

RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:
Travaux publics et Services gouvernementaux
Canada
Place Bonaventure, portail Sud-Est
800, rue de La Gauchetière Ouest
7^{ème} étage
Montréal
Québec
H5A 1L6
FAX pour soumissions: (514) 496-3822

REQUEST FOR PROPOSAL
DEMANDE DE PROPOSITION

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

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

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

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

Comments - Commentaires

Title - Sujet RFP-Mars 2020 System Contribution	
Solicitation No. - N° de l'invitation 9F052-130213/B	Date 2014-07-04
Client Reference No. - N° de référence du client 9F052-13-0213	
GETS Reference No. - N° de référence de SEAG PW-\$MTB-545-12808	
File No. - N° de dossier MTB-3-36083 (545)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2014-08-01	
Time Zone Fuseau horaire Heure Avancée de l'Est HAE	
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input checked="" type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Niquette, Caroline	Buyer Id - Id de l'acheteur mtb545
Telephone No. - N° de téléphone (514) 496-3730 ()	FAX No. - N° de FAX (514) 496-3822
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: AGENCE SPATIALE CANADIENNE 6767 ROUTE DE L AEROPORT Expl. spatiale/ Space Exploration 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-Est
800, rue de La Gauchetière Ouest
7^{ème} étage
Montréal
Québec
H5A 1L6

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

This bid solicitation cancels and supersedes partially the previous bid solicitation number 9F052-130213/A, dated April 9, 2014 with a closing of May 27, 2014 at 2PM. A debriefing or feedback session will be provided upon request to bidders/offerors/suppliers who bid on the previous solicitation.

Take note that this new solicitation concerns only the project for the Category 2: Phase 0 study for the High Gain Communication System (HGCS).

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Note: Annex "C", "D" and "E" will not be part of the eventual Contracts.

PART 1 - GENERAL INFORMATION

1. Introduction

The bid solicitation is divided into seven parts plus 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: includes the certifications to be provided;
- Part 6 Financial 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 Annexes include the Statement of Work, the Basis of Payment, the Document Naming Convention, the Bid Preparation Instructions and the Point Rated Technical Criteria.

2. Summary

Project title

Phase 0 Studies on a High Gain Communication System (HGCS) for the Rover of the NASA Mars 2020 Mission

Description

Public Works and Government Services Canada (PWGSC) on behalf of Canadian Space Agency (CSA) located in St-Hubert, (Quebec) is seeking bids to conduct Phase 0 studies related to the potential contribution by the Canadian Space Agency (CSA) of a High Gain Communication System for the Rover of the NASA Mars 2020 mission.

The Canadian Space Strategy seeks to define a bold vision for Canada's future in Space, where:

- Canadians, in a global partnership, work to harness the potential of space to advance scientific and technical knowledge of our world and the Universe beyond; and
- Effective cooperation between government, industry and research institutions in Canada allows Canadians to take their place among the top creators and users of space products and services in the world, and to take full advantage of the benefits space has to offer. The Phase 0 development focuses on the identification of the technological and scientific needs and on the mission analysis. As the initial phase in payload/mission development, it provides an opportunity for exploring truly innovative ideas. These studies are thus of importance to the CSA in encouraging the growth and development of an internationally competitive Canadian space community and the advancement of new ideas.

Period of the Contract

Maximum duration of nine (9) months from contract award.

Actual Available Budget

The actual budget available under this RFP is \$235,000.00 all applicable taxes extra.

Security Requirements

No security requirements apply to this project.

Code of Conduct and Certifications - Bid

Bidders must provide a list of names, or other related information as needed, pursuant to section 01 of Standard Instructions 2003.

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Former Public Servant

For services requirements, Bidders in receipt of a pension or a lump sum payment must provide the required information as detailed in article 3 of Part 2 of the bid solicitation.

Trade agreements

This requirement is not subject to the trade agreements

Intellectual property

Ownership of Intellectual Property will vest with Canada

Canadian content

The requirement is limited to Canadian goods and/or services.

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

PART 2 - BIDDER INSTRUCTIONS

1. Standard Instructions, Clauses and Conditions

All instructions, clauses and conditions identified in the bid solicitation by number, date and title are set out in the *Standard Acquisition Clauses and Conditions Manual*(

<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>)

issued by Public Works and Government Services Canada.

Bidders who submit a bid agree to be bound by the instructions, clauses and conditions of the bid solicitation and accept the clauses and conditions of the resulting contract.

The 2003 (2014-03-01) 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: sixty (60) days

Insert: two-hundred and forty (240) days

2. Submission of Bids

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

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

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 with FPS, bidders must provide the information required below before contract award.

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:

an individual;

an individual who has incorporated;

a partnership made of former public servants; or

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 FPS in receipt of a pension, as applicable:

name of former public servant;

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:

- name of former public servant;
- conditions of the lump sum payment incentive;
- date of termination of employment;
- amount of lump sum payment;
- rate of pay on which lump sum payment is based;

-
- period of lump sum payment including start date, end date and number of weeks;
 - 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.

4. Communications- Solicitation Period

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. In that case, 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.

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.

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) calendar days** before the bid closing date. Canada will have the right to accept or reject any or all suggestions.

7. Basis for Canada's Ownership of Intellectual Property

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The Canadian Space Agency has determined that any intellectual property rights arising from the performance of the Work under the resulting Contract will belong to Canada, on the following grounds:

- The main purpose of the contract, or of the deliverables contracted for, is to augment an existing body of Canada's background information as a prerequisite to the transfer of the augmented background to the private sector, through licensing or assignment of ownership (not necessarily to the original contractor), for the purposes of commercial exploitation.

8. Maximum funding

The maximum funding available for the Contract resulting from the bid solicitation is \$ 235K CAN (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.

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PART 3 - BID PREPARATION INSTRUCTIONS

1. Bid Preparation Instructions

Canada requests that bidders provide their bid in separately bound sections as follows:

Section I: Technical and Managerial Bid and Executive Summary (1 hard copy and 2 soft copy on CD).

Section II: Financial Bid (1 hard copy and 1 soft copy on CD).

Section III: Certifications (1 hard copy).

The acceptable electronic formats are: MS Word, WordPerfect, PDF, and HTML.

If there is a discrepancy between the wording of the soft copy and the hard copy, the wording of the hard copy will have priority over the wording of the soft copy.

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

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

- (a) Use a numbering system that corresponds to the bid solicitation;
- (b) each electronic file should be named according to instructions provided in Annex C;
- (c) the cover pages of the Bid (Section I, II and III) shall include the following table duly filled:

Company name	Company address
Discipline	Project Title
Project summary: 8 lines of text	

In April 2006, Canada issued a policy directing federal departments and agencies to take the necessary steps to incorporate environmental considerations into the procurement process [Policy on Green Procurement](http://www.tpsgc-pwgsc.gc.ca/ecologisation-greening/achats-procurement/politique-policy-eng.html) (<http://www.tpsgc-pwgsc.gc.ca/ecologisation-greening/achats-procurement/politique-policy-eng.html>). To assist Canada in reaching its objectives, bidders should:

- 1) use 8.5 x 11 inch (216 mm x 279 mm) paper containing fibre certified as originating from a sustainably-managed forest and containing minimum 30% recycled content; and

- 2) use an environmentally-preferable format including black and white printing instead of colour printing, printing double sided/duplex, using staples or clips instead of cerlox, duotangs or binders.

Section I: Technical and Managerial bid

In their technical and Managerial 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 and Managerial 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.

The required outline and content of Section I, is detailed in Annex D. Should clarification be required, it is the responsibility of the Bidder to obtain this prior to submitting the bid.

Section II: Financial Bid

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

1.1.1 Price Breakdown

Bidders are requested to detail the following elements for 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. These items will be deliverable to Canada upon completion of the contract.
- (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 and cost of journeys, together with the basis of these costs. These charges must not be superior to the rates indicated in the National Joint Council Travel Directive. Refer to Appendices B, C and D of the National Joint Council (NJC) Travel Directive (<http://www.njc-cnm.gc.ca/directive/travel-voyage/index-eng.php>), and with the other provisions of the directive referring to "travellers", rather than those referring to "employees".

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- (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.

1.2 Exchange Rate Fluctuation

C3011T (2013-11-06), Exchange Rate Fluctuation

Section III: Certifications

Bidders must submit the certifications required under Part 5.

PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION

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.

1.1 Technical and Management Evaluation

1.1.1 Point Rated Technical and Management Criteria

Point Rated Technical and Management Criteria are included in Annex E-Point Rated Technical Criteria.

1.2 Financial Evaluation

1.2.1 Mandatory Financial Criteria

The maximum funding available for the Contract resulting from the bid solicitation is listed in Part 2, Section 8 (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.

1.2.2 SACC Manual Clauses

A0220T (2013-04-25), Evaluation of Price

2. Basis of Selection

2.1 Basis of Selection – Highest Rated Within Budget

To be declared responsive, a bid must:

- (a) comply with all the requirements of the bid solicitation;
- (b) meet all mandatory evaluation criteria;
- (c) obtain the required minimum score of 15 points on a scale of 20 points for the Evaluation Criterion # 1 "Merit of the Investigation" as indicated in Table 1 of Annex E; and
- (d) obtain the required minimum of 70 points for the overall Evaluation Criteria (Impact Criteria, Technical/Scientific Criteria and Management Criteria) subject to ratings. The ratings are on a scale of 100 points.

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Bids not meeting (a) or (b) or (c) or (d) will be declared non responsive.

Responsive bids will be ranked in a descending order of overall scores, the bid with the highest overall score being ranked first.

In the event that the highest score is obtained by more than one responsive bid, the responsive bid with the highest-score in the Technical/Scientific Criteria as identified in Table 1 of Annex E will be recommended for award of a contract.

PART 5 - CERTIFICATIONS

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

The certifications provided by bidders to Canada are subject to verification by Canada at all times. 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 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 with this request will also render the bid non-responsive or will constitute a default under the Contract.

1. Certifications Required Precedent to Contract Award

1.1 Integrity Provisions- Associated Information

By submitting a bid, the Bidder certifies that the Bidder and its affiliates are in compliance with the provisions as stated in Section 01 Integrity Provisions-Bid of Standard Instructions 2003. The associated Information required within the Integrity Provisions will assist Canada in confirming that the certifications are true.

1.2 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 (http://www.labour.gc.ca/eng/standards_equity/eq/emp/fcp/list/inelig.shtml) available from Employment and Social Development Canada (ESDC)-Labour's website.

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.

2. Additional Certifications Required Precedent to Contract Award

The certifications listed below should be completed and submitted with the bid but may be submitted afterwards. If any of these required certifications 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 comply with the request of the Contracting Authority and to provide the certifications within that time frame provided will render the bid non-responsive.

2.1 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.

2.1.1 SACC Manual Clauses

SACC Manual clause A3050T (2010-01-11) Canadian Content Definition.

2.2 Status and Availability of Resources

2.2.1 SACC Manual Clauses

A3005T (2010-08-16), Status and Availability of Resources

2.3 Education and Experience

2.3.1 SACC Manual Clauses

A3010T (2010-08-16), Education and Experience

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PART 6 - FINANCIAL REQUIREMENT

1. Financial Capability

1.1 SACC Manual Clauses

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.

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 and managerial bid entitled _____, dated _____.

2. Standard Clauses and Conditions

All clauses and conditions identified in the Contract by number, date and title are set out in the *Standard Acquisition Clauses and Conditions Manual*

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

2.1 General Conditions

2040 (2014-03-01), General Conditions - Research & Development, apply to and form part of the Contract.

2.2 Supplemental General Conditions

The following supplemental general conditions may apply to and form part of the Contract.

4001 (2013-01-28), Hardware Purchase, Lease and Maintenance
4002 (2010-08-16), Software Development of Modification Services
4003 (2010-08-16), Licensed Software
4004 (2013-04-25), Maintenance and Support Services for Licensed Software

2.3 SACC Manual Clauses

K3410C (2008-12-12), Canada to Own Intellectual Property Rights in Foreground Information

3. Term of Contract

3.1 Period of the Contract

The period of the Contract is from date of Contract to a maximum of nine (9) months inclusive.

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4. Authorities

4.1 Contracting Authority

The Contracting Authority for the Contract is:

Name: Caroline Niquette
 Title: Supply Specialist
 Organization: Public Works and Government Services Canada
 Acquisition Branch
 Address: Place Bonaventure, South-East Portal
 800 de la Gauchetière Street West
 Suite 7300
 Montreal, Quebec, H5A 1L6

Telephone: (514) 496-3730
 Facsimile: (514) 496-3822
 E-mail address: caroline.niquette@tpsgc-pwgsc.gc.ca

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

4.2 Project Authority *(Will be identified at contract award)*

The Project Authority for the Contract is:

Name: _____
 Title: _____
 Organization: _____
 Address: _____

Telephone: ____ - ____ - ____
 Facsimile: ____ - ____ - ____
 E-mail address: _____

The Project Authority named above is the representative of the department or agency for whom the Work is being carried out under the Contract and is responsible for all matters concerning the evaluation, recommendations and approvals of Progress claims, Schedule or Cost and Acceptance of the deliverable items of the Work under this Contract. Such Progress claim, scheduling, cost or acceptance of deliverables matters may be discussed with the Project Authority, however the Project Authority has no capacity 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.

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4.3 Technical Authority *(Will be identified in the contract)*

The Project Authority for the Contract is:

Name: _____

Title: _____

Organization: _____

Address: _____

Telephone: ____-____-_____

Facsimile: ____-____-_____

E-mail address: _____

The Technical Authority named above is the representative of the department or agency for whom the Work is being carried out under the Contract and is responsible for all recommendations to the Project Authority concerning the technical content of the Work under the Contract. Technical matters may be discussed with the Technical Authority, however the Technical authority has no capacity 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.

4.4 Contractor's Representative

Name: _____

Title: _____

Organization: _____

Address: _____

Telephone: ____-____-_____

Facsimile: ____-____-_____

E-mail address: _____

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.

6. Payment

6.1 Basis of Payment

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 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.

6.2 Limitation of Price

6.2.1 SACC Manual Clauses

C6000C (2011-05-16) Limitation of Price

6.3 Method of Payment

6.3.1 Milestone Payments- Firm Price

Canada will make milestone payments in accordance with the Schedule of Milestones detailed in Annex B and the payment provisions of the Contract, up to 90 percent (90%) of the amount claimed and approved by Canada if:

(a) an accurate and complete claim for payment using PWGSC-TPSGC 1111, Claim for Progress Payment, and any other document required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;

(b) the total amount for all milestone payments paid by Canada does not exceed 90 percent (90%) of the total amount to be paid under the Contract;

(c) 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.

6.3.2 Schedule of Milestones- Firm price

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

6.4 SACC Manual Clauses

A9117C (2007-11-30), T1204 - Direct Request by Customer Department
C0305C (2008-05-12), Cost Submission

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) the description and value of the milestone claimed as detailed in the Contract.
2. The 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 taxes payable as it was claimed and payable under the previous claims for progress payments.
3. The Contractor must prepare and certify one (1) original and two (2) copies of the claim on form PWGSC-TPSGC 1111, forward:
- (a) **the original and one (1) copy** to the Canadian Space Agency (CSA) at the address shown on page 1 of the Contract under « Invoices » (Financial Services Section) for appropriate certification by the Technical Authority identified herein after inspection and acceptance of the Work takes place;
- and,
- (b) **one (1) copy of the original** progress claim to the Contractor Authority specified herein.
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.

8. Certifications

8.1 Compliance

Compliance with the certifications and related documentation provided by the Contractor in its bid is a condition of the Contract and subject to verification by Canada during the term of the Contract. If the Contractor does not comply with any certification, provide the related documentation or if it is determined that any certification made by the Contractor in its bid is untrue, whether made knowingly or unknowingly, Canada has the right, pursuant to the default provision of the Contract, to terminate the Contract for default.

8.2 SACC Manual Clauses

A3060C (2008-05-12), Canadian Content Certification

9. Applicable Laws

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

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:
4001 (2013-01-28), Hardware Purchase, Lease and Maintenance, and
4002 (2010-08-16), Software Development or Modification Services, and
4003 (2010-08-16), Licensed Software, and
4004 (2013-04-25), Maintenance and Support Services for Licensed Software;
- (c) the general conditions 2040 (2014-03-01), General Conditions – Research & Development;
- (d) Annex A, Statement of Work ;
- (e) Annex B, Basis of Payment;
- (f) the Contractor's bid dated _____.

11. Foreign Nationals (Canadian Contractor)

11.1 SACC Manual Clauses

A2000C (2006-06-16), Foreign Nationals (Canadian Contractor)

12. Insurance

12.1 SACC Manual clauses

G1005C (2008-05-12) Insurance

13. Publication Right

1. In this section:

- (a) "copyright work" means any work in which a copyright may subsist, produced in or as a result of performing the Contract;
- (b) "publication" or "publish" do not include disclosure to an academic supervisor or appraiser, for the sole purpose of academic evaluation.

2. Canada grants to the Contractor and to the author a royalty-free non-exclusive license to publish or have published any copyright work in the course of the normal dissemination of knowledge in the subject field. The Contractor or the author must not however publish or have published any copyright work during the performance of the Contract or for a period of six months after without obtaining before the written consent of Canada.

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3. Any copyright work published by or on behalf of the Contractor or the author must acknowledge that the Work was performed under the Contract with Canada, unless specified otherwise by Canada.

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ANNEX "A"
STATEMENT OF WORK

The Statement of Work (Annex A) appended to the bid solicitation package is to be inserted at this point and forms Part of this document.

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**ANNEX B
BASIS OF PAYMENT
SCHEDULE OF MILESTONES**

Firm milestone payments shall be made to the Contractor as follows:

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

Holdback of 10% will be taken on each milestone and will be payable after acceptance of all deliverables by the Technical Authority.

TOTAL FIRM PRICE (Taxes extra, if applicable): \$ _____

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ANNEX C DOCUMENT NAMING CONVENTION

The Document Naming Convention (Annex C) appended to the bid solicitation package is to be inserted at this point and forms Part of this document.

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ANNEX D
BID PREPARATION INSTRUCTIONS

The Bid Preparation Instructions (Annex D) appended to the bid solicitation package is to be inserted at this point and forms Part of this document.

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ANNEX E
POINT RATED TECHNICAL CRITERIA

The Point Rated Technical Criteria (Annex E) appended to the bid solicitation package is to be inserted at this point and forms Part of this document.

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ANNEX A STATEMENT OF WORK

This Statement of Work (SOW) defines the work to be performed in terms of document deliverables. It also defines the manner in which the work is to be performed and controlled. The following topics are covered:

- Work Definition
- Deliverables
- Schedule Requirements.

A.1 INTRODUCTION

This section provides the Bidder with the overall scope of the HGAS Mars 2020 Phase 0 System Study Request for Proposal (RFP) related to the potential contribution by the Canadian Space Agency (CSA) of the HGAS system for the NASA Mars 2020 mission rover.

The rover HGAS shall have the performances as described in Appendix 1.

A.1.1 Responsibilities

The CSA is the customer for this Phase 0 study. As such, the Agency has the technical authority on all matters concerning this study.

The Contractor shall perform the tasks as outlined in this SOW and shall deliver the end items defined by this SOW.

A.1.2 Convention

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

- | | |
|----------|---|
| 'must' | indicates a mandatory requirement or activity |
| '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. |

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A.2 DOCUMENTS

A.2.1 Applicable documents (AD)

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-1, AD-3, AD-4 and AD-6 can be obtained from the following File Transfer Protocol (FTP) site: <ftp://ftp.asc-csa.gc.ca/users/TRP/pub/TRRA/>. AD-5 can be obtained from the following File Transfer Protocol (FTP) site: <ftp://ftp.asc-csa.gc.ca/users/TRP/pub/TRM/>.

Table A-1: - Applicable Documents

AD No.	Document Number	Document Title	Rev. No.	Date
AD-1	CSA-ST-GDL-0001	CSA Technology Readiness Levels and Assessment Guidelines	Rev A	Feb 2014
AD-2	ESTEC TEC-SHS/5574/MG/ap	Technology Readiness Levels Handbook for Space Applications	Iss. 1 / Rev. 6	March 2009
AD-3	CSA-ST-FORM-0001	Technology Readiness and Risk Assessment Worksheet: TRA Assessment Worksheet.pdf	E	July 29, 2013
AD-4	CSA-ST-RPT-0002	Technology Readiness and Risk Assessment Rollup: TRA_Assessment_Tool.xlsm	G	March, 2014
AD-5	CSA-ST-RPT-0003	Roadmap Framework: ExCore Concept Study TechnologyRoadmappingWorkbook.xlsx	A	Sept 2012
AD-6	CSA-ST-FORM-0003	Critical Technology Element (CTE) Identification Criteria Worksheet	A	March 2014

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A.2.2 Reference documents (RD)

The following documents provide additional information or guidelines that either may clarify the contents or are pertinent to the history of this document.

Table A-2: - Reference Documents

RD No.	Document Number	Document Title	Rev. No.	Date
RD-1.	JPL D-80637	Mars Exploration Program Mars 2020 Landed Science Payload Proposal Information Package http://soma.larc.nasa.gov/mars2020/pdf_files/Mars2020ProposallInformationPackage130918Signatures.pdf		Sept 18, 2013
RD-2.		The Global Exploration Strategy: The Framework for Coordination ftp://ftp.asc-csa.gc.ca/users/TRP/pub/phase0/		May 2007
RD-3.		Science and Technology Strategy http://www.ic.gc.ca/epic/site/ic1.nsf/en/h_00231e.html		
RD-4.	CSA-SE-STD-0001	CSA Technical Reviews Standard ftp://ftp.asc-csa.gc.ca/users/TRP/pub/phase0/	A	November 7, 2008
RD-5.		Mars 2020 Acquisition Website http://soma.larc.nasa.gov/mars2020		
RD-6.	JPL D-79380	High Gain Antennae System Equipment Specification Document Note: Portions of this document used to create the preliminary specs within this document.	Preliminary	May 7, 2013
RD-7.	NNH13ZDA018O	Announcement of Opportunity Mars 2020 Investigations http://nspires.nasaprs.com/external/viewrepositorydocument/cmdocumentid=387051/solicitationId=%7BC49E4810-6DE9-9509-E896-EBC006101A9E%7D/viewSolicitationDocument=1/Mars%202020%20AO%20amend2.pdf		Oct. 21, 2013
RD-8	JPL D-79809	Mars2020 Environmental Requirements Document	Preliminary	September 2013
RD-9	JPL D-79821	Mars 2020 Preliminary Instrument Standard Electrical and Software Interface Specification	I.R.	September 2013

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A.3 LIST OF ACRONYMS

ACA	After Contract Award
AD	Applicable Documents
AI	Action Item
AIL	Action Item Log
AIT	Assembly, Integration and Testing
AM	Amplitude Modulation
AO	Announcement of Opportunity
AR	Acceptance Review
Assy	Assembly
ATN	Attenuator
BIP	Background Intellectual Property
CAD	Canadian Dollar
CDR	Critical Design Review
CDRL	Contract Deliverables Requirements List
Com	Common
CSA	Canadian Space Agency
CTE	Critical Technology Item
CW	Continuous Wave
DHMR	Dry Heat Microbial Reduction
DID	Data Item Description
DOF	Degree of Freedom
DR	Decommissioning Review
DTE	Direct to Earth
EM	Engineering Model
EQM	Engineering Qualification Model
Ex	Exciter
FIP	Foreground Intellectual Property
FY	Fiscal Year
FM	Flight Model
HGA	High Gain Antennae
HGAG	High Gain Antennae Gimbal
HGAS	High Gain Antennae System
HGCS	High Gain Communication System
HPA	High Power Amplifier
IP	Intellectual Property
IPMTT	Intellectual Property Management and Technology Transfer
ITAR	International Traffic in Arms Regulations
JPL	Jet Propulsion Laboratory
LPF	Low Pass Filter
MC	Mandatory Criteria
MCR	Mission Concept Review

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ML	Maturity Level
MSL	Mars Science Lander
MOAs	Memorandums of Agreement
MOUs	Memorandums of Understanding
MRR	Mission Requirements Review
NDA	Non-Disclosure Agreement
OPI	Office of Prime Interest
ORR	Operations Readiness Review
PA	Project Authority
PDR	Preliminary Design Review
PFM	Proto-Flight Model
PM	Phase Modulation
Pol	Polarizer
PWGSC	Public Works and Government Services Canada
R&D	Research and Development
RAM	Responsibility Allocation Matrix
RD	Reference Document
RF	Radio Frequency
RFP	Request for Proposal
RHCP	Right Hand Circularly Polarized
RID	Review Item Discrepancy
RLGA	Rover Low Gain Antennae
RMS	Robotic Manipulator System
Rx	Receive
ROM	Rough Order of Magnitude
SA	Scientific Authority
SDST	Small Deep Space Transponder
SMA	Sub miniature of type A
SOW	Statement of Work
SRR	System Requirements Review
SRS	Shock Response Spectrum
SSPA	Solid State Power Amplifier
TA	Technical Authority
TBC	To Be Confirmed
TBD	To Be Defined
TBR	To Be Refined
TPM	Technical Performance Measure
TRM	Technology Road Map
TRL	Technology Readiness Level
TRRATx	Technology Readiness and Risk Assessment Transmit
TWTA	Travelling Wave Tube Amplifier
UHF	Ultra High Frequency
VSWR	Voltage Standing Wave Ratio
W	Watt

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WBS	Work Breakdown Structure
WP	Work Package
WTS	Waveguide Transfer Switch

A.4 WORK DEFINITION

The Contractor shall structure his Bid along the lines presented in this section.

The work to be performed by the Contractor under this Phase 0 study is divided into four major Work Packages (WPs). Each WP has one or more associated major tasks. Figure A-4 describes the Work Breakdown Structure (WBS):

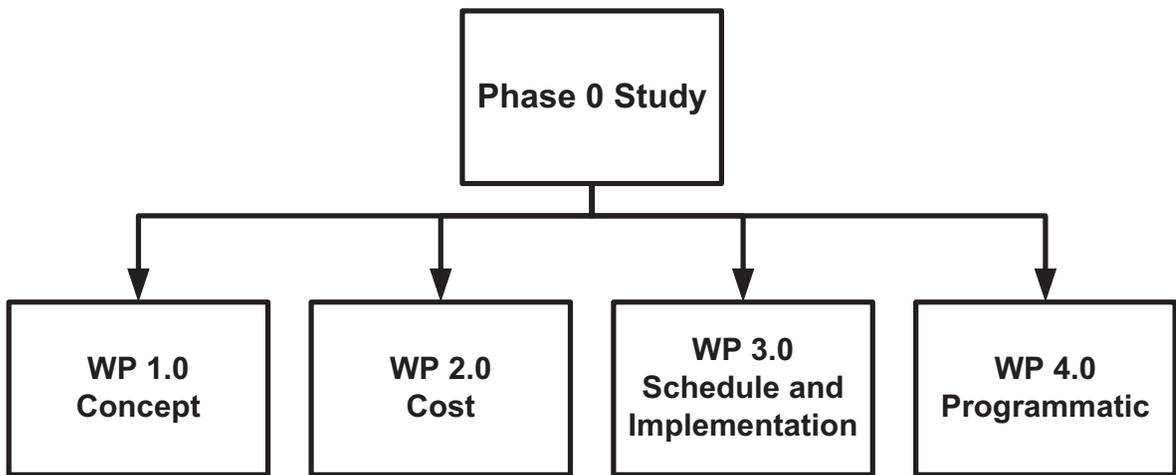


Figure A1: Work Breakdown Structure (Top Level)

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A.5 Scope

The purpose of this Phase 0 study is to prepare for potential Canadian contribution for NASA Mars mission currently planned for launch in mid 2020. While The CSA could potentially contribute a High Gain Antenna System (and other related microwave components) for the rover. the phase 0 study considered under this RFP shall address a technology contribution related only to the development of the HGAS (and other related microwave components).

A.5.1 Concept

The Concept is subdivided into the following elements:

- Overall concept
- Conceptual design
- Interface definition
- Feasibility
- Compatibility with the targeted mission
- User/Mission requirements
- Preliminary system requirements

A.5.1.1 Overall concept

The Bid shall characterize the intended contribution to the mission that his concept targets. The Contractor shall develop and describe the overall approach at system level with an emphasis on the degree of innovation and any critical aspect. As much as possible, existing data from currently active programs, along with the extensive information available in [RD-5] should be used as a reference.

A.5.1.2 Conceptual design

The conceptual design shall further describe the approach through a preliminary layout, a functional block diagram, the identification of related subsystems, and subsystem trade-offs. A preliminary Concept of Operation shall be described, including aspects such as potential system operator, support staff, support equipment should also be identified.

A.5.1.3 Interface definition

The Contractor shall define and describe the various interfaces of the rover system concept to other elements of the mission.

A.5.1.4 Feasibility

The Contractor shall present a feasibility study that includes an assessment of the impact of the various operating constraints (such as, but not limited to, physical, operational, environmental). The contractor should also identify the requirements that drive either cost or schedule.

A.5.1.5 Compatibility with Target Mission

The Contractor shall assess and describe the compatibility with the targeted mission by showing how the concept contributes to mission objectives and requirements.

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A.5.1.6 User/Mission Requirements

The Contractor shall provide requirements of the proposed rover system in terms of needs, key system parameters, expected performance and reliability. The Contractor shall also present system Technical Performance Measures (TPMs) defining the functional requirements (including ground system requirements and operational requirements description and substantiation), the performance and resource budgets.

A.5.1.7 Preliminary System Requirements

Starting with the User/Mission Requirements, the Contractor shall derive preliminary system requirements for all the subsystems of the rover system. It is expected that the contractor will also provide a list of relevant information required to help refine the system requirements that are either incomplete or missing from the data package available.

A.5.2 Cost

The cost is subdivided into the following elements:

- Rough Order of Magnitude (ROM) cost
- Estimate of Canadian content

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A.5.2.1 Rough Order of Magnitude of Cost

The Contractor shall provide cost estimates as per the table below A-3, for all phases leading to the development, implementation, operation and disposition of the unit or device resulting from his concept.

Table A-3: - ROM COST

		Prior to Mission	Phase A	Phase B	Phase C	Phase D	Phase E	Phase F
Labour	Management							
	Technology Development							
	Design							
	Documentation							
	Reviews							
	Manufacturing							
	Assembly							
	Testing							
	Product Assurance							
	Science Team Support (if applicable)							
	Total Labour							
Non-Labour	Hardware / Software Procurement							
	Science Team Support (if applicable)							
	Tools, equipment & facilities							
	T&L							
	Overhead							
	Total Non-Labour							
Risk	Risk Contingency							
Total								

Total all Phases:

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A.5.2.2 *Estimate of Canadian Content*

The Contractor shall provide an estimate of the anticipated percentage of Canadian content relative to the overall cost presented in Table A-5.2, what options could be undertaken to maximize the Canadian content, and their corresponding impacts and benefits.

A.5.3 *Schedule and Implementation*

A.5.3.1 *Schedule*

The Contractor shall suggest a schedule relative to the overall life cycle of the mission. The timeline shall include key milestones such as Preliminary Design Review (PDR), Critical Design Review (CDR), and readiness for integration onto the mission.

A.5.3.2 *Collaboration*

The Contractor shall analyse the possible mechanisms and difficulties related to the potential collaborations among the parties (national and international), and shall address, among other things, the type of agreements required (inter agency, subcontract, etc.).

A.5.3.3 *Roadmap*

The Contractor must perform a Technology Readiness and Risk Assessment (TRRA) of key technologies foreseen to be used in the proposed system, in accordance with the requirements CDRL 0014, while using AD-3, AD-4, and must describe the performance characteristics of the technology with respect to the needs of the targeted mission for the given target environment.

The Contractor must provide a Technology Development Plan, a.k.a. Technology Roadmap (TRM), including the required technology developments to meet targeted mission needs, and a plan and timeline to reach TRL 6 and 8. The Technology Roadmap must be provided as well in the format of CDRL 0015.

A.5.3.4 *Development and Manufacturing Approach*

The Contractor shall provide an overview of the development approach, specifying subsystem providers, key subcontractors, and the general strategy best suited for this approach. The Contractor shall also list the major tasks required in the development and manufacturing cycles.

A.5.4 *Programmatic*

A.5.4.1 *Mission Risk Assessment*

The Contractor shall provide a technical, schedule, cost and programmatic risks assessment. This assessment shall also consider access to information issues [International Traffic in Arms Regulations (ITAR) and others].

A.5.4.2 *Business Potential*

The Contractor shall provide information on the minimum business, in the field, required to maintain the necessary expertise in the long run.

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A.5.4.3 Canadian Capabilities Development

The Contractor shall provide an overview of its strategy to develop and maintain Canadian capabilities. If the overall approach of the Contractor implies technology transfer and partnership with foreign entities to develop the Canadian capabilities, the Contractor shall specify teaming arrangements, Intellectual Property (IP) ownership issues, royalties, etc., as well as opportunities that this partnership would open.

A.5.4.4 Intellectual Property Management

The Contractor shall identify the Background Intellectual Property (BIP), the IP that will be generated, and the owners of these BIP and IP and how it will be managed and coordinated among the various collaborators and entities involved.

A.5.4.5 Preliminary Commercialisation Plan

The Contractor shall provide a preliminary commercialization plan to support further Canadian positioning beyond the scope of the proposed CSA program. This shall include an analysis of who the competitors are (national and international) for the proposed subsystem/technology/concept and for the overall mission. It shall identify who are the stakeholders and how Canada and/or the bidder are positioned.

This shall also include potential spin-offs (space and non-space).

A.6 PHASE 0 PROJECT SCHEDULE

The Phase 0 Project duration may range up to 9 months.

The project schedule prepared by the Bidder shall provide a graphical representation of predicted tasks, milestones, dependencies, resource requirements, task duration, and deadlines. The project's master schedule shall inter-relate all tasks on a common time scale and shall be in the form of a Gantt chart. The project schedule shall be detailed enough to show each WBS task to be performed, the name of the person responsible for completing the task, the start and end date of each task, the deliverables and the expected duration of the task. An example of WBS is supplied in Annex D Figure 5.2. The Bidder must provide all the WBS.

Table A-6 shows this RFP (Phase 0 - shaded) within the context of the entire mission life cycle. Only major milestone reviews are shown. See RD-4 "CSA Technical Reviews Standard" in Table A-1 for a full description of all the possible reviews, which may vary depending on the nature of the mission.

Table A-6: - Context for Phase 0 Studies

Project Phases	Description	Milestones	Mechanism
-	Science / Technology / Application Development Programs	Produce Science / Technology / Applications required for future missions	Various RFPs
0	Concept (Opportunity assessment and feasibility studies)	Identification and characterization of the intended mission/payload Mission Concept Review (MCR) Mission Requirements Review (MRR)	This RFP
A	Concept Development and Option Selection (Trade studies to select baseline mission / payload and science / mission floor) / System Definition	System Requirements Review (SRR)	Phase A RFP
B	Preliminary Design	Preliminary Design Review (PDR)	Usually Mission RFP by Phase (B/C + D)
C	Detailed Design	Critical Design Review (CDR)	
D	Manufacturing and Assembly, Integration and Testing (AIT)	Acceptance Review (AR) / Operations Readiness Review (ORR) Others	
E	Operations	Decommissioning Review (DR)	Various RFPs (if required)
F	Disposal	-	Various RFPs

A.7 CONTRACT MEETINGS AND DELIVERABLES

This section reviews and describes the contract meetings and deliverables.

A.7.1 Contract Meetings

The Contractor shall organize the meetings listed in Table A-7.1.

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Table A-7.1: - Meeting Schedule

Meeting	Date	Location
Kick-off Meeting	2 weeks After Contract Award (ACA)	CSA's premises
Quarterly Review Meeting	Every 3 months	WEBEX
Final Review Meeting	End of contract (9 months ACA at the latest)	CSA's premises

All key participants under the contract shall attend all the meetings.

The Kick-off and Quarterly Review Meetings may be held via teleconference instead of at the contractor premises.

One Quarterly Review Meeting shall cover elements typically found in a Mission Concept Review (MCR) and another Quarterly Review Meeting (or Final Review Meeting) shall cover a typical content of a Mission Requirement Review (MRR) and a System Requirement Review (SRR). See RD-4 for a description of the MCR, MRR and SRR.

The specific intent of the Final Review Meeting will be to discuss in detail the results obtained and the proposed follow-on activities. This meeting is intended to provide an opportunity for the Contractor, the Project Authority (PA), the Technical Authority (TA), and other invited attendees to review and discuss the project. Canada reserves the right to invite additional knowledgeable people [Public Servants or others under Non-Disclosure Agreement (NDA)] to this meeting. Key Contractor personnel involved in the work under review shall attend the meetings. The exact date and time of the review meeting will be mutually agreed to by the PA, the TA, and the Contractor.

The Contractor may request Ad-hoc Meetings with CSA whenever required to resolve unforeseen and urgent issues. The CSA may also request such Ad-hoc Meetings with the Contractor. The selection of participants will depend on the nature of the issue.

A.7.2 Documentation, Reporting and Other Deliverables

The Contractor shall submit the documentation as defined and at the date stipulated in the Contract Data Requirements List (CDRL), Table A-7.2, to the PA. All diagrams shall be clearly drawn and labelled.

In addition to any paper copy of all project documentation and reports, the Contractor should also provide the PA with an electronic copy in a format acceptable to the CSA. Both the PDF and original version, e.g. Microsoft Word or Powerpoint, shall be provided to CSA. Original version of any figures or tables part of these documents shall also be provided to CSA, e.g. Visio file of a figure created in Microsoft Visio. Instructions on how to name electronic documents are provided in Annex C.

The cover page of each document shall include the following text:

This document is a deliverable under contract no. _____. It contains information proprietary to the Canadian Space Agency and the information contained herein is not to be used for any purpose other than to accomplish CSA programs and projects whether they are completely Canadian initiatives or in cooperation with International Partners. The contents of this document are not to be disclosed or

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transferred in whole or in part, to any third party without the prior written consent of the CSA.

Then, on all internal pages each document shall include the following text:

Use, duplication or disclosure of this document or any of the information contained herein is subject to the Proprietary Notice at the front of this document.

The Contractor shall not publish or have published any information contained within this, without the prior written approval of the CSA.

All documents shall identify the organisation's name, contract number and title and document name and shall be structured in accordance with the Data Item Description (DID) referenced in the CDRL.

Table A-7.2: - CDRL

CDRL #	Deliverable	Due Date	Version	DID No.
1	Meeting Agendas	Meeting – 1 week	Final	0001
2	Kick-off Meeting Presentation	Meeting – 1 week	Final	0002
3	Background Intellectual Property (FIP) Disclosure	End of contract – 2 weeks	Final	0007
4	Quarterly Review Meeting Presentation	Meeting – 1 week	Final	0003
5	Final Review Meeting Presentation	Meeting – 1 week	Final	0004
6	Meeting Minutes	Meeting + 1 week	Final	0005
7	Action Items Log (AIL)	Meeting + 1 week	Final	0013
8	Quarterly Progress Reports	Quarterly	Final	0006
9	Technology Readiness and Risk Assessment worksheets and rollup	1 months after contract award	Final	0014
10	Technology Roadmap Worksheet	1 months after contract award	Final	0015
11	ROM Cost Estimate	2 months after contract award End of contract – 2 weeks	Initial Final	0017
12	Project Schedule	2 months after contract award End of contract – 2 weeks	Initial Final	0018
13	Technical Report	Draft copy at each milestone End of contract – 2 weeks	Final	0016
14	Final Report	End of contract – 2 weeks	Final	0009
15	Foreground Intellectual Property (FIP) Disclosure	End of contract – 2 weeks	Final	0008
16	Executive Report	End of contract – 2 weeks	Final	0010

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CDRL #	Deliverable	Due Date	Version	DID No.
1	Meeting Agendas	Meeting – 1 week	Final	0001
17	Final Data Package	End of contract – 2 weeks End of contract	Draft Final	0011
18	Contractor Performance Evaluation	End of contract – 2 weeks	Final	0012
19	Preliminary Planetary Protection Plan	Draft copy at each milestone End of contract – 2 weeks	Final	0019

A.7.3 Data Items Description (DIDs)

DID-0001 - MEETING AGENDA

DID-0002 - KICK-OFF MEETING PRESENTATION

DID-0003 - QUARTERLY REVIEW MEETING PRESENTATION

DID-0004 - FINAL REVIEW MEETING PRESENTATION

DID-0005 - MEETING MINUTES

DID-0006 - QUATERLY PROGRESS REPORT

DID-0007 - BIP DISCLOSURE

DID-0008 - FIP DISCLOSURE

DID-0009 - FINAL REPORT

DID-0010 - EXECUTIVE REPORT

DID-0011 - FINAL DATA PACKAGE

DID-0012 - CONTRACTOR PERFORMANCE EVALUATION

DID-0013 - ACTION ITEMS LOG

DID-0014 – TECHNOLOGY READINESS WITH TRRA WORKSHEETS AND ROLLUP

DID-0015 – TECHNOLOGY ROADMAP WORKSHEET

DID-0016 – TECHNICAL/SCIENTIFIC REPORT

DID-0017 – ROM COST ESTIMATE

DID-0018 – PHASES A/B/C/D/E PROJECT SCHEDULE ESTIMATE

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DID-0019 - PRELIMINARY PLANETARY PROTECTION PLAN

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DID-0001 – MEETING AGENDA

PURPOSE:

To specify 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; and
- h) Set or confirm dates of future meetings.

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DID-0002 – KICK-OFF MEETING PRESENTATION

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 major assumptions for the Phase 0
2. Review of contract deliverables;
3. Work requirements, WBS status and schedule;
4. FIP and BIP;
5. Licensing issues if any;
6. Project's funding and expected cash-flow;
7. Presentation's to include the required copyrights and IP disclosure;
8. Other items as deemed appropriate.

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DID-0003 – QUARTERLY REVIEW MEETING PRESENTATION

PURPOSE:

To present the results of the work done to date in the contract, and in particular since the previous meeting. One quarterly review shall cover elements typically found in a Mission Concept Review (MCR) and another quarterly review (or final review) shall cover a typical content of a Mission Requirement Review (MRR) and a System Requirement Review (SRR).

PREPARATION INSTRUCTIONS:

The Quarterly Review Meeting Presentation shall contain the following information, as a minimum:

1. Review current status of the work, discuss orientation and preliminary results;
2. Elements of a Mission Concept Review, a Mission Requirement Review or a System Requirement Review;
3. Technical and programmatic issues if any;
4. Review of contract deliverables;
5. Work requirements, WBS status and schedule;
6. FIP and BIP;
7. Licensing issues if any;
8. Project's funding and expected cash-flow;
9. Other items as deemed appropriate;
10. Presentation's slides to include the required copyrights and intellectual property disclosure.

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DID-0004 – FINAL REVIEW MEETING PRESENTATION

PURPOSE:

To present the overall results of the work done in the project including the elements of a Mission Requirement Review and a System Requirement Review, if not already covered in one of the quarterly reviews.

PREPARATION INSTRUCTIONS:

The Final Review Meeting Presentation shall contain the following information, as a minimum:

1. Detailed presentation of the work conducted (presentation of the content of the technical report, concept, design, interface, feasibility, etc.)
2. Elements of a Mission Requirement Review and a System Requirement Review (if not covered in a quarterly review);
3. Technical and programmatic issues if any;
4. Contract deliverables;
5. FIP and BIP;
6. Licensing issues if any;
7. Final Funding and cash-flow;
8. Discuss project management issues;
9. Other items as deemed appropriate;
10. Presentation's slides to include the required copyrights and intellectual property disclosure.

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DID-0005 – MEETING MINUTES

PURPOSE:

To provide a record of decisions and agreements reached during reviews/meetings.

PREPARATION INSTRUCTIONS:

The Meeting Minutes shall contain the following information, as a minimum:

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 the 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, numbered per the AIL (see CDRL No. 7, and DID-0013);
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."

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DID-0006 – QUARTERLY PROGRESS REPORT

PURPOSE:

To record the status of the work in progress during the previous calendar month. The Progress Report is used by the Government to assess the Contractor's progress in performance of the work.

PREPARATION INSTRUCTIONS:

The Monthly Progress Report shall list each deliverable and shall contain the following information, as a minimum:

1. Current % of completion;
2. Planned and actual completion date;
3. Brief summary of the work performed in the current month;
4. The work planned for the following month;
5. A highlight of problems, if any, and the proposed corrective approach;
6. A table showing current financial status (cash flow planned vs. actual);
7. Any other relevant information deemed necessary.

Based on the above, the Quarterly Progress Report should not exceed 3 pages.

This report is required even in the case of a fixed firm price contract.

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DID-0007 – BIP DISCLOSURE

PURPOSE:

To list all BIP resulting from the project, to be reviewed at the Kick-off Meeting.

PREPARATION INSTRUCTIONS:

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

1. List and descriptions of all BIP required by CSA for use of the FIP;

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Instructions to the Contractor

BIP

- If the Contractor intends to use Background Intellectual Property (BIP) to develop the FIP, the Contractor must complete Table 1 (Disclosure of BIP brought to the project by the Contractor) and forward it to the CSA Project Manager before the beginning of the Contract if any.
- At the end of the Contract, the Contractor must review and update the BIP disclosure (Table 1) when applicable before closing of the Contract. Only the BIP elements that were used to develop the FIP elements should be listed.

General Instructions for BIP and FIP tables

- Tables must be structured according to the CSA IP form provided.
- Each IP element must have a unique ID # in order to easily link the elements of the different tables.
- Titles of IP elements must be descriptive enough for project stakeholders to get a general idea of the nature of the IP.
- Numbers and complete titles of reference documents must be included.

Instructions to the Project Manager

- The CSA Project Manager is responsible to review and approve Table 1 (Disclosure of BIP brought to the project by the Contractor) upon receipt.

He/she also has to approve the Contractor Disclosure of Intellectual Property before closing the Contract and confirm his approval of the Disclosure by signing it below.

- He/she will then forward the Disclosure to the Intellectual Property Management and Technology Transfer (IPMTT) office: PITT-IPTT@asc-csa.gc.ca
- He/she can consult with the IPMTT office when needed.

<i>For the Contractor</i>	
_____	_____
<i>Signature</i>	<i>Date</i>
<i>For the CSA Project Manager</i>	
_____	_____
<i>Signature</i>	<i>Date</i>

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CONTRACTOR DISCLOSURE OF INTELLECTUAL PROPERTY

Table 1. Disclosure of Background Intellectual Property (BIP) brought to the project by the Contractor

1	2	3	4	5	6	7	8	9
BIP ID#	Project Element	Title of the BIP	Type of IP	Type of access to the BIP required to use/improve the FIP	Description of the BIP	Reference documentation	Origin of the BIP	Owner of the BIP
<i>Provide ID # specific to each BIP element brought to the project e.g. BIP-CON-99 where CON is the contract acronym</i>	<i>Describe the system or sub system in which BIP is integrated (e.g. camera, control unit, etc)</i>	<i>Use a title that is descriptive of the BIP element integrated to the work</i>	<i>Is the BIP in the form of an invention, trade secret, copyright, design?</i>	<i>Describe how the BIP will be available for Canada to use the FIP(e.g. BIP information will be incorporated in deliverable documents, software will be in object code, etc)</i>	<i>Describe briefly the nature of the BIP(e.g. mechanical design, algorithm, software, method, etc)</i>	<i>Provide the number and fill title of the reference documents where the BIP is fully described, The reference document must be available to Canada. Provide patent# for Canada if BIP is patented.</i>	<i>Describe circumstances of the creation of the BIP Was it developed from internal research or through a contract with Canada? If so, provide contract number.</i>	<i>Name the organization that owns the BIP. Provide the name of the subcontractor if not owned by the prime contractor.</i>

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DID-0008 – FIP DISCLOSURE

PURPOSE:

To list all FIP resulting from the project, to be reviewed at the Final Review Meeting.

PREPARATION INSTRUCTIONS:

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

1. List and descriptions of all BIP required by CSA for use of the FIP; and
2. List and description of all FIP resulting from project work.

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CONTRACTOR DISCLOSURE OF INTELLECTUAL PROPERTY

1. Contractor Legal Name:
2. Project Title supported by the Contract:
3. CSA Project Manager of the Contract:
4. Contract #:
5. Date of the disclosure:
6. Will there be Contractor's Background Intellectual Property brought to the project:
 - Yes_ Complete Table 1 attached (Disclosure of Background Intellectual Property)
 - No
7. For Canada's owned IP, are there any IP elements that, to your opinion, would benefit from being patented by Canada?
 - Not applicable, FIP resides with the Contractor
 - Yes_ Complete Table 3 attached (Canada's Owned Additional Information)
 - No

Definitions
<u>Intellectual Property (IP)</u> : means any information or knowledge of an industrial, scientific, technical, commercial artistic or otherwise creative nature relating to the work recorded in any form or medium; this includes patents, copyright, industrial design, integrated circuit topography, patterns, samples, know-how, prototypes, reports, plans, drawings, Software, etc.
<u>Background Intellectual Property (BIP)</u> : IP that is incorporated into the Work or necessary for the performance of the Work and that is proprietary to or the confidential information of the Contractor, its subcontractors or any other third party.
<u>Foreground Intellectual Property (FIP)</u> : IP that is first conceived, developed, produced or reduced to practice as part of the Work under the Contract.

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Instructions to the Contractor

Identification

- The Contractor must respond to the 7 questions at the top of this page when Foreground Intellectual Property (FIP) is created under the Contract with the CSA.

BIP

- If the Contractor intends to use Background Intellectual Property (BIP) to develop the FIP, the Contractor must complete Table 1 (Disclosure of BIP brought to the project by the Contractor) and forward it to the CSA Project Manager before the beginning of the Contract if any.
- At the end of the Contract, the Contractor must review and update the BIP disclosure (Table 1) when applicable before closing of the Contract. Only the BIP elements that were used to develop the FIP elements should be listed.

FIP

- At the end of the Contract, the Contractor must complete Table 2 (Disclosure of the FIP developed under the Contract).
- If Canada is the owner of the FIP and identifies some FIP elements that would benefit from being patented by Canada, the Contractor must also complete Table 3 (Canada's Owned FIP Additional Information).
- The Contractor must sign below and deliver the completed Contractor Disclosure of Intellectual Property to the CSA Project Manager of the Contract for his/her approval before closing the Contract.

General Instructions for BIP and FIP tables

- Tables must be structured according to the CSA IP form provided.
- Each IP element must have a unique ID # in order to easily link the elements of the different tables.
- Titles of IP elements must be descriptive enough for project stakeholders to get a general idea of the nature of the IP.
- Numbers and complete titles of reference documents must be included.

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Instructions to the Project Manager

- The CSA Project Manager is responsible to review and approve Table 1 (Disclosure of BIP brought to the project by the Contractor) upon receipt.

He/she also has to approve the Contractor Disclosure of Intellectual Property before closing the Contract and confirm his approval of the Disclosure by signing it below.

- He/she will then forward the Disclosure to the Intellectual Property Management and Technology Transfer (IPMTT) office: PITT-IPTT@asc-csa.gc.ca
- He/she can consult with the IPMTT office when needed.

<p><i>For the Contractor</i></p> <hr/> <p><i>Signature</i></p>	<hr/> <p><i>Date</i></p>
<p><i>For the CSA Project Manager</i></p> <hr/> <p><i>Signature</i></p>	<hr/> <p><i>Date</i></p>

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CONTRACTOR DISCLOSURE OF INTELLECTUAL PROPERTY

Table 2. Disclosure of the Foreground Intellectual Property (FIP) developed under the Contract

1	2	3	4	5	6	7	8	9
FIP ID #	Project Element	Title of FIP	Type of FIP	Description of the FIP	Reference documentation	BIP used to generate the FIP	Owner of the FIP	Patentability
<p><i>Enter an ID # specific to each FIP element</i></p> <p><i>e.g. FIP-CON-99</i></p> <p><i>where CON is the contract acronym</i></p>	<p><i>Describe the system or sub-system for which the FIP element was developed (e.g. a camera, ground control, etc)</i></p>	<p><i>Use a title that is descriptive of the FIP element.</i></p>	<p><i>Specify the form of the FIP e.g. invention, trade secret, copyright, industrial design</i></p>	<p><i>Specify the nature of the FIP e.g. software, design, algorithm, etc?</i></p>	<p><i>Provide the full title and number of the reference document where the FIP is fully described. The reference document must be available to Canada</i></p>	<p><i>BIP referenced in table 1 e.g. BIP-CON-2, 15</i></p>	<p><i>Specify which organization owns the FIP e.g. Contractor, Canada* or Subcontractor.</i></p> <p><i>Provide the name of the subcontractor if not owned by the prime contractor.</i></p> <p><i>*If Canada is the owner of the FIP, complete Table 3 below</i></p> <p><i>Provide reference to contract clauses that support FIP ownership.</i></p> <p><i>Provide reference to WPDs under which the technical work has been performed.</i></p>	<p><i>In the case where the IP is owned by Canada, indicate with an "X", any IP elements described is patentable and complete Table 3 only for this IP.</i></p>

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DID— 0009 FINAL REPORT

PURPOSE:

The purpose of the final report is to record formally the history of the Project, its achievements, financial, material and human resources expenditure, problems encountered solutions implemented and recommendations for future Canadian Missions.

PREPARATION INSTRUCTIONS:

The final report will encompass all the work done in the Project. It should be a comprehensive summary of the project with the emphasis on the problems encountered, solutions implemented, successes encountered and lessons learned. The final report must be a standalone document and must contain as a minimum the following information:

- a. Project Executive Summary.
- b. Comparison of system performance results against system requirements and objectives.
- c. Comparison of actual versus planned schedules and milestones.
- d. Comparison of Proposal financial value and completed project value with explanation of variations for cost reimbursable items.
- e. Comparison of risks anticipated versus actual experience.
- f. Problems encountered and solutions implemented.
- g. Design summary
- h. Tests and tests results summary
- i. Manufacturing summary
- j. Final CDRL list including document number and revision.
- k. Summary related to the retention of highly specialized scientists, engineers and workers in Canada.
- l. Technical innovation achieved to maintain Canada's leadership in the development of the next generation space robotics to support on orbit servicing Missions.
- m. Recommendations for future development.

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DID-00010 – EXECUTIVE REPORT

PURPOSE:

To fully describe the entire project for dissemination in the public domain.

PREPARATION INSTRUCTIONS:

The Executive Report will be placed in the public domain (e.g. CSA's library, publication and/or website). The report should not exceed ten (10) pages. The Contractor shall submit an electronic copy plus one (1) hard copy of the Executive Report in the Final Data Package.

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

1. Introduction (~2 pages);
Presentation of overall concept and main objectives. Illustrative picture(s) should be included.
2. Concept Overview (2-3 pages);
Discussion on main user/mission requirements, feasibility and compatibility with target mission.
3. Roadmap, Cost and Implementation (2-3 pages);
Schedule, Roadmap with TRL, overall cost category, collaboration. For the cost, the following categories shall be used:
 - > \$ 200 M
 - \$ 75 M - \$ 200 M
 - \$ 20 M - \$ 75 M
 - \$ 5 M - \$ 20 M
 - \$ 1 M - \$ 5 M
 - < \$ 1 M.
4. Business Potential (~1 page);
Business potential, Canadian capabilities development

The CSA and the Contractor, or others designated by them, have the right to unrestricted reproduction and distribution of the Executive Report. The report shall include the following proprietary notice ("Owner of FIP" being either the CSA or the Contractor):

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DID-0011 – FINAL DATA PACKAGE

PURPOSE:

The Final Data Package is a collection of all documents to be presented by the Contractor at the end of the contract.

PREPARATION INSTRUCTIONS:

The Final Data Package shall consist of the final/revised version of all deliverables requested under the present contract (electronic copy + 1 hard copy). For example, with no limitation, the final data package should include presentations, minutes, monthly progress reports and other required deliverables in their final revision. It must also include the contractor disclosure of intellectual property and project evaluation sheet.

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DID-0012 – CONTRACTOR PERFORMANCE EVALUATION

PURPOSE:

To provide an evaluation of the overall success of the project.

PREPARATION INSTRUCTIONS:

The Contractor Performance Evaluation shall contain the following information, as a minimum:

1. Was the project completed on schedule (list deliverables with planned and actual delivery date)?
2. How many man-hours of highly qualified personnel (by category) did this work create or maintain?
3. New opportunities created by the work conducted under the study.

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DID-0013 – ACTION ITEMS LOG

PURPOSE:

The Action Item Log (AIL) lists, in chronological order, all items on which some action is required, allows tracking of the action, and in the end provides a permanent record of those Action Items (AI).

PREPARATION INSTRUCTIONS:

The Action Item Log (AIL) shall be in a tabular form, with the following headings in this order:

1. Item Number;
2. Item Title;
3. Open Date;
4. Source of AI (e.g. PDR meeting, RID, etc.);
5. Originator;
6. Office of Prime Interest (OPI);
7. Person responsible (for taking action);
8. Target/Actual Date of Resolution;
9. Status (Open or Closed); and
10. Remarks.

The date in column 8) will be the target date as long as the item is open, and the actual date once the item is closed.

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DID-0014 – TECHNOLOGY READINESS WITH TRRA WORKSHEETS AND ROLLUP

PURPOSE:

Referring to AD-0, the Technology Readiness and Risk Assessment (TRRA) describes in a systematic and objective fashion the technological readiness of a system for a particular spaceflight mission or environment, the criticality of the constituent technologies, and the expected degree of difficulty to achieve the remaining technology development steps.

The TRRA provides for all the Critical Technology Elements (CTE) of the proposed concept, as per the Product Breakdown Structure (PBS), a high-level summary of the maturity of the technologies and the technology development risks.

Agreement on the appropriate PBS level and identification of the CTE is required prior to the TRRA.

PREPARATION INSTRUCTIONS:

The Technology Readiness and Risk Assessment must be done in accordance with the CSA Technology Readiness and Risk Assessment Guidelines (AD-01) using the worksheet (AD-04) for each CTE and rollup using (AD-05). A summary of the TRRA assessment and recommendations must be included in the Final Report [CDRL-0014].

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DID-0015– TECHNOLOGY ROADMAP WORKSHEET

PURPOSE:

The Technology Roadmap provides an overview of the required technology developments to meet mission needs and the plan and timeline to reach TRL 6 and 8.

PREPARATION INSTRUCTIONS:

The Technology Roadmap must be done using AD-03.

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DID– 0016 TECHNICAL/SCIENTIFIC REPORT

PURPOSE:

To fully describe the technical work done, problems encountered and achieved objectives.

PREPARATION INSTRUCTIONS:

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

1. Concept
 - a) Overall Concept:
 - i) Mission selected,
 - ii) Contribution to mission,
 - iii) System level approach,
 - iv) Innovation,
 - v) Critical aspects, and
 - vi) Traceability to science/mission requirements (for scientific missions);
 - b) Conceptual Design:
 - i) Technical approach and possible options,
 - ii) Preliminary layout,
 - iii) Functional block diagram,
 - iv) Related subsystems identification,
 - v) Subsystems trade-offs,
 - vi) Preliminary Concept of Operation, and
 - vii) Potential system operator identification;
 - c) Interface Definition;
 - d) Feasibility:
 - i) Intrinsic technical constraints,
 - ii) External operating constraints, and
 - iii) Potential solutions;
 - e) Compatibility with Target Mission;

-
- f) User / Mission Requirements:
- i) Mission needs,
 - ii) Key system parameters,
 - iii) Expected performance,
 - iv) Reliability, and
 - v) Technical Performance Measures:
 - (1) Functional requirements,
 - (2) Preliminary performance targets,
 - (3) Resource budgets (mass, power, thermal, processing power, etc.);
 - vi) Science Instrument requirements (if applicable):
 - (1) Science definition,
 - (2) Planned data product to meet science objectives,
 - (3) Operation scenarios,
 - (4) Science requirements that will deliver planned data products:
 - (a) Performance requirements,
 - (b) Operations requirements,
 - (c) Mass, power, volume, data compression requirements;
 - g) Preliminary System Requirements
2. Cost
- a) ROM; and
 - b) Estimate of Canadian Content
3. Schedule and Implementation
- a) Schedule;
 - b) Collaboration:
 - i) Identified collaborators,
 - ii) Types of agreements,
 - iii) Mechanisms, and
 - iv) Potential difficulties;

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- c) Roadmap
 - i) Current TRL of the proposed concept/technology,
 - ii) Required TRL for mission needs,
 - iii) Required technology development to meet mission needs, and
 - iv) Plan and timeline to reach required TRL;
 - d) Development and Manufacturing Approach:
 - i) Development approach,
 - ii) Subsystem providers,
 - iii) Key subcontractors,
 - iv) General strategy,
 - v) Development tasks, and
 - vi) Manufacturing tasks;
4. Programmatic
- a) Preliminary Mission Risk Assessment identification and mitigation:
 - i) Technical,
 - ii) Schedule,
 - iii) Cost, and
 - iv) Programmatic;
 - b) Business Potential;
 - c) Canadian Capabilities Development;
 - d) Intellectual Property Management:
 - i) BIP, and
 - ii) FIP;
 - e) Preliminary Commercialisation Plan:
 - i) Targeted market,
 - ii) Potential sales,
 - iii) Competition, and
 - iv) Marketing Strategy

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DID-0017 – ROM COST ESTIMATES

PURPOSE:

To provide CSA with an ROM estimate of costs for the Instrument

PREPARATION INSTRUCTIONS:

1. Cost Estimates
 - 1) Cost estimates must be provided, as follows:
 - a) Comparative cost estimate for the the Instrument based on analogous mission, or
 - b) Comparative cost estimate for the the Instrument based on a standard parametric cost model.
 2. Comparative Estimates
 - 1) The estimates named in paragraph 1(a), and 1(b) of this DID must be based on the following Cost Work Breakdown Structure. Additions to this WBS may be made following consultation with CSA.

Number	Description
1	Overall Project
1.5	Science support
1.5.3	Mission/User/system requirements definition
1.5.4	Project
1.5.5	Integration, Assembly Test & Check out
1.10	System Integration, Assembly, Test & Check Out

- 2) For estimates 1(a), or 1(b), the following information must be provided for each element of the Cost Work Breakdown Structure, broken-down by project phase and further broken-down by Government of Canada Fiscal Year:
 - a) Price charged under contract in Actual Fiscal Year \$CAD for the original project (i.e. including markup and fee)
 - b) Total Labour (person-hours or person-days) for the original project.
- 3) For estimates 1(a), or 1(b), the following information must be provided for each element of the Cost Work Breakdown Structure, broken-down by project phase:
 - a) Total for Item 3(a), adjusted to FY13/14 \$CAD (as at 1 Apr 2011). The historical inflation rates (percentage, and dollar value) used must be clearly indicated in the estimates, as well as the rationale for choosing that rate.

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- b) List of adjustments to 4(a), representing differences/changes with the Instrument (or the management thereof), expressed in FY13/14 \$CAD. A description of each adjustment must be included as part of each cost estimate.
- c) Total value of item 4(a), adjusted by item 4(b), expressed in FY13/14 \$CAD.
- 4) For estimates 1(a), or 1(b), the following information must be provided for each element of the Cost Work Breakdown Structure, broken-down by project phase and further broken-down by Government of Canada Fiscal Year:
- a) Value from 4(c), projected into future fiscal years as per the project schedule, expressed in projected Actual Fiscal Year \$CAD. The projected inflation rate (percentage, and dollar value) used must be clearly indicated in the estimates.
- 5) A numbered list of assumptions must be provided. Each assumption must indicate which estimate it applies to: 1(a) and/or 1(b). All dollar figures expressed in the assumptions must be in FY13/14 \$CAD.
- 6) In support of 1(a), and 1(b), following values of the following parameters must be recorded. For the the Instrument , this must be a best estimate based on all available information at the time when the estimates were prepared:
- a) mass
- b) volume
- c) power
3. Cost Uncertainty and risk
- 1) Quantification of the cost uncertainty surrounding the estimate must be provided in the form of a probability distribution.
- 2) A risk reserve must be recommended for each phase.

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DID-0018 – PHASES A/B/C/D/E PROJECT SCHEDULE ESTIMATE

PURPOSE:

To provide a schedule estimate for Phases A, B, C, D and E.

PREPARATION INSTRUCTIONS:

4. The Phases A/B/C/D/E Schedule Estimate may be prepared in the Contractor's format, must be based on the Phases A, B, C, D and E WBS, and must, as a minimum, contain the following information:
5. The schedule must include all elements of the system.
6. All design reviews must be shown.
7. All mission level readiness reviews must be indicated.
8. The schedule must be at a level sufficient to support project management reviews and interface activities between the organizations part of the Mars 2020 Mission.
9. Dependencies,
10. Resource requirements,
11. The start and end date of each task,
12. Task duration,
13. Deadlines and milestones.
14. The schedule must show dependencies between the Contractor and other organizations.
15. The schedule must be provided in its native tool format; MS project is the preferred format.
16. The Contractor must also prepare preliminary networks to a level indicating the critical path activities and events:
17. This schedule must continue through spacecraft level assembly, integration, test, launch site and early operation activities again clearly indicating critical path activities and events.
18. Modelling and environmental testing requirements for the robotic manipulator must be clearly shown.

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DID-19 – PRELIMINARY PLANETARY PROTECTION PLAN

PURPOSE:

Details the planned approach to compliance with category 4b requirements

PREPARATION INSTRUCTIONS:

GENERIC FORMAT AND CONTENT

robot arm description

microbial burden estimates

contamination analysis plan

assay plan

microbial reduction plan

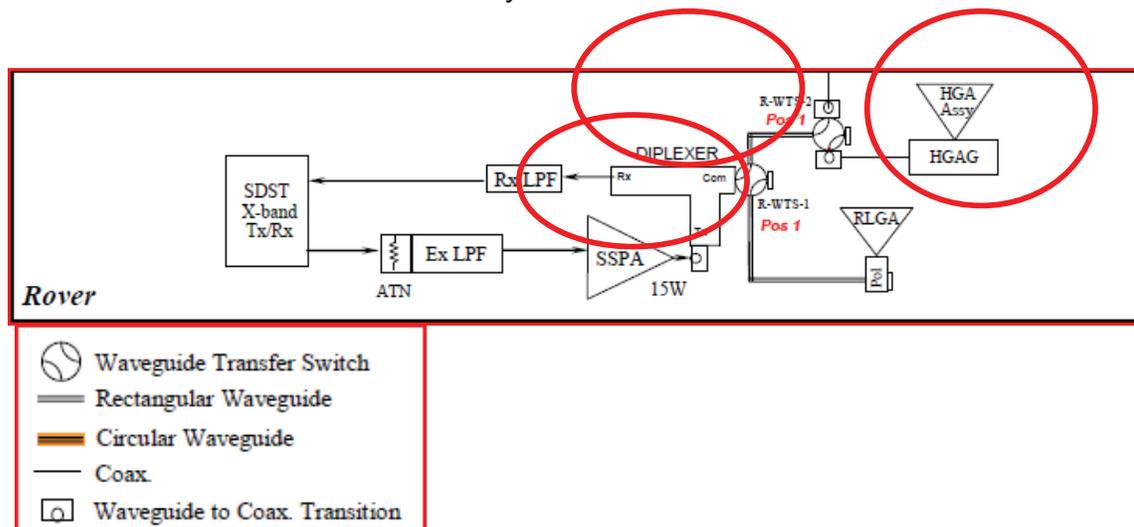
method of preventing recontamination description

Appendix 1 to Annex A: Description and requirements of the High Gain Antenna System, the Diplexer, and the High Power Amplifier

1.1 Introduction

The HGAS constitutes one potential contribution from Canada for the Mars 2020 mission. The HGAS is located on the rover deck, comprises of an Antenna (HGA) and a Gimbal mechanism (HGAG). The surface telecom system HGAS will be the only DTE communication system to Earth. A diplexer is also needed to filter out the transmit and receive signals. An HPA is also needed to transmit the Tx signal with the appropriate Power level.

The contractor has to provide the facilities, personnel, materials, and services required to perform the Phase 0 Study of the CSA HGAS for the Mars 2020 Mission. The objective of this phase 0 is to develop the concept of a HGAS, comprising of both the HGA and HGAG including some of the communication components, namely the waveguide path starting from the diplexer to the HGAS, as well to propose a suitable diplexer and HPA (whether using SSPA technology or TWTA technology). The WTS will be provided by JPL (see area highlighted in red in figure 1-1). While the actuator, motors incl. encoder and brake can also be provided by JPL (specifications pending), the scope should include provisions for these components in such a way that the ROM and schedule impacts can be easily separated from the rest of the concept and development. The HGAS is to be a single string, e.g.: no redundancy. The UHF communication system on the rover acts as the effective redundancy.



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Figure 1-1 : Block diagram of the MSL X-Band DTE communication system

1.2 Description

The HGAS will provide high data rate, direct-to-Earth (DTE) communications to and from the Mars2020 rover. The mission plans to operate on the Mars surface for at least a full Martian year (687 Earth days). The HGA is an X-band right hand circularly polarized (RHCP) antenna. The HGAG enables precise pointing of the HGA to Earth. The HGAG is a two (2) Degree-of-Freedom (DOF) mechanical assembly that is located on the Mars2020 Rover Deck in a manner similar to MSL (see Figure 1-2). The 2DOF mechanisms are orthogonally mounted with each axis driven independently to achieve desired speeds and accuracies.

The HGAS and related components are required to meet loads requirements for launch, entry, and landing. Where applicable, it is also required to deploy properly from the pyrotechnic restraint device after landing, drive the antenna required accuracies, and hold positions without back-driving under all planned operating scenarios.

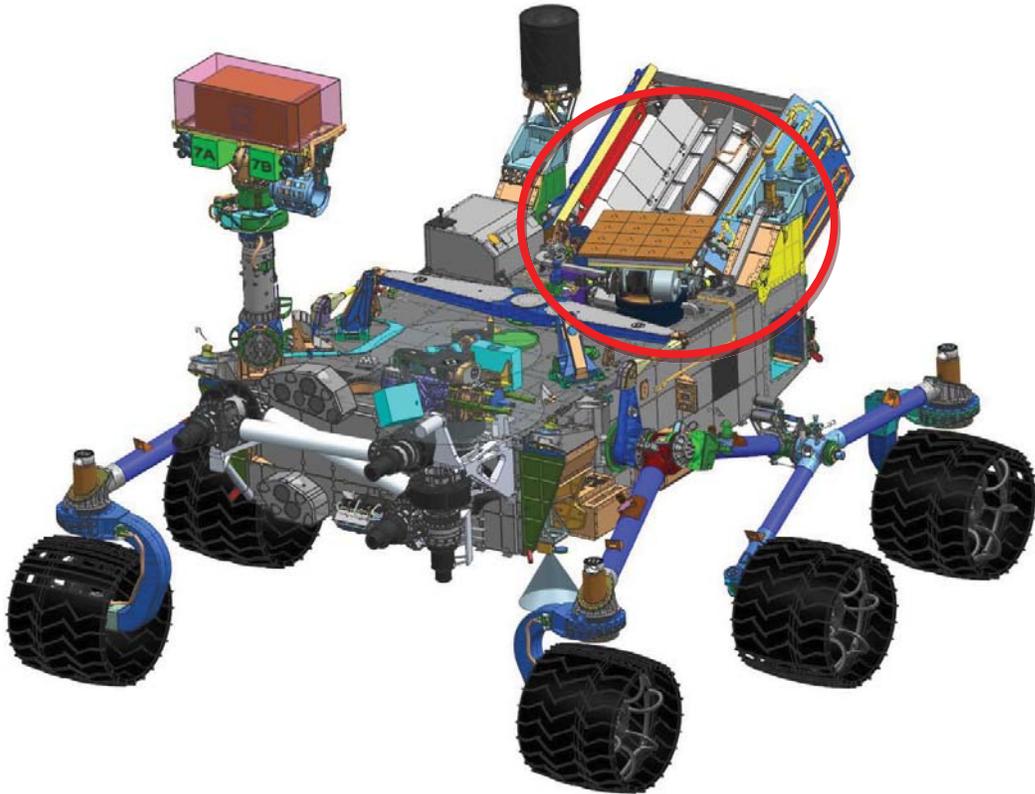


Figure 1-2 : Mars fully deployed 2020 landed configuration – HGAS highlighted (Ref: NASA)

1.3 Baseline Requirements

This section will identify currently known requirements. As is typical of projects at this early phase, these may change over time as the mission and requirements become better defined. The contractor is encouraged to expand upon them, and may provide alternate scenarios/concepts provided they address the requirements stated below as the primary scenario.

The concept should identify the driving requirements with a ROM sensitivity to changes.

1.4 Reliability

The diplexer, HPA and HGAS shall be designed to meet the standards of a class A mission.

1.5 Service Life

The diplexer and the HPA shall be designed for operational life of 5 years (2 years of ground testing, 1 year for cruise and 2 years on the Mars surface)

The HGA shall be designed for operational life of 4 years: 2 years of ground testing and 2 years on the surface.

1.6 HGAS Requirements

1.6.1 Functional Requirements

RD-6 was used to establish the HGAS requirements. The functional and environmental requirements are shown in Table 1-2 and Figure 1-3. It should be noted that because of the constraint on the envelope shape (square top), it may be forcing a certain type of design (for instance a square array patch network), however it could be the case that another antenna technology (for instance a reflector technology) might be more suitable to meet the gain and power handling requirements while slightly deviating from the envelope requirements. While every effort should be aimed at meeting every requirements (functional, environmental, mass and envelope), the contractor is free to propose a baseline design meeting all requirements, and an alternative design meeting all functional and environmental ones while deviating as little as possible from the top aperture area . It must be noted however, that compliance to HGAS height requirement is mandatory. As an example, it would be possible to propose a circular reflector design with an equivalent radiating area equal to the square top area (38cm x 38 cm) area or any other technology which would meet the main functional and environment requirements.

Table 1-2 : HGAS requirements

ID	Requirement	Specification	Comment
	Bus Operating Voltage	22 V to 36 V (28 V nominal, 40 V survival)	
	HGAS Electrical Interface	micro-D connector (for actuators and heaters)	
	HGAS RF Interface	WR-112 waveguide	
	HGAS EMC/Grounding	Similar to MSL	
	HGAG Cabling	Similar to MSL (flex-print cable harness)	
	Operating Frequency: Tx	8400 – 8450 MHz	

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	Operating Frequency: Rx	7145 – 7190 MHz	
	HGAS Polarization	RHCP	
	HGAS Gain (including gimbal losses): Tx	≥ 29.5 dBic	
	HGAS Gain (including gimbal losses): Rx	≥ 28.0 dBic	
	HGAS Return Loss	≥ 15 dB	(50 ohm, over band)
	HGAS 3 dB Beamwidth	≥ 4.5 deg	
	HGAS Sidelobes	≤ -16 dB	
	HGAS Nominal Power Handling	≥ 100 W CW	400 W, Mars atm. 2-12 torr, for ionization breakdown testing
	HGAS Axial Ratio	≤ 2.5 dB	2 deg from boresight
	HGAS Pointing Knowledge	≤ 0.3 deg	Electrical to mech. boresight
	HGAG Actuators	Provided by JPL	Identical to those on MSL
	HGAS Mass	≤ 15 kg	
	HGAS Azimuth Range of Motion	360 degrees	
	HGAS Static Mech. Envelope	See figure	
	HGAS Dynamic Mech. Envelope	See Figure	
	HGAS Dynamics & Loading Environments	TBD	Similar to MSL
	HGAS Design Guidelines	TBD	Similar to MSL
	HGAS Materials and Processes	TBD	Similar to MSL
	HGAG Operating Torque	TBD	Similar to MSL
	HGAG Hardstops & Position Holding	TBD	Same as MSL
	HGAG Restraint & Release	TBD	Similar to MSL
	HGAG Operational Speed	TBD	Similar to MSL
	HGAG Duty Life	TBD	Similar to MSL
	HGAG Safety	TBD	Same as MSL

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	Factors & Margin		
	HGAG Alignments & Drift	Similar to MSL	Post installation drift of 5 mrad vs. 8 mrad max.
	HGA Solar Absorptivity	≤ 0.3	
	HGA Solar Emissivity	≥ 0.85	
	HGA. preliminary Qualified and protoflight temperature	-135 °C to +120 °C	

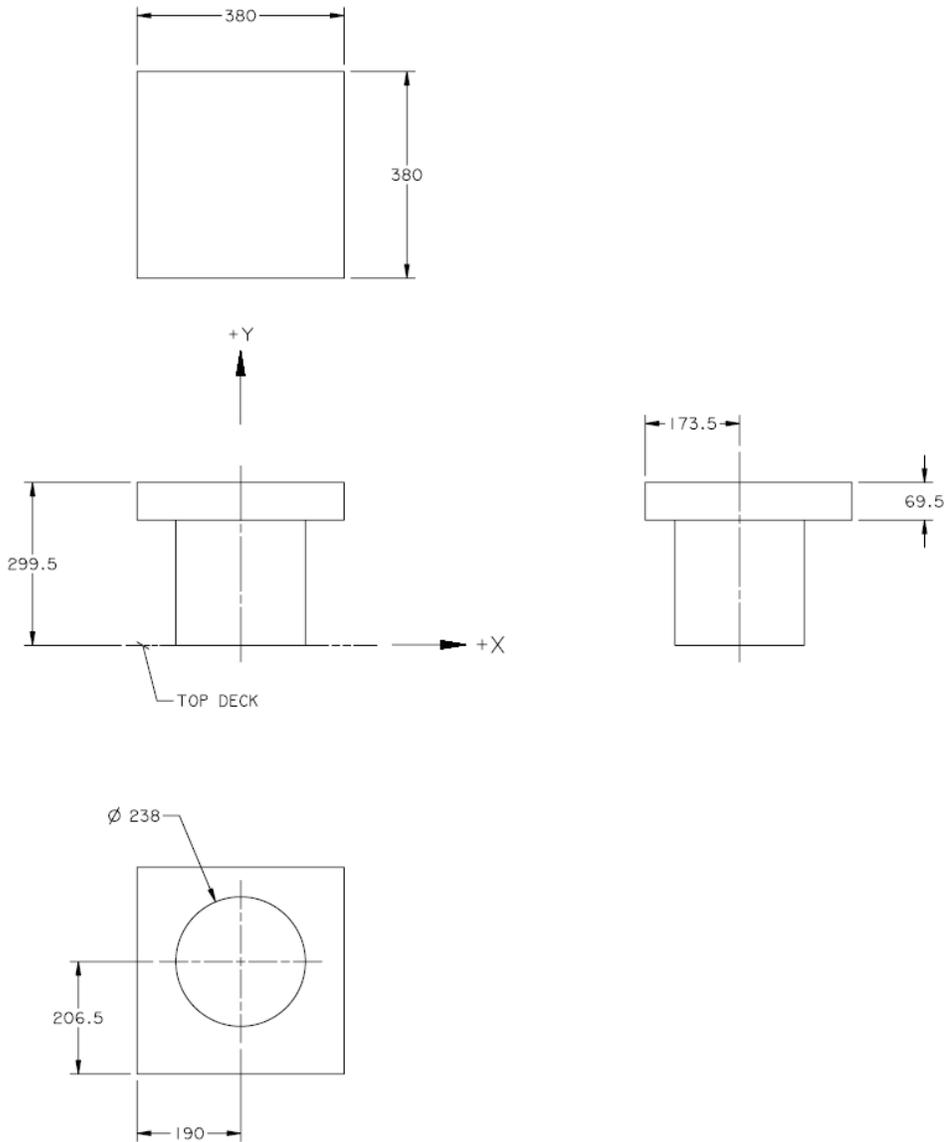


Figure 1-3 : the HGAS envelope.

1.6.2 Environmental requirements specific to HGAS

Details can be found within RD-8.

The HGAS itself is expected to be on the rover deck, and thus exposed to the environment.

The remaining components are expected to be within the rover body. For the purposes of this study, the thermal management system will be managed by the rover, thus only thermal loads/needs need be defined.

1.7 Diplexer Requirements

1.7.1 Venting

If the diplexer is not pressured or vacuum sealed, venting shall be provided for the escape of gasses during exposure to the launch ascent (maximum pressure rate of change is -33 Torr/sec) and hard vacuum environments, except for components requiring hermetic sealing. Any residual pressure differentials shall not contribute to malfunction nor cause performance degradation.

1.7.2 Mass and Envelope

If not pressurized or vacuum sealed, the Diplexer shall not exceed 750 grams. The Diplexer envelope shall not exceed 30 cm 30 cm 5 cm.

1.7.3 Performance Requirements

The Diplexer shall be designed to meet or exceed the following performance requirements.

1.7.3.1 Operating Frequency

1.7.3.1.1 Receiver Pass Band

The receiver pass band (from antenna port to receiver port) shall be 7.1 to 7.2 GHz.

1.7.3.1.2 Transmitter Pass Band

The transmitter pass band (from transmitter port to antenna port) shall be 8.35 to 8.50 GHz.

1.7.3.2 Insertion Loss

1.7.3.2.1 Receive Pass Band Insertion Loss

The maximum insertion loss from the antenna port to the receiver port across the receiver pass band shall be no greater than 0.3 dB. The variation in insertion loss across the pass band shall be 0.1 dB maximum.

1.7.3.2.2 Transmitter Pass Band Insertion Loss

The maximum insertion loss from transmitter port to antenna port across the transmit pass band shall be no greater than 0.3 dB. The variation in insertion loss across the pass band shall be 0.1 dB maximum.

1.7.3.3 Return Loss

1.7.3.3.1 Receiver Port Return Loss

The return loss of the receiver port across the receiver pass band (7.1 to 7.2 GHz) shall be less than 20.8 dB, when the Antenna and Transmitter Ports are terminated by a load with a return loss 26.4 dB.

1.7.3.3.2 Transmitter Port Return Loss

The return loss of the transmitter port across the transmitter pass band (8.35 to 8.50 GHz) shall be less than 20.8 dB, when the Antenna and Receiver ports are terminated by a load with a return loss 26.4 dB.

1.7.3.3.3 Antenna Port Return Loss

The return loss of the antenna port across the receiver pass band (7.1 to 7.2 GHz) and the transmitter pass band (8.35 to 8.50 GHz) shall be less than 20.8 dB, when the Receiver and Transmitter ports are terminated by a load with a return loss 26.4 dB.

1.7.3.4 Isolation

The diplexer shall be designed for the following Isolation levels:

TX/RX (8.35-8.50 GHz): 50 dB Min, (55 dB as goal)

RX/TX (7.10-7.20 GHz): 120 dB Min, (125 dB as goal)

TX/RX (16.8-17.0 GHz): 50 dB Min, (55 dB as goal)

TX/RX (25.2-36.0 GHz): 35 dB Min

1.7.4 RF Power

1.7.4.1 Corona Discharge

The diplexer shall be free of corona discharge when operating at 420 W RF Power (+50.6 dBm + 6 dB) at the Transmit Passband while exposed to pressures from 5×10^{-4} to 50 Torr in simulated Martian Atmosphere.

Alternatively, this test may be performed with a 105 W CW input power and the output connected to a sliding short.

1.7.4.2 Operation at 760 Torr in Air

The diplexer shall be free of corona discharge when operating at 420 W RF Power (+50.6 dBm + 6 dB) at the Transmit Passband in air at standard pressure.

Alternatively, this test may be performed with a 105 W CW input signal and the output connected to a sliding short.

1.7.4.3 Multipaction in Vacuum

The diplexer shall be free of multipactor breakdown when operating at 420 W RF Power (+50.6 dBm + 6 dB) at the Transmit Passband in vacuum, ($P < 1 \times 10^{-5}$ Torr).

Alternatively, this test may be performed with a 105 W CW input signal and the output connected to a sliding short.

1.7.5 Group Delay Variation

Over any 1-MHz range in the Receiver (7.1 – 7.2 GHz) and Transmitter (8.35 – 8.50 GHz) passbands, the group delay variation, or change in phase relative to change in frequency ($d\Phi/d\omega$) added by the Diplexer shall not exceed 300 picoseconds.

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1.8 HPA requirements

The following table synthesizes the main requirements of the HPA.

Table 1-3 : HPA requirements

Parameter	Performance
Tx RF Frequency Range	8.38 MHz to 8.47 MHz
Minimum EOL Output Power	100 W
Minimum power efficiency (including DC-DC regulating)	40% minimum.
Gain	47 – 50 dB
AM-PM Conversion	max. 5 deg/dB around saturation
Group delay	1 nsec p-p max over the band
Gain flatness	0.5 dB p-p max over the band
Phase noise	TBD.
Third Order Intermod (two tones)	≤ -25 dBc at max. saturation
Spectral regrowth	< -75 dBc at 7.1623 ± 0.03 GHz < -50 dBc at 8.415 ± 0.03 GHz Harmonics: 2nd < -15 dBc, 3rd < -25 dBc, 4th < -60 dBc
Return Loss	Input and Output ports shall each display an operating VSWR of 1.50:1 or less over the frequency band, and shall be designed to operate with source and load impedance VSWR less than or equal to 1.75:1 at any phase angle and over the frequency band.
RF Connectors:	SMA female at the input, WR112 at the output
Main bus voltage	22-36 V unregulated, balanced bus
Undervoltage switch-off:	< 20 V TBC
Telecommands	N/A
Analogue telemetry	TBR: Internal temperature, RF input power, RF output power, bus current
Mass	TBD

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Envelope	TBD
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1.9 Environmental Design and Testing Requirements

1.9.1 Temperature

The Qualification/Protoflight Operational Temperature Range is -55 C to +70 C. The Qualification/Protoflight Operational Temperature Range is to be used in the verification of all Electrical Performance Parameters. Temperature testing shall be performed in vacuum at a pressure of 10^{-5} Torr or less. A minimum of 3 temperature cycles are required with 6 hrs. of accumulated dwell time at the hot and cold extremes. JPL acceptance of the Test Plans and Test Procedures will be used to ensure that the test methods will validate the performance of the Diplexer over the Qualification/Protoflight Operational Temperature Range.

1.9.2 Planetary Protection and Contamination Control

The HGAS, HPA and Diplexer shall (TBC):

- 1) Withstand a Dry Heat Microbial Reduction (DHMR) cycle at a temperature of 125°C for 25 hours or at 110°C for 250 hours. The DHMR shall be performed at an absolute humidity corresponding to a relative humidity of less than 25% referenced to the standard conditions of 0°C and 760 Torr (1 atm) pressure and it can be conducted either in air with pressure less than 1.15 Torr or in dry nitrogen environment.
- 2) Be able to be cleaned with isopropyl alcohol (external to the unit).
- 3) Be built in a Class 100K clean room (or better), using appropriate controls and procedures.
- 4) Be able to tolerate a bio-sampling process which includes swabbing with water on a cotton swab (external to the unit).

All the Diplexer Flight Model (FM) units shall undergo a bakeout for 50 hours at 125 °C and pressure $\leq 1.0 \times 10^{-5}$ Torr. The bakeout shall be performed at the beginning of the thermal vacuum test.

1.9.3 Mars Atmospheric Composition

The HGAS (TBC), HPA (TBC) and Diplexer shall be designed for operation in the following Mars atmospheric composition. The mole fractions of gases in the Mars atmosphere are approximately:

0.955	0.0065	CO ₂
0.027	0.003	N ₂
0.016	0.003	Ar
0.0015	0.005	O ₂
0.0007		CO
2.5 ppm		Ne
0.3 ppm		Kr
0.08 ppm		Xe

1.9.4 Launch Vehicle Induced Dynamics Environments and Loads

1.9.4.1 Mass Acceleration Curve (MAC)

The HGAS (TBR), HPA (TBR) and Diplexer shall survive the static load as specified in the physical Mass Acceleration Curve (MAC) in Figure 1-4.

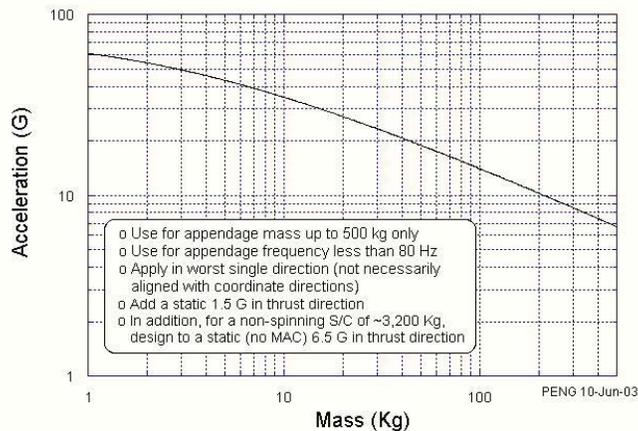


Figure 1-4 : Physical Mass Acceleration Curve (MAC)

1.9.4.2 Assembly Random Vibration Test

The random vibration design requirements for the HGAS (TBC), HPA (TBC) and Diplexer are as specified in Table 2.4.2.1. These spectra shall be applied in each of the three orthogonal axes at the mounting points of the assembly. The design exposure time is 2 minutes per axis. The assemblies shall be tested to the random vibration zone requirements per Table 1-4 and must be force limited to reduce over-test at hard mounted resonance frequencies.

Table 1-4 : Assembly Random Vibration Test Acceleration Input

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Descent Stage Mounted Assemblies	20 - 40	+ 6 dB/oct	+ 6 dB/oct
Rover Mounted Assemblies	40 - 450	0.04 g ² /Hz	0.08 g ² /Hz
	450 - 2000	- 6 dB/oct	- 6 dB/oct
	Overall	5.6 g _{rms}	7.9 g _{rms}

Duration - Qualification: 2 minutes in each of 3 axes. Protoflight/Flight Acceptance: 1 minute in each of 3 axes.

1.9.4.3 Pyroshock (for qual. Model or one protoflight model only)

One unit shall be identified as Protoflight model and go through pyroshock testing. Pyrotechnic shock design requirements are configuration and type of pyro device dependent. Table 1-6 shows pyroshock requirements for various zones on the spacecraft. The pyroshock requirement is defined in terms of Shock Response Spectrum (SRS) for a frequency range of 100 to 10,000 Hz, which is intended to represent the structurally transmitted transients from Mars 2020 pyrotechnic devices used to achieve various separations. The shock pulse, with the SRS corresponding to this specification, shall be applied to the assembly mounting points in each of three orthogonal axes. The synthesized shock waveform shall meet the following criteria:

- The time history shall be oscillatory in nature, and
- The pulse shall decay to less than 10% of its peak value within 20 milliseconds.

Table 1-6 : Assembly Pyrotechnic Shock Requirements by Spacecraft Zones

	Frequency, Hz	QUAL, PF Peak SRS Response (Q=10)
2	100 1-0 - 1,600 1,6-0 - 10,000	14 g + 10.0 dB / Oct 1,400 g

1g = standard acceleration due to gravity = 9.81 m/s²

Two shocks for QUAL and one shock for PFM in each of the three orthogonal axes. No test for FM.

1.9.5 Radiation Environment

The HPA shall be designed to be capable of withstanding the total radiation environment which is TBD from fabrication to the end its design life.

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1.9.6 Planetary Protection and Contamination control

The AI&T portion of the concept must conform to contamination controls outlined in RD-1.

The planetary protection level for the outbound portion of the mission is considered to be Category IV b.

1.10 Procurement Plan and ROM Delivery Schedule

Currently the procurement plan and the AI&T plan are understood to include the following items:

- HPA:
 1. 1 EQM
 2. 2 FM units
- diplexer:
 1. 1 PFM unit and 1 FM
- HGAS:
 1. 1 mechanical EM unit (without the radiating antenna),
 2. 1 PFM unit and 1 FM
 3. Mechanical spare parts of the gimbal mechanisms (i.e: refurbishment kit).
- Waveguide:
 1. waveguide technology and exact routing is currently TBD.

The current approximate delivery schedule for the hardware is the following:

EM's delivered: 6/1/16
PFM and FM diplexer delivered: 10/1/17
PFM and FM HPA delivered: 10/1/17
PFM and FM HGAS delivered: 3/1/18

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ANNEX C

DOCUMENT NAMING CONVENTION

1. Context

This attachment presents the naming convention to follow for any documentation generated under this RFP and any resulting contract.

Documents shall contain 4 main components:

Project identifier

Contract Number

Date Tracking number

Brief Relevant Title

WXYZ-TYPE-NUM-CIE_ContractNumber_sent2007-03-30_Brief relevant title

2. Project Identifier

The project identifier shall contain:

WXYZ: A 4-8 letter acronym of the project

TYPE: A 2 letter acronym according for the table below.

Acronym	Description
AG	Agenda
ER	Executive Report
MN	Minutes of meeting
PR	Progress Report
PT	Presentation
TN	Technical Note

NUM: A three digits sequential number (e.g. 001, 002, etc.)

CIE: Name of Company (no space, no hyphen)

3. Contract Number

For example: _9F028-07-4200-03

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4. Date Tracking Number

_sentYEAR-MONTH-DAY_draft

The *_draft* mention shall be removed on the final version of the document once approved by CSA.

5. Brief Relevant Title

Especially in the cases of meeting minutes, presentations and technical notes, a brief title indicating the topic .

For example: _

_Motor types trade

_KOM minutes, *alternatively* _KOM

_Mid-term presentation, *or simply* _Mid-Term

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ANNEX D

BID PREPARATION INSTRUCTIONS Outline and content of Section I

The required outline and content of Section I, is detailed herein. Should clarification be required, it is the responsibility of the Bidder to obtain this prior to submitting the bid.

Section I should address only one project and be contained within a single document/file. The information should be organized in the following order:

1. Title / Project Identification Page;
2. Executive Summary;
3. Table of Contents;
4. Technical Bid;
5. Managerial Bid;
6. Bid Appendices:

Note: The structure of Section I and subsections are described below. Some of the subsection headings are followed by numbers in brackets. These numbers represent the Evaluation Criteria (see Annex E) that are applicable to that specific section/subsection.

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1. TITLE / PROJECT IDENTIFICATION PAGE

This is the first page of the Bid. It should be laid out in accordance with the requirements specified in Part 3 and should clearly state:

1. RFP file number;
2. The company's name and address;
3. The title of the proposed project (the use of acronyms in the title is discouraged, unless they are described);
4. A short summary of the Bid summarizing the Bid in 8 lines (maximum).

2. EXECUTIVE SUMMARY

The Executive Summary of Section I, of the Bid should be a stand-alone document suitable for public dissemination, for example, through the CSA web site, if the Bid is successful. It should not exceed one page in length (8.5" x 11") and should highlight the following elements:

1. Project objectives;
2. Relevance to targeted Category (refer to table 1.1 of Part 1, list of concepts.);
3. Main technical innovations;
4. Major milestones and deliverables; and
5. Relevance to CSA strategy and programs;

3. TABLE OF CONTENTS

The table of contents should be formatted such that its headings are linked to their respective location in the Bid for ease of reference when using the Bids' electronic version.

4. TECHNICAL BID

The Bid should describe the proposed project as outlined in the following subsections.

4.1 Impact

4.1.1 Merit of the Investigation (Evaluation Criteria 1)

This subsection should provide the technical objectives of the system concept, both in terms of its purpose, functionality and performance.

A case should be made for the relevance of the proposed system in the context of the CSA Space Exploration Program. Moreover, it should be clearly demonstrated that the proposed concept addresses the requirements of the rover system as requested in Annex A.

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4.1.2 Niche sector for Canada (Evaluation Criteria 2)

The proposed Canada's Space Exploration Program clearly states that the technologies developed for space exploration should be applicable to many potential missions. The goal is to develop a sustainable sector in space exploration that should ideally create commercial opportunities for either space (non-CSA) or non-space applications.

The Bid should demonstrate the applicability of the technology for a series of missions either through a description or by providing a draft road map.

The technology being studied must be applicable for a series of missions spanning a 10 to 15 year time frame.

4.2 Technical/ Scientific Objectives

4.2.1 Understanding the system requirements and technical principles (Evaluation Criteria 3)

This subsection should clearly emphasize and substantiate the system requirements and address the technical principles driving the system. It should include a description of the overall problem, an overview of the background context and a description of the state of the art, using for example, results of literature review. It should also demonstrate a clear understanding of the requirements and technical principles of the proposed mission scenarios. It should identify the main common requirements and those that are specific to a given mission scenario.

4.2.2 Feasibility of Achieving Technical Objectives (Evaluation Criteria 4)

This proposed system concept should be described in detail.

In this subsection the Bidder should describe the proposed implementation of the system and clearly demonstrate how the proposed system implementation will achieve the system objectives. The bidder must provide sufficient information to clearly substantiate the overall feasibility of the proposed approach in order to meet the technical objectives. Any proposed deviation from the stated requirements must be identified and justified.

4.2.3 Technical Risk Assessment (Evaluation Criteria 5)

This section should provide an assessment of the technical risks involved in performing the work for the system concept study, and identify critical issues that may jeopardise the successful achievement of the technical objectives. The current technology readiness level (TRL) should be identified, as well as advancements necessary to meet the needs of the mission and a technology development roadmap to achieve it and associated technical risks.

5. Managerial Section

The Managerial Section should demonstrate the effectiveness and commitment of the Bidder in delivering the Work and the overall technology development up to its integration into the targeted Future Mission(s). Its subsections are Key Resource Management Experience, Management Plan.

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5.1 Key Resource Management Experience (Evaluation Criterion 6)

The Bidder should identify his Project Manager for each bid he submits and outline his/her qualifications. Bidder It should identify the key members of the project's technical and management teams and state their specific qualifications and experience for the work involved. Detailed resumes must be provided into an Appendix to Section I of the bid. Names of back-up personnel for key positions should also be included.

This section should also outline the roles and responsibilities of all the proposed resources, as well as discuss and highlight the unique expertise they offer with respect to the capability of the team. Bidder should include an organization chart that illustrates the structure of the proposed project team.

5.2 Management Plan (Evaluation Criterion 7)

The Bidder should present a Management Plan. The Management Plan for its completeness and assesses its effectiveness in directing the project to a successful completion. Collaborative projects and/or projects led by University or Non-Profit Bidders should identify specific tasks and objectives related to an effective process for transfer of knowledge and technologies to industry. IP management approach must be described. The Management Plan's presentation must be based on the recognized management tools most applicable to the proposed project, such as a scope planning (Work Breakdown Structure), and schedule development charts (Gantt, Program Evaluation and Review Technique -PERT, etc). Equivalent Bidder-developed, project-tailored tools/charts are also acceptable, provided that the information is complete and comprehensive.

5.2.1 Bidder Background and Related Experience (will NOT be used as a proposal evaluation criterion)

This section should contain a concise overview of the Bidder. It should cover the following elements: the nature and structure of the Bidder's organization; the level of Canadian ownership; the location, size and general description of the plant facility; the size and composition of staff; the principal product or field of endeavour; the annual business volume and general nature of the company's client base; and a list of any applications for funding from other Government sources and/or Government contracts received for similar and/or related work. This section should identify the location where the Work will be performed.

5.2.2 Work Breakdown Structure and Work Package Definition

This Management Plan subsection should define and specify the scope of Work to be executed according to the requirements of the Statement of Work, Contract Deliverables and Meetings (Annex A). Work Breakdown Structure (WBS) is a recognized scope definition technique, while Work Packages (WP) stem from the WBS. The WBS should flow down to a low enough level and the associated WP should be defined in sufficient depth in order for the Bidder to demonstrate the process that will be followed to perform the project.

Each WP should focus on specific activities that will form the total Work and, as a minimum, should define and describe the specific work to be carried out. It should also indicate: the person responsible, the WP's associated levels-of-effort and required resources, the schedule (start and finish dates), the risks, and the associated inputs and deliverable or output.

As a guideline, Figure 5.2 presents a fictitious example of a WBS, while Table 5.2 presents a fictitious example of a Work Package Definition Sheet. For each work packages the Bidder should provide a detailed statement of work and list the associated resources.

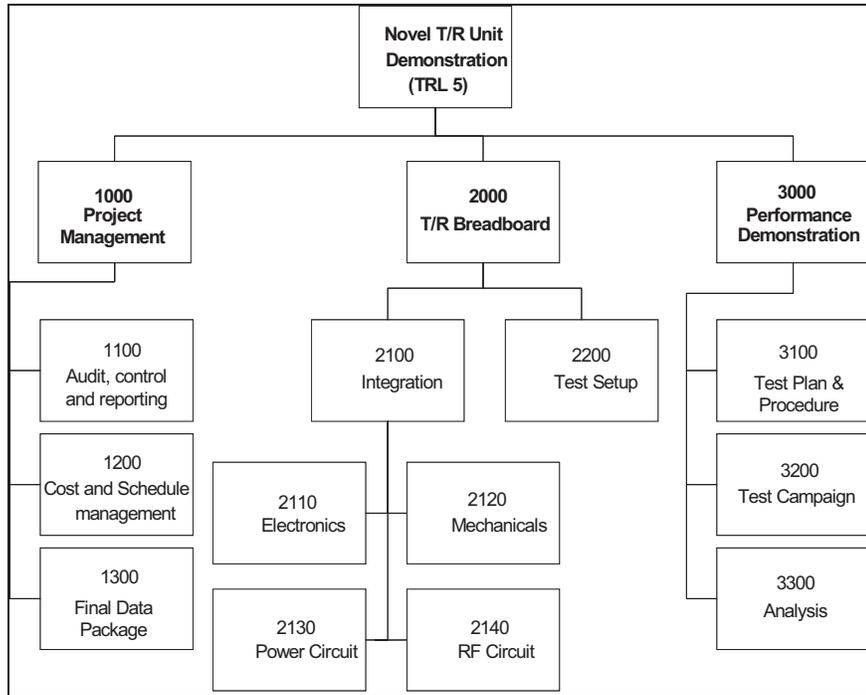


Figure 5.2: Example of a Work Breakdown Structure

Project: T/R Unit Demonstration		
Work Pack Title:	TEST SETUP	WBS Ref: 2200
Sheet: 1 of 1	WP Estimated Value:	Do not indicate \$ value in Section I of the bid, indicate value only in Section II
Scheduled Start: T0 + 2 weeks	Accountable Manager:	Resource A,
Scheduled End: T0 + 12 weeks	Resources:	Resource A, Resource B, Resource C
Estimated Effort: 80 hours		
<u>Objectives:</u>		
•Deliver a functional test setup for the T/R unit		
<u>Inputs:</u>		
•Test plan and procedure		

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<ul style="list-style-type: none"> •Unit drawings •Unit Interface Control Documents
<p><u>Tasks:</u></p> <ul style="list-style-type: none"> •Review input documentation •Define requirements •Produce initial concept •Design test setup •Fabricate test setup •Commission and debug
<p><u>Outputs and Deliverables:</u></p> <ul style="list-style-type: none"> •Fully functional T/R unit test setup •Test setup log manual •Test setup user manual

Table 5.2: Example of Work Package Definition Sheet

5.2.3 Personnel Allocation

This Management Plan subsection should include a Responsibility Assignment Matrix (RAM) showing the level-of-effort for each individual team member that has been allocated to each WP. The matrix should identify each individual by name, and provide the estimated time (number of hours or days) required to complete each task. Also, the RAM should identify the role of the individual, either being the accountable person for the WP (A), or being a participant (P). As a guideline, Table 4 presents a fictitious example of a RAM. The RAM should be presented in both the technical bid and the financial bid.

WBS Number	Work Package Title	Resource A		Resource B		Resource C		Total
1.1	Project Management	A 200		P 25		P 25		250
1.2	Literature Survey	A	25	P	100	-	0	125
1.3	Requirements	P	50	A	100	P	100	250
1.4	Design	P	100	A	100	P	150	350
1.5	Build	-	0	P	200	A	150	350
1.6	Test and Analysis	A	100	P	200	P	200	500

Total	475	725	625	1825
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Table 3A.4: Example of Responsibility Allocation Matrix (RAM)

P: Participant
A: Accountable

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5.2.4 Managerial Risk Assessment

This Management Plan subsection should provide an assessment of the managerial risks involved in performing the work for the mission/payload concept study, and identify critical issues that may jeopardise the successful completion of the project within cost and schedule constraints.

5.2.5 Milestones and Deliverables

Milestones and deliverables should be detailed in accordance to what is specified in in Annex A.

5.2.6 Schedule

The Bidder should provide a project timetable that relates tasks, milestones and deliverables. A Gantt chart and/or PERT chart should be used to illustrate the schedule. The schedule should show significant details for events associated with achievement of major tasks, milestones and deliverables. The Bidder should demonstrate how required milestones will be met. Linkage between activities should also be identified in the schedule.

5.2.7 Project Control System

This Management Plan subsection should outline the methods and systems to be used to control tasks, schedules, and costs for the project. Any project management tool or a spreadsheet software package may be used as long as it contains, as a minimum, the information required in the Quarterly Progress Report (DID-0006). Additionally, the Project Control System should provide the capability to report the amount of work per WBS item for each individual on a monthly basis.

The cost figures and values of all industrial contributions should be provided separately in the Financial Bid in Section II.

6. Bid Appendices

3A.8.1 Appendices Required with the Bid

The following item should be addressed in individual appendices as part of the bids:

- a) List of Acronyms: All the acronyms used in the Section I: Technical and Managerial Bid, should be explained;
- b) Resumes: The bid should include resumes of the proposed resources and these should be appended to Section I: Technical and Managerial Bid;
- c) Relevant Technical Papers Published by Team Members: Only literature that is relevant and that would be useful to support the bid;
- d) Science Summary Section based on NASA Mars2020 AO requirements:

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- e) Canadian Capabilities Development: The contractor shall provide an overview of its strategy to develop and maintain Canadian capabilities. If the overall approach of the Contractor implies technology transfer and partnership with foreign entities to develop the Canadian capabilities, the Contractor shall specify teaming arrangements, Intellectual Property (IP) ownership issues, royalties, etc., as well as opportunities that this partnership would open.
- f) List of Contacts: The list of contacts should be appended to Section I: Technical and Managerial Bid, in a format suitable for distribution and should include all the Bidder's points-of-contacts involved in the bid development and/or during the Contract.

The following example format should be used:

Role	Name	Telephone	Fax	E-Mail
Project Manager				
Project Engineers/Head Investigator				
Contractor's Representative				
Claims(Invoicing) Officer				
Communications (for press release)				
Etc.				

Table 3A.9 : Bidder's List of Contacts

If possible, and for the Project Authority ease of reference, the Bidder is also encouraged to include an electronic business card for each of the points-of-contact.

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ANNEX E POINT RATED TECHNICAL CRITERIA

1. IMPACT, TECHNICAL/SCIENTIFIC, MANAGEMENT POINT RATED CRITERIA

The Bidder should achieve the minimum score requirements as indicated in Table 1: *"List of Evaluation Criteria and Associated Ratings"*. Bids will be evaluated according to the point-rated criteria as specified in Table 1 and at subsection 2 of this attachment: *"Evaluation Criteria and Benchmark Statements"*. The criteria are grouped under the following divisions:

1. Impact
2. Technical/Scientific
3. Management.

"Evaluation Criteria and Benchmark Statements" contains a series of evaluation criteria, each supported by a set of 5 benchmark statements (0, A, B, C, D). Each of these statements has a corresponding relative value:

- 0 = 0% of the maximum point rating;
- A = 25% of maximum point rating;
- B = 50% of maximum point rating;
- C = 75% of maximum point rating;
- D = 100% of maximum point rating.

As an example, the maximum point rating for the *"Understanding the system Requirements and Technical"* criterion is 20 points. If a Bid receives a "C" for this criterion in the evaluation process, the score attributed will be:

75% of 20 points = 15 points (score)

Table 1 identifies:

1. The maximum point rating assigned to each criterion;
2. The maximum point rating possible for each division (Impact, Technical and Management);
3. The maximum point rating possible for the overall score;
4. The minimum point rating required for the overall score.

Note that the criterion "Merit of Investigation" has a minimum score requirement of 15 to make sure that the bidder addresses the requested contribution identified at Annex A.

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Table 1: - List of Evaluation Criteria and Associated Ratings

Evaluation Criteria and Ratings	
	Ratings
Impact Criteria	
1. Merit of the Investigation (Minimum Score Requirement of 15)	20
2.Niche sector for Canada	10
Maximum Score	30
Technical/Scientific Criteria	
3. Understanding the system requirements and technical principles	20
4. Feasibility of achieving technical objectives	20
5.Technical Risk Assessment	10
Maximum Score	50
Management Criteria	
6.Key Resource Management Experience	10
7.Management Plan	10
Maximum Score	20
Maximum Overall Score	100
Minimum Overall Score Requirement	70

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2. EVALUATION CRITERIA AND BENCHMARK STATEMENTS

"IMPACT" CRITERIA

1. MERIT OF THE INVESTIGATION (CRITERION 1):

This criterion evaluates the relevance and merit of the investigation relative to the current state and need of the proposed space-related field. The proposed contribution shall fall under the scope of work presented in Annex A.

- 0) The relevance and merit of investigation is not addressed.
- A) The relevance and merit of the investigation are poorly substantiated and the Bid fails to address and answer its needs.
- B) The relevance and merit of the investigation are unclear and the needs are poorly addressed.
- C) The relevance and merit of the investigation are substantiated and the needs are addressed and answered.
- D) The relevance and merit of the investigation are clearly substantiated and demonstrated. The needs are addressed, answered and justified.

2. NICHE SECTOR FOR CANADA (CRITERION 2):

This criterion evaluates the possibility of maintaining or creating a niche sector for Canada with good commercialization potential.

- 0) The proposed plan does not demonstrate the creation of a niche sector for Canada
- A) The proposed plan demonstrates that the technology being studied is focused mainly on one mission
- B) The proposed plan demonstrates that the technology being studied is applicable to a series of missions but with little re-usability of previous developments
- C) The proposed plan demonstrates that the technology being studied is applicable to a series of missions with a good re-usability of previous developments and with some potential for commercialization in space (non-CSA) or on Earth.
- D) The proposed plan demonstrates that the technology being studied is applicable to a series of missions with a good re-usability of previous developments and with a good potential for commercialization in space (non-CSA) or on Earth.

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“TECHNICAL/SCIENTIFIC” CRITERIA

3. UNDERSTANDING THE SYSTEM REQUIREMENTS AND TECHNICAL PRINCIPLES (CRITERION 3):

This criterion assesses the degree to which the Bid identifies the underlying system requirements and technical principles and also to what extent it exhibits an understanding of these requirements and principles.

- 0) The system requirements and technical principles are not addressed.
- A) Does not clearly identify the system requirements and technical principles underlying the proposed system concept or exhibits a limited understanding of these requirements and principles.
- B) Identifies the main system requirements and technical principles necessary for realizing the proposed mission and exhibits a general understanding of these requirements and principles. Reference to existing literature or previous relevant missions are made but in a cursory way.
- C) Adequately demonstrates identification and understanding of the system requirements and technical principles relevant to the mission concept being proposed and includes a review of other work or previous missions relevant to the central theme of the proposed concept.
- D) Includes an exhaustive identification of the mission requirements and technical and knowledge relevant to the central goal of the mission concept being proposed, and provides an authoritative understanding of these requirements, principles and concepts. The review of the existing literature or that of the previous relevant missions is provided.

4. FEASIBILITY OF ACHIEVING TECHNICAL OBJECTIVES (CRITERION 4):

The criterion assesses the overall feasibility of the proposed concept and approach as well as the degree to which it is capable of delivering the technical objectives.

- 0) The feasibility of achieving the technical objectives is not demonstrated.
- A) The feasibility of achieving the technical objectives is demonstrated. The methodology is deemed inappropriate.
- B) The feasibility of achieving the technical objectives is demonstrated. The methodology is reasonable, but gaps exist in the technology and proposed methodology.
- C) The feasibility of achieving the technical objectives is demonstrated. The case is well referenced. The proposed effort distinctly displays creative and valid concepts and methods that can obtain the desired technical results.
- D) The feasibility of achieving the technical objectives is demonstrated. Presents a well-referenced and convincing case with a system that can clearly deliver the technical objectives.

5. TECHNIAL RISK ASSESSMENT (CRITERION 5):

The criterion assesses the risk assessment approach proposed by the Bidder.

- 0) There is no risk assessment.
- A) The methodology is deemed inappropriate, or the risks assessment is incomplete, or critical issues that may jeopardise the successful achievement of the technical objectives are not identified sufficiently.
- B) The methodology is reasonable, and the risks assessment is complete. Some critical issues that may jeopardise the successful achievement of the technical objectives are identified, but there may be some still not identified.
- C) The methodology is reasonable, and the risks assessment is complete, clear and substantiated. All critical issues that may jeopardise the successful achievement of the technical objectives are identified, but their mitigation measures are not complete.
- D) The methodology is reasonable, and the risks assessment is complete, clear, substantiated and credible. All critical issues that may jeopardise the successful achievement of the technical objectives are identified, and full mitigation measures are proposed.

“MANAGEMENT” CRITERIA

6. KEY RESOURCE MANAGEMENT EXPERIENCE (CRITERION 6):

This criterion assesses the qualifications and experience and past successes of the Project Manager and key project Scientists/Engineers identified to lead this proposal. Resumes requested to be appended to Section 1: Technical and Managerial Bid will be assessed for this criterion.

- 0) The key project management team has not been identified or has no experience in successfully completing projects of similar scope, complexity and technology similar to that required for this proposal.
- A) The key project management team does not have a proven track record of successfully completing projects of similar scope, complexity and technology similar to that required for this proposal.
- B) The key project management resource has a moderate track record of successfully executing projects of a scope, complexity and technology similar to that required for this proposal.
- C) The Project Manager and Project Scientist/Engineer identified have a proven track record of success in executing and managing projects of a scope, complexity and technology similar to that required for this proposal.

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- D) The Project Manager and Project Scientist/Engineers identified have a proven strong track record of success in completing projects on time, budget and performance of at least the scope, complexity and technology similar to that required for this proposal.

7. MANAGEMENT PLAN (CRITERION 7)

This criterion evaluates the Management Plan for its completeness and also assesses its effectiveness in directing the contract to a successful completion. It also assesses the Bidder's IP management approach.

- 0) Has no concrete management plan and thereby instills no confidence that the selected team will bring the contract to its successful completion.
- A) Does not provide an adequate Management Plan and more than one of the subsections of the paragraph 5.2 of Annex D is not covered. Moreover, there is no BIP and/or FIP identified.
- B) Provides an adequate Management Plan, including identification of BIP and FIP; however, some subsections of the paragraph 5.2 of Annex D are not covered. Consequently, the likelihood of delivering the proposed deliverables to the specified level of performance is not substantiated.
- C) Provides a credible Management Plan and provides a reasonable, but not complete, BIP and FIP management approach. The plan's ability to effectively deliver on the projects requirements is demonstrated, but is somewhat limited because of lack of details.
- D) Provides a coherent and comprehensive Management Plan. The plan's ability to effectively deliver on the project requirements is fully substantiated. A comprehensive IP management approach is provided.