.89	1077.89	33.75
85	17	23				301.64	1111.64	33.75
86		24				335.39	1145.39	33.75
87	18	25				369.14	1179.14	33.75
88		26				402.89	1212.89	33.75
89	19	27				436.64	1246.64	33.75
90		28				470.39	1280.39	33.75
91	20					537.89	1347.89	67.50
92	21					605.39	1415.39	67.50
93	22					672.89	1482.89	67.50
94	23					740.39	1550.39	67.50
95			3			800.00	1610.00	59.61
96	24					807.89	1617.89	7.89

30+ kHz
sampling