



**RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:**

Bid Receiving/Réception des soumissions

Procurement Hub | Centre d'approvisionnement
Fisheries and Oceans Canada | Pêches et Océans Canada
301 Bishop Drive | 301 promenade Bishop
Fredericton, NB E3C 2M6

Email - courriel: DFOtenders-soumissionsMPO@dfo-mpo.gc.ca

REQUEST FOR PROPOSAL

DEMANDE DE PROPOSITION

Proposal to: Fisheries and Oceans 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 and services listed herein and on any attached sheets at the price(s) set out therefor.

Proposition aux : Pêches et Océans 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 appendices ci-jointes, les biens et les services énumérés ici sur toute feuille ci-annexée, au(x) prix indiqué(s).

Comments: - Commentaries :



Title – Sujet Design and produce an automated integrated infrared, visual, and RADAR whale and ship detection system		Date January 27, 2021
Solicitation No. – N° de l'invitation F5211-200583		
Client Reference No. - No. de référence du client FP197-200113		
Solicitation Closes – L'invitation prend fin At / à : 14:00 AST(Atlantic Standard Time)/ HNA (heure normale de l'Atlantique) On / le : February 11, 2021		
F.O.B. – F.A.B Destination	GST – TPS See herein — Voir ci-inclus	Duty – Droits See herein — Voir ci-inclus
Destination of Goods and Services – Destinations des biens et services See herein — Voir ci-inclus		
Instructions See herein — Voir ci-inclus		
Address Inquiries to – Adresser toute demande de renseignements à Grace Bowness Email – courriel: DFOtenders-soumissionsMPO@dfo-mpo.gc.ca		
Delivery Required – Livraison exigée See herein — Voir ci-inclus	Delivery Offered – Livraison proposée	
Vendor Name, Address and Representative – Nom du vendeur, adresse et représentant du fournisseur/de l'entrepreneur:		
Telephone No. – No. de téléphone	Facsimile No. – No. de télécopieur	
Name and title of person authorized to sign on behalf of Vendor (type or print) – Nom et titre de la personne autorisée à signer au nom du fournisseur (taper ou écrire en caractères d'imprimerie)		
Signature	Date	



TABLE OF CONTENTS

PART 1 - GENERAL INFORMATION	3
1.1 SECURITY REQUIREMENTS	3
1.2 STATEMENT OF WORK.....	3
1.3 DEBRIEFINGS	3
PART 2 - BIDDER INSTRUCTIONS	4
2.1 STANDARD INSTRUCTIONS, CLAUSES AND CONDITIONS	4
2.2 SUBMISSION OF BIDS.....	4
2.3 ENQUIRIES - BID SOLICITATION.....	4
2.4 APPLICABLE LAWS.....	4
PART 3 - BID PREPARATION INSTRUCTIONS	5
3.1 BID PREPARATION INSTRUCTIONS	5
PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION	6
4.1 EVALUATION PROCEDURES.....	6
4.2 BASIS OF SELECTION.....	6
PART 5 – CERTIFICATIONS AND ADDITIONAL INFORMATION	8
5.1 CERTIFICATIONS REQUIRED WITH THE BID	8
PART 6 - RESULTING CONTRACT CLAUSES	12
6.1 SECURITY REQUIREMENTS	12
6.2 STATEMENT OF WORK.....	12
6.3 STANDARD CLAUSES AND CONDITIONS.....	12
6.4 TERM OF CONTRACT	12
6.5 AUTHORITIES	13
6.6 PROACTIVE DISCLOSURE OF CONTRACTS WITH FORMER PUBLIC SERVANTS	14
6.7 PAYMENT	14
6.8 INVOICING INSTRUCTIONS	15
6.9 CERTIFICATIONS AND ADDITIONAL INFORMATION.....	15
6.10 APPLICABLE LAWS.....	15
6.11 PRIORITY OF DOCUMENTS	15
6.12 PROCUREMENT OMBUDSMAN	15
6.13 INSURANCE – NO SPECIFIC REQUIREMENT G1005C (2016-01-28)	16
ANNEX "A" – STATEMENT OF WORK	17
ANNEX "B" – BASIS OF PAYMENT	23
ANNEX "C" – MANDATORY CRITERIA	24



PART 1 - GENERAL INFORMATION

1.1 Security Requirements

There is no security requirement applicable to the Contract.

1.2 Statement of Work

The Work to be performed is detailed under Annex 'A' of the resulting contract clauses.

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.

1.4 Procurement Ombudsman

The Office of the Procurement Ombudsman (OPO) was established by the Government of Canada to provide an independent avenue for suppliers to raise complaints regarding the award of contracts under \$25,300 for goods and under \$101,000 for services. You have the option of raising issues or concerns regarding the solicitation, or the award resulting from it, with the OPO by contacting them by telephone at 1-866-734-5169 or by e-mail at opo-boa@opo-boa.gc.ca. You can also obtain more information on the OPO services available to you at their website at www.opo-boa.gc.ca.



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

Revision to Departmental Name: As this solicitation is issued by Fisheries and Oceans Canada (DFO), any reference to Public Works and Government Services Canada or PWGSC or its Minister contained in any term, condition or clause of this solicitation, including any individual SACC clauses incorporated by reference, will be interpreted as reference to DFO or its Minister.

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](#) (2020-05-28) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.

2.2 Submission of Bids

Bids must be submitted only to Fisheries and Oceans Canada (DFO) 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 DFO will not be accepted.

2.3 Enquiries - Bid Solicitation

All enquiries must be submitted in writing to the Contracting Authority no later than 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.

2.4 Applicable Laws

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

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/saved sections as follows:

Section I: Technical Bid (one soft copy in PDF format)

Section II: Financial Bid (one soft copy in PDF format)

Section III: Certifications (one soft copy in PDF format)

The maximum size per email (including attachments) is limited to 10MB. If the limit is exceeded, your email might not be received by DFO. It is suggested that you compress the email size or send multiple emails to ensure delivery. Bidders are responsible to send their proposal and to allow enough time for DFO to receive the proposal by the closing period indicated in the RFP.

For bids transmitted by email, DFO will not be responsible for any failure attributable to the transmission or receipt of the email bid. DFO will send a confirmation email to the Bidders when the submission is received.

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

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.

Section II: Financial Bid

Bidders must submit their financial bid in accordance with the Basis of Payment.

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

4.1.1.1 Mandatory Technical Criteria

See Annex “C” for details.

4.1.2 Financial Evaluation

SACC Manuel Clause [A0220T](#) (2014-06-26) Evaluation of Price - Bid

4.2 Basis of Selection

4.2.1 Basis of Selection – Mandatory Technical Criteria

A bid must comply with the requirements of the bid solicitation and meet all mandatory technical evaluation criteria to be declared responsive. The responsive bid with the lowest evaluated price will be recommended for award of a contract.

4.2.2 Maximum Funding

The maximum funding available for the Contract resulting from the bid solicitation is \$55,000.00 (Applicable Taxes extra) for the firm contract period and \$40,000.00 (Applicable Taxes extra) for the option period. Bids valued in excess of this amount will be considered non-responsive. This disclosure does not commit Canada to pay the maximum funding available.

A tie-breaker will be used where multiple bids meet the mandatory criteria and the evaluated price is the same. The following criteria will be used as the tie-breakers, with the bid with the highest score recommended for award of a contract. Tie-breaker 1 will be used first, and if the results are a tie, then tie-breaker 2 will be used, etc.

Tie-Breaker Number	Tie-Breaker Criteria	Points
1	The number of related projects previously completed by the Bidder. Examples must be verifiable via technical report or peer-reviewed publication.	1 pt per project and each peer-reviewed published results earn an extra point
2	The number of related projects currently in process by the Bidder. Examples must be verifiable by providing name and contact information of an independent reference.	1 pt per project
3	The number of species automatically identified by the system. Examples of detections (e.g. detection image or comparable) need to be provided.	1 pt per species



4	The number of regions the system has been in operation. Examples must be verifiable by providing name and contact information of an independent reference	1 pt per region
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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 Integrity Provisions of the Standard Instructions, all bidders must provide with their bid, **if applicable**, the declaration form available on the [Forms for the Integrity Regime](http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html) website (<http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html>), to be given further consideration in the procurement process.

5.1.2 Contractor's Representative

The Contractor's Representative for the Contract is:

Name: _____
 Title: _____
 Address: _____
 Telephone: _____
 Facsimile: _____
 E-mail: _____

5.1.3 Supplementary Contractor Information

Pursuant to paragraph 221 (1)(d) of the Income Tax Act, payments made by departments and agencies under applicable services contracts (including contracts involving a mix of goods and services) must be reported on a T4-A supplementary slip.

To enable the Department of Fisheries and Oceans to comply with this requirement, the Contractor hereby agrees to provide the following information which it certifies to be correct, complete, and fully discloses the identification of this Contractor:

- a) The legal name of the entity or individual, as applicable (the name associated with the Social Insurance Number (SIN) or Business Number (BN), as well as the address and the postal code:

- b) The status of the contractor (individual, unincorporated business, corporation or partnership:



c) For individuals and unincorporated businesses, the contractor's SIN and, if applicable, the BN, or if applicable, the Goods and Services Tax (GST)/Harmonized Sales Tax (HST) number:

d) For corporations, the BN, or if this is not available, the GST/HST number. If there is no BN or GST/HST number, the T2 Corporation Tax number must be shown:

5.1.4 Electronic Payment of Invoices – Contract

The Contractor accepts to be paid using any of the following Electronic Payment Instrument(s):

- () MasterCard Acquisition Card;
- () Direct Deposit (Domestic and International);

5.1.5 Former Public Servant

Contracts awarded to former public servants (FPS) in receipt of a pension or of a lump sum payment must bear the closest public scrutiny, and reflect fairness in the spending of public funds. In order to comply with Treasury Board policies and directives on contracts awarded to 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 majority 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.

Signature

The following certification signed by the contractor or an authorized officer:

"I certify that I have examined the information provided above and that it is correct and complete"

Signature



Print Name of Signatory

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 section titled Information to be provided when bidding, contracting or entering into a real procurement agreement of the [Ineligibility and Suspension Policy \(http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html\)](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.



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 Statement of Work

The Contractor must perform the Work in accordance with the Statement of Work 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

[2010C](#) (2020-05-28), General Conditions - Services (Medium Complexity) apply to and form part of the Contract.

6.4 Term of Contract

6.4.1 Period of the Contract

The period of the Contract is from date of Contract to March 31, 2021 inclusive.

6.4.2 Option to Extend the Contract

The Contractor grants to Canada the irrevocable option to extend the term of the Contract by up to one additional one year period 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 15 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.



6.5 Authorities

6.5.1 Contracting Authority

The Contracting Authority for the Contract is:

Name: Grace Bowness
Title: Contracting Officer
Organization: Fisheries and Oceans Canada
Directorate: Material and Procurement Services
Address: 301 Bishop Drive, Fredericton, NB, E3C2M6
Telephone: 506 429 6269
Facsimile: 506 452 3676
E-mail address: DFOtenders-soumissionsMPO@dfo-mpo.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 Project Authority (To be named at contract award)

The Project Authority for the Contract is:

Name: _____
Title: _____
Organization: _____
Directorate: _____
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.

6.5.3 Contractor's Representative (To be named at contract award)

Name: _____
Title: _____
Organization: _____
Directorate: _____
Address: _____
Telephone: _____
Facsimile: _____
E-mail address: _____



6.6 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.

6.7 Payment

6.7.1 Basis of Payment

6.7.1.1 The Contractor will be paid in accordance with Annex “B” – Basis of Payment

6.7.1.2 All prices and amounts of money in the Contract are exclusive of the Goods and Services Tax (GST) or Harmonized Sales Tax (HST), whichever is applicable, unless otherwise indicated. GST or HST, to the extent applicable, will be incorporated into all invoices and progress claims for goods supplied or work performed and will be paid by Her Majesty. The Contractor agrees to remit to Canada Revenue Agency any GST or HST paid or due.

6.7.1.3 Any payment by Her Majesty under this contract is subject to there being an appropriation for the fiscal year in which the payment is to be made.

6.7.2 Limitation of Price

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

6.7.3 Multiple Payments

Canada will pay the Contractor upon completion and delivery of units in accordance with the payment provisions of the Contract if:

- a. an accurate and complete invoice and any other documents required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;
- b. all such documents have been verified by Canada;
- c. the Work delivered has been accepted by Canada.

6.7.4 Electronic Payment of Invoices – Contract

The Contractor accepts to be paid using any of the following Electronic Payment Instrument(s):

- a. MasterCard Acquisition Card;
- b. Direct Deposit (Domestic and International);



6.8 Invoicing Instructions

6.8.1 Payments will be made provided that:

6.8.1.1 The invoice(s) must be emailed to DFO Accounts Payable, at the email address indicated below:

Email: DFO.invoicing-facturation.MPO@canada.ca

6.8.1.2 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.

Each Invoice must have the following:

Indicate the **Contract Number**: F5211-200583

Indicate the name of the **Project Authority**: To be named at contract award

Indicate the name of the **AP Code**: To be named at contract award

6.9 Certifications and Additional Information

6.9.1 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.

6.10 Applicable Laws

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

6.11 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) 2010C (2020-05-28), General Conditions: Services (Medium Complexity);
- (c) Annex A, Statement of Work;
- (d) Annex B, Basis of Payment;
- (e) the Contractor's bid dated _____ (*insert date at contract award*)

6.12 Procurement Ombudsman

6.12.1 The Contractor confirms that it has read the Code of Conduct for Procurement and agrees to be bound by its terms.

6.12.2 The office of the Procurement Ombudsman (OPO) was established by the Government of Canada to provide an independent avenue for suppliers to raise complaints regarding the award of contracts under \$25,300.00 for Goods and under \$101,100.00 for Services. You



have the option of raising issues or concerns regarding the solicitation, or the award resulting from it, with the OPO by contacting them by telephone at 1-866-734-5169 or by e-mail at opo-boa@opo-boa.gc.ca. You can also obtain more information on OPO services available to you on their website at www.opo-boa.gc.ca.

6.12.3 For further information, the Contractor may refer to the following PWGSC site:

<http://www.tpsgc-pwgsc.gc.ca/app-acq/cndt-cndct/contexte-context-eng.html>

6.13 Insurance – No Specific Requirement G1005C (2016-01-28)

The Contractor is responsible for deciding if insurance coverage is necessary to fulfill its obligation under the Contract and to ensure compliance with any applicable law. Any insurance acquired or maintained by the Contractor is at its own expense and for its own benefit and protection. It does not release the Contractor from or reduce its liability under the Contract.



ANNEX "A" – STATEMENT OF WORK

1.0 Scope

1.1 Objective

Fisheries and Oceans Canada (DFO) through its Ecosystem Sciences Division to fulfil its mandates under the Ocean Protection Plan Whale Detection and Collision Avoidance Initiative (OPP-WDCA) is looking to test the performance of technologies for whale detection in near real-time in key locations in Southern Resident Killer Whale (SRKW) critical habitat in the Strait of Juan de Fuca and Swiftsure Bank off the West Coast of Vancouver Island. The main objective of the work proposed in this contract is to design and produce an automated infrared (IR)/visual marine mammal detection system with integrated RADAR vessel detection system using equipment owned by DFO, train DFO personnel remotely to install the system, develop a remote online monitoring protocol and test detection effectiveness and update detection training algorithms for different marine mammal species. The system will detect and track whales in near real time in combination with the simultaneous detection and tracking of small and large vessels. The results from this work will allow DFO evaluate whether the system can be used as an alert tool for mitigating physical and acoustic disturbances from vessels including ship strikes. A similar system without RADAR detection component is currently being tested in another part of the Salish Sea where vessel traffic is easier to track by other visual means. In this remote area of deployment where endangered SRKW have been seen regularly, the addition of the RADAR vessel detection and tracking component will allow DFO to track small vessel traffic around whales, which is otherwise difficult because most small vessels do not carry Automated Identification System (AIS) transponders. DFO also has deployed several remote passive acoustic monitoring (PAM) systems in the area and the addition of the IR/visual whale detection system will increase monitoring accuracy given that whales are not always vocal and would then not be detected by an acoustic detection system. Combining a RADAR vessel tracker allows determination of location and speed of travelling vessels which will be used to assess the noise contribution of small vessels to the acoustic habitat of the whales.

The focus of the whale detections will be on killer whales including the endangered SRKW but the system also detects gray, humpback and other large whales, smaller dolphins, porpoises, and sea lions and seals. This work is to be conducted in an area where SRKW interim spatial management measures have been implemented by the Government of Canada under the authorities of DFO and Transport Canada in 2018, 2019, and 2020. These management measures restrict vessel usage and fishing activity in SRKW foraging areas with the aim at abating key threats of disturbance as well as prey availability and accessibility. A voluntary slowdown trial for large commercial vessels was also implemented in the outgoing international shipping lane across Swiftsure Bank in 2020 through the Vancouver Fraser Port Authority Enhancing Cetacean Habitat and Observation (ECHO) Program; the slowdown is aimed at reducing underwater noise from large vessels. Swiftsure Bank and the surrounding area is also being proposed for further discussion on potential longer term area based spatial management measures to support the recovery of SRKW and other species through DFO's Oceans Act Authorities. Information from this proposed project can therefore help inform these longer term discussions.

The results of this contract will provide information on the effectiveness of whale and ship monitoring systems in remote sections of the critical habitat of SRKW and other whales in close proximity to major international shipping lanes that may impact whales through acoustic disturbance and the threat of ship strikes. The results of this contract will also contribute to fulfilling DFO's mandate to address the Trans Mountain Pipeline Expansion Project Recommendations 5 and 6 from the Canada Energy Regulator (formerly National Energy Board). This recommendation requires DFO to assess underwater noise impacts and ship strike risk from



both project related and non-project related vessels on whales including in Strait of Juan de Fuca and Swiftsure Bank areas.

1.2 Background

Marine mammal detection can be used for tracking movements, to assess habitat use, and real time tracking is often required for mitigation of impacts from anthropogenic threats (e.g., acoustic and physical disturbances from underwater noise and ship strikes). Human observers are commonly used for detection of marine mammals to implement required mitigation of harm to the animals but detection performance is affected by environmental conditions such as light conditions, sea state, wind force, and glare, as well as observer experience level, observer fatigue, and whale behaviour. Work on improving traditional visual detection methods (e.g. thermal imaging-based automatic detection systems) have been tested in recent years and considered useful for detecting whales across a wide range of environmental conditions (Zitterbart et al. 2020¹).

The proposed location for installation of cameras and RADAR is at Carmanah Light Station on west coast of Vancouver Island in the Strait of Juan de Fuca/Swiftsure Bank area. Swiftsure Bank is a biologically productive area that is important for many marine species including whales, birds, and fish and a portion of the Bank overlaps with a major international shipping lane. It is also a key area for tracking whale movements in and out of the Salish Sea and has been a focus of annual management measures for SRKW since 2018 including area based fishing closures, a vessel entry restricted area called an Interim Sanctuary Zone and a large commercial vessel slowdown trial. This area is part of identified Critical Habitat for SRKW and whales that enter the area coming from the west typically continue their travel towards Haro Strait and from there potentially to the Southern Gulf Islands and into the Strait of Georgia; these are all areas where interim spatial management measures have been implemented by the Government of Canada under the authorities of DFO and Transport Canada. Better understanding of whale use and threats including vessel density and use of real time detections in the areas where management measures are implemented is critically important to inform the effectiveness of the management measures in reducing those threats and for adaptive conservation management; the management measures for SRKW implemented since 2018 have been adapted on an annual basis and there is interest in considering adapting management measures for only when the whales are there.

Strait of Juan de Fuca and Swiftsure Bank are also important habitat areas for the threatened Northern Resident and Bigg's killer whales (formerly transient killer whales) and the North Pacific humpback whale. Vessel disturbance (acoustic and physical including ship strikes) has been identified as a priority threat for multiple marine mammals at risk in recovery, action, or management plans including for: Resident killer whales² (Southern – Endangered under the *Species at Risk Act*; Northern – Threatened), transient (Bigg's) killer whales (Threatened), North Pacific humpback whales, harbour porpoise (Pacific Ocean population), Eastern North Pacific grey whale, and Steller sea lions (the latter four are Special Concern).

1.3 Terminology

1.3.1 Terms

Contractor: the person or persons contracted to complete the work as described

¹ Zitterbart, D.P., H.R. Smith, M. Flau, S. Richter, E. Burkhardt, J. Beland, L. Bennett, A. Cammareri, A. Davis, M. Holst, C. Lanfredi, H. Michel, M. Noad, K. Owen, A. Pacini, and O. Boebel. 2020. Scaling the laws of thermal imaging-based whale detection. *Journal of Atmospheric and Oceanic Technology*. <https://doi.org/10.1175/JTECH-D-19-0054.s1>

² Fisheries and Oceans Canada (DFO). 2018. Recovery Strategy for the Northern and Southern Resident Killer Whales (*Orcinus orca*) in Canada. Species at Risk Act Recovery Strategy Series, Fisheries & Oceans Canada, Ottawa, x + 84 pp.



1.3.2 Acronyms

SOW: Statement of Work
OPP: Oceans Protection Plan
WDCA: Whale Detection Collision Avoidance
SRKW: Southern Resident Killer Whales
IR: Infrared
AIS: Automated Identification System
PAM: passive acoustic monitoring
ECHO: Enhancing Cetacean Habitat and Observation
IOS: Institute of Ocean Sciences

1.4 Scope of Work

Mandatory services provided by the contractor include:

1. Detection system design and ready-to-install production of an IR/Visual camera-based systems with integrated artificial intelligence computer software that allows automated whale detection (published proof of detection capabilities of the system in primary scientific literature is required)
2. System integration of a marine RADAR automated vessel localization and tracking module
3. Online training for DFO personnel to assemble and install the system at Carmanah Light Station
4. Remote support for installation and initial testing of the system setup (due to covid-19 travel restrictions it is unlikely that the contractor will be able travel to install the system)
5. Remote system testing and operation including training of computer algorithms to classify thermal image signatures of marine mammals and vessels at the site
6. Documentation of system performance shall be provided as distance detection function of the detected marine mammal
7. Setting-up real time remote access to data and automated data analysis for DFO personnel
8. Remote training of DFO light station personnel and DFO science personnel in servicing the system and operation
9. Remote data quality control and system upgrade when necessary

1.5 Tasks

DFO is seeking services to provide near real-time whale and ship detection. Specific tasks include:

- 1.5.1 Design of the hardware and computer software for automated whale and ship detection including pre-assembly, programming and testing of the detection/classification algorithm and computer-based system components system at the contractor's facility (Computer hardware will be provided by DFO and remains property of DFO)
- 1.5.2 Shipping of the computer-based automated detection system to the Institute of Ocean Sciences (IOS) in Sidney, BC, Canada
- 1.5.3 Remote support for the integration and assembly of all components of the whale and ship detection system at IOS by DFO personnel and remote supervision of the testing of the assembled system. System components already owned by DFO include two thermal imaging cameras (FLIR Boson), one RGB camera (AV GT6400), camera housing, one marine RADAR (GARMIN 24 xHD), and the computer platform on which the automated detection system will be installed. (The whale and ship detection system is required to operate on the provided hardware)



- 1.5.4 Remote testing of the system by the contractor at IOS.
- 1.5.5 Remote support of the installation of the integrated system at Carmanah Light Station. Cameras will be installed at the highest point possible at the location to maximize the field of view.
- 1.5.6 Remote control and testing of the installed system and support for software and equipment operations including training of the computer algorithm to detect and classify whale presence and RADAR based tracking of vessels.
- 1.5.7 Training Light station and DFO science personnel in servicing the system.
- 1.5.8 Prepare maps showing detections of whales and vessels during contract period.
- 1.5.9 Provide remote support throughout the duration of the contract including providing access to detections in near real-time, verifying IR/RADAR detections, and adapting real-time detection algorithms to local conditions.

1.6 Deliverables and Acceptance Criteria

The contractor must provide:

- Detection system design and hardware integration, shipping of components and remote supervision of whale and ship detection system assembly and installation as outlined in tasks 1.5.1 to 1.5.5;
- Remote support for whale and ship detection system installation and service at Carmanah Light Station as outlined in task 1.5.6 and 1.5.7;
- Support of near real-time operation of camera and RADAR systems and evaluation of operation (related to task 1.5.9);
- Provide access to whale and vessel detections for verification by DFO personnel in a timely manner (dependent on remote internet access capabilities at the site data processing times may vary);
- Bi-weekly email or conference call updates on system status; and
- A summary report on tasks 1.5.1 through 1.5.8 including all detection and algorithm results until March 31st, 2021. Updates on items listed under Task 1.5.9 will be provided via e-mail and discussed during conference calls. (The contract may be extended into fiscal year 2021-2022).

1.7 Constraints

- Language of work must be English.
- **Unforeseeable constraints may arise due to the unpredictable nature of Covid 19.** To minimize this, all system development work and system testing prior to installation will be completed at the contractor's facilities and at a DFO facility (IOS) with remote support by the contractor during system set up and testing as well as during installation. Covid protocols will be in place based on restrictions from DFO and the BC Provincial Health Authority guidelines during setup and installation by DFO. Remote access to the system will be setup for DFO and the contractor to troubleshoot the system remotely.

1.8 Support Provided by Canada

DFO will provide support for installing equipment at Carmanah Light Station including hardware transport and coordination with Canadian Coast Guard and Real Properties for installation logistics including power needs and access to location. Due to the COVID travel restriction, DFO will conduct the installation.



1.9 Timeframe and Delivery Dates

Timeline and delivery dates are outlined in Table 1.

Table 1: Deliverables

Item	Deliverable Date
Support during assembly and remote testing of whale and ship detection system (Infrared/RGB cameras, housing with computer, hard drive, modem) at IOS	Starting at Contract award
Support during whale and ship detection system installation (cameras, RADAR, housing, cables) at Carmanah Light Station	Within 1 month of contract award
Remote operations testing and system upgrade	Contract award to March 31 st , 2021 (may be extended into next fiscal year – Option Year)
Timely provision of whale and vessel detections and bi-weekly updates on system status	Contract award to March 31 st , 2021
Monthly maps of detected whales and tracked ships	Contract award to March 31 st , 2021

1.10 Budget

Table 3 outlines maximum budget, excluding taxes.

Table 1: Budget (excluding taxes)

Item	Total Budget (excluding taxes)
Firm contract period ending March 31 st , 2021: Design and setup of integrated whale detection and vessel tracking system, remote support during assembly and installation at DFO facility and remote site, training of DFO personnel in installation and service of system, remote supervision of system operation and advanced training of detection algorithms, preparation of verifiable detection results including detection data sheets, graphs containing day and time and location of whale detections, and vessel track information including distance from observation location and speed of vessels.	\$55,000
Contract option period ending March 31 st , 2022: Advanced training of detection algorithms based on site specific samples, preparation of verifiable detection results including detection data sheets, graphs containing day and time and location of whale detections, and vessel track information including distance from observation location and speed of vessels. Preparation of a report containing system description and whale detections and vessel tracks made in 2021 and 2022.	\$ 40,000
TOTAL	\$95,000



1.11 Contractor Qualifications and Obligations

The contractor must have verifiable experience in the setup and successful operation of an automated infrared and RGB camera marine mammal detection system with integrated RADAR for automated localization and tracking of vessels/ships. This experience will include setup, programming, and testing of automated detection software and full system operation at a minimum of three different sites.

The Bidder must provide training in the assembly, installation and servicing of the detection system.

The Bidder must provide remote support for system assembly, installation, initial testing, data quality control, system upgrade, and operation for the duration of the contract.



ANNEX "B" – BASIS OF PAYMENT

Firm contract period: Contract award to March 31, 2021

Description	Unit	Unit Price	Total Price
- Setup and testing of whale detection system -Remote support during assembly and installation at DFO facility and at remote site -Preparation of verifiable detection results including detection data sheets and graphs containing day, time, species and location information and vessel localizations and vessel tracking information -Preparation of summary report with detection and tracking maps	Global	\$ _____	\$ _____
Total (taxes excluded)			\$ _____

Payments will be made according to the following schedule:

- 40% of firm contract period will be payable upon installation of the system
- 60% of firm contract period will be payable at end of firm contract period

Option Year: April 1, 2021 to March 31, 2022

Description	Unit	Unit Price	Total Price
-Advanced training of detection algorithms based on site specific samples -Preparation of verifiable detection results including detection data sheets and graphs containing day, time, species and location information and vessel localizations and vessel tracking information -Preparation of summary report with detection and tracking maps	Global	\$ _____	\$ _____
Total (taxes excluded)			\$ _____

Payments will be made according to the following schedule:

- 40% of option year period will be payable after September 30, 2021
- 60% of option year period will be payable at project completion



ANNEX “C” – MANDATORY CRITERIA

Proposals submitted for this requirement must clearly demonstrate that the Bidder meets all of the Mandatory Criteria. Failure to demonstrate this will result in the Proposal being deemed NON-COMPLIANT and given no further consideration.

The Bidder must include the following tables in their proposal, providing the proposal page number or section that contains information to verify that the criterion has been met.

For the Bidder’s examples and for each of the proposed resources, project experience is to be used to demonstrate compliancy and must include the following information:

- The client organization;
- The dates/duration of the project (month and year);
- A description of the project, including the scope and elements of the framework, and the results/outcomes of the work undertaken by the proposed resources;
- A description of the activities performed by the proposed resources; and,
- The name and contact information of the client Project Authority.

Proposals which do not contain the following documentation will be declared non-responsive and no further evaluation will be conducted with respect to the proposal.

	MANDATORY CRITERIA	REFERENCE PAGE IN BID SUBMISSION
M1.	<p>Experience & System Capabilities The Bidder must provide proof through peer-reviewed publications of their ability to provide functional design of an automated whale detection and tracking system design based on machine learning algorithms. Published documentation of system operations must include range dependent automatic detection performance testing and an example of a comparison between human observers and automatic detections.</p>	
M2.	<p>Species Detection Capabilities The Bidder must demonstrate proof of system detection algorithm capabilities by providing detection image examples for a baleen whale (e.g., humpback), killer whales, and a smaller dolphin or porpoise. Unpublished results are acceptable.</p>	
M3.	<p>Infrared (IR) Camera Support The Bidder must provide a system design capable of processing simultaneously the thermal image data streams from two FLIR BOSON 640 camera cores (USB 2.0) with a resolution of 640 x 512 pixels over a 5.5° horizontal field of view to detect marine mammals. The Bidder must include screen shots and/or schematics of system processing capabilities.</p>	
M4.	<p>RGB Camera Support The Bidder must provide a system design capable of receiving and processing video data from an Allied Vision GT6400 mono camera via GigE. This includes remote control of focus and aperture of the lens (EF Mount, electronic controller for focus & aperture). The Bidder must include screen shots and/or schematics of system processing capabilities.</p>	



M5.	RADAR Support The Bidder must provide a system design capable of integrating data received from a GARMIN 24 xHD marine RADAR for vessel detection and tracking. The Bidder must include screen shots and/or schematics of system processing capabilities.	
M6.	Real-time Processing The Bidder must provide a system design and software capable of processing all data in real-time at the site of installation with detection results being available remotely to DFO personnel. The Bidder must provide examples of previous projects demonstrating these system capabilities.	
M7.	Retrainable Artificial Intelligence (AI) model The Bidder must provide a system design capable of incorporating detections made into the algorithm training procedures. The Bidder must provide examples of previous projects demonstrating these system capabilities.	
M8.	Notification Support The Bidder must provide a system design capable of creating and transmitting detection notifications automatically via internet connection either using mobile data networks or broadband internet access point. The Bidder must provide examples of previous projects demonstrating these system capabilities.	