Public Works and Government Services Canada | Travaux publics et Services gouvernementaux Canada

RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:

Travaux publics et Services gouvernementaux Canada
Place Bonaventure,
800 rue de la Gauchetière Ouest
Voir aux présentes - See herein
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
Secondary Payloads & Nanomissions

Solicitation No. - N° de l'invitation	**Date**
9F050-170072/B	2017-11-20

Client Reference No. - N° de référence du client
9F050-17-0072

GETS Reference No. - N° de référence de SEAG
PW-$MTB-770-14626

File No. - N° de dossier	**CCC No./N° CCC - FMS No./N° VME**
MTB-7-40116 (770)	

Solicitation Closes - L'invitation prend fin
at - à 02:00 PM
on - le 2018-01-08

Time Zone
Fuseau horaire
Heure Normale du l'Est
HNE

F.O.B. - F.A.B.
Plant-Usine: ☐ **Destination:** ☑ **Other-Autre:** ☐

Address Enquiries to: - Adresser toutes questions à:	**Buyer Id - Id de l'acheteur**
Mathurin, Martine	mtb770

Telephone No. - N° de téléphone	**FAX No. - N° de FAX**
(514) 712-5733 ( )	(514) 496-3822

Destination - of Goods, Services, and Construction:
Destination - des biens, services et construction:
AGENCE SPATIALE CANADIENNE
EXPLORATION SPATIALE / SPACE EXPLOR
6767 ROUTE DE L AEROPORT
ST HUBERT
Québec
J3Y 8Y9
Canada

Instructions: See Herein

Instructions: Voir aux présentes

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

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**

Issuing Office - Bureau de distribution
Travaux publics et Services gouvernementaux Canada
Place Bonaventure,
800 rue de la Gauchetière Ouest
Voir aux présentes - See herein
Montréal
Québec
H5A 1L6

Canada

REQUEST FOR PROPOSALS

CHANGE OF ADDRESS – BIDS DELIVERY

For bids delivered starting Monday, May 8, 2017:

In person or by mail:
Place Bonaventure, 1st Floor
800 de la Gauchetière Street West
Suite 1110 Montreal (QC), H5A 1L6

TABLE OF CONTENTS

PART 1 - GENERAL INFORMATION

1.1 Introduction

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

Part 1 General Information: provides a general description of the requirement;

Part 2 Bidder Instructions: provides the instructions, clauses and conditions applicable to the bid solicitation;

Part 3 Bid Preparation Instructions: provides Bidders with instructions on how to prepare their bid;

Part 4 Evaluation Procedures and Basis of Selection: indicates how the evaluation will be conducted, the evaluation criteria that must be addressed in the bid, and the basis of selection;

Part 5 Certifications and Additional Information: includes the certifications and additional information to be provided;

Part 6 Financial and Other Requirements: includes specific requirements that must be addressed by Bidders; and

Part 7 Resulting Contract Clauses: includes the clauses and conditions that will apply to any resulting contract

The following Annexes:

Annex A Statement of Work
Annex B Basis of Payment

The following Attachments:

Attachment 1 to Part 3 Technical and Managerial Bid Preparation Instructions
Attachment 2 to Part 3 Electronic Payment Instructions
Attachment 1 to Part 4 Point Rated Evaluation Criteria

1.2 Summary

Project Title
Space Exploration Concept Studies for Planetary Secondary Payloads and Nanomissions

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 concept studies related to secondary payloads or nanomission investigations for planetary exploration. The outcome of the concept studies should target CSA Space Exploration's Science Readiness Level (SRL) 3 or higher.

Period of Contract
From date of award for up to 12 months.

Intellectual Property
Canada will own all intellectual property rights in foreground information.

Security Requirements
There are no security requirements associated with this requirement.

Trade Agreements
This requirement is not subject to the trade agreements.

Canadian Content
The requirement is limited to Canadian goods and Canadian services.

Bidders' Conference
There is an optional Bidders' Conference associated with this requirement. Consult Part 2 – Bidder Instructions.

Federal Contractors Program for Employment Equity
The Federal Contractors Program (FCP) for employment equity applies to this procurement; refer to Part 5 – Certifications and Additional Information.

1.3 Debriefings

Bidders may request a debriefing on the results of the bid solicitation process. Bidders should make the request to the Contracting Authority within fifteen (15) working days from receipt of the results of the bid solicitation process. The debriefing may be in writing, by telephone or in person.

PART 2 - BIDDER INSTRUCTIONS

2.1 Standard Instructions, Clauses and Conditions

All instructions, clauses and conditions identified in the bid solicitation by number, date and title are set out in the *Standard Acquisition Clauses and Conditions Manual* (https://buyandsell.gc.ca/policyand-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 (2017-04-27) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.

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

Delete: 60 days
Insert: 240 days

2.2 Submission of Bids

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

Public Works and Government Services Canada
Quebec Region, Place Bonaventure, 1st Floor
800 de la Gauchetière Street West
Suite 1110 Montreal (QC), H5A 1L6

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

2.3 Former Public Servant

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

Definitions

For the purposes of this clause, "**former public servant**" is any former member of a department as defined in the Financial Administration Act, R.S., 1985, c. F-11, a former member of the

Canadian Armed Forces or a former member of the Royal Canadian Mounted Police. A former public servant may be:

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

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

"**pension**" means a pension or annual allowance paid under the Public Service Superannuation Act (PSSA), R.S., 1985, c.P-36, and any increases paid pursuant to the Supplementary Retirement Benefits Act, R.S., 1985, c.S-24 as it affects the PSSA. It does not include pensions payable pursuant to the Canadian Forces Superannuation Act, R.S., 1985, c.C-17, the Defence Services Pension Continuation Act, 1970, c.D-3, the Royal Canadian Mounted Police Pension Continuation Act , 1970, c.R-10, and the Royal Canadian Mounted Police Superannuation Act, R.S., 1985, c.R11, 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:

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

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

Work Force Adjustment Directive

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

If so, the Bidder must provide the following information:

a. name of former public servant;
b. conditions of the lump sum payment incentive;
c. date of termination of employment;
d. amount of lump sum payment;
e. rate of pay on which lump sum payment is based;

f. period of lump sum payment including start date, end date and number of weeks;
g. number and amount (professional fees) of other contracts subject to the restrictions of a work force adjustment program.

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

2.4 Enquiries - Bid Solicitation

All enquiries must be submitted in writing to the Contracting Authority no later than ten (10) calendar days before the bid closing date. Enquiries received after that time may not be answered.

Bidders should reference as accurately as possible the numbered item of the bid solicitation to which the enquiry relates. Care should be taken by Bidders to explain each question in sufficient detail in order to enable Canada to provide an accurate answer. Technical enquiries that are of a proprietary nature must be clearly marked "proprietary" at each relevant item. Items identified as “proprietary” will be treated as such except where Canada determines that the enquiry is not of a proprietary nature. Canada may edit the question(s) or may request that the Bidder do so, so that the proprietary nature of the question(s) is eliminated and the enquiry can be answered to all Bidders. Enquiries not submitted in a form that can be distributed to all Bidders may not be answered by Canada.

2.5 Applicable Laws

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

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

2.6 Improvement of Requirement During Solicitation Period

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

2.7 Maximum Funding

A maximum of three (3) contracts is expected to be awarded and the maximum funding available for each contract resulting from the bid solicitation is **200,000.00$** (Applicable Taxes extra, as appropriate). Bids valued in excess of this amount will be considered non-responsive. This disclosure does not commit Canada to pay the maximum funding available.

ID	Study Category	Description	Expected number of contracts
SN	Planetary Exploration	Secondary Payloads and Nanomissions	3

2.8 Bidders' Conference

A bidders' conference will be held no later than **November 30th 2017**, by way of virtual conference. *The conference exact time will be confirmed by way of an amendment to the RFP*. The scope of the requirement outlined in the bid solicitation will be reviewed during the conference and questions will be answered. It is recommended that bidders who intend to submit a bid attend.

Bidders are recommended to communicate with the Contracting Authority before the conference to confirm attendance. Bidders should provide, in writing, to the Contracting Authority, the name(s) of the person(s) who will be attending and a list of any issues they wish to table, no later than 2 working days prior to the conference.

Any clarifications or changes to the bid solicitation resulting from the bidders' conference will be included as an amendment to the bid solicitation. Bidders who do not attend will not be precluded from submitting a bid.

2.9 Basis for Canada's Ownership of Intellectual Property

The Canadian Space Agency (CSA) has determined that any intellectual property rights arising from the performance of the Work under the resulting contract will belong to Canada, for the following reasons, as set out in the *Policy on Title to Intellectual Property Arising Under Crown Procurement Contracts*:

- The main purpose of the Contract, or of the deliverables contracted for, is to deliver a not-yet fully developed component or subsystem that will be incorporated into a complete system at a later date, as a prerequisite to the planned transfer of the complete system to the private sector, through licensing or assignment of ownership, for the purposes of Commercial Exploitation.

PART 3 - BID PREPARATION INSTRUCTIONS

3.1 Bid Preparation Instructions

The Bidder must clearly identify on the first page of the bid the **Study ID #,** as indicated in Table 4A1 of Attachment 1 to Part 4 of this document, **to indicate which Eligible Investigation they are bidding on**, and the title should reflect the study subject. A proposed study may be related to several eligible investigation categories, in which case, **the Study ID # of the primary investigation** should be identified on the first page.

The Bidder must submit one separate bid for each study proposed. The Bidder must follow the same instructions described in this Request for proposal for each bid they submit.

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

Section I: Technical and Managerial Bid (1 hard copy and 1 soft copy on CD/DVD/USB)

Section II: Financial Bid (1 hard copy and 1 soft copy on CD/DVD/USB)

Section III: Certifications (1 hard copy and 1 soft copy on CD/DVD/USB)

a) 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;

b) For the soft copies of Section I (Technical and Managerial Bid as well as the Executive Summary), all of the information must be contained in two files (one for the Technical and Managerial Bid and one for the Executive Summary). The only acceptable formats are: MS Word, PDF and HTML Format chosen for Section I must allow the text to be copied (unprotected) for evaluation and other operational purposes;

c) For the soft copy of Section II (Financial Bid), all of the information must be contained in one file. The only acceptable formats are: MS Word, PDF and HTML. Format chosen for Section II must allow the text to be copied (unprotected) for evaluation and other operational purposes;

d) The soft copy of Section II must be submitted on a separate CD/DVD/USB key than the soft copy submitted for Section I;

e) Prices must appear in Section II (Financial Bid) only. **No prices must be indicated in any other section of the bid**;

f) The total number of pages **for Section I**: Technical and Managerial Bid **must not exceed 40 pages** (8.5 X 11 inches) (216 mm X 279 mm) paper, **excluding resumes**. If the number of pages of Section I, as described herein, is exceeded, **the evaluation will strictly be based on the first 40 pages submitted and resumes.**

g) The bid should use a numbering system that corresponds to the bid solicitation;

In April 2006, Canada issued a policy directing federal departments and agencies to take the necessary steps to incorporate environmental considerations into the procurement process Policy on Green

Procurement (http://www.tpsgc-pwgsc.gc.ca/ecologisation-greening/achatsprocurement/politique-policy-eng.html).
To assist Canada in reaching its objectives, Bidders should:

1) use 8.5 x 11 inches (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.

Part 4: *Evaluation Procedures and Basis of Selection* contains additional instructions that Bidders should consider when preparing their technical and managerial bid.

The structure and content requested for the Technical and Managerial Bid (Section I) are detailed in Attachment 1 to Part 3: *Technical and Managerial Bid Preparation Instructions.*

Section II: Financial Bid

3.1.1 Bidders must submit their financial bid in accordance with the following:

(a) A firm, all-inclusive lot price for the Work, not exceeding the maximum funding available for the contract resulting from the bid solicitation. The total amount of applicable taxes should be shown separately, if applicable;

(b) For Canadian-based bidders, prices should be in Canadian funds, Applicable Taxes excluded and Canadian customs duties and excise taxes included.

3.1.2 Electronic Payment of Invoices – Bid

If you are willing to accept payment of invoices by Electronic Payment Instruments, complete Attachment 2 to Part 3 - Electronic Payment Instruments, to identify which ones are accepted.

If Attachment 2 to Part 3 - Electronic Payment Instruments is not completed, it will be considered as if Electronic Payment Instruments are not being accepted for payment of invoices.

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

3.1.3 Price Breakdown

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

(a) Labour: For each individual and (or) labour category to be assigned to the Work, indicate: i) the hourly rate, inclusive of overhead and profit; and ii) the estimated number of hours.

(b) Equipment: Specify each item required to complete the Work and provide the pricing basis of each one, Canadian customs duty and excise taxes included, as applicable.

(c) Materials and Supplies: Identify each category of materials and supplies required to complete the Work and provide the pricing basis.

(d) Travel and Living Expenses: Indicate the number of trips and the number of days for each trip, the cost, destination and purpose of each journey, together with the basis of these costs which must not exceed the limits of the National Joint Council (NJC). With respect to the NJC's Directive, only the meal, private vehicle and incidental allowances specified in Appendices B, C and D of the Directive http://www.njc-cnm.gc.ca/directive/travelvoyage/index-eng.php, and the other provisions of the Directive referring to "travellers", rather than those referring to "employees", are applicable. The Treasury Board Secretariat's Special Travel Authorities, http://www.tbssct.gc.ca/pubs_pol/hrpubs/tbm_113/statb-eng.asp, also apply.

(e) Subcontracts: Identify any proposed subcontractor and provide for each one the same price breakdown information as contained in this article.

(f) Other Direct Charges: Identify any other direct charges anticipated, such as long distance communications and rentals, and provide the pricing basis.

(g) Applicable Taxes: Identify any Applicable Taxes separately.

Section III: Certifications

Bidders must submit the certifications required under Part 5.

PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION

4.1 Evaluation Procedures

(a) Bids will be assessed in accordance with the entire requirement of the bid solicitation including the technical and managerial and financial evaluation criteria;

(b) An evaluation team composed of representatives of Canada will evaluate the bids.

4.1.1 Technical Evaluation

4.1.1.1 Mandatory Evaluation Criteria

The mandatory evaluation criteria are described at Attachment 1 to Part 4: *Mandatory and Point Rated Technical and Management Evaluation Criteria*. Bids which fail to meet the mandatory evaluation criteria will be declared non-responsive.

4.1.1.2 Point Rated Technical and Management Criteria

Point Rated Technical Evaluation Criteria are described at Attachment 1 to Part 4: *Mandatory and Point Rated Technical and Management Evaluation Criteria*. Criteria not addressed will be given a score of zero.

4.1.1.2.1 Bidder Experience

Except where expressly provided otherwise, the experience described in the bid must be the experience of one or more of the following:

1. The Bidder itself (which includes the experience of any companies that formed the Bidder by way of a merger but does not include any experience acquired through a purchase of assets or an assignment of contract); or

2. The Bidder's affiliates (i.e. parent, subsidiary or sister corporations), provided the Bidder identifies and demonstrates the transfer of know-how, the use of toolsets and the use of key personnel from the affiliate for the applicable criterion; or

3. The Bidder's subcontractors, provided the Bidder includes a copy of the teaming agreements and identifies the roles and responsibilities of all parties under the agreement and how their work will be integrated.

The experience of the Bidder's suppliers will not be considered.

4.1.2 Financial Evaluation

4.1.2.1 Mandatory Financial Criteria

The Bidder must submit a firm, all-inclusive lot price for the Work, which must not exceed the maximum funding available for the contract resulting from the bid solicitation (Applicable Taxes extra, as appropriate).

Bids which fail to meet the mandatory financial criteria will be declared non-responsive. Bids valued in excess of this amount will be considered nonresponsive. This disclosure does not commit Canada to pay the maximum funding available.

4.1.2.2 Evaluation of Price

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

4.2 Basis of Selection – Highest Combined Rating for Technical Merit Within Budget

4.2.1 To be declared responsive, each bid must:

(a) comply with all the requirements of the bid solicitation;

(b) meet all mandatory evaluation criteria;

(c) obtain the required minimum rating of 25 points (out of 40 points) for Merit criteria;

(d) obtain the required minimum rating of 62.5 points overall (out of 100 points) for all categories of the point-rated evaluation criteria (i.e. *Merit, Feasibility and Management criteria***)**.

The rating is performed on a scale of 100 points.

4.2.2 Bids not meeting (a) or (b) or (c) or (d) will be declared non-responsive;

4.2.3 For each responsive bid, the rankings for each evaluation criteria will be combined for the overall score.

4.2.4 The responsive bids with the highest overall scores will be recommended for award of contract, up to the number of expected contracts.

4.2.5 In the event that two or more responsive bids obtain the same overall ratings, the bid which obtained the highest rating for the *Merit Criteria* will be recommended for award of contract.

PART 5 - CERTIFICATIONS AND ADDITIONAL INFORMATION

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

The certifications provided by Bidders to Canada are subject to verification by Canada at all times. Unless specified otherwise, Canada will declare a bid non-responsive, or will declare a contractor in default if any certification made by the Bidder is found to be untrue, whether made knowingly or unknowingly, during the bid evaluation period or during the contract period.

The Contracting Authority will have the right to ask for additional information to verify the Bidder's certifications. Failure to comply and to cooperate with any request or requirement imposed by the Contracting Authority will render the bid non-responsive or constitute a default under the Contract.

5.1 Certifications Required with the Bid

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

5.1.1 Integrity Provisions - Declaration of Convicted Offences

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

5.2 Certifications Precedent to Contract Award

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

5.2.1 Integrity Provisions – Required Documentation

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

5.2.2 Federal Contractors Program for Employment Equity - Bid Certification

By submitting a bid, the Bidder certifies that the Bidder, and any of the Bidder's members if the Bidder is a Joint Venture, is not named on the Federal Contractors Program (FCP) for employment equity "FCP Limited Eligibility to Bid" list (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.

Canada will also have the right to terminate the Contract for default if a Contractor, or any member of the Contractor if the Contractor is a Joint Venture, appears on the "FCP Limited Eligibility to Bid" list during the period of the Contract.

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

5.2.3 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. If the answer to the questions and, as applicable the information required have not been received by the time the evaluation of bids is completed, Canada will inform the Bidder of a time frame within which to provide the information. Failure to comply with Canada's request and meet the requirement within the prescribed time frame will render the bid non-responsive.

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

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

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

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

Former Public Servant in Receipt of a Pension

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

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

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

By providing this information, Bidders agree that the successful Bidder's status, with respect to being a former public servant in receipt of a pension, will be reported on departmental websites as part of the

published proactive disclosure reports in accordance with Contracting Policy Notice: 2012-2 and the Guidelines on the Proactive Disclosure of Contracts.

Work Force Adjustment Directive

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

If so, the Bidder must provide the following information:

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

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

5.3 Additional Certifications Precedent to Contract Award

5.3.1 Canadian Content Certification

This procurement is limited to Canadian goods and Canadian services.

The Bidder certifies that:

( ) a minimum of 80 percent of the total bid price consist of Canadian goods and Canadian services as defined in paragraph 5 of clause A3050T.

For more information on how to determine the Canadian content for a mix of goods, a mix of services or a mix of goods and services, consult Annex 3.6.(9), Example 2, of the Supply Manual

5.3.1.1 *SACC Manual* clause A3050T (2014-11-27) Canadian Content Definition.

5.3.2 Status and Availability of Resources

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

control of the Bidder: death, sickness, maternity and parental leave, retirement, resignation, dismissal for cause or termination of an agreement for default.

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

5.3.3 Education and Experience

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

PART 6 - FINANCIAL AND OTHER REQUIREMENTS

6.1 Financial Capability

SACC Manual clause A9033T (2012-07-16), Financial Capability

PART 7 - RESULTING CONTRACT CLAUSES

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

7.1 Statement of Work

The Contractor must perform the Work in accordance with the Statement of Work in Annex A and the Contractor's technical and Managerial Bid entitled _____, dated _____*(will be inserted at contract award)*.

7.2 Standard Clauses and Conditions

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

7.2.1 General Conditions

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

7.2.1.1 SACC Manual Clause K3410C (2015-02-25) Canada to Own Intellectual Property Rights in Foreground Information

7.3 Term of Contract

7.3.1 Period of the Contract *(will be inserted at contract award)*

From date of Contract award until _____.

7.4 Authorities

7.4.1 Contracting Authority

The Contracting Authority for the Contract is:

Martine Mathurin
Public Works and Government Services Canada
Quebec Region
Place Bonaventure, 1st Floor
800 de la Gauchetière Street West
Suite 1110
Montreal (QC), H5A 1L6

Telephone: 514-496-3859
Facsimile: 514-496-3822
E-mail address: martine.mathurin@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

7.4.2 Project Authority *(will be inserted at contract award)*

The Project Authority for the Contract is:

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

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

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

7.4.3 Contractor's Representative *(will be inserted at contract award)*

The Contractor's Representative for the Contract is:

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

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

7.5 Proactive Disclosure of Contracts with Former Public Servants

SACC Manual Clause A3025C (2013-03-21)

7.6 Payment

7.6.1 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 the Contract for a cost of $ _____ *(the amount will be inserted at contract award).* Customs duties are included and Applicable taxes are extra, if applicable.

7.6.2 Limitation of Price

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

7.6.3 Method of Payment

7.6.3.1 Milestone Payments

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

(a) an accurate and complete claim for payment using form PWGSC-TPSGC 1111 (http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/1111.pdf) and any other document required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;

(b) all the certificates appearing on form PWGSC-TPSGC 1111 have been signed by the respective authorized representatives;

(c) all work associated with the milestone and as applicable any deliverable required has been completed and accepted by Canada.

7.6.3.2 Schedule of Milestones

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

7.7 SACC Manual Clauses

SACC Manual Clause A9117C (2007-11-30), T1204 - Direct Request by Customer Department

7.8 Electronic Payment of Invoices – Contract

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

a. Visa Acquisition Card;
b. MasterCard Acquisition Card;
c. Direct Deposit (Domestic and International);
d. Electronic Data Interchange (EDI);
e. Wire Transfer (International Only);
f. Large Value Transfer System (LVTS) (Over $25M)

7.9 Invoicing Instructions - Progress Claim - Firm Price

1. The Contractor must submit a claim for progress payment using form PWGSC-TPSGC 1111 Claim for Progress Payment (https://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/1111.pdf).

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.
(d) a copy of the progress report, as applicable.

2. Applicable Taxes must be calculated on the total amount of the claim before the holdback is applied. At the time the holdback is claimed, there will be no Applicable Taxes payable as it was claimed and payable under the previous claims for progress payments.

3. The Contractor must prepare and certify **one (1) original and two (2) copies** of the claim on form PWGSC-TPSGC 1111, and forward:

a) the **original and one (1) copy** to the Canadian Space Agency at the address shown on page 1 of the Contract under "Invoices" (Financial Services Section) for appropriate certification by the Project Authority identified herein after inspection and acceptance of the Work takes place; and,

b) **one (1) copy of the original** progress claim to the Contracting Authority identified under the section entitled “Authorities” of the Contract.

4. The CSA's Financial Services Section will then forward the original and one (1) copy of the claim to the Contracting Authority for certification and onward submission to the Payment Office for the remaining certification and payment action.

5. The Contractor must not submit claims until all work identified in the claim is completed.

7.10 Certifications and Additional Information

7.10.1 Compliance

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

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

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

7.10.3 SACC Manual Clause

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

7.11 Applicable Laws

The Contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in _____ *(to be inserted at contract award).*

7.12 Priority of Documents

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

(a) the Articles of Agreement;
(b) the general conditions 2040 (2016-04-04) General Conditions - Research & Development;
(c) Annex A, Statement of Work;
(d) Annex B, Basis of Payment;
(e) the Contractor's bid dated _____ (insert date of bid) (If the bid was clarified or amended, insert at the time of contract award: "as clarified on _____" **or** ", as amended on _____" and insert date(s) of clarification(s) or amendment(s))

7.13 Foreign Nationals (Canadian Contractor)

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

7.14 Insurance

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

7.15 Directive on Communications with the Media

1. DEFINITIONS

“Communication Activity(ies)” includes: public information and recognition, the planning, development, production and delivery or publication, and any other type or form of dissemination of marketing, promotional or information activities, initiatives, reports, summaries or other products or materials, whether in print or electronic format that pertain to the present agreement, all communications, public relations events, press releases, social media releases, or any other communication directed to the general public in whatever form or media it may be in, including but without limiting the generality of the preceding done through any company web site.

2. COMMUNICATION ACTIVITIES FORMAT

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

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

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

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

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

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

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

The Contractor must obtain and use a high resolution printed or electronic copy of the CSA's corporate identity logo and seek advice on its application, by contacting the Project Authority, mentioned in section 7.4.2 of this contract.

3. COMMUNICATION ACTIVITY COORDINATION PROCESS

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

a. As soon as the Contractor intends to organize a Communication Activity, send a Notice to the CSA's Directorate of Communications and Public Affairs. The Communications Notice must include a complete description of the proposed Communication Activity. The Notice must be in writing in accordance with the clause Notice included in the general conditions applicable to the contract. The Communications Notice must include a copy or example of the proposed Communication Activity.

b. The contractor must provide to the CSA any and all additional document in any appropriate format, example or information that the CSA deems necessary, at its entire discretion to correctly and efficiently coordinate the proposed Communication Activity. The Contractor agrees to only proceed with the proposed Communication Activity after receiving a written confirmation of coordination of the Communication Activity from the CSA's Directorate of Communications and Public Affairs.

c. The Contractor must receive beforehand the authorization, approval and written confirmation from the CSA's Directorate of Communications and Public Affairs before organizing, proceeding or hosting a communication activity.

ANNEX "A"

STATEMENT OF WORK

The Statement of Work, appended to the bid solicitation package, is to be inserted at this point and forms part of this document.

ANNEX B

BASIS OF PAYMENT

SCHEDULE OF MILESTONES

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

Milestone No.	Deliverable	Firm Amount	Delivery Date
1	Specify		
2	Specify		
3	Specify		
Etc			

Total Firm Price CAN $_____
(Taxes Extra, if applicable)

ATTACHMENT 1 TO PART 3

TECHNICAL AND MANAGERIAL BID PREPARATION INSTRUCTIONS

3A.1 Technical and Managerial Bid

The details provided in this Attachment complement the information introduced in sections 3.1 and 3.2 of Part 3 - Bid Preparation Instructions.

As indicated in Part 3, section 3.1 par. f) of this RFP, Bidders are reminded that the total number of pages for Section I: Technical and Managerial Bid **must not exceed 40 pages** (8.5 X 11 inches) (216 mm X 279 mm) paper, **excluding resumes**. If the number of pages of Section I, as described herein, is exceeded, the evaluation will strictly be based **on the first 40 pages submitted and resumes.**

The information should be organized in the following order:

1. Title / Project Identification Page (see 3A.2);
2. Executive Summary (see 3A.3);
3. Table of Contents (see 3A.4);
4. Technical and Managerial Section (see 3A.5);
5. Bid Appendices (see 3A.6).
    a) List of acronyms used in the Bid;
    b) Short résumés or NSERC form 100 or equivalent; and
    c) List of Contacts.

    If applicable and within the page limit:

    d) Relevant technical papers published by team members;
    e) Any other Bid appendices deemed appropriate and required by the Bidder.

Note: The structure of the Technical and Managerial Bid, and its subsections, are described below. In this attachment, some of the subsection headings are followed by numbers in brackets. These numbers represent the Evaluation Criteria (see Table 4A2 of Attachment 1 to Part 4) that are applicable to that specific section/subsection, for each bid submitted by the bidder.

3A.2 Title/Project Identification Page

The first page of the bid submitted should be laid out in according to the requirements of Part 3 of this Request for Proposal (RFP) and should clearly state the following information:

a) The Request for Proposal (RFP) file number;
b) The Bidder's organisation name and address;
c) The Category of the proposed project;
d) The title of the proposed project (the use of acronyms in the title is discouraged, unless they are described). The title should reflect the study subject; and
e) A short summary of the Bid summarizing the Bid in 8 lines (maximum).

3A.3 Executive Summary

The Executive Summary of the Technical and Managerial sections of the Bid should be a stand-alone document suitable for public dissemination, for example, through the CSA web site. The Executive Summary should not exceed one page in length (8.5 X 11 inches) (216 mm X 279 mm) paper and should highlight the following elements:

- Science investigation objectives;
- Mission concept;
- Team;
- Main scientific and technical innovations;
- Major milestones and deliverables; and
- Relevance to CSA strategy and programs.

Bidder should provide the Executive Summary in Soft copy with the only acceptable formats being: MS Word, PDF or HTML in a separate file and not contain any proprietary markings.

3A.4 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 bid's electronic version.

3A.5 Mandatory and Point Rated Technical Evaluation Criteria

Technical Bid

The Bid should describe the proposed project as outlined in the following subsections. The bidder should strive to address all items described under the letter "D" of each criterion, as described in section 4A.3: *Evaluation Criteria and Benchmark Statements,* at Attachment 1 to Part 4 of this RFP.

3A.5.1 Mandatory Criteria

3A.5.1.1 Eligible Categories

- Planetary Science priorities are derived by CSA from community consultation. Priorities for this SOW are derived directly from the 2016-17 consultation on 'Canadian Space Exploration: Science and Space Health Priorities for Next Decade and Beyond' which included the 2016 Canadian Space Exploration Workshop and planetary Topical Teams for Astrobiology; Planetary Atmospheres; Planetary Geology, Geophysics and Prospecting; and Planetary Space Environment. (Ref: SOW MDR-09)
- Investigations undertaken through this Concept Study must correspond to a community priority as listed in Table 4A1 of Attachment 1 to Part 4. The investigations must address the corresponding science objective. Where the priority is general, e.g., Moon or Mars, one planetary body must be selected such that development reflects a target mission and its operational environment. Specific mission opportunities with launch dates need not be identified, but where a mission target exists it should be named and described. The Earth and geospace may not be proposed. The Earth's Moon is an eligible target.

3A.5.2 Point Rated Technical Criteria

3A.5.2.1 Science Investigation (Management Criteria)

3A.5.2.1.1 Relevance of the Investigation to the SE Program (Evaluation Criterion 1)

(see section 4A.3.1.1, Criterion 1, *Relevance of the Investigation to the SE Program of Attachment 1 to Part 4)*

This subsection should provide the substantiated evidence describing the relevance of the proposed mission investigation concept relative to the Program Requirements and Objectives in the scope of work. It should address all Program Requirements and Objectives.

3A.5.2.1.2 Expected impact of the Investigation (Merit of the Investigation) (Evaluation Criterion 2)

***(see section 4A.3.1.2,* Criterion 2, *Merit of the Investigation* of Attachment 1 to Part 4)**

This subsection should clearly describe the science goals and objectives of the proposed investigation and provide evidence describing the merit of the proposed science objectives relative to Canadian science priorities and the domain of planetary science, substantiated by a literature review. It also describes the impact the mission will have on the Canadian public and the plan for public engagement.

3A.5.2.1.3 Traceability of the Investigation (Evaluation Criterion 3)

***(see section 4A.3.1.3,* Criterion 3, *Traceability of the Investigation* of Attachment 1 to Part 4)**

This subsection should provide the traceability from science goals to mission functional requirements in tabular form using the template provided in the SOW – Table 3-1, accompanied by narrative description, demonstrating the appropriateness of the investigation approach to meeting science objectives.

The section must include a high level description of a preliminary baseline and threshold mission investigation, and for the preliminary baseline mission, a high level description of data that will be generated on board, received by the ground system, and processed for public archive.

3A.5.2.2 Technical Implementation (Feasibility Criteria)

3A.5.2.2.1 Scope, understanding and feasibility of the scientific approach (Evaluation Criterion 4)

(see section 4A.3.2.1, Criterion 4, *Scope, understanding and feasibility of the scientific approach* of Attachment 1 to Part 4)

This section should describe the mission concept, identifying and substantiate in detail the underlying system requirements and the scientific principles and knowledge necessary for realizing the proposed concept. It should thoroughly demonstrate an understanding of these requirements and principles. The proposal should include a presentation of proposed concept and operations requirements that will be addressed by the proposed activities and objectives, and their relationship to overall objectives. References to and a thorough discussion of the existing literature relevant to the central theme of the proposed concept is provided.

3A.5.2.2.2 Scope, understanding and feasibility of the technical approach (evaluation criterion 5)

(see section 4A.3.2.2, Criterion 5, *Scope, understanding and feasibility of the technical approach* of Attachment 1 to Part 4)

In this subsection the Bidder should provide a description and overall feasibility assessment of the proposed technical approach and the degree to which it is capable of delivering the goals and technical objectives.

This includes the compatibility of the technology selected and incorporation into the proposed design for addressing the technical requirements and enhancements. The bidder should elaborate on the technical risks associated with the eventual integration and implementation of the concept.

The proposed effort should be clearly communicated and well substantiated. A well thought-out, feasible and valid concept and methods that can obtain the desired technical results should be presented. The bid should show and substantiated that overall scenario is valid. It should be demonstrated that the proposed concept relies on well proven technology.

3A.5.2.2.3 Feasibility of Achieving the Goals and Technical Objectives (Evaluation Criterion 6)

(see section 4A.3.2.3, Criterion 6, *Feasibility of Achieving the Goals and Technical Objectives* of Attachment 1 to Part 4)

The section should address the scope and aspects of the proposed concept in relation to what is asked in the statement of work. It should provide a detailed description and substantiation of a relevant approach for

the concept development. It should provide a preliminary design of the technology and a description of the operation concept.

A preliminary technology development roadmap should be presented in order to meet the technical basic requirements and enhancements of the study. The CSA Technology Readiness Levels and Assessment Guidelines are provided in CSA-ST-GDL-0001 (MRD-06 in the SOW) for further details on technology readiness.

Managerial Bid

The Managerial Bid should demonstrate the effectiveness and commitment of the Bidder in delivering the project on time and budget. Its sub-sections should address in detail: key-personnel qualifications, team organisation and arrangements, previous project experience, and the Management Plan.

3A.5.2.3 Team Capability - Management Criteria (Evaluation Criterion 7)

(see section 4A.3.3.1, Criterion 7, *Team Capability* of Attachment 1 to Part 4)

3A.5.2.3.1 Team expertise

This subsection should identify the Principal Investigator, Project Manager and Technical Lead and outline their respective qualifications applicable to the SOW. It should identify the key members of the project's science, technical, and management teams and state their specific and relevant qualifications and experience for the work involved. Short résumés in keeping with the specified page limit are to be put in an appendix of the Technical Bid. Provisions for back-up personnel for key positions are to be stated.

Key personnel identified must include at least the principal investigator, project manager and technical leads for all the top-level technical work packages.

3A.5.2.3.2 Team Organisation and Arrangements

This subsection should outline the roles and responsibilities of the proposed team members, and discuss and highlight the unique expertise they offer with respect to the capability of the team. This subsection should also provide details on the subcontractors' roles, responsibilities and on the nature of their contractual relationship with the prime contractor. An organisation chart should be included illustrating the structure of the proposed project team.

Letters of Agreement between the prime contractor, subcontractors, and other collaborators should be provided in an Appendix. These Letters of Agreement typically describe the scope-of-work, financial contributions, IP ownership, commercialisation activities, and any other applicable items. For scientific co-investigators, this letter should include the proposed role and time commitment for the concept study.

3A.5.2.3.3 Previous Project Experience

The Bidder should identify any previous experience with Research and Development (R&D) projects of a similar scope as the one proposed, including any projects undertaken with the CSA or other government institutions. The Bidder should list previous projects and assignments undertaken, within the last five years,

which are relevant to proposed scope of work. The Bidder should identify any team members in the current Bid that participated in those other projects and describe the nature of their contributions to those projects.

Note: The Bidder may describe as many previous projects as it feel is necessary in order to adequately demonstrate the experience and qualifications of the company and of the proposed team, as long as the Bid length is compliant to the requirement.

3A.5.2.4 Project Management Plan (Evaluation Criterion 8)

(see section 4A.3.3.2 Criterion 8 *Project Management Plan* of Attachment 1 to Part 4)

This subsection describes the Management Plan that will be retained in order to deliver the project, and to do so in the most effective manner.

The Management Plan should contain, as a minimum, the following information: Work Package (WP) definitions, personnel allocation, managerial risk assessment, schedule, milestones and deliverables.

The Management Plan's presentation should be based on the recognised management tools most applicable to the proposed project, such as a scope planning (Work Breakdown Structure (WBS)), schedule development charts (e.g. Gantt chart, etc.). Equivalent project-tailored tools/charts are also acceptable, provided that the information is complete and comprehensive.

3A.5.2.4.1 Work Package Definition and Project schedule

This Management Plan subsection should define and specify the work to be executed according to the requirements of this SOW. The project should be broken down into Work Packages (WPs).

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

Work Packages should be defined in sufficient depth in order for the Bidder to demonstrate a clear understanding of the process that will be followed to perform the project.
As a guideline, Table 3A1 of this attachment presents a fictitious example of a Work Package Definition Sheet.

The Bidder should provide a detailed SOW for each subcontractor along with a Letter of Agreement in Principle to be included in the Bid Appendices. **The subcontractors' price information should be included in the Financial Bid only.**

Table 3A1: Example of Work Package Definition Sheet

Project:	**Novel 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 Bid, indicate value 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		
Objectives:	1) Deliver a functional test setup for the T/R unit	
Inputs:	1) Test plan and procedure 2) Unit drawings 3) Unit Interface Control Documents	
Tasks	1) Review input documentation 2) Define requirements 3) Produce initial concept 4) Design test setup 5) Fabricate test setup 6) Commission and debug	
Outputs and Deliverables	1) Fully functional T/R unit test setup 2) Test setup log manual 3) Test setup user manual	

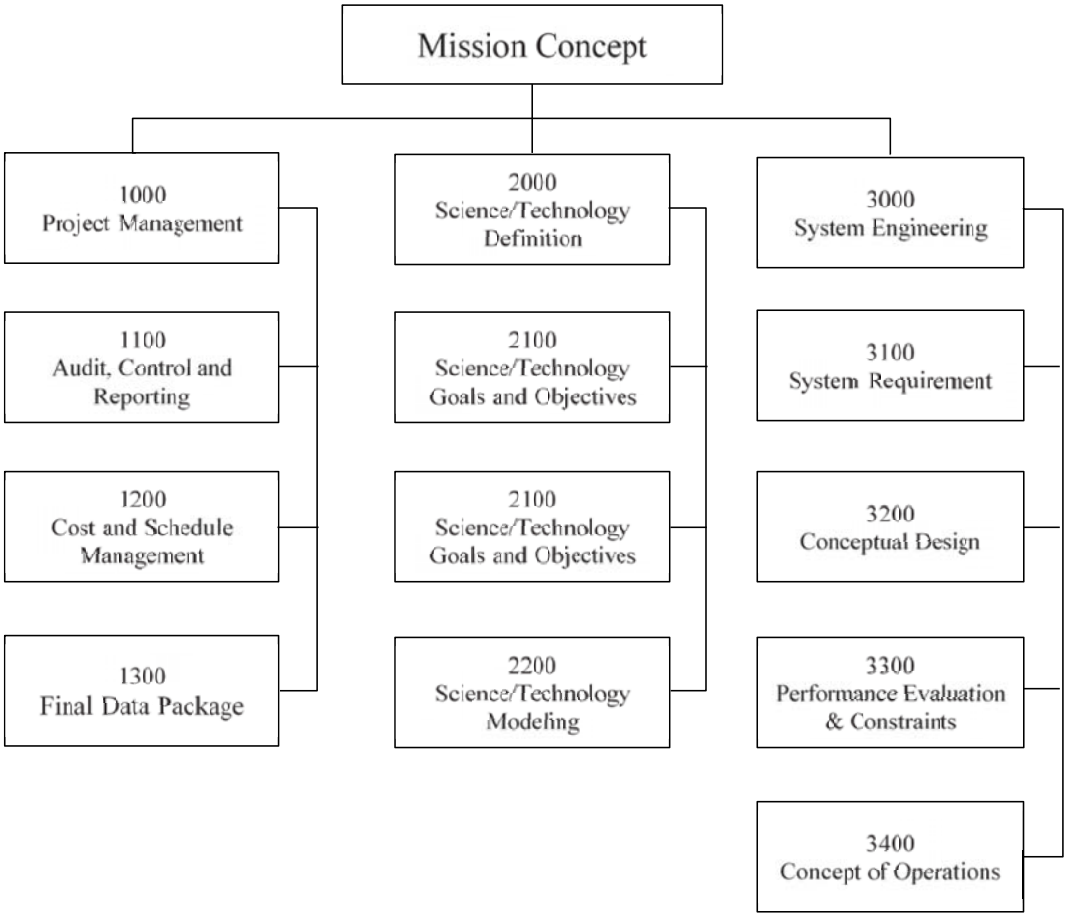

Figure 3A1: Example of a Work Breakdown Structure

Please see SOW for details of the WBS required for this work.

3A.5.2.4.2 Personnel Allocation

This Management Plan subsection should include a resource assignment matrix 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. As a guideline, Table 3A2 of this attachment presents a fictitious example of a Responsibility Allocation Matrix (RAM) also known as a Resource Allocation Matrix. The RAM should be presented in both the Technical and Managerial Bid and the Financial Bid.

Table 3A2: Example of Responsibility Allocation Matrix

WBS Number	Work Pack 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

P: Participant A: Accountable

3A.5.2.4.3 Managerial Risk Assessment

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

3A.5.2.4.4 Milestones and Deliverables

Milestones and deliverables should be detailed in accordance to what is specified in Table 4-1 in Annex A - Statement of Work.

3A.5.2.4.5 Schedule

This Management Plan subsection should relate tasks, milestones and deliverables to a project schedule. **For planning purposes, the project expected start date is January 2018.**

The project schedule must provide a graphical representation of predicted tasks, milestones, dependencies, resource requirements, task duration, and deadlines. The project's master schedule must inter-relate all tasks on a common time scale and be in the form of a Gantt chart.

The project schedule must be detailed enough to show each 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. A sample WBS is provided in Figure 3A1.

3A.5.2.4.6 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 Progress Report (DID-0006). Additionally, the Project Control System should provide the capability to report the amount of work per Work Package 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.

3A.6 Bid Appendices

3A.6.1 Required Bid Appendices

The following items should be addressed in individual appendices, as part of the Bid.

a) List of Acronyms: All the acronyms used in the Bid should be explained. The list of Acronyms should be appended to Section I: Technical and Managerial Bid;

b) Resumes: The Bid should include short professional résumés of all key personnel and these should be appended to Section I: Technical and Managerial Bid. NSERC form 100 may be used for convenience. Résumés will not be included in the page limit count;

c) 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 contract negotiations.

The following example format should be used:

Table 3A3: Bidder's List of Contacts

Role	Name	Telephone	Fax	E-mail
Project Manager				
Principal Investigator				
Contracting Authority				
Claims officer				
Communications (for press release)				
Etc.				

3A.6.2 Applicable Bid Appendices

The following Bid appendices may be provided with Section I: Technical and Managerial Bid. Only documents that are relevant and will be useful to support the Bid should be provided. Appendices must be within the specified page limit to be considered.

c) Relevant scientific technical papers published by team members

d) Any other Bid appendices deemed appropriate and necessary by the Bidder

ATTACHMENT 2 TO PART 3

ELECTRONIC PAYMENT INSTRUMENTS

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

( ) VISA Acquisition Card;
( ) MasterCard Acquisition Card;
( ) Direct Deposit (Domestic and International);
( ) Electronic Data Interchange (EDI);
( ) Wire Transfer (International Only);
( ) Large Value Transfer System (LVTS) (Over $25M)

ATTACHMENT 1 TO PART 4

MANDATORY AND POINT RATED TECHNICAL EVALUATION CRITERIA

4A.1 Mandatory Evaluation Criteria

4A.1.1 Eligible Categories

Investigations undertaken through this Concept Study must correspond to one of the community priorities listed in Table 4A1. The proposed investigations must address the corresponding science objective.

TABLE 4A1:

COMMUNITY SCIENCE PRIORITIES DERIVED FROM 2016 CSA TOPICAL TEAMS AND CANADIAN SPACE EXPLORATION WORKSHOP

ID #	Topic	Objective	Eligible Investigations
SN-1	Astrobiology	Accessing Special Regions including the subsurface of Mars, Europa, Titan or Enceladus for astrobiology	Sterilisable penetrator, micro-penetrator or micro-rover investigations
SN-2	Planetary Atmospheres	Understanding the chemistry of planetary atmospheres	Canadian-led nanosatellite investigations
SN-3	Planetary Atmospheres	Constrain the Dynamics of Planetary Atmospheres	Independently commandable weather stations/cloud tracking cameras: deployed packages from landed spacecraft
SN-4	Planetary Atmospheres	Constrain the Dynamics of Planetary Atmospheres	Network of meteorological stations

ID #	Topic	Objective	Eligible Investigations
SN-5	Planetary Geology, Geophysics & Prospecting	Document the geological record and processes that have shaped the surface of the terrestrial planets, their moons, icy satellites, and asteroids	Investigations using nanosats, micro-rovers and landed packages
SN-6	Planetary Geology, Geophysics & Prospecting	Determine the Resource Potential of the Moon, Mars, and asteroids	Investigations using nanosats, micro-rovers and landed packages
SN-7	Planetary Geology, Geophysics & Prospecting	Understand the origin and distribution of volatiles on the terrestrial planets and their moons, asteroids, and comets	Investigations using nanosats, micro-rovers and landed packages
SN-8	Planetary Geology, Geophysics & Prospecting	Determine the interior structure and properties of the terrestrial planets and their moons, icy satellites, and asteroids	Investigations using nanosats, micro-rovers and landed packages
SN-9	Planetary Space Environment	To understand the role of magnetic fields, plasma, and atmosphere-ionosphere dynamics on the history and evolution of planets and other solar-system bodies	Investigations using Nanosats and landed packages
SN-10	Planetary Space Environment	To understand and characterize the plasma processes that shape the heliosphere and drive planetary and interplanetary space weather and related effects, which create hazards to space exploration.	Investigations using Nanosats and landed packages

4A.2 Impact / Technical / Management Point Rated Evaluation Criteria

Proposals meeting the mandatory criteria will be evaluated and scored as specified in Table 4A2: "List of Evaluation Criteria and Associated Ratings".

Proposals which fail to obtain the required minimum number of points specified will be declared non-responsive. Each point rated technical criterion should be addressed separately.

The Bidder should achieve the minimum score requirements as indicated in Table 4A2. Bids will be evaluated according to the point-rated criteria as specified in Table 4A2 and subsection 4A.3 of this document: "Evaluation Criteria and Benchmark Statements".

The criteria are grouped under the following divisions:

1) Merit;
2) Feasibility; and
3) Management.

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

0 = 0% of 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 Requirements and Technical Principles*" 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 4A2 identifies:

1) The maximum point rating assigned to each criterion;
2) The maximum point rating possible for each criteria category (*Merit, Feasibility*, and *Management*);
3) The minimum point rating required for the *Merit* criteria category;
4) The maximum point rating possible for the overall score;
5) The minimum point rating required for the overall score.

Table 4A2: List of Evaluation Criteria and Associated Ratings

Evaluation Criteria	Ratings
Merit Criteria	
1) Relevance of the Investigation to the SE Program	15
2) Expected impact of the Investigation	15
3) Traceability of the Investigation	10
Minimum Score	***25***
Maximum Score	***40***
Feasibility Criteria	
4) Scope and understanding of the scientific approach	10
5) Scope and understanding of the technical approach	10
6) Feasibility of achieving the goals and technical objectives	20
Maximum Score	***40***
Management Criteria	
7) Team Capability	10
8) Project Management Plan	10
Maximum Score	***20***
Maximum Overall Score	***100***
Minimum Overall Score Requirement	***62.5***

4A.2.1 Cross-References to Evaluation Criteria in the Bid (Optional)

The Bidder may complete the following table by indicating where in its Bid the information is found demonstrating how the proposal meets the evaluation criteria, in order to assist in the assessment of the Bid.

Table 4A3: Cross-References to Evaluation Criteria in the Bid

Bidder: **Project Title:**	
Evaluation Criteria	**Location where the information is found in the Bidder`s bid**
1	
2	
3	
4	
5	
6	
7	
8	

4A.3 Evaluation Criteria and Benchmark Statements

4A.3.1 Merit Criteria

This criterion evaluates the relevance and merit of the proposed concept relative to the scope of work presented in the Statement of Work.

4A.3.1.1 Relevance of the proposed investigation to the SE program

This criterion evaluates the relevance of the proposed secondary payload mission objectives to CSA SE Program Requirements and Objectives as described in the SOW. The consideration that proposed mass, interfaces, and technical approaches are appropriate for the nominal host mission and launch date values both near term mature investigations, and highly novel investigations targeting more distant and less well known potential opportunities for which more technology development is needed.

0)
- The mission investigation proposed does not meet Program Requirements and does not address Objectives in the SOW.

A)
- The proposed mission investigation meets Program Requirements, but does not address all Program Objectives described in the SOW.

B)
- The proposed mission investigation meets Program Requirements and addresses all Program Objectives described in the SOW, but the approach to meeting Objectives is weakly defined and some key information is missing.

C)
- The proposed mission investigation meets Program Requirements and addresses all Program Objectives described in the SOW, and the approach to meeting Objectives is clear, AND,
- The proposed mass, interfaces, and technical approaches are appropriate for the nominal host mission and launch date, AND,
- The bid demonstrates clear opportunities to demonstrate Canadian scientific or technological strengths.

D)
- The proposed mission investigation meets Program Requirements and addresses all Program Objectives described in the SOW, and the approach to meeting Objectives is clear and well defined, AND,
- The proposed mass, interfaces, and technical approaches are appropriate for the nominal host mission and launch date, AND,
- The mission investigation is substantiated as a compelling opportunity for Canada to pioneer a significant new technological or scientific approach with expectation of follow on benefits to Canada.

4A.3.1.2 Expected impact of the proposed science investigation

This criterion evaluates the degree to which the bid addresses Canadian science priorities described in the SOW and the impact this investigation will have in the science discipline and on

the public, if successful. This criterion also addresses international impact in terms of the fit of proposed investigation to international program science objectives or missions.

0)

- The science objectives are weakly aligned with Canadian science priorities described in Table 4A1 of Attachment 1 to Part 4, OR,
- The anticipated data duplicates other mission data without a meaningful case for the augmented data set.

A)

- The scientific objectives address questions aligned with the Canadian science priorities described in Table 4A1 of Attachment 1 to Part 4.

B)

- The scientific objectives address questions aligned with the Canadian science priorities described in Table 4A1 of Attachment 1 to Part 4, AND,
- The proposed investigation is broadly complementary to international programs.

C)

- The scientific objectives address questions directly aligned with the Canadian science priorities described in Table 4A1 of Attachment 1 to Part 4, AND,
- The proposed investigation contains elements that are novel in terms of science and/or technology approaches, AND,
- The proposed investigation is highly complementary to important international objectives or missions, AND,
- A theme for public engagement is described that is likely to inspire the public.

D)

- The scientific objectives address questions directly aligned with the Canadian priorities described in Table 4A1 of Attachment 1 to Part 4, AND,
- The proposed investigation contains elements that are highly novel in terms of science and/or technology approaches, AND,
- The proposed investigation is highly complementary to important international objectives or missions, AND,
- A theme for public engagement, which includes the use of mission imagery is well-described and likely to inspire the public and maintain interest for the duration of the mission.

4A.3.1.3 Traceability of the science investigation

This criteria evaluates the clarity and completeness of the proposal with respect to science elements, and the understanding of the relationship between science objectives and the investigation concept.

0)

- The science objectives are not described

A)

- The proposed science objectives are not substantiated; OR,

- The proposal is poorly written such that it is difficult to understand, and significant assumptions need to be made by the reader to interpret its intent.

B)

- The proposed science objectives are described and substantiated with a literature review, but key references and justifications are missing' OR,
- Traceability of the science objectives to proposed mission concept is presented, but does not demonstrate good understanding through lack of key details and justifications.

C)

- The proposed science objectives are clearly described in the context of international scientific goals and substantiated with a literature review that indicates good understanding, AND,
- Traceability between objectives, measurement needs, and proposed mission concept is presented and shows good understanding of the needs the science objectives impose on mission design.

D)

- The proposed science objectives are clearly described in the context of recent results and international scientific goals and the literature review that provides substantiation is complete and indicates full understanding, AND,
- Traceability between objectives, measurement needs, and proposed mission concept is presented that is comprehensive and shows full understanding of the needs the proposed science objectives impose on investigation design.

4A.3.2 Feasibility Criteria

4A.3.2.1 Scope and understanding of the scientific approach

This criterion assesses the degree to which the scope of the Science Work Package required in the Statement of Work is addressed, the degree to which work is planned to meet this scope, the appropriateness of the methodologies proposed for the scientific approach and the degree to which it is capable of meeting the science goals of the mission and the requirements of the Science Work Package.

0)

- No plan is provided to address the Science Work Package requirements.

A)

- A broad methodology for the proposed science is described but a plan of work for the Science Work Package is not presented, OR,
- The methodology is appropriate but is unsubstantiated by a literature review and better approaches exist, OR,
- The proposed scientific approach presents significant risks that the science goals of the mission and science Work Package objectives will not be achieved.

B)

- A plan is described to address the main scope of the Science Work Package, and the methodologies (experiments, tools, models and/or approaches) described in this plan are appropriate and substantiated by a literature review, AND
- The chosen methodologies are sufficient to allow the work to be completed and planned study goals achieved, but risks exist, AND,
- The planned work is likely to result in the mission investigation achieving a Science Readiness Level less than 3 at the end of this concept study, with some undefined key and driving science requirements, and an incomplete science roadmap for future work.

C)

- A detailed plan is described to comprehensively address the scope of the Science Work Package, and the methodologies (experiments, tools, models and/or approaches) described in this plan are appropriate and substantiated by a literature review, AND
- The chosen methodologies are sufficient to allow the work to be completed and planned study goals achieved, but risks exist, AND,
- The planned work is likely to result in well-defined baseline and threshold requirements with clear traceability to science objectives and well understood impact on science return. AND
- The planned work is likely to result in the mission investigation achieving Science Readiness Level 3 at the end of this study.

D)

- A detailed plan is described to comprehensively identify and validate science requirement values for the measurements and data processing needed to address the proposed science objectives, AND
- The methodologies (experiments, tools, models and/or approaches) described in this plan are appropriate and substantiated by a literature review, AND
- The chosen methodologies are comprehensive and will allow the work to be completed and planned study goals achieved with minimal risks, AND
- The planned work is highly likely to result in well-defined baseline and threshold requirements with clear traceability to science objectives and well understood impact on science return, AND
- The planned work is highly likely to result in the mission investigation achieving Science Readiness Level 3 or above at the end of this study, and provides a comprehensive science roadmap for future work.

4A.3.2.2 Scope and Understanding of the Technical Approach

This criterion assesses the degree to which the scope of the Technical Work Package required by the Statement of Work is addressed in the Bid, the understanding of the technical principles involved, the degree to which work is planned to meet this scope and is appropriate. This criterion assesses if the proposed technical effort is well documented and substantiated.

0)

- No plan is provided to address the Technical Work Package requirements, OR
- The technical principles driving the proposed concept are not identified.

A)

- The plan of work to address the scope of the Technical Work Package is incomplete, OR
- The proposal includes an incomplete overview of the main Technical requirements, OR,
- The proposal demonstrates incomplete knowledge of the technical principles relevant to the goal of the study.

B)

- The bid includes a high level overview of the main requirements, AND,
- The proposal exhibits a general understanding of these requirements and principles AND
- The plan of work addresses the main scope of the Technical Work Package, but some minor details are missing, AND,
- The proposal demonstrates a basic knowledge of the technical principles relevant to the goal of the study.

C)

- The proposal includes a review which demonstrates an understanding of the main requirements; AND
- The proposal demonstrates knowledge of the technical principles relevant to the goal of the study; AND
- The technical work planned adequately addresses the entire concept study scope; AND
- The proposal includes references to and a discussion of other work or previous activities relevant to the central theme of the proposed concept.

D)

- The proposal includes an exhaustive review of all requirements and demonstrates a thorough understanding; AND
- The proposal demonstrates a comprehensive knowledge of the technical principles relevant to the goal of the study; AND
- The technical work planned is well-defined and fully addresses the concept study scope; AND
- The proposal includes references to and a thorough discussion of the existing literature relevant to the central theme of the proposed concept.

4A.3.2.3 Feasibility of Achieving Goals and Objectives

The criterion assesses the description and overall feasibility of the proposed approach and the degree to which it is capable of delivering the goals and objectives. This includes the compatibility of the technology selected and incorporation into the proposed design for addressing the technical requirements and enhancements, as well as the feasibility of the scientific approach to meet the science goals of the mission and the requirements of the Science Work Package. This criterion evaluates the technical risks associated with the eventual integration and implementation of the concept. It assesses if the proposed effort is well documented and substantiated.

0)

- The feasibility of achieving the scientific goals and technical objectives is not addressed; OR
- The proposed concept is not feasible.

A)

- The feasibility of the proposed concept is not clearly demonstrated; OR
- The proposed concept may obtain the desired results, but significant technical gaps exist.; OR
- Main elements of a preliminary technology development road map, in order to meet the technical basic requirements, are not provided.

B)

- The proposal presents an adequate case with system(s) that can deliver the objectives; AND
- The proposed concept can obtain the desired technical results, but some details or information of limited importance are omitted; AND
- Some elements of a preliminary technology development road map, in order to meet the basic technical requirements are provided.

C)

- The proposal presents a well-referenced case with system(s) that can deliver the objectives; AND
- The proposed concept displays creative, feasible and valid concepts and methods that can obtain the desired results with details; AND
- A preliminary technology development road map is presented in order to meet the basic technical requirements of the study.

D)

- The proposal presents a well-referenced and convincing case with system(s) that can undoubtedly deliver the objectives; AND
- The proposed concept relies on well proven technology with one or more components having flight heritage and is substantiated with ample details; AND
- A preliminary technology development roadmap is presented in order to meet the basic technical requirements and enhancements of the study.

4A.3.3 Management Criteria

4A.3.3.1 Team Capability

This criterion assesses the capability (education, knowledge, experience, expertise and completeness of skill-sets in science, engineering and management) of the personnel assembled to carry out the proposal.

0)
- The proposed team does not have the required skill-set to fulfill all areas of the statement of work (SOW)

A)
- The proposed team lacks relevant expertise and may not be capable of fulfilling the statement of work (SOW); OR
- The roles and responsibilities of the team members are not defined.

B)
- The proposed team is lacking expertise in some areas but demonstrates that it is capable of fulfilling the statement of work (SOW); AND
- Some team members have experience in the design and development and/or operation of space flight software or hardware in a similar environment as described in the SOW.

C)
- The relevant expertise of the proposed team demonstrates that it is highly capable of fulfilling the statement of work (SOW); AND
- The completeness of the team is very well demonstrated through the complementarities of skills of its members and by the roles / tasks that they are assigned during the concept study; AND
- The roles and responsibilities for most of the team members, including sub-contractors, are defined; AND
- The key personnel have experience in the design and development and/or operation of space flight software or hardware in a similar environment as described in the SOW.

D)
- The relevant expertise of the proposed team demonstrates that it is highly capable of fulfilling the statement of work (SOW) with the potential of delivering an authoritative concept; AND
- The roles and responsibilities of all the team members, including all sub-contractors, are defined; AND
- The completeness of the team is very well demonstrated through the complementarities of skills of its members and by the roles / tasks that they are assigned during the concept study; AND
- The key personnel have significant experience in the design and development and/or operation of space flight software and hardware in a similar environment as described in the SOW; AND,
- The science team includes representation from two or more Canadian universities.

4A.3.3.2 Project Management Plan

This criterion assesses the completeness of the management plan (including, WPs, personnel allocation, detailed schedule and milestones, and managerial risk assessment) and evaluates the effectiveness of the described methodology in successfully achieving the stated objectives of the work to be carried out in this study.

0)
- The management plan is not addressed; OR
- No schedule is provided.

A)
- The proposal presents a poor work-plan; OR
- The proposed methodology is not effective in achieving the objectives of the work; OR
- Risks are not identified.

B)
- The proposal presents a basic work-plan; OR
- The proposed methodology is not effective in achieving the objectives of the work as per the proposed schedule; OR
- Risks are identified, however mitigation strategies are missing or insufficient.

C)
- The work-plan as described in the proposal is based on a methodological approach; AND
- The effectiveness of the proposed methodology in achieving the objectives of the work as per the proposed schedule is credible; AND
- Risks are identified and mitigation strategies are discussed.

D)
- The work-plan as described in the proposal follows a clearly defined methodology; AND
- The effectiveness of the proposed methodology in achieving the objectives of the work in the proposed schedule is credible; AND
- Comprehensive risk analysis and mitigation strategies are provided.

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CSA-SPEX-SOW-0002

Canadian Space Agency

Annex "A"

Space Exploration Concept Studies for Planetary Secondary Payloads and Nanomissions

Statement of Work (SOW)

Initial Release

9 November, 2017

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1 INTRODUCTION

1.1 PROGRAM BACKGROUND

The exploration of space is a highly visible endeavour, a powerful driver for scientific and technical innovation, a magnet for world-class talent, and an incentive for young Canadians to pursue careers in science and technology. This study is part of the implementation of the Space Policy Framework of Canada in which the Government commits to: ensuring that Canada is a sought-after partner in the international space exploration Missions that serve Canada's national interests; and, continuing to invest in the development of Canadian contributions in the form of advanced systems and scientific instruments as part of major international endeavours.

To determine the nature of Canada's potential contributions to future international space exploration, the Canadian Space Agency (CSA) engages in several types of activities, which include the following possible groupings: (i) consultation and prioritisation; (ii) science definition studies; (iii) concept and contribution studies; (iv) science maturation studies; and, (v) prototyping, testing and deployment. Through these activities, and responding to Space Exploration stakeholders priorities, CSA's Space Exploration Strategic Planning defines the science and technology developments of highest strategic interest. Results from these activities prepare well-defined options in which Canada can confidently invest. In addition, these studies are of high importance to the CSA to encourage the growth and development of an internationally competitive Canadian space community and advance new ideas.

1.2 OBJECTIVE

The objective of a CSA Space Exploration Concept Study is to develop end-to-end concepts for future mission or payload contributions to Space Exploration endeavours. The results of these studies provide information to assess the viability of investments in potential subsequent developments.

The objective of this study to develop concepts for secondary payload or nanomission investigations for planetary exploration. Definitions of nanomission and secondary payload are provided in Appendix A3.3,5A3.1.3. Specific program requirements are provided in Appendix A3.3, section 5A3.1.4. This work is part of a number of preparatory studies for future missions or mission contribution options that CSA is supporting related to priorities derived from the 2016 Space Exploration Topical Teams and Canadian Space Exploration Workshop (CSEW).

The outcome of the concept study should target CSA Space Exploration's Science Readiness Level (SRL) 3 or higher. The SRL scales are further described in MRD-03 (and summarized in Table 1-1).

TABLE 1-1: THE CSA SPACE EXPLORATION SRL SCALE

(see details in MRD-03)

Science Readiness Level Description	SRL No:	Program or Mission Phase
Basic scientific principles observed and reported	SRL 1	Fundamental research
Science investigation defined	SRL 2	SE R&D programs (preparatory phases including: Science Definition, Concept Studies, Science Maturation)
Science investigation proof of concept	SRL 3	
Science investigation validated using simulated and/or breadboard data	SRL 4	
Science investigation validated using analogue and/or instrument prototype data	SRL 5	CSA Capability Demonstration Programs; Phase 0/A
Science investigation validated using instrument Engineering Model calibration/ characterization data products	SRL 6	Phase BCD
Science investigation validated using instrument Flight Model pre-launch calibration data products (and analogue science operations where relevant)	SRL 7	
Science investigation data production proven through successful mission operations	SRL 8	Phase E operations
Science investigation outcomes generated through publication of results	SRL 9	Phase E data analysis or post operations analysis

1.3 DEFINITIONS

Planetary Exploration: Using space-based platforms to explore solar system bodies, serves to study the origins and evolution of the Solar System, including the investigation of habitable environments beyond Earth that may support (or may have supported) life.

Science Investigation: For the purpose of this study, a mission or instrument science **investigation** is defined as a complete end–to-end activity to generate and use data and/or samples from space to address specific science objective(s). The investigation includes the mission definition, development, manufacture, integration, test and operations phases and must include a well-defined data analysis phase and the delivery of data to a public archive.

- Instrument investigations include the definition, development, test and calibration, characterisation, delivery, integration and operations of the instrument payload(s) and their flight software.

- Mission investigations include the definition, development, test and calibration, delivery, integration and operation of the mission spacecraft and systems and their flight software.
- For both mission and instrument concepts, the definition, development, test and operations of the ground segment is included as a necessary part of the investigation.

Science Baseline: Describes the recommended full investigation for which traceability has been provided to the mission design.

Science Threshold: The minimum acceptable data and scientific return for the mission, below which the science mission or contribution would not be worth pursuing.

Augmented Mission: Describes additions to the Baseline Science Mission should additional resources be available. The Augmented Mission may describe stretch goals for instrument performance where the projected performance is uncertain, or may describe additional payload elements and/or capabilities.

1.4 CONVENTION

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

- "must" indicates a mandatory requirement
- "should" indicates a preferred but not mandatory alternative.
- "will" indicates a statement of intention or fact.

In the following, the term 'contractor' is used to describe the team that will conduct the study, which must be led by a Canadian university or company, and may consist of multiple sub-contracted organizations (universities, companies)

1.5 RESPONSIBILITIES

The CSA is the customer for this study. As such, the Agency has the scientific and technical authority on all matters concerning this study. The Contractor must perform the tasks as outlined in this Statement of Work (SOW) and must deliver the end items defined by this SOW.

1.6 SCOPE

The Contractor must provide the facilities, personnel, materials, and services required to perform the work described in this Concept Study (CS) SOW. This CS SOW provides the requirements and deliverables list that will enable the CSA to recommend options to the government for informed decision-making about potential future science investments.

The detailed scope of work specific to planetary exploration study categories are provided in Appendix A3.3.

2 MASTER REFERENCE DOCUMENTS

The documents identified in Table 2-1 provide additional information or guidelines that either may clarify the contents or are pertinent to the history of this document.

TABLE 2-1: REFERENCE DOCUMENTS

MRD No.	Doc Number/ Source	Document Title	Rev. No.	Date
MRD-01	http://asc-csa.gc.ca/eng/publications/space-policy/default.asp	Government of Canada, Space Policy Framework	-	February, 2014
MRD-02	ftp://ftp.asc-csa.gc.ca/users/ExP/pub/Publications/CSEW2016/LowCostMissions-CSA-AMES-2015/	Report From the CSA/NASA Ames Information Session On Low Cost Space Exploration Missions	-	18 March, 2016
MRD-03	CSA-SPEX-GDL-001 ftp://ftp.asc-csa.gc.ca/users/TRP/pub/Exploration-Core-Science-Definition-Studies/2017	CSA SE Scientific Readiness Level Guidelines	Draft 2.0	June, 2017
MRD-04	JPL D-26359 https://pds.jpl.nasa.gov/documents/pag/pag.pdf	NASA Planetary Data System Proposer's Archiving Guide	Version 1.4	March 29, 2010
MRD-05	CSA-SE-STD-0001 ftp://ftp.asc-csa.gc.ca/users/TRP/pub/SE-STD/	CSA Technical Reviews Standard	A	Nov 7, 2008
MRD-06	CSA-ST-GDL-0001 ftp://ftp.asc-csa.gc.ca/ users/TRP/pub/TRRA	CSA Technology Readiness Levels and Assessment Guidelines	C	March 31, 2017
MRD-07	CSA-ST-RPT-0003 ftp://ftp.asc-csa.gc.ca/ users/TRP/pub/TRM	Technology Roadmap Worksheet	A	Sept 17, 2012
MRD-08	ftp://ftp.asc-csa.gc.ca/users/ExP/pub/Publications/CSEW2016/TopicalTeams-EquipesThematiques/	Topical Teams Reports on Planetary Exploration 2017		Aug 2017

3 TASK DESCRIPTION

The work to be performed by the Contractor under this concept study is divided into four major Work Packages (WPs). Each WP has one or more associated major tasks. Figure 3-1 describes the Work Breakdown Structure (WBS):

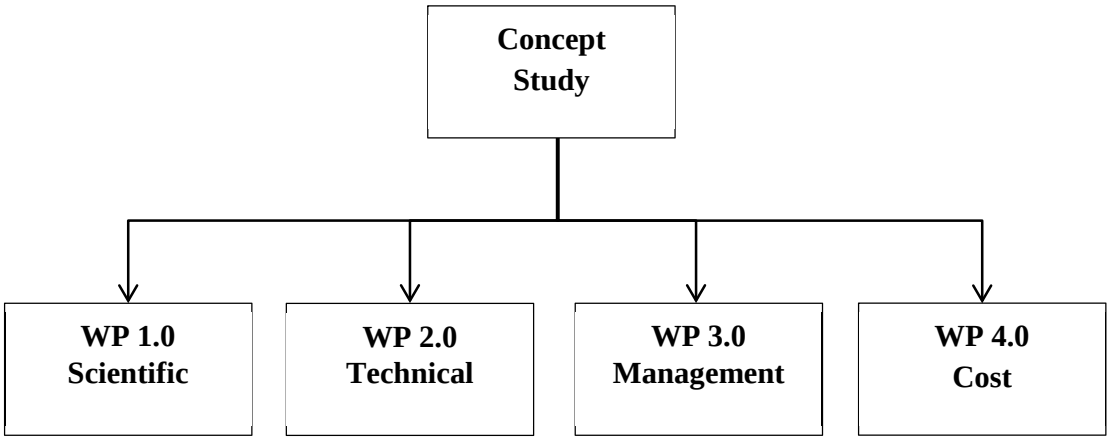

FIGURE 3-1: WORK BREAKDOWN STRUCTURE (TOP LEVEL)

3.1 SCIENTIFIC WORK PACKAGE

This WP includes the work needed to produce the development and documentation of items related to the scientific aspect of the investigation. The work must target SRL 3 or higher as per MRD-03.

The contractor must provide the following information in the Concept Study Report (CDRL 6):

1) The scope of the proposed science investigation including:
   - Science Investigation goals and objectives that address Canadian scientific priorities as identified in the relevant Study Category Appendix. These must be clearly identified and described and be supported by a literature review. During the study the contractor should further develop and refine the proposed goals and objectives.
   - Baseline and threshold science investigations must be described with clear description of loss of science on de-scope from baseline to threshold requirements.
   - Augmented science investigations should also be described.
   - Mission success criteria must be clearly defined for baseline and threshold investigations and should be clearly defined for an augmented mission.
2) Preliminary measurement and operations concept including:
   - Proposed nominal science operations timeline
   - High-level description of modes of operation
   - Nominal commissioning and calibration operations
3) The traceability of the proposed baseline investigation must be supported by narrative discussions in the concept study report and documented in the applicable Traceability matrix. Examples of a Science Traceability Matrix and a Mission Traceability Matrix are given in Table 3-1 and Table 3-2.
   - Science Traceability matrix: The flow-down from the science goals and objectives, to measurement objectives that constitute the baseline investigation, to the data to be returned, and the instrument or experiment complement to be used in obtaining the required data. This Matrix provides systems engineers with functional requirements needed to design the associated systems, and can be used to show the effects of de-scoping or loss of elements in terms of degradation of science.
   - Mission Traceability Matrix: The mission requirements that the science goals and objectives impose on the mission design elements, instrument accommodation, spacecraft design, ground systems, communications approach, and mission operations plan. Specific information that describes how the science investigation imposes unique requirements on these mission design elements must be included, including contamination control and planetary protection requirements. This matrix should be completed for instrument as well as mission science investigations, providing details of the mission capabilities needed to implement the instrument investigation even if a target mission is not identified.
4) Science Readiness Level self-assessment, based on MRD-03.
5) A preliminary science plan which includes sufficient detail on which to base a rough schedule and order of magnitude costing for science team activities from Phase 0-E, and with detailed description of desired pre-Phase A science maturation activities:

- Preliminary description of Phase 0-E science development activities
- A description of the approach to science requirements validation/ verification
- A description of the approach to calibration and characterisation of the required instrument(s).
- A description of the approach to science operations staffing
- An assessment of the feasibility of the data product development plan

6) Preliminary plan for science dissemination
   - Plans to calibrate, analyze, publish results, and archive the returned data. Where available in the targeted scientific journal, open access options for publishing should be selected.
   - The data plans must identify and provide justification for any period of exclusive access to the data. The Government of Canada and international partners subscribe to open data policies and it is a requirement that data be publically archived.

TABLE 3-1: EXAMPLE SCIENCE TRACEABILITY MATRIX

Science Goals	Science Objectives	Science Measurement Requirements		Instrument Functional Requirements		Projected Performance	Mission Functional Requirements (top level)
		Observables	Physical Parameters				
Goal 1	Objective 1	Absorption line	% abundance of absorber	Vertical resolution	XXkm	ZZ km	Observing strategies: requires yaw and elevation manoeuvres (orbiter), or, traverse and instrument positioning (rover) Launch window: to meet nadir and limb overlap requirement (orbiter) ,or, to achieve landing site (rover) Need YY seasons to trace evolution of phenomena Need YY months of observation to observe variability of phenomena
		Morphological feature	Size of feature	Horizontal resolution	XX deg x XX lat x XX lon	ZZ deg x ZZ lat x ZZ lon	
		Rate of change of observable phenomenon	Duration of event	Temporal resolution	XX min	ZZ min	
				Precision	XX K	ZZ K	
				Accuracy	XX K	ZZ K	
	Objective 2 to N			Repeat above categories			
Goal 2	Repeat above categories						

TABLE 3-2: EXAMPLE MISSION TRACEABILITY MATRIX

Mission Functional Requirements	Mission Design Requirements	Spacecraft Requirements	Ground System Requirements	Operations Requirements
From Table 3-1	Launch date Mission length Orbit/landing site requirements and rationale Spatial coverage and how it drives orbit requirements or surface mobility system range Other	Spinning, stabilised, robotic surface system Pointing or Position Control: knowledge, stability, jitter, drift, other Mass Volume Power Data rate Autonomy Detector radiation shielding Other	Passes per day and duration Data volume per day Transmit frequency Power available for comm Downlink data rate Number of data dumps per day Spacecraft data destination (ground control centre) Science data destination (science operations centre)	General spacecraft manoeuvre reqts Special manouvre rqts and rationale Ephemeris rqts Changes in operations modes over time: by day, season, other, and rationale
Four different observing strategies: limb, solar, nadir and zenith: requires yaw and elevation manoeuvers		Slew rate of X degrees / s Settle = stability of better than 0.001 degrees after 30 secs		Target planning on 3 day centres Ephemeris accuracy of X with updates every day
Instrument X precision of 5K		Thermal stability of 1 degree /hr Bus stability of 0.01degree /10 s	Bit error rate better than 1e-5 Time correlation of 1 msec over 1 week	Weekly time correlation

3.2 TECHNICAL WORK PACKAGE

This WP includes the development and documentation of the technical aspects of the study.

The contractor must provide the following information in the Concept Study Report (CDRL 6).

1) Preliminary Systems Requirements: The Contractor must ensure that key and driving functional and performance requirements necessary for the baseline investigation are captured in the Science and Mission Traceability matrices and that the investigation concept is designed to meet these requirements.
   - Description of the proposed Mission or Instrument investigation concept architecture, including high level schematics of
     - mechanical system and interfaces
     - electrical system and interfaces
     - flight software
     - ground segment for baseline mission.

     Schematics must clearly identify science payload(s) and critical subsystems.

2) Development, Manufacturing and Qualification Approach
   - The Contractor must provide an overview of the development approach, potential key subcontractors, and the general strategy best suited for this approach. The Contractor must also list the major tasks required in the development and manufacturing cycles and identify the potential long lead items. The Contractor must provide the preliminary verification plan, qualification approach, and any assumptions made.
3) Technology Readiness and Risk Assessment (TRRA) and Technology Roadmap (TRM).

- The TRRA is used to assess project status and technical risks, and to guide definition of risk reduction work in the current and following phases. The Contractor must perform a TRRA in accordance with the requirements of the CSA Technology Readiness and Risk Assessment Guidelines (MRD-06) to formally document the technology status.
- The Contractor must also provide a Technology Development Plan, also known as Technology Roadmap (TRM), including the required technology developments to meet components needs, and a plan and timeline to reach TRL 6 and 8.

Additionally the contractor should provide the following information in the Concept Study Report (CDRL 7):

4) Preliminary environmental requirements assumed in this study, for operations and qualification, with justification.
5) Preliminary system budget estimates for mass, volume, power, thermal, software/processing, and, data communications for baseline mission.

3.3 MANAGEMENT WORK PACKAGE

The management work package includes work needed to complete the following tasks:

1) A preliminary schedule for the overall life cycle of the Concept

   The Contractor must prepare a preliminary schedule relative to the overall life cycle of the Concept. The project schedule prepared by the Contractor must provide a graphical representation of predicted tasks, milestones, dependencies, resource requirements, task duration, and deadlines.

   The timeline must include key milestones corresponding to, for instance, Preliminary Design Review (PDR), Critical Design Review (CDR), hardware delivery, readiness for integration, launch. The project's master schedule must inter-relate all tasks on a common time scale and be in the form of a Gantt chart.

   The project schedule must be detailed enough to show each WBS task to be performed, the resources required for completing the task, the start and end date of each task, the deliverables, the long lead items, the expected duration of the task, and finally the critical path. The flight project schedule must be presented in the management report with a Gantt Chart and with a table with all significant milestone dates.

2) A Preliminary Mission Risk Assessment

   The Contractor must provide a preliminary technical, schedule, cost and programmatic risks assessment. For each risk identified, the Contractor should identify the phase of the components to which the risk applies, the likelihood of occurrence, the impact should the risk occur, and any possible mitigation actions that may be taken to decrease either the likelihood or the impact before the components or the phase starts. Specific mitigation actions must be identified for high risks at this time. Contingency plans (i.e., identifying alternative strategies) must also be developed for high risks, or when it is uncertain that mitigation plan will be effective. This general risk assessment must also consider access to information issues, like Export Control (International Traffic in Arms Regulations (ITAR)) and others as potential risks.

3) A Preliminary Business Case

   The Contractor must provide a narrative cost/benefit analysis that could justify government investment in the proposed contribution. This should include a discussion on future business opportunities and benefits to industry directly derived from the work, quantitative estimates of number of HQP whose expertise would be enhanced as a result of the mission broken down by type: engineering staff, faculty, post-doctorate fellows, PhD students, MSc students; quantitative estimate of scientific journal articles produced as a result of this mission, and a discussion on possible spin-off products, including markets. A brief commercialisation plan should be provided where further commercial business opportunities and/or spin-off products are identified, including an estimate of the potential market and markets that would purchase their product.

4) A proposed high level plan for public engagement

   The contractor must propose a plan to promote the science and engineering accomplishments of the mission in a manner that can be understood by the general public.

5) Canadian Capabilities Development

- The Contractor must provide an overview of its strategy to develop and maintain Canadian capabilities. This includes an assessment of current science and industry capability in Canada, and needs for capacity building.
- If the overall approach of the Contractor implies technology transfer and partnership with foreign entities to develop the Canadian capabilities, the Contractor must specify teaming arrangements, Intellectual Property (IP) ownership issues, royalties, etc., as well as opportunities that this partnership would open.

6) Intellectual Property Management

The Contractor must 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. This must be documented as per CDRL 7.

3.4 COST ESTIMATES

The Contractor must provide cost estimates as per Table 3-3 for all phases leading to the development, qualification, implementation, launch, operation and disposal of the hardware/software/instruments resulting from the concept. Each cost estimate must be substantiated by describing the methodology used for each (e.g., bottom-up, analogous, parametric, etc.) and any assumptions made for the derivation. The cost estimates must include planned activities required to mature the science readiness.

TABLE 3-3: COST

		Prior to Mission	Phase A	Phase B	Phase C	Phase D	Phase E	Phase F
Labour	Management							
	Science Support (cal/val/ops/ archiving (contract)							
	Science Data Analysis (grants)							
	Technology Development							
	Design							
	Documentation							
	Reviews							
	Manufacturing							
	Assembly							
	Testing							
	Product Assurance							
	Operations							
	Total Labour							
Non-Labour	HW/SW Procurement							
	Tools, Equipment & Facilities							
	Travel & Living							
	Overhead							
	Total Non-Labour							
Risk	Risk Contingency							
Total								
Total all Phases								

The Contractor must provide an estimate of the anticipated percentage of Canadian content relative to the overall cost. The contractor should recommend options that could be undertaken to maximize the Canadian content, and their corresponding impacts and benefits.

4 CONTRACT MEETINGS AND DELIVERABLES

This section reviews and describes the contract meetings and deliverables.

4.1 CONTRACT MEETINGS

The Contractor must organize the meetings listed in Table 4-1. The exact date and time of the meetings will be mutually agreed to by the PA, the SA, and the Contractor.

TABLE 4-1: MEETING SCHEDULE

Milestone	Meeting	Date	Location
M1	Kick-off Meeting	No later than 2 weeks after contract award	CSA HQ or Telecon
M2	Mid-term Review	Contract award + 6 to 8 months	Telecon
M3	Final Review Meeting	2 weeks prior to end of contract	CSA HQ or Telecon

Meetings are intended to provide an opportunity for the Contractor, the Project Authority (PA), the Scientific Authority (SA), and other invited attendees to review and discuss the concept. Canada reserves the right to invite additional knowledgeable people (public servants or others) to these meetings.

All key participants under the contract, including at least one representative from each subcontractor, must attend all the meetings. In keeping with a low cost approach to project management, it is assumed that contract meetings are by teleconference instead of in person, unless justified and by mutual agreement.

The purpose of the final review meeting is to demonstrate and confirm the feasibility, scientific merit, and overall value and benefits of the concept for Canadians. Should the concept be selected for future development the final review meeting may serve as a preliminary MCR and as such should address the objectives of an MCR as described in MRD-05.

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

4.2 DOCUMENTATION, REPORTING AND OTHER DELIVERABLES

The Contractor must submit the documentation as defined and at the date stipulated in the CDRL, Table 4-2, to the PA. All diagrams must be clearly drawn and labelled.

The Contractor must provide the PA with an electronic copy of all documentation in a format acceptable to the CSA. Both the PDF and original version, e.g. Microsoft Word or PowerPoint, must be provided to CSA. Original version of any figures or tables part of these documents must also be provided to CSA, e.g. Visio file of a figure created in Microsoft Visio, STEP file for models and drawings in Computer Aided Design (CAD) software. Instructions on how to name electronic documents are provided in Appendix A3.1.

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

> © CANADIAN SPACE AGENCY yyyy (insert year)
>
> "RESTRICTION ON USE, PUBLICATION OR DISCLOSURE OF PROPRIETARY INFORMATION
>
> This document is a deliverable under contract no. _____ . This document contains information proprietary to Canada, or to a third party to which Canada may have legal obligation to protect such information from unauthorized disclosure, use or duplication. Any disclosure, use or duplication of this document or any of the information contained herein for other than the specific purpose for which it was disclosed is expressly prohibited except as Canada may otherwise determine."

Then, on all internal pages, each document must 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 must not publish, nor discuss verbally in public (i.e. conferences), nor have published any information contained within this, without the prior written approval of the CSA.

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

TABLE 4-2: CONTRACT DATA REQUIREMENTS LIST (CDRL)

CDRL No.	Deliverable	Due Date	Version	DID No.
1.	Meeting Agendas	Meeting – 1 week	Final	CF
2.	Kick-off Meeting Presentation	Meeting – 1 week	Final	0002
3.	Mid-term Review Meeting Presentation	Meeting – 1 week	Final	0003
4.	Final Review Meeting Presentation	Meeting – 1 week	Final	0004
5.	Meeting Minutes	Meeting + 1 week	Final	CF
6.	Progress Reports	Quarterly	Final	0006
7.	Concept Study Report	Mid Term Review End of contract – 2 weeks	Draft Final	0007
8.	Foreground Intellectual Property (FIP) Disclosure	End of contract – 2 weeks	Final	0008
9.	Technology Readiness and Risk Assessment	Mid Term Review End of contract – 2 weeks	Draft Final	0010

5 LIST OF ACRONYMS

BIP	Background Intellectual Property
BLEO	Beyond Low Earth Orbit
CAD	Computer Aided Design
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CF	Contractor Format
CSA	Canadian Space Agency
CSEW	Canadian Space Exploration Workshop
CTE	Critical Technology Element
DID	Data Item Description
FIP	Foreground Intellectual Property
FTP	File Transfer Protocol
HW	Hardware
HQ	Headquarters
IP	Intellectual Property
ITAR	International Traffic in Arms Regulations
MCR	Mission Concept Review
MM	Animation/Multimedia
MN	Minutes of meeting
MRD	Master Reference Document
MTR	Mid-term Review
NASA	National Aeronautics and Space Administration
PA	Project Authority
PDF	Portable Document Format
PDR	Preliminary Design Review
PDS	Planetary Data System
PM	Project Manager
PR	Progress Report
PT	Presentation
RFP	Request For Proposal
SA	Scientific Authority
SOW	Statement Of Work
SRL	Science Readiness Level
STEP	Standard for the Exchange of Product Data

SW	Software
TN	Technical Note
TRL	Technology Readiness Level
TRM	Technology Roadmap
TRRA	Technology Readiness and Risk Assessment
WBS	Work Breakdown Structure
WP	Work Package
WPD	Work Package Description

APPENDICES

A3.1 DOCUMENT NAMING CONVENTIONS

Context

This appendix presents the naming convention to follow for any documentation generated under this contract.

Documents must contain 4 main components:

1. Project identifier
2. Contract Number
3. Document title
   - revision number or letter
4. Date Tracking number

WXYZ-TYPE-NUM-CIE_ContractNumber document title rev no._sent2017-10-30

1. Project Identifier

The project identifier must contain:

- WXYZ: A 4-8 letter acronym of the project
- TYPE: A 2 letter acronym according to the table below.

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

- NUM: A three digits sequential number (e.g. 001, 002, etc.)
- CIE: Name of Company (no space, no hyphen)

2. Contract Number

- For example: _9F028-07-4200-03

3. Date Tracking Number

- _sentYEAR-MONTH-DAY_draft

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

A3.2 DATA ITEM DESCRIPTION (DID)

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 must contain the following information, as a minimum:

1) Review major assumptions for the study
2) Review of contract deliverables;
3) Work requirements, WBS status and schedule;
4) Plan for FIP and review of BIP;
5) Licensing issues if any;
6) Project's funding and expected cash-flow;
7) Other items as deemed appropriate

   Presentation material must include the required copyrights and IP disclosure statements;

DID-0003 – Mid-Term Review Meeting Presentation

PURPOSE:

To present the results of the work done to date in the contract, and in particular since the previous meeting. The Mid-Term Review is intended as an opportunity for CSA to review the progress to date and provide feedback. The mid-term review must cover the work done to date and provide information on any issues that may impact the final outcome of the study.

PREPARATION INSTRUCTIONS:

The Mid-Term Review Meeting Presentation must contain the following information, as a minimum:

1) Current status of the work including WBS Status, schedule updates and ongoing work requirements
2) Discussion of preliminary results including as a minimum, draft concept of operations, Science Baseline, draft traceability matrices, and preliminary systems architecture
3) Technical and programmatic issues if any;
4) Proposed CTE for TRRA as per MRD-06.
5) Review of contract deliverables;
6) FIP and BIP should be summarized in a draft version of CDRL 7;
7) Licensing and IP issues if any;
8) Other items as deemed appropriate;

   Presentation materials must include the required copyright and intellectual property disclosure statements.

DID-0004 – Final Review Meeting Presentation

PURPOSE:

To present the overall results of the work done for the concept study including the elements of a Mission Concept Review (MCR). See CSA-SE-STD-0001 (MRD-05) for a description of the MCR.

PREPARATION INSTRUCTIONS:

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

1) Detailed presentation of the work conducted (presentation of the content of the technical and/or science report, concept, design, interface, feasibility, etc.)
2) Elements of a Preliminary Mission Concept Review including a discussion of the following:
    a) Mission objectives and needs are clearly understood and comprehensively defined;
    b) The study proves that the mission is feasible;
    c) Mission success criteria have been established for baseline and threshold missions. Augmented mission criteria have been defined if applicable;
    d) The mission conceptual design meets mission objectives and needs;
    e) The preliminary Concept of Operations clearly supports the achievement of the mission objectives and needs;
    f) Interfaces with external systems have been identified.
    g) Technology dependencies (i.e. new or emerging technologies on which the project depends) are understood and alternative strategies for achievement of objectives are identified;
    h) Preliminary mission planning provides an approximate estimation of the resources required for mission execution, including preliminary life-cycle costs, schedule and programmatic resources;
    i) Technology Readiness Assessment (TRA) and Risk Analysis have been completed and potential Risks established;
3) Technical and programmatic issues if any;
4) Contract deliverables;
5) Review of project FIP and BIP;
6) Licensing and IP issues if any;
7) Discuss project management issues;
8) Contractor performance evaluation, must contain the following information, as a minimum:
    - Was the project completed on schedule (list deliverables with planned and actual delivery date)?
    - How many hours of work by highly qualified personnel (by category) did this work create or maintain?

- New opportunities created by the work conducted under the study.

9) Assessment of Benefits to Canada anticipated from mission implementation
   - Canadian HQP training & development
   - Canadian Capabilities Development
   - Business Potential and/or Preliminary Commercialisation Plan
10) Other items as deemed appropriate;
11) Presentation's slides to include the required copyrights and intellectual property disclosure

DID-0006 – Progress Report

PURPOSE:

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

PREPARATION INSTRUCTIONS:

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

1) Current % of completion
2) Updated schedule showing planned and actual completion dates
3) Brief summary of the work performed in the current period
4) The work planned for the following 3 months
5) A highlight of problems, if any, and the proposed corrective approach
6) An Action Item Log in a tabular form, with the following headings in this order:
    - Item Number;
    - Action Item;
    - Open Date;
    - Source of Action Item (e.g. PDR meeting, RID, etc.);
    - Person responsible (for taking action);
    - Target/Actual Date of Resolution;
    - Status (Open or Closed); and
    - Remarks.
7) Any other relevant information deemed necessary.

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

DID-0007 – Concept Study Report

PURPOSE:

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

(The author may define and organize additional sub-sections as deemed appropriate to present the comprehensive results of the concepts study.)

PREPARATION INSTRUCTIONS:

The Concept Study Report must contain the following information, as a minimum:

1) Executive summary suitable for public dissemination on a website (2 page graphic format describing the mission objectives, mission concept, team and the benefits to Canada)
2) Science Investigation
   a) Scope of the proposed investigation
      i) Science Investigation goals and objectives that address Canadian scientific priorities identified in Appendix A3.3.
      ii) Preliminary measurement and operations concept
      iii) Mission success criteria
   b) Traceability of proposed investigation
      iv) Science Traceability Matrix
      v) Mission Traceability Matrix
   c) Baseline and threshold investigations
   d) Planetary protection categorisation
   e) Preliminary science plan
   f) Approach to science dissemination
   g) Science Readiness Level self-assessment, based on CSA-SPEX-GDL-0001 (MRD-03).
3) Technical Implementation
   a) Preliminary Systems Requirements
      a. Key systems requirements including reliability and performance for baseline science requirements case.
      b. Preliminary environmental requirements assumed in this study, for operations and qualification, with justification
   b) Mission concept description, including technical approach and possible options:

a. High level schematics of a) mechanical system b) electrical system c) flight software d) ground segment for baseline mission. Schematics must clearly identify science payload(s) and critical subsystems/development packages.
b. System budget estimates for mass, volume, power, thermal, software/processing, and, data communications for baseline mission
c. A detailed description of baseline science payload(s), and critical subsystems and development packages including schematics of a) mechanical system b) electrical system c) flight software d) ground segment.
d. Preliminary plan for implementation of contamination control requirements, including planetary protection.
e. Preliminary mission operations plan
f. Identification and discussion on design trades relevant to baseline mission
g. Identification and discussion on descopes implied by threshold mission requirements
h. Discussion on options related to augmented mission requirements

c) Interface definition – desired interface with Host Mission
   a. Identification of possible host missions if known.

d) Feasibility & Technology development needs, including
   a. Technology Readiness and Risk Assessment (TRRA) as per DID-0010
   b. Technology development roadmap as per DID-0011
   c. Identification of Canadian Key Industrial Capabilities
   d. Development, manufacturing and qualification approach

4) Management, Schedule and Risk
   a) Proposed Management Approach, including team roles and responsibilities
      i) Phase A-D
      ii) Phase E
   b) Proposed collaboration, if applicable
   c) Proposed Mission Schedule
   d) Estimated Mission Costs for Phases A through D
   e) Preliminary Mission Risk Assessment identification and mitigation:
      i) Technical
      ii) Schedule
      iii) Cost
      iv) Programmatic

DID-0008 – Contractor Disclosure of Intellectual Property

PURPOSE:

To list all Foreground and Background Intellectual Property related to the project, to be reviewed at the Final Review Meeting.

PREPARATION INSTRUCTIONS:

The Disclosure must address the questions listed the document

- CONTRACTOR DISCLOSURE OF INTELLECTUAL PROPERTY that can be found at:

ftp://ftp.asc-csa.gc.ca/users/GPITT-IPMTT/pub/ .

DID-0010 – Technology Readiness and Risk Assessment

PURPOSE:

Referring to the Technology Readiness and Risk Assessment (TRRA) Guidelines (CSA-ST-GDL-0001), the TRRA describes in a systematic and objective fashion, at a specific point in time (milestone) in the development process, 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 (CTEs) 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 CTEs is required prior to the TRRA.

PREPARATION INSTRUCTIONS:

The Technology Readiness and Risk Assessment must be carried out in accordance with the CSA Technology Readiness and Risk Assessment Guidelines using the CSA provided worksheets (MRD-06): the Critical Technologies Elements Identification Criteria Worksheet (CSA-ST-FORM-0003), the Technology Readiness and Risk Assessment Worksheet (CSA-ST-FORM-0001) for each CTE and TRRA summary template (CSA-ST-FORM-0004).

All the completed worksheets must be provided to CSA, and a summary of the TRRA assessment and recommendations must be included in the project Final Report. The project Final Report should also contain the Technology Development Plan, Technology Roadmap (MRD-07) and appropriate inputs to the Risk Assessment, Budget, and Schedule.

DID-0011 – Technology Roadmap

PURPOSE:

The Technology Roadmap (TRM) is a plan that matches short-term and long-term goals with specific technology solutions to help meet those goals. Developing a roadmap has three major uses. It helps reach a consensus about a set of needs and the technologies required to satisfy those needs; it provides a mechanism to help forecast technology developments; and it provides a framework to help plan and coordinate technology developments.

PREPARATION INSTRUCTIONS:

The Technology Roadmap must be prepared as per CSA-ST-GDL-0001 [MRD-06] for each technology in a standard excel format as per CSA-ST-RPT-003 (MRD-07).

A3.3 SECONDARY PAYLOADS AND NANOMISSIONS

A3.1.1 OBJECTIVE

This Concept Study Category supports the development of complete mission science investigation concepts that can be accomplished using Space Exploration secondary payloads and nanomissions.

It is expected that the proposed science investigations would, by necessity, push the current technology state-of-the-art, involve innovative thinking, advanced engineering, and/or technology development for instruments and/or spacecraft systems.

A3.1.2 BACKGROUND

Recently, small satellites have been suggested as a means to execute scientific missions at far lower cost and complexity than typical space science missions. Community ideas were explored in the 2015 joint CSA-NASA Ames Information Session on Low Cost Space Exploration Missions (MRD-02). Additionally, NASA's Planetary Science Program is considering including small secondary payloads on every future planetary science launch. This study will provide an initial concept for a secondary payload which CSA could contribute, should a suitable slot become available.

A3.1.3 DEFINITIONS

For the purpose of this study, **planetary secondary payloads** include nanomissions and penetrators that would be released from a host spacecraft at orbit entry or from orbit of the planetary body, and stand-alone packages (including small rovers) that could be deployed by a large rover or lander platform at the surface of the planetary body.

Nanomissions are here defined as satellite missions under 20 kg mass, and are assumed to be based on the CubeSat form factor. Cubesats are built from a set of standardized subunits that each measure 10x10x10 cm and weigh 1.33 kg (designated '1U'). Common configurations include 1U, 2U, 3U, and 6U (2Ux3U) spacecraft.

This Concept Study Category includes the use of CubeSat form factors from 1U up to 12U.

A3.1.4 PROGRAM REQUIREMENTS AND OBJECTIVES

The study must be compliant with following Space Exploration (SE) Program Requirements for Secondary Payloads (SP):

- Requirement SP-1. The secondary payload mission must directly address Canadian science priorities (MRD-08).

  Concepts should be science-driven, technology enabled.

- Requirement SP-2. The secondary payload mission must be Canadian-led.

  Contributions from other Canadian and international organizations should be clearly identified, with detailed roles and responsibilities, and 'in-kind' and financial contributions. Mission investigations are sought that are compelling opportunities for Canada to pioneer a significant new technological or scientific approach with expectation of follow on benefits to Canada.

- Requirement SP-3. The Concept must include an imager in the mission baseline and a plan to communicate results and benefits to the public.
- Requirement SP-4. The planetary protection categorization for the mission must be provided.
- Requirement SP-5. For penetrators and landed missions, the reference landing site information must be provided.
- Requirement SP-6. The Concept must clearly define the expected environmental conditions at the destination (radiation, dust, etc.) and demonstrate that the mission can be accomplished at the intended destination beyond low Earth orbit (BLEO).

In addition, the study must address the following SE Program Objectives for Secondary Payloads (OSP):

- Objective OSP-1: Mission Cost

  Costs to CSA should not exceed C$20M for secondary payload phases ABCD as defined in MRD-06 (Systems Engineering standards).

  This cost cap includes industry and science team costs for the baseline mission investigation and excludes taxes and CSA overhead. There is no cost cap for the phase E operations and data analysis phase as the duration of phase E can vary significantly according to planetary destination. Cost estimates and technology readiness and risk analysis arising from this study will be an important factor for future planning.
- Objective OSP-2: Mission launch date

  Targeted launch dates should be no earlier than 2020 and the secondary payload should be designed to be transferrable to later opportunities.
- Objective OSP-3: Secondary payload interface and mission architecture

  A realistic interface and mission architecture that will deliver the payload to its destination should be described. Specific target host mission details should be supplied, if known. The secondary payload should be designed on the basis of non-interference with the host spacecraft to maximise opportunities for flight.
- Objective OSP-4: Secondary payload mass and volume

  An upper mass and volume limit is not provided for small rovers or deployed packages. Landed mass is always at a premium so the contractor must provide justification for the mass and volume of the system in terms of compelling science objectives commensurate with the proposed mass, cost and technical feasibility.
- Objective OSP-5: Mission management

  CSA Technical Reviews Standards (MRD-05) allow for modifications of the full-up approach to reviews for low cost missions. The Contractor should propose and describe a low cost systems engineering approach to secondary payload project management in CDRL 006 (Concept Study Report).

  Should a secondary payload be selected for implementation as a mission, CSA may consider awarding a single contract to a Principal Investigator (PI)-led team, comprising both industrial contractor and science team, rather than awarding separate science support

and industrial prime contracts. The study should provide a recommendation and narrative describing the resulting decision-making structure and subcontract(s). In the event it is recommended that a PI institution subcontracts the industrial prime, the capability of the PI institution to manage the contract, and previous PI experience in missions should be discussed. In the event it is recommended that a PI-led science team is subcontracted by an industrial prime, the PI authority in decisions related to mission scope and risk should be described.