



**RETURN BIDS TO:**  
**RETOURNER LES SOUMISSIONS À:**  
Travaux publics et Services gouvernementaux  
Canada  
Voir dans le document/  
See herein  
NA  
Québec  
NA

**REQUEST FOR PROPOSAL**  
**DEMANDE DE PROPOSITION**

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

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

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

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

**Comments - Commentaires**

<b>Title - Sujet</b> Ionospheric Radio Wave Prop Mod	
<b>Solicitation No. - N° de l'invitation</b> 9F045-200301/A	<b>Date</b> 2021-01-25
<b>Client Reference No. - N° de référence du client</b> 9F045-20-0301	
<b>GETS Reference No. - N° de référence de SEAG</b> PW-\$MTB-550-16042	
<b>File No. - N° de dossier</b> MTB-0-43228 (550)	<b>CCC No./N° CCC - FMS No./N° VME</b>
<b>Solicitation Closes - L'invitation prend fin</b> <b>at - à 02:00 PM</b> Eastern Standard Time EST <b>on - le 2021-03-08</b> Heure Normale du l'Est HNE	
<b>F.O.B. - F.A.B.</b> <b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input checked="" type="checkbox"/> <b>Other-Autre:</b> <input type="checkbox"/>	
<b>Address Enquiries to: - Adresser toutes questions à:</b> Mirfatahi, Kaveh	<b>Buyer Id - Id de l'acheteur</b> mtb550
<b>Telephone No. - N° de téléphone</b> (514) 260-4106 ( )	<b>FAX No. - N° de FAX</b> ( ) -
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b> AGENCE SPATIALE CANADIENNE Space Utilization 9F045-Solar & Earth System Sciences 6767 ROUTE DE L AEROPORT ST HUBERT Québec J3Y8Y9 Canada	

**Instructions: See Herein**

**Instructions: Voir aux présentes**

**Vendor/Firm Name and Address**

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

**Issuing Office - Bureau de distribution**

Travaux publics et Services gouvernementaux Canada  
Place Bonaventure, portail Sud-Oue  
800, rue de La Gauchetière Ouest  
7e étage, suite 7300  
Montréal  
Québec  
H5A 1L6

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

---

## TABLE OF CONTENTS

<b>PART 1 - GENERAL INFORMATION .....</b>	<b>3</b>
1.1 INTRODUCTION.....	3
1.2 SUMMARY .....	3
1.3 DEBRIEFINGS .....	4
<b>PART 2 - BIDDER INSTRUCTIONS .....</b>	<b>4</b>
2.1 STANDARD INSTRUCTIONS, CLAUSES AND CONDITIONS.....	4
2.2 SUBMISSION OF BIDS.....	4
2.3 FORMER PUBLIC SERVANT.....	5
2.4 ENQUIRIES - BID SOLICITATION.....	6
2.5 APPLICABLE LAWS.....	6
2.6 IMPROVEMENT OF REQUIREMENT DURING SOLICITATION PERIOD.....	7
2.7 MAXIMUM FUNDING .....	7
2.8 BID CHALLENGE AND RECOURSE MECHANISMS.....	7
<b>PART 3 - BID PREPARATION INSTRUCTIONS.....</b>	<b>7</b>
3.1 BID PREPARATION INSTRUCTIONS .....	7
<b>PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION .....</b>	<b>9</b>
4.1 EVALUATION PROCEDURES.....	9
4.2 BASIS OF SELECTION.....	9
<b>PART 5 – CERTIFICATIONS AND ADDITIONAL INFORMATION .....</b>	<b>10</b>
5.1 CERTIFICATIONS REQUIRED WITH THE BID .....	10
5.2 CERTIFICATIONS PRECEDENT TO CONTRACT AWARD AND ADDITIONAL INFORMATION .....	10
<b>PART 6 - SECURITY, FINANCIAL AND OTHER REQUIREMENTS.....</b>	<b>11</b>
6.1 FINANCIAL CAPABILITY .....	11
<b>PART 7 - RESULTING CONTRACT CLAUSES .....</b>	<b>11</b>
7.1 STATEMENT OF WORK.....	11
7.2 STANDARD CLAUSES AND CONDITIONS.....	11
7.3 TERM OF CONTRACT .....	12
7.4 AUTHORITIES .....	12
7.5 PROACTIVE DISCLOSURE OF CONTRACTS WITH FORMER PUBLIC SERVANTS .....	13
7.6 PAYMENT .....	13
7.7 INVOICING INSTRUCTIONS .....	14
7.8 CERTIFICATIONS AND ADDITIONAL INFORMATION.....	15
7.9 APPLICABLE LAWS.....	15
7.10 PRIORITY OF DOCUMENTS .....	15
7.11 FOREIGN NATIONALS (CANADIAN CONTRACTOR) .....	15
7.12 INSURANCE .....	15
7.13 DIRECTIVE ON COMMUNICATIONS WITH THE MEDIA.....	15
7.14 DISPUTE RESOLUTION.....	17
<b>ANNEX A .....</b>	<b>18</b>
STATEMENT OF WORK .....	18
<b>ANNEX B .....</b>	<b>19</b>
BASIS OF PAYMENT .....	19

Solicitation No. - N° de l'invitation  
9F045-200301/A  
Client Ref. No. - N° de réf. du client  
9F045-200301

Amd. No. - N° de la modif.  
File No. - N° du dossier  
MTB-0-43228

Buyer ID - Id de l'acheteur  
mtb550  
CCC No./N° CCC - FMS No./N° VME

---

<b>ATTACHMENT 1 TO PART 3 OF THE BID SOLICITATION.....</b>	<b>20</b>
ELECTRONIC PAYMENT INSTRUMENTS.....	20
<b>ATTACHMENT 1 TO PART 4 OF THE BID SOLICITATION.....</b>	<b>21</b>
TECHNICAL AND MANAGEMENT EVALUATION CRITERIA.....	21

## **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.

#### **The following Annexes:**

Annex A Statement of Work  
Annex B Basis of Payment

#### **The following Attachments:**

Attachment 1 to Part 3 Electronic Payment Instructions  
Attachment 1 to Part 4 Point Rated Evaluation Criteria

### **1.2 Summary**

#### **Project Title**

Ionospheric Radio Wave Propagation Modeling

#### **Description**

Public Works and Government Services Canada (PWGSC) on behalf of Canadian Space Agency (CSA) located in St-Hubert, (Quebec), is seeking bids for the CSA's Sun-Earth System Science Program, specifically for the modeling of radar and radio wave propagation through the polar ionosphere.

#### **Security Requirements**

There are no security requirements associated with this requirements.

#### **Period of Contract**

The period of contract will be from the date of issue for a period of approximately thirty (30) months.

#### **Actual Available Budget**

The maximum funding available for each contract resulting from the bid solicitation for this stream is **\$425,000.00 per contract** (Applicable Taxes extra, as appropriate). Annex A (Statement of Work)

---

includes a description of the work required. Bids valued in excess of this amount will be considered non-responsive. This disclosure does not commit Canada to pay the maximum funding available.

In this RFP, up to two (2) contracts are expected to be awarded. For additional information, please refer to Part 2, section 2.7 – Maximum Funding, of the bid solicitation.

### **Intellectual property**

The intellectual property will vest with the Contractor.

### **Trade Agreements**

This requirements is not subject to the trade agreements.

### **Canadian Content**

This requirement is limited to Canadian services.

### **Electronic Bidding**

This bid solicitation allows bidders to use the epost Connect service provided by Canada Post Corporation to transmit their bid electronically. Bidders must refer to Part 2 entitled Bidder Instructions, and Part 3 entitled Bid Preparation Instructions, of the bid solicitation, for further information.

### **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) (<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](#) (2020-05-28 ) 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: 180 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 in the bid solicitation.

Only bids submitted using epost Connect service will be accepted. The Bidder must send an email requesting to open an epost Connect conversation to the following address:

---

[tpsgc.dgareceptiondessoumissions-abbidreceiving.pwgsc@tpsgc-pwgsc.gc.ca](mailto:tpsgc.dgareceptiondessoumissions-abbidreceiving.pwgsc@tpsgc-pwgsc.gc.ca)

**Note: Bids will not be accepted if emailed directly to this email address.** This email address is to be used to open an epost Connect conversation, as detailed in Standard Instructions [2003](#), or to send bids through an epost Connect message if the bidder is using its own licensing agreement for epost Connect.

**Bids transmitted by facsimile or hardcopy 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 ten (10) 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 Quebec.

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

## 2.6 Improvement of Requirement during Solicitation Period

Should bidders consider that the specifications or Statement of Work contained in the bid solicitation could be improved technically or technologically, bidders are invited to make suggestions, in writing, to the Contracting Authority named in the bid solicitation. Bidders must clearly outline the suggested improvement as well as the reason for the suggestion. Suggestions that do not restrict the level of competition nor favour a particular bidder will be given consideration provided they are submitted to the Contracting Authority at least ten (10) days before the bid closing date. Canada will have the right to accept or reject any or all suggestions.

## 2.7 Maximum Funding

The maximum funding available for each contract resulting from the bid solicitation, for this stream, is **\$425,000.00** (Applicable Taxes extra, as appropriate). 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 maximum of 2 contracts are expected to be awarded under this RFP. For additional information, please refer to Part 4 - Evaluation Procedures and Basis of Selection.

## 2.8 Bid Challenge and Recourse Mechanisms

- (a) Several mechanisms are available to potential suppliers to challenge aspects of the procurement process up to and including contract award.
- (b) Canada encourages suppliers to first bring their concerns to the attention of the Contracting Authority. Canada's [Buy and Sell](#) website, under the heading "[Bid Challenge and Recourse Mechanisms](#)" contains information on potential complaint bodies such as:
  - Office of the Procurement Ombudsman (OPO)
  - Canadian International Trade Tribunal (CITT)
- (c) Suppliers should note that there are **strict deadlines** for filing complaints, and the time periods vary depending on the complaint body in question. Suppliers should therefore act quickly when they want to challenge any aspect of the procurement process.

## PART 3 - BID PREPARATION INSTRUCTIONS

### 3.1 Bid Preparation Instructions

The Bidder must submit its bid electronically in accordance with section 08 of the 2003 standard instructions. The epost Connect system has a limit of 1GB per single message posted and a limit of 20GB per conversation.

The bid must be gathered per section and separated as follows:

Section I: Technical Bid  
Section II: Financial Bid  
Section III: Certifications

Bids transmitted by facsimile or hardcopy will not be accepted.

---

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

### **Section I: Technical and Management 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.

In their management bid, Bidders must describe their capability and experience, the project management team and provide client contact(s).

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

Bidders must submit their financial bid in accordance with the Pricing Schedule detailed in the Basis of Payment in Annex B.

#### **3.1.2 Electronic Payment of Invoices – Bid**

If you are willing to accept payment of invoices by Electronic Payment Instruments, complete Attachment 1 to Part 3 – Electronic Payment Instruments, to identify which ones are accepted.

If Attachment 1 to Part 3 – Electronic Payment Instruments is not completed, it will be considered as if Electronic Payment Instruments are not being accepted for payment of invoices.

Acceptance of Electronic Payment Instruments will not be considered as an evaluation criterion.

#### **3.1.3 Price Breakdown**

Bidders are requested to detail the following elements for expenses in the performance of each task, milestone or phase of the Work, as applicable:

- (a) Labour: For each individual and (or) labour category to be assigned to the Work, indicate: i) the hourly rate, inclusive of overhead and profit; and ii) the estimated number of hours.
- (b) Equipment: Specify each item required to complete the Work and provide the pricing basis of each one, Canadian customs duty and excise taxes included, as applicable.
- (c) Materials and Supplies: Identify each category of materials and supplies required to complete the Work and provide the pricing basis.
- (d) Travel and Living Expenses: Indicate the number of trips and the number of days for each trip, the cost, destination and purpose of each journey, together with the basis of these costs which must not exceed the limits of the National Joint Council (NJC). With respect to the NJC's Directive, only the meal, private vehicle allowances specified in Appendices B, C and D of the Directive <http://www.njc-cnm.gc.ca/directive/travelvoyage/index-eng.php>, and the other provisions of the Directive referring to "travellers", rather than those referring to "employees", are applicable. The

---

Treasury Board Secretariat's Special Travel Authorities,  
[http://www.tbssct.gc.ca/pubs\\_pol/hrpubs/tbm\\_113/statb-eng.asp](http://www.tbssct.gc.ca/pubs_pol/hrpubs/tbm_113/statb-eng.asp), also apply.

- (e) Subcontracts: Identify any proposed subcontractor and provide for each one the same price breakdown information as contained in this article.
- (f) Other Direct Charges: Identify any other direct charges anticipated, such as long distance communications and rentals, and provide the pricing basis.
- (g) Applicable Taxes: Identify any Applicable Taxes 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, management and financial evaluation criteria.
- (b) An evaluation team composed of representatives of Canada will evaluate the bids.

#### **4.1.1 Technical and Management Evaluation**

Mandatory and point rated technical evaluation criteria are included in Attachment 1 to Part 4.

#### **4.1.2 Financial Evaluation**

##### **4.1.2.1 Mandatory Financial Criteria**

The maximum funding available for each contract resulting from the bid solicitation, for this stream, is **\$425,000.00** (Applicable Taxes extra, as appropriate). 1Bids valued in excess of this amount will be considered non-responsive. This disclosure does not commit Canada to pay the maximum funding available.

##### **4.1.2.2 Evaluation of Price**

The price of the bid will be evaluated in Canadian dollars, Applicable Taxes excluded, FOB destination, Canadian customs duties and excise taxes included.

### **4.2 Basis of Selection**

#### **4.2.1 Basis of Selection – Highest Rated Within Budget**

1. To be declared responsive, each bid must:
  - a) comply with all the requirements of the bid solicitation;
  - b) meet all the mandatory evaluation criteria; and
  - c) obtain the required minimum points for the technical evaluation criteria which are subject to point rating.
2. Bids not meeting (a) or (b) or (c) will be declared non-responsive.

3. Responsive Bids will be ranked according to their overall score. Bids will be ranked starting from the Bid with the highest score down to the lowest score resulting in a Responsive Bid List.
4. In the event that more than one responsive bid have the same score, these responsive bids will be further ranked based on the highest score of the "Relevance of the model(s) or concept(s) to be implemented in the application" criteria.
5. Up to 2 Contracts will be awarded by ranking order of the Responsive Bid List or until allocation of funds for this RFP is exhausted.

## **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 Integrity 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.

### **5.2 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 section titled Information to be provided when bidding, contracting or entering into a real property 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.

---

## 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](https://www.canada.ca/en/employment-social-development/canada/esdc-labour) website (<https://www.canada.ca/en/employment-social-development/programs/employment-equity/federal-contractor-program.html#>).

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.

## 5.2.3 Additional Certifications Precedent to Contract Award

### 5.2.3.1 Canadian Content Certification

This procurement is limited to Canadian services.

The Bidder certifies that:

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

**5.2.3.1.1** *SACC Manual* clause [A3050T](#) (2018-12-06) Canadian Content Definition

### 5.2.3.2 Status and Availability of Resources

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

### 5.2.3.3 Education and Experience

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

## PART 6 - SECURITY, FINANCIAL AND OTHER REQUIREMENTS

### 6.1 Financial Capability

*SACC Manual* clause [A9033T](#) (2012-07-16) Financial Capability

## 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

The Contractor must perform the Work in accordance with the Statement of Work at Annex A and the Contractor's technical bid entitled \_\_\_\_\_, dated \_\_\_\_\_.

### 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) (<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 (2020-05-28) General Conditions - Research & Development, apply to and form part of the Contract.

## 7.2.2 Supplemental General Conditions

4002 (2010-08-16) Supplementary General Conditions - Software Development or Modification Services, apply to and form part of the Contract.

## 7.3 Term of Contract

### 7.3.1 Period of the Contract

The period of the contract is from date of Contract to September 30, 2023 inclusive.

## 7.4 Authorities

### 7.4.1 Contracting Authority

The Contracting Authority for the Contract is:

Kaveh Mirfatahi  
Supply Specialist  
Public Works and Government Services Canada  
Acquisitions Branch, Space Procurement Directorate  
Place Bonaventure  
800 de la Gauchetière Ouest  
Suite 7300, Portail Sud-Ouest, Montréal, Québec H5A 1L6

Telephone: 514-260-4106  
Facsimile: 514-496-3822  
E-mail address: kaveh.mirfatahi@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.

### 7.4.2 Project Authority ( *to be completed at contract award* )

The Project Authority for the Contract is:

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

Solicitation No. - N° de l'invitation  
9F045-200301/A  
Client Ref. No. - N° de réf. du client  
9F045-200301

Amd. No. - N° de la modif.  
File No. - N° du dossier  
MTB-0-43228

Buyer ID - Id de l'acheteur  
mtb550  
CCC No./N° CCC - FMS No./N° VME

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.

#### **7.4.3 Contractor's Representative** (*Bidder to fill in*)

Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Organization: \_\_\_\_\_  
Address: \_\_\_\_\_

Telephone: \_\_\_\_ - \_\_\_\_ - \_\_\_\_  
Facsimile: \_\_\_\_ - \_\_\_\_ - \_\_\_\_  
E-mail address: \_\_\_\_\_

#### **7.5 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.

#### **7.6 Payment**

##### **7.6.1 Basis of Payment** (*to be completed at contract award*)

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid a firm price, as specified in Annex B – Basis of Payment (A) for a cost of \$ \_\_\_\_\_. Customs duties are included and Applicable Taxes are extra.

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

##### **7.6.2 Method of Payment**

###### **7.6.2.1 Milestone Payments - Firm Price**

Canada will make milestone payments in accordance with the Schedule of Milestones detailed in Annex B - Basis of Payment and the payment provisions of the Contract if:

- (a) an accurate and complete claim for payment using form PWGSC-TPSGC 1111 (<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/1111.pdf>) and any other document required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;
- (b) all the certificates appearing on form PWGSC-TPSGC 1111 have been signed by the respective authorized representatives;
- (c) all work associated with the milestone and as applicable any deliverable required has been completed and accepted by Canada.

###### **7.6.2.1.1 Schedule of Milestones**

The schedule of milestones for which payments will be made in accordance with the Contract is detailed in Annex B.

### 7.6.3 T1204 – Direct Request by Customer Department

SACC Manual clause [A9117C](#) (2007-11-30), T1204 – Direct Request by Customer Department

### 7.6.4 Electronic Payment of Invoices – Contract

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

- a. Visa Acquisition Card;
- b. MasterCard Acquisition Card;
- c. Direct Deposit (Domestic and International);
- d. Electronic Data Interchange (EDI);

### 7.7 Invoicing Instructions

1. The Contractor must submit a claim for payment using form [PWGSC-TPSGC 1111](#), Claim for Progress Payment.

Each claim must show:

- a. all information required on form [PWGSC-TPSGC 1111](#);
- b. all applicable information detailed under the section entitled "Invoice Submission" of the general conditions;
- c. a list of all expenses;
- d. expenditures plus pro-rated profit or fee;
- e. the description and value of the milestone claimed as detailed in the Contract.

Each claim must be supported by:

- a. a copy of time sheets to support the time claimed;
  - b. a copy of the invoices, receipts, vouchers for all direct expenses, travel and living expenses;
  - c. 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. Invoices must be distributed as follows:
    - i. Send one PDF copy of the invoice by e-mail to the Contracting and Technical Authorities as identified under sub-articles 7.4.1 and 7.4.2 of the contract with copy to the following CSA e-mail address: [asc.facturation-invoicing.csa@canada.ca](mailto:asc.facturation-invoicing.csa@canada.ca); **OR**

- 
- ii. If mailed, the Contractor must prepare and certify **one original and two (2) copies** of the invoice, and forward it to CSA's Financial Services using the address shown on page 1 of the Contract under "Invoices" (Financial Services Section)
  4. The CSA's Financial Services Section will then forward **the original and one (1) copy** of the claim to the Contracting Authority for certification and onward submission to the Payment Office for the remaining certification and payment action.
  5. The Contractor must not submit claims until all work identified in the claim is completed.

## **7.8 Certifications and Additional Information**

### **7.8.1 Compliance**

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

### **7.8.2 Canadian Content Certification**

*SACC Manual* clause [A3060C](#) (2008-05-12), Canadian Content Certification

## **7.9 Applicable Laws**

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

## **7.10 Priority of Documents**

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

- (a) the Articles of Agreement;
- (b) the supplemental general conditions [4002](#) (2010-08-16) Software Development or Modification
- (c) the general conditions [2040](#) (2020-05-28), Research & Development;
- (d) Annex A, Statement of Work;
- (e) Annex B, Basis of Payment;
- (f) the Contractor's bid dated \_\_\_\_\_.

## **7.11 Foreign Nationals (Canadian Contractor)**

*SACC Manual* clause [A2000C](#) (2006-06-16) Foreign Nationals (Canadian Contractor)

## **7.12 Insurance**

*SACC Manual* clause [G1005C](#) (2016-01-28) Insurance

## **7.13 Directive on Communications with the Media**

## **1. Definitions**

"Communication Activity(ies)" includes: public information and recognition, the planning, development, production and delivery or publication, and any other type or form of dissemination of marketing,

---

promotional or information activities, initiatives, reports, summaries or other products or materials, whether in print or electronic format that pertain to the present agreement, all communications, public relations events, press releases, social media releases, or any other communication directed to the general public in whatever form or media it may be in, including but without limiting the generality of the preceding done through any company web site.

## 2. Communication Activities Format

The Contractor must coordinate early on with the Canadian Space Agency (CSA) all Communication Activities that pertain to the present contract.

Subject to review and approval by the CSA, the Contractor may mention and/or indicate visually, without any additional costs to the CSA, the CSA's participation in the contract through at least one of the following methods at the complete discretion of the CSA:

- a. By clearly and prominently labelling publications, advertising and promotional products and any form of material and products sponsored or funded by the CSA, as follows, in the appropriate official language:

"This program/project/activity is undertaken with the financial support of the Canadian Space Agency."

"Ce programme/projet/activité est réalisé(e) avec l'appui financier de l'Agence spatiale canadienne."

- b. By affixing CSA's corporate logo on print or electronic publications, advertising and promotional products and on any other form of material, products or displays sponsored or funded by the Canadian Space Agency.

Any and all mention or reference to the Canadian Space Agency in addition to those specified above in (a) and (b) must be specifically accepted by the CSA prior to publication.

The Contractor must obtain and use a high resolution printed or electronic copy of the CSA's corporate identity logo and seek advice on its application, by contacting the project authority as mentioned in Paragraph 6.4.2 of this contract.

## 3. Communication Activity Coordination Process

The contractor must coordinate with the CSA's Directorate of Communications and Public Affairs all Communication Activities pertaining to the present contract. To this end, the contractor must:

- a. As soon as the Contractor intends to organize a Communication Activity, send a Notice to the CSA's Directorate of Communications and Public Affairs. The Communications Notice must include a complete description of the proposed Communication Activity. The Notice must be in writing in accordance with the clause Notice included in the general conditions applicable to the contract. The Communications Notice must include a copy or example of the proposed Communication Activity.
- b. The contractor must provide to the CSA any and all additional document in any appropriate format, example or information that the CSA deems necessary, at its entire discretion to correctly and efficiently coordinate the proposed Communication Activity. The Contractor agrees to only proceed with the proposed Communication Activity after receiving a written confirmation of coordination of the Communication Activity from the CSA's Directorate of Communications and Public Affairs.

The Contractor must receive beforehand the authorization, approval and written confirmation from the

Solicitation No. - N° de l'invitation  
9F045-200301/A  
Client Ref. No. - N° de réf. du client  
9F045-200301

Amd. No. - N° de la modif.  
File No. - N° du dossier  
MTB-0-43228

Buyer ID - Id de l'acheteur  
mtb550  
CCC No./N° CCC - FMS No./N° VME

---

CSA's Directorate of Communications and Public Affairs before organizing, proceeding or hosting a communication activity

#### **7.14 Dispute Resolution**

- (a) The parties agree to maintain open and honest communication about the Work throughout and after the performance of the contract.
- (b) The parties agree to consult and co-operate with each other in the furtherance of the contract and promptly notify the other party or parties and attempt to resolve problems or differences that may arise.
- (c) If the parties cannot resolve a dispute through consultation and cooperation, the parties agree to consult a neutral third party offering alternative dispute resolution services to attempt to address the dispute.
- (d) Options of alternative dispute resolution services can be found on Canada's Buy and Sell website under the heading "[Dispute Resolution](#)".

Solicitation No. - N° de l'invitation  
9F045-200301/A  
Client Ref. No. - N° de réf. du client  
9F045-200301

Amd. No. - N° de la modif.  
File No. - N° du dossier  
MTB-0-43228

Buyer ID - Id de l'acheteur  
mtb550  
CCC No./N° CCC - FMS No./N° VME

---

**ANNEX A**

**STATEMENT OF WORK**

The Statement of Work is hereby attached.

**Canadian Space Agency  
Sun-Earth System Science Program**

---

**Statement of Work (SOW) for the modeling of radar  
and radio wave propagation through the polar  
ionosphere**

**Draft 3 (Initial Release upon approval)  
December 2020**

**FOR SPACE AGENCY USE ONLY**

This document and the information contained herein are not to be disclosed or transferred in whole or in part, to any third party without the prior written consent of the Canadian Space Agency.

This Page Intentionally Left Blank

**APPROVAL**

The Canadian Space Agency (CSA), has prepared this Statement of Work (SOW) for the modeling of radar and radio wave propagation through the polar ionosphere. Any proposed changes to the baselined version of this document shall be forwarded to the CSA Configuration Management (CM) Receipt Desk for evaluation and, if approved, incorporated into this document.

Prepared by:

---

 Pierre Langlois

---

 Date

 Solar-Terrestrial Science Lead  
 Space Utilization

Reviewed by:

---

 Thayananthan Thayaparan

---

 Date

 Researcher  
 DRDC

Reviewed by:

---

 Name

---

 Date

 Title  
 Directorate

Reviewed by:

---

 Name

---

 Date

 Title  
 Directorate

Approved by:

---

 Name

---

 Date

 Title  
 Directorate

This Page Intentionally Left Blank

**REVISION HISTORY**

<b>Rev.</b>	<b>Description</b>	<b>Initials</b>	<b>Date</b>

## TABLE OF CONTENTS

### Table des matières

STATEMENT OF WORK (SOW) FOR THE MODELING OF RADAR AND RADIO WAVE PROPAGATION THROUGH THE	
POLAR IONOSPHERE .....	I
DRAFT 1 (INITIAL RELEASE UPON APPROVAL) .....	I
SEPTEMBER 2020 .....	I
<b>1 INTRODUCTION .....</b>	<b>8</b>
1.1 PROJECT BACKGROUND .....	8
1.2 SCOPE .....	8
1.3 DOCUMENT CONVENTIONS .....	9
<b>2 DOCUMENTS .....</b>	<b>10</b>
2.1 APPLICABLE DOCUMENTS .....	10
<b>3 WORK DESCRIPTION .....</b>	<b>11</b>
3.1 GENERAL .....	11
3.2 PROJECT MANAGEMENT .....	11
3.2.1 Project Planning .....	11
3.2.2 Action Item Log .....	11
3.2.3 Reviews & Meetings .....	12
3.2.4 Documentation .....	12
<b>4 CONTRACTOR DELIVERABLES .....</b>	<b>13</b>
4.1 HARDWARE .....	13
4.2 SOFTWARE .....	13
4.3 DOCUMENTATION .....	13
<b>5 GOVERNMENT FURNISHED EQUIPMENT .....</b>	<b>14</b>
<b>6 SCHEDULE .....</b>	<b>15</b>
APPENDICES .....	16
<b>1. GENERAL INSTRUCTIONS .....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>1.1. PREPARATION .....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>1.2. ELECTRONIC DOCUMENTS FORMAT .....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
1.1.1 Page Numbering .....	<i>Error! Bookmark not defined.</i>
1.1.2 Document Numbers .....	<i>Error! Bookmark not defined.</i>
<b>1.3. DELIVERY, NOTIFICATIONS AND IDENTIFICATION REQUIREMENTS ..</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
1.1.3 E-mailed documents .....	<i>Error! Bookmark not defined.</i>
1.1.4 Direct Transferred Documents .....	<i>Error! Bookmark not defined.</i>
1.1.5 Documents Delivered on DVD or CD-ROM disk or USB Flash drive ..	<i>Error! Bookmark not defined.</i>
<b>2. DOCUMENT STRUCTURE AND CONTENT .....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>2.1 OVERALL .....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>2.2 COVER/TITLE PAGE .....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>2.3 TABLE OF CONTENTS .....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>

**2.4 INTRODUCTION.....ERROR! BOOKMARK NOT DEFINED.**  
**2.5 APPLICABLE AND REFERENCE DOCUMENTS.....ERROR! BOOKMARK NOT DEFINED.**  
**2.6 BODY OF DOCUMENT .....ERROR! BOOKMARK NOT DEFINED.**  
**2.7 APPENDICES.....ERROR! BOOKMARK NOT DEFINED.**

## **1 INTRODUCTION**

This document is intended to provide a description of the work that will be completed by Contractor/Supplier to develop, implement, test and validate models that predict the propagation of radar and radio waves in the Polar regions.

### **1.1 PROJECT BACKGROUND**

The mandate of the Canadian Space Agency (CSA) is to promote the peaceful use and development of space, to advance the knowledge of space through science and to ensure that space science and technology provide social and economic benefits for Canadians. As part of this mandate, the CSA has funded Canadian Universities to perform continuous monitoring of the ionosphere above Canada using ground-based instruments. Those measurements, often combined with satellite observations, help better understand the fundamental processes taking place in that region of geospace, which affect radio propagation, including radar and GNSS signal distortion, and produce ground induced currents which may impact pipelines and electric power lines.

Through data analysis, simulation and modeling, Canadian scientists can better understand the ionosphere and predict its behavior. The CSA has funded a number of such studies whose aim was to develop the science required to understand the physics at play in the ionosphere and how the ionosphere responds to solar input (space weather), affecting our technology. Canada's Department of National Defence has a plan to use polar over-the-horizon radar (POTHR) for long-range surveillance of the polar cap; however, the highly dynamic nature and complex structure of the ionosphere at high-latitudes impedes the application of such technology. Recent observations suggest that the characterization of the E-region ionosphere, sporadic-E-layer formation, and ionospheric dynamics is critical for the mitigation of space weather effects on POTHR. As space weather processes tied to sporadic-E are poorly understood and significantly under-sampled this necessitates the need to simulate and study the detrimental impacts of Sporadic-E on the propagation of POTHR signals through the ionosphere.

### **1.2 SCOPE**

This document is a Statement of Work for projects that will mitigate the effects of space weather on radar and radio wave propagation over the poles. Given the current state of understanding of the ionosphere, the various models that have been developed, and the (quasi) real time data that is openly available, the CSA is funding the development of user friendly applications to simulate the propagation of radio and radar signals, as they interact with the Canadian (sub-auroral, auroral, and polar) ionosphere.

This application will integrate physical (synergy with empirical models) models to take into account the effects of the local time and date, solar input, particle precipitation, electric field and magnetic field, metallic ions, heating and cooling effect, and geophysical and chemical data in the region of interest, such as the time dependent (time and date) three-dimensional (latitude,

longitude, height) ionospheric electron density. This model must incorporate different sources and formations of the sporadic-E-layer in the characterization of the E-region ionosphere.

The intent of this contract is to produce a working deliverable. The proposed development must focus on the integration of validated models in a mature framework in order to produce an innovative application that will improve the operations of POTH and HF communications.

### **1.3 DOCUMENT CONVENTIONS**

The following verbs, as used in this document, have specific meaning as indicated below:

- “shall” indicates a mandatory requirement.
- “should” indicates a preferred but not mandatory alternative.
- “may” indicates an option.
- “will” indicates a statement of intention or fact.

## 2 DOCUMENTS

Unless otherwise specified, in the case of conflict between this document and the documents listed below, this document shall take precedence. All documents are latest version in effect at time of order. Note: Actual titles may not be exact as written.

### 2.1 APPLICABLE DOCUMENTS

The following documents of the exact issue date and revision level shown are applicable and form an integral part of this document to the extent specified herein.

AD	Document Number	Revision	Title
AD-01	CSA-ST-GDL-0001	D	CSA Technology Readiness and Assessment Guidelines
AD-02	CSA-SE-STD-0001	A	CSA Systems Engineering Technical Reviews Standard

### **3 WORK DESCRIPTION**

The work description described herein consists in the development, implementation, and test of modeling software that will help the client use radio wave communication or radar more effectively in the polar regions, and may use real-time data as input. This includes the acquisition of software if required, development of modeling code, documentation, implementation and testing.

The output of this contract will be an innovative software, configured to run in real time on the hardware platform that will be provided by the client, and returned to the client, along with the required software and documentation at the end of the contract. The software shall implement the algorithms described in the proposal, and further described in the Project Requirement Document that will be reviewed at the kick-off meeting. The software will read and generate files that shall be compatible with Matlab 2019b or later version.

#### **3.1 GENERAL REQUIREMENTS**

The Contractor shall:

- a. Provide Project Management and Project Reporting activities.
- b. Provide Software Design and Development activities.
- c. Provide a design, development and test team with the skills and knowledge necessary to address each area of expertise.
- d. Provide operational support for the early deployment phase, while the resulting application is used by the client.

#### **3.2 PROJECT MANAGEMENT**

##### ***3.2.1 Project Planning***

The contractor shall provide a Project Management Plan (PMP), and update it as the project progresses. CSA shall be notified of any updates to the PMP. The PMP shall include the following sections:

- Work Breakdown Structure and Product Tree
- Project Schedule
- Project Team Organization
- Risk Management
- Project Management Reporting

##### ***3.2.2 Action Item Log***

The contractor is responsible for capturing any actions resulting from the review of material submitted in support of this contract.

**3.2.3 Reviews & Meetings**

The contractor shall prepare for and attend the required reviews and meetings, including virtual meetings and teleconferences, as listed in section 6 of this SOW.

**3.2.4 Documentation**

All documents will be delivered in MS Word for review, and in searchable PDF in final form.

## **4 CONTRACTOR DELIVERABLES**

### **4.1 HARDWARE**

All Hardware or Software purchased under this contract is expected to return to the crown at the end of the contract, unless a loan agreement is put in place to keep the hardware with the contractor.

### **4.2 SOFTWARE**

Software is expected to be deliverable under this contract. All the required documentation for a third party to install, update and run the software will be delivered with the software code and data files, on USB key, CD ROM or DVD ROM.

### **4.3 DOCUMENTATION**

The Contractor must deliver all documentation requested in Appendix A.

The Contractor may propose to combine documents called by more than one CDRL into one document, but this is subject to prior approval from the CSA. Where this approval is granted, the document cover page must list all the CDRL numbers that are covered by this document.

Documentation, reporting and other deliverables must be according to instructions provided in Appendix B of this SOW, which also provides naming convention. Presentation material should be in Power Point format. Documents provided in Adobe PDF format must not be protected against copy of text and figures.

Documents must be delivered in the original software application format. One electronic copy of each deliverable document must be transferred to the CSA to the address and in the format specified in the contract. No paper copy is to be delivered.

All simulation scenarios that have been considered (e.g. with STK) must be delivered in CD-ROM or DVD-ROM format or USB flash drive.

All documents must be provided 10 working days prior to the specified Review/Meeting unless otherwise indicated.

## **5 GOVERNMENT FURNISHED EQUIPMENT**

The contractors will be provided with two government furnished computationally fast high-end rugged laptops running windows 10, and with Matlab 2019b or later version installed, on which the developed software application shall be compiled, tested and validated. The Matlab installation will include the signal processing toolbox, image processing toolbox, parallel computing toolbox, mapping toolbox, aerospace toolbox, and can be used by the contractor to develop or integrate with his application. The government furnished equipment shall be returned with the deliverables at the end of the contract. If applicable, any government furnished information must be returned to the Crown at the conclusion of the Contract.

The GFE laptop will be a Dell Latitude 7750, 128 Go of RAM, and 1TB M.2 PCIe NVMe Drive, Class 50 SSD, Dell, 400-BFCX Hard Disk.

## 6 SCHEDULE

The contractor will be responsible for delivering the software, configured and running real-time or better, on self-contained computer hardware. Internet may be used to fetch data files, but not for running the executable on a cloud platform. The contractor will deliver the documents listed in Appendix A, TABLE A 1 – CDRL, at the corresponding dates. The expected contents of these documents is provided in the CSA Systems Engineering Technical Reviews Standard, listed in the Applicable documents.

Milestone	Target Date
Kick-off meeting	March 2021
Progress review	September 2021
Demonstration of the preliminary version	November 2021
Critical Design Review	February 2022
Progress review	September 2022
Final Design Review	February 2023
Demonstration of the final version	September 2023
Acceptance of the deliverables	November 2023

## **APPENDICES**

## **A CONTRACT DATA REQUIREMENTS LIST (CDRL)**

This Appendix defines the documentation to be delivered by the Contractor.

### **LEGEND:**

#### **1) DID No.**

- CF = Contractor's format

#### **2) Document Versions:**

- D: Draft (under Version Control, expected to be updated – up to 50% complete and correct)
- P:Preliminary (under Version Control, expected to be updated - 70% complete and correct).
- IR: Initial Release (under Configuration Control, may well be revised during normal project life - 95-100% complete & correct).
- U: Update (expected revision, but not final; under Configuration Control, previous versions remain unchanged under Configuration Control).
- F: Final (under Configuration Control, normally not expected to be revised, but could be if necessary - 100% complete and correct).

Table A-1 provides the current Contract Data Requirements List (CDRL).

TABLE A-1 – CDRL

CDRL No.	Title	DID No.	Initial Release	Update	Final	Acceptance Category
PM100	CWBS and Work Package Descriptions	102	Proposal			
PM101	Progress Report	107	Quarterly			
PM102	Kick-Off Meeting Presentation	108	March 20 <sup>th</sup> 2021		April 20 <sup>th</sup> 2021	
PM103	Meeting Agenda	110	As required			
PM104	Minutes of Meetings	111	As required			
PM105	FIP & BIP Disclosure	120	March 20 <sup>th</sup> 2021	February 2022	November 2023	
	<b>Requirements &amp; Specification</b>					
EN400	Requirements Document	400	March 20 <sup>th</sup> 2021	February 2022	November 2023	
EN401	Software Specification	405	March 2022	February 2022	November 2023	
EN402	Simulator Implementation and Verification Plan	456	February 2022	February 2023	November 2023	
	<b>Design Documents and Drawings</b>					
EN403	Software Architecture Document	707	February 2022	February 2023	November 2023	
	<b>Testing</b>					
EN750	Test Requirements Document	750	February 2022	February 2023	November 2023	
EN751	Software Test Plan	751	February 2022	February 2023	November 2023	
EN752	Software Test Procedure	755	February 2022	February 2023	November 2023	
EN753	Software Test Report	760	February 2022	February 2023	November 2023	
	<b>Operations Manuals</b>					

<b>CDRL No.</b>	<b>Title</b>	<b>DID No.</b>	<b>Initial Release</b>	<b>Update</b>	<b>Final</b>	<b>Acceptance Category</b>
OP800	Software User's Manual	952	February 2022	February 2023	November 2023	

**B DATA ITEMS DESCRIPTIONS (DIDS)**

---

## DATA ITEM DESCRIPTION

---

### DID-102 – CWBS and Work Package Descriptions

DID Issue: IR

Date: 2013-12-18

---

#### PURPOSE:

The Contractor Work Breakdown Structure (CWBS) is used during planning for estimating resources and scheduling the work. During the implementation phase, it is used for reporting and controlling costs and schedule.

---

#### PREPARATION INSTRUCTIONS:

The Contractor shall provide a Work Breakdown Structure (WBS) describing all the project elements that organise and define the total scope of the project, including subcontracted work, and shall be deliverable-oriented.

The Contractor shall prepare and maintain a WBS Dictionary made up of Work Package Descriptions (WPDs) for every element to the lowest level of the WBS. Each WPD shall include, as a minimum:

- a) A unique identifier traceable to the WBS;
- b) A title;
- c) The name of the individual responsible for completion of the work;
- d) The scope of the work package;
- e) The start date and duration;
- f) Required inputs and dependencies;
- g) A description of every activity covered by the WPD including the level of effort and earned value measurement method for each activity, and all non-labour costs;
- h) Assumptions;
- i) Output and work package acceptance criteria;
- j) Issue date;
- k) Version number; and
- l) List of deliverable with delivery milestone.

---

## DATA ITEM DESCRIPTION

---

### DID-107 – Progress Report

DID Issue: IR

Date: 2014-01-10

---

#### PURPOSE:

The Progress Report presents the results of the work done to date in the contract, and in particular since the previous report. The Progress Report is used by the Government to assess the Contractor's progress in performance of the work.

---

#### PREPARATION INSTRUCTIONS:

*NOTE TO CSA PROJECT MANAGERS: The content required below includes all the information required for a large project. For smaller or Phase 0 or A projects, the CSA Project Manager may elect to tailor these requirements down to a suitable level, however, it is necessary to ensure that enough information is obtained to maintain control of the project.*

The Monthly Progress Report shall include status data and information summarizing project management, technical and schedule progress and accomplishment for each element of the Contractor's Work Breakdown Structure (CWBS). The report shall address the major activities of the reporting period and shall emphasize major achievements and events of special significance. Difficulties and/or problems that have affected the work progress, proposed corrective actions, project impact expected and concerns for the future, shall also be reported.

Each progress report shall answer the following three questions:

- 1) Is the project on schedule?
- 2) Is the project within budget?
- 3) Is the project free of any areas of concern in which the assistance or guidance of the CSA may be required?

Each negative response must be supported with an explanation.

The Progress Report must include the following information, as a minimum:

- 1) Summary outlook, including technical performance, work performed, schedule and cost status (at CWBS level 2), organization and key personnel changes and areas of concerns;
- 2) Financial status including actual and forecasted expenditures, by month, as compared to the original monthly planned expenditure profile;
- 3) *For fixed price contracts:* Updated milestones payment plan;
- 4) A detailed integrated project schedule status including:
  - a) The schedule baseline,
  - b) Dependencies between activities,

- 
- c) Percent of completion for all activities,
  - d) List of completed milestones,
  - e) Critical path,
  - f) 1st level subcontractor's activities having impact on WP delivery date shall be provided, and
  - g) All other activities having an impact on WP delivery date shall be provided;
- 5) Schedule variances from the plan, including deviations from schedule and proposed corrective actions for significant variances;
  - 6) Major meetings schedule update;
  - 7) Status of the work in progress, specifically the work performed in the previous calendar period; sufficient sketches, diagrams, photographs, etc. shall be included, if necessary, to describe the progress accomplished;
  - 8) The work projected for the next period, and estimated date of completion of next milestone;
  - 9) Outline of technical and programmatic issues, with solutions recommended;
  - 10) Contractual issues, including changes to activities and costs;
  - 11) Subcontracts events, status and issues;
  - 12) Equipment ordered, received, made and assembled;
  - 13) Description of trips or conferences connected with the Contract during the period of the report;
  - 14) Risk status report including previous issues resolved, status of on-going risks (changes, likelihoods and impacts), and identification of new risks, their likelihood and impact, and proposed mitigation action;
  - 15) Status of all action items from previous review(s) and meeting(s).

---

## DATA ITEM DESCRIPTION

---

### DID-108 – Kick-off Meeting Presentation

DID Issue: IR

Date: 2014-01-10

---

#### PURPOSE:

To present the Contractor's plan for carrying out the project and to address all significant issues.

---

#### PREPARATION INSTRUCTIONS:

The Kick-off Meeting Presentation shall contain the following information, as a minimum:

- 1) Review of major assumptions;
- 2) Review of contract deliverables;
- 3) Work requirements, WBS status and schedule;
- 4) Project's funding and expected cash-flow;
- 5) FIP and BIP;
- 6) Licensing issues if any;
- 7) Presentation to include the required copyrights and IP disclosure;
- 8) Other items as deemed appropriate

---

## DATA ITEM DESCRIPTION

---

### DID-110 – Meeting Agenda

DID Issue: IR

Date: 2013-12-19

---

#### PURPOSE:

The Meeting Agenda specifies the purpose and content of a meeting.

---

#### PREPARATION INSTRUCTIONS:

The meeting agendas shall contain the following information, as a minimum.

- 1) Document Header:
  - a) Title;
  - b) Type of meeting;
  - c) Project title, project number, and contract number;
  - d) Date, time, and place;
  - e) Chairperson; and
  - f) Expected duration.
- 2) Document Body:
  - a) Introduction;
  - b) Opening Remarks: CSA;
  - c) Opening Remarks: Contractor;
  - d) Review of previous minutes and all open action items;
  - e) Project technical issues;
  - f) Project management issues;
  - g) Other topics;
  - h) Review of newly created/closed action items, decisions, agreements and minutes; and
  - i) Set or confirm dates of future meetings.

---

## DATA ITEM DESCRIPTION

---

### DID-111 – Minutes of Meetings

DID Issue: IR

Date: 2013-12-19

---

#### PURPOSE:

The minutes of reviews or meetings provide a record of decisions and agreements reached during reviews/meetings.

---

#### PREPARATION INSTRUCTIONS:

Minutes of meeting shall be prepared for each formal review or meeting in the Contractor's format and shall, as a minimum, include the following information:

- 1) Title page containing the following:
  - a) Title, type of meeting and date
  - b) Project title, project number, and contract number
  - c) Space for signatures of the designated representatives of the Contractor, the CSA and the Public Works and Government Services Canada (PWGSC), and
  - d) Name and address of the Contractor.
- 2) Purpose and objective of the meeting;
- 3) Location;
- 4) Agenda;
- 5) Summary of the discussions, decisions and agreements reached;
- 6) List of attendees by name, position, phone numbers and e-mail addresses as appropriate;
- 7) Listing of open action items and responsibility for each action to be implemented as a result of the review;
- 8) Other data and information as mutually agreed; and
- 9) The minutes shall include the following statement:

*“All parties involved in contractual obligations concerning the project acknowledge that minutes of a review/meeting do not modify, subtract from, or add to the obligations of the parties, as defined in the contract.”*

## **DATA ITEM DESCRIPTION**

---

### **DID-120 – FIP and BIP Disclosure**

**DID Issue: IR**

**Date: 2014-01-16**

---

#### **PURPOSE:**

To fully disclose all FIP and BIP resulting from the contract.

---

#### **PREPARATION INSTRUCTIONS:**

The FIP Disclosure shall contain the following information, as a minimum:

- 1) Introduction including the scope and the purpose;
- 2) List and description of all BIP that will be used in the contract; and
- 3) List and description of all FIP resulting from the contract.

---

## DATA ITEM DESCRIPTION

---

### DID-400 – Requirements Document

DID Issue: IR

Date: 2014-01-23

---

#### PURPOSE:

To define the functional, performance, environmental and other requirements for a given system, segment, subsystem, unit, module or assembly and to provide the basis on which the Specifications Documents will be developed.

*NOTE: Requirements Documents are sometimes called "Requirements Specification". This DID applies to them as well.*

---

#### PREPARATION INSTRUCTIONS:

- 1) Requirements documents shall conform to norms of English usage for Systems Engineering:

"shall" indicates a mandatory requirement

"should" indicates a preferred but not mandatory alternative,

"will" indicates statement of intention or fact

"may" indicates an option.

- 2) Requirements documents shall define the requirements on the subject item (segment, subsystem, etc.) as a whole and shall not contain specific requirements on sub-items. All requirements shall be verifiable on the item as integrated.
- 3) All requirements shall be documented in the MBSE model and requirements documents expressed from the model (*Optional*).
- 4) Requirements documents shall cite applicable standards and parent requirements, and shall make clear the priority sequence of the applicable documents.
- 5) There shall be one set of requirements for each node in the System Hierarchical Tree. Note that interface requirements (which are between two or more nodes) are in separate documents.
- 6) Requirements shall conform to the following standards for quality:
  - a) They shall be unambiguously clear to the intended readership;
  - b) There shall be one requirement per paragraph;
  - c) Each requirement shall have a unique identifier (e.g. an ID number or paragraph number);
  - d) They shall not define design solutions;
  - e) They shall define their source and/or rationale
  - f) They shall be verifiable, preferably by test;

- g) They shall specify the conditions under which they apply; and
  - h) Performance requirements shall be quantified.
- 7) The Requirements Document shall comprise a number of sections, each defining a specific set of requirements. The document shall address all of the following categories of requirements, as applicable to the project:
- a) Functional and performance requirements (see item 8) below);
  - b) External interface requirements (unless done in a separate document);
  - c) Resource allocation requirements,
  - d) Design requirements;
  - e) Qualification and/or verification requirements;
  - f) Other applicable requirements types.
- 8) Functional and performance requirements shall include, as applicable to the project:
- a) Functional and performance requirements imposed on the system by the scientific needs (flow down from MRD);
  - b) Operating modes requirements;
  - c) Software requirements;
  - d) Other applicable requirements.

---

## DATA ITEM DESCRIPTION

---

### DID-405 – Software Specification

DID Issue: IR

Date: 2014-01-27

---

#### **PURPOSE:**

To define the top-level requirements applicable to the development of the system software. In addition, this document specifies computer resource requirements (e.g. memory, timing, etc.), which are necessary to ensure that the system hardware enables the computer software to meet its performance requirements.

---

#### **PREPARATION INSTRUCTIONS:**

The Software Specification shall cover all deliverable software and test-benches. It applies to whole system software or to the software used in any constituent subsystem.

The Software Specification shall address the following, as applicable:

1. **Scope**
2. **Applicable and Reference Documents**
3. **List of Software Items**
4. **Computer Hardware Design**

This paragraph shall specify the required design constraints that shall be imposed on computer hardware and firmware (i.e. RAM, CPU, etc.).

5. **Operational Environment**

This section shall describe the operational environment for each Computer Software Configuration Item identified as a result of the system design. This section shall also describe the internal interfaces between subsystems, equipment, and software items. A “context diagram” or “system block diagram” shall be provided here.

6. **Capability Requirements**

This section shall describe the operation, or sequence of related operations, that each software item shall be able to perform. A list of specific capability requirements, with their attributes shall be provided. Quantitative statements that specify performance and accuracy attributes should be provided in terms of “capacity,” “speed,” and “accuracy.”

7. **Constraint Requirements**

This section shall describe all the restrictions on how the software shall meet the capability requirements (e.g. what hardware has to be used, what software has to be compatible with what, how it must interact with humans, etc.). External interfaces are to be considered as constraints.

---

## DATA ITEM DESCRIPTION

---

### DID-456 – Software Implementation and Verification Plan

DID Issue: IR

Date: 2014-01-27

---

#### PURPOSE:

To define the plan for the sequence of builds that create the system software, and to define the activities and supporting equipment to verify a particular build of the software.

---

#### PREPARATION INSTRUCTIONS:

- 1) The implementation section of the plan shall describe, as a minimum:
  - a) The set of builds that are planned, and
  - b) The requirements sets that will be implemented in each build.
- 2) The verification section of the plan shall cover, as a minimum:
  - a) The test activities, with a description of each activity,
  - b) The requirements on the current build of the test-bench,
  - c) The objective of each activity, including requirements to be verified,
  - d) Supporting hardware and software,
  - e) Assumptions and constraints that apply to the activity,
  - f) Plans to install, setup, and maintain items in the test or analysis environment, and
  - g) A description of the data recording, reduction, and analysis activities to be carried out during and after the activity.
- 3) The plan shall contain a Verification Matrix showing the linkage of requirements implemented in the Build to the verification activities.

---

## DATA ITEM DESCRIPTION

---

### DID-707 – Software Architecture Document

DID Issue: IR

Date: 2014-03-24

---

#### PURPOSE:

To describe the software architecture showing how all the requirements will be addressed by the software design.

---

#### PREPARATION INSTRUCTIONS:

The Software Architecture Document shall contain the following information, as a minimum.

1. Introduction
  - 1.1. Purpose
  - 1.2. Scope
  - 1.3. Overview
2. Applicable and Reference Documents
3. CSCI-wide design decisions
4. CSCI architectural design
  - 4.1. CSCI components
    - 4.1.1. Reusable components
  - 4.2. Concept of execution
    - 4.2.1. Software initialization
    - 4.2.2. State transitions
  - 4.3. Interface design
    - 4.3.1. Interface identification and diagrams
5. CSCI detailed design
  - 5.1. Source module organization
  - 5.2. Software build
  - 5.3. Top-level main function
6. Requirements traceability
7. Notes

---

## DATA ITEM DESCRIPTION

---

### DID-750 – Test Requirements Document

DID Issue: IR

Date: 2014-02-25

---

#### PURPOSE:

To define the testing to be performed in order to accurately measure, verify and document the functionality and performance of a system, subsystem or unit.

---

#### PREPARATION INSTRUCTIONS:

The purpose of this document is to specify the minimum test requirements from the customer's perspective.

The Test Requirements Document shall contain the following information, as a minimum:

1. Introduction:
  - a) Background;
  - b) Goals and objectives,
  - c) Scope;
  - d) Requirements numbering convention;
  - e) Assumptions;
  - f) Constraints.
2. Applicable and Reference Documents;
3. General test requirements:
  - a) Tests required;
  - b) Test Design:
    - i) Test Case,
    - ii) Test Procedures,
    - iii) Test Data Sheet;
4. Test Activities, Test Management and Conduct:
  - a) Test Readiness Review;
  - b) Test Management:
    - i) Test Interruptions,
    - ii) Re-test,
    - iii) Regression Testing;

- c) Test measurement accuracy;
  - d) Non-Compliance and Problem Reports;
  - e) Test Data Review.
5. Requirements for documenting test activities and test results:
- a) Test Records;
  - b) Test Reports;
6. Specific tests in addition to verification.

---

## DATA ITEM DESCRIPTION

---

### DID-751 – Software Test Plan

DID Issue: IR

Date: 2014-03-28

---

#### PURPOSE:

To describe the purpose and goals of the software testing, and to identify the strategies to be used to implement and execute testing, and the resources needed.

---

#### PREPARATION INSTRUCTIONS:

The document shall include the following:

##### 1. SCOPE

The Software Test Plan (SWTP) identifies the software test environment resources required for testing and provides schedules for testing activities. In addition the SWTP identifies the individual tests that must be performed during testing. The testing must include Human-Computer Interface Testing.

##### 2. CONTENT

The SWTP may be prepared in the Contractor's format and must, as a minimum, contain the following information:

- 1) identification number, title, and brief overview of the system and Computer Software Configuration Items (CSCIs) to which the SWTP applies;
- 2) a description of the relationship of this plan to other project management plans;
- 3) identification and description of all hardware and software items required to perform testing
- 4) a description of plans to install, setup, and maintain items in the software test environment;
- 5) identification and description of general test requirements applicable to all tests or group of tests (e.g. measurement of execution time);
- 6) a description of the types or classes of tests (e.g. stress tests, timing tests, erroneous input tests, maximum capacity tests) and levels at which testing will be performed (e.g. CSCI, CSCI to CSCI, CSCI to HWCI, system);
- 7) a description of the data recording, reduction, and analysis activities to be carried out both during and after tests;
- 8) a schedule of tests; and
- 9) identification and description of each test to be conducted on the CSCI(s) including:
  - a) test objective,
  - b) test level,
  - c) type or class,

- d) test method,
- e) cross reference to the CSCI design requirements,
- f) cross reference to the CSCI interface requirements,
- g) type of data to be recorded, and
- h) assumptions and constraints.

---

## DATA ITEM DESCRIPTION

---

### DID-755 – Software Test Procedure

DID Issue: IR

Date: 2014-03-26

---

#### PURPOSE:

To define the procedure to be followed for each test to be performed on the software.

---

#### PREPARATION INSTRUCTIONS:

The test procedures shall contain the following information, as a minimum:

##### 1. SCOPE

This section shall include a brief description of the test and the objectives of the test.

##### 2. Test Item and feature(s) to be tested.

This section shall identify the test items and describe the features and combination of features that are going to be the object of the test.

##### 3. Participants Required

This section shall provide a listing of the individuals (position titles, trade or profession) required to conduct or witness the test.

##### 4. Test Design Specification

- 1) **Approach refinement:** This section shall refine the approach described in the test plan. It must include the specific testing techniques to be used and the method of analyzing the test results.
- 2) **Automated or Manual Testing:** This section shall state whether the testing will be done manually or automatically. If it is done automatically, the automatic testing software shall be identified and briefly described.
- 3) **Test case/procedure identification.** This section shall include a brief description of each test case associated with its particular design and procedure.

##### 5. Test Case Specification

This section shall include the following information:

- 1) Test case and feature specification identifier: Test case number, feature ID, and name.
- 2) **Input specifications:** This section shall specify each input required to execute the test case. Note: explain how each input will be identified either by name, value, file etc.
- 3) **Output expectations:** This section shall specify the outcome of the feature's input execution (time response, valid or invalid etc.)

##### 6. Test Hardware and Software

This section shall include the following information:

---

- 1) **Hardware:** This section shall specify hardware configurations, size, memory space etc.
- 2) **Software:** This shall specify the software required to execute each test case. It shall include operating system, compiler, test environment and test tools if applicable.

## 7. Test Log

This section shall include the following information:

- 1) **Test Log identifier:** Number assigned to a feature to identify it.
- 2) **Execution description:** This section shall specify the execution process used for the item tested.
- 3) **Activity and event entry:** This section shall provide a brief description of the events and activities that occurred during the test.
- 4) **Procedure results:** For each execution, a record of visually observable results (for example, error messages generated, abort, and requests for operator action), and a statement of whether the test was successful or unsuccessful.

## 8. Test Summary Report

This section shall include the following information:

- 1) Test summary report identifier.
- 2) Summary of results. This section shall contain a summary of all the testing. It shall include any incidents and their resolution.
- 3) Evaluation. This section shall provide an overall evaluation of each test feature item including its limitations.

---

## DATA ITEM DESCRIPTION

---

### DID-760 – Software Test Report

DID Issue: IR

Date: 2014-03-28

---

#### PURPOSE:

To document the results of tests done on the software.

---

#### PREPARATION INSTRUCTIONS:

The test report shall document all tests performed to verify that the software will meet all the requirements specified in the applicable Software Specification.

The Test Report shall contain, the following information, as a minimum:

1. Overview.
  2. Software identification, including name and version number.
  3. Dates and duration [start and end dates, duration (the number of calendar days that the test phase spanned) and test effort (the sum of all the work days of all the test team over the test duration)].
  4. Resources
    - 4.1. People (test lead, test analyst, development lead, developer, etc.);
    - 4.2. Environment (test rigs, test PCs, test server, production server);
    - 4.3. References (references such as Requirements Specification, Functional Specification, Test Specification, etc.)
  5. Testing
    - 5.1. Methodology:

This should reflect the approach described in the Test Procedure. If it became necessary to use different techniques and methods as testing progressed, then document these changes in this section. Otherwise simply refer to the original document.
    - 5.2. Tools (names and version)
    - 5.3. Tests performed:

Describe the tests that were performed: area, component, screen, load, performance, etc. This should be as documented in the Test Procedure. If different, then mention those differences in this section.
    - 5.4. Tests not performed:

This section must identify items or areas that were not tested. The reason for not testing must be provided.
  6. Issues
-

- 6.1. Issues raised: number of bugs and change requests raised.
- 6.2. Issues closed: number of bugs and change requests closed.
- 6.3. Issues deferred to future releases: number of bugs and change requests deferred.
- 6.4. Issues outstanding: number of bugs and change requests outstanding.

For each outstanding issue, provide the following information:

- a) ID: the unique ID number of the issue
  - b) Severity (e.g. low, medium or high)
  - c) Type: bug or change request
  - d) Summary: one line summary of the issue
  - e) Workaround: state/identify any workaround that mitigates the issue; these workarounds should be included in release notes or equivalent documentation.
  - f) Plan: state what the plan is to finally resolve this issue for the final version of the flight software.
7. Recommendations.

---

## DATA ITEM DESCRIPTION

---

### DID-952 – Software User’s Manual

DID Issue: IR

Date: 2014-03-28

---

#### PURPOSE:

To provide the end user with instructions explaining how to use the software effectively.

---

#### PREPARATION INSTRUCTIONS:

The document shall include information on the following:

- 1) Overview of functions;
- 2) Installation and initialization;
- 3) Start-up and termination;
- 4) Functions and their operation;
- 5) Error and warning indications (event messages); and
- 6) Recovery Procedures.

Solicitation No. - N° de l'invitation  
9F045-200301/A  
Client Ref. No. - N° de réf. du client  
9F045-200301

Amd. No. - N° de la modif.  
File No. - N° du dossier  
MTB-0-43228

Buyer ID - Id de l'acheteur  
mtb550  
CCC No./N° CCC - FMS No./N° VME

---

**ANNEX B**

**BASIS OF PAYMENT**

**SCHEDULE OF MILESTONES**

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

<b>Milestone No.</b>	<b>Description of Deliverable</b>	<b>Firm Amount</b>	<b>Delivery Date</b>
1	Specify		
2	Specify		
3	Specify		
Etc.			

**Total Firm Price \$ \_\_\_\_\_ (All taxes applicable Extra)**

Solicitation No. - N° de l'invitation  
9F045-200301/A  
Client Ref. No. - N° de réf. du client  
9F045-200301

Amd. No. - N° de la modif.  
File No. - N° du dossier  
MTB-0-43228

Buyer ID - Id de l'acheteur  
mtb550  
CCC No./N° CCC - FMS No./N° VME

---

**ATTACHMENT 1 to PART 3 OF THE BID SOLICITATION**

**ELECTRONIC PAYMENT INSTRUMENTS**

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

- VISA Acquisition Card;
- MasterCard Acquisition Card;
- Direct Deposit (Domestic and International);
- Electronic Data Interchange (EDI);

Solicitation No. - N° de l'invitation  
9F045-200301/A  
Client Ref. No. - N° de réf. du client  
9F045-200301

Amd. No. - N° de la modif.  
File No. - N° du dossier  
MTB-0-43228

Buyer ID - Id de l'acheteur  
mtb550  
CCC No./N° CCC - FMS No./N° VME

---

**ATTACHMENT 1 to PART 4 OF THE BID SOLICITATION**

**TECHNICAL AND MANAGEMENT EVALUATION CRITERIA**

The technical and management evaluation criteria are hereby attached.

## EVALUATION CRITERIA AND SCORING

Evaluation criteria and scoring:

1. Relevance of the model(s) or concept(s) to be implemented in the application (50 points. Minimum :25)

The proposed application will incorporate physical modeling (synergy with empirical model) of factors that impact over-the-horizon radar and HF radio propagation. The inclusion of each modeling element in the table below will be evaluated by using the word ladder to assign a score for each of them. The relevance of the proposal will be evaluated by the sum of these scores.

<b>Modeling element to be included in the proposal</b>	<b>Maximum Score</b>
The 3D, time dependent model of the polar ionosphere, including electron density, flow and temperature, based on instrument data	12
Ray-tracing, ionospheric propagation	7
Sporadic E layer	6
Convection electric field and magnetic field	4
Electrons precipitation	4
High altitude atmospheric chemistry	4
Metallic ions	4
Heating and cooling effects	2
Solar-wind and solar irradiance	2
Neutral winds	2
Other relevant models	3

<b>Assessment for each modeling element in the proposal</b>	<b>Score</b>
The proposed model or concept is mature, integrates all the required factors that impact POTH, each component has been implemented and tested for a number of years and its predictions have been validated against physical data. The work required to transfer this knowledge into an operational application that can produce results in a short timeframe can be performed as proposed by the bidder.	100%
The proposed model or concept is mature, integrates most of the required factors that impact POTH, some component have been implemented and tested and	75%

produced meaningful results in a laboratory environment. The work required to transfer this knowledge into an operational application that can produce results in a short timeframe can be performed as proposed by the bidder.	
The proposed model or concept is mature, integrates few of the required factors that impact POTH, some component have been implemented and produced physically plausible results in a laboratory environment. The work required to transfer this knowledge into an operational application that can produce results in a short timeframe can be performed as proposed by the bidder.	50%
The proposed model or concept can lead to useful results but is not mature enough for implementation.	25%
The model proposed is not ready for implementation or does not lead to usable results in the field.	0

2. Expected results from the application: what kind of information will the application require and return and how will this be useful for a user. (24 points, minimum 12)

Assessment	Score
The output of the proposed application will be useful to support operations of over-the-horizon communications and/or radar. The proposal includes a User Requirement Specification document that details the expected use of the final product. The proposal includes solid estimates of the precision of the parameters that will be produced. The application will run without the need for a consultant, and increase the efficiency of operations across Canada.	100%
The output of the proposed application will be useful to support operations of over-the-horizon communications and/or radar. The proposal includes a User Requirement Specification document that details the expected use of the final product. The proposal shows credible estimates of the precision of the parameters that will be produced. The application will run with minimal need for a consultant, and increase the efficiency of operations across Canada.	75%
The output of the proposed application could be used to support operations of over-the-horizon communications and/or radar. The proposal includes a partial User Requirement Specification document that details some aspects of the expected use of the final product. The proposal includes estimates of the precision of the parameters that will be produced but does not justify them properly. The application will likely need an expert to interpret the results, and increase the efficiency of operations across Canada.	50%
The output of the proposed application could be used to support operations of over-the-horizon communications and/or radar. The proposal does not include an acceptable User Requirement Specification document. The proposal does not provide credible estimates of the precision of the parameters that will be produced. The application will likely need an expert to interpret the results, and the efficiency increase of operations using the proposed application will be low.	25%
The output of the proposed application cannot be used to support operations of over-the-horizon communications and/or radar.	0

3. Readiness of the science to be implemented: is the proposal a research project or is the science presented mature enough to produce cutting edge, operational results at the end of this contract? (16 points, minimum 4)

Assessment	Score
The proposed model is cutting edge, and has been proven to produce accurate results, validated against data in a wide range of situations and its efficiency for operational use is well documented.	100%
The proposed model has produced accurate results, validated against simulated data in a wide range of situations and its potential for operational use is well documented.	75%
The proposed model has produced credible results, validated against simulated data in a wide range of situations but has not been tested in an operational environment.	50%
The proposed model has produced physically plausible results, but have not been validated.	25%
The proposed concept has not been studied in depth and is not ready for implementation.	0

4. Implementation plan, Test plan and success criteria: How will the application be developed, implemented, tested, and validated for operational use. (20 points)

Assessment	Score
The proposal includes a solid software development plan for the application, discusses the parameters that will be produced, the expected precision in comparing to the corresponding physical measurements, how this measurement will take place and how estimating this value leads to improved operational use of over-the-horizon communication and radar.	100%
The proposal includes an acceptable software development plan for the application, discusses the parameters that will be produced, the expected precision in comparing to the corresponding physical measurements, but is not clear on how these measurements will take place or how estimating these values leads to improved operational use of over-the-horizon communication and radar.	75%
The proposal includes an acceptable software development plan for the application, discusses the parameters that will be produced, but is not clear on how these parameters can be validated against measurement or how estimating these values leads to improved operational use of over-the-horizon communication or radar.	50%
The proposal includes a weak software development plan for the application, and is not clear on how the key output parameters can be validated against measurement or how estimating these values can lead to improved operational use of over-the-horizon communication or radar.	25%
The proposal includes no software development plan for the application, the parameters to be produced do not have a physical equivalent that can be calculated using existing data.	0

5. Quality and experience of the team: Does the team include the right resources to ensure the science is correct and the code is reliable. (12 points, minimum required : 6)

Assessment	Score
The team contains the required expertise to complete this project. The members have clearly assigned responsibilities. All tasks are led by an expert in that field. Half or more of the members of the team have more than 10 years of experience in the field of ionospheric physics. The team has proven to be effective in the successful development of space plasma simulations or models in the past.	100%
The team contains the required expertise to complete this project. The members have clearly assigned responsibilities. One members of the team has more than 5 years of experience in the field of ionospheric physics. The members of the team have proven to be effective in the successful development of space plasma simulations or models in the past.	75%
The team members have clearly assigned responsibilities. A member of the team has more than 3 years of experience in the field of ionospheric physics or simulations. The members of the team have gained some experience through similar tasks in the past.	50%
The team has the right mix of talent for success, but the members do not have clearly assigned responsibilities. At least one team member has experience in the field of ionospheric physics and has worked on similar projects.	25%
The team does not have a documented track record to support their proposal of performing this type of projects.	0

6. Risk and Mitigation: Have the risks of the project been correctly assessed? Do they have a credible mitigation plan? Is the project likely to succeed? (12 points)

Assessment	Score
At least 3 Financial risks, 3 technical risks, 3 managerial risks have been identified, described, assessed for probability and impact, and have credible mitigation plans. No important risk is left out and the project is likely to succeed.	100%
At least 9 risks have been identified, described, assessed for probability and impact, and have credible mitigation plans. Some important risks are left out but the project is likely to succeed.	75%
At least 4 risks have been identified, described, assessed for probability and impact, and have credible mitigation plans. Some important risks are left out but the project is likely to succeed.	50%
Less than 4 risks have been identified, described, assessed for probability and impact, and have credible mitigation plans.	25%
Risks are not discussed	0