

**REQUEST FOR PROPOSALS (RFP) FOR THE REQUIREMENT OF:**

**2013 CSA EXPLORATION CORE SCIENCE DEFINITION STUDIES FOR  
SPACE EXPLORATION**

**FOR THE:**

**CANADIAN SPACE AGENCY**



**Bid Submission Deadline:**  
**February 5<sup>th</sup>, 2014 at 2:00 PM (EST)**

Submit Bids to:

Canadian Space Agency  
TENDERS RECEPTION OFFICE  
Receiving/Shipping (between 8:00 am and 4:30 pm)  
6767 Route de l'Aéroport  
Saint-Hubert QC  
Canada J3Y 8Y9

Attention: Robert Kardum

Reference: CSA File No. **9F052-130442/A**

December 13<sup>th</sup>, 2013




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## PART 1 - GENERAL INFORMATION

### 1. Introduction

The bid solicitation and resulting contract document is divided into six parts plus attachments and annexes, as follows:

- Part 1 General Information: provides general description of the requirement;
- Part 2 Bidder Instructions: provides the instructions, clauses and conditions applicable to the bid solicitation and states that the Bidder agrees to be bound by the clauses and conditions contained in all parts of 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, if applicable, and the basis of selection;
- Part 5 Certifications: includes the certifications to be provided;
- Part 6 Resulting Contract Clauses: includes the clauses and conditions that will apply to any resulting contract.

The Attachments include:

[Pricing Schedule](#)  
[Outline and Content of Technical/Managerial Bid](#)  
[Technical and Financial Criteria and Evaluation Procedures](#)  
[Certifications Precedent to Contract Award](#)

The Annexes include the:

[Annex "A" Statement of Work](#)

### 2. Summary

Requirement Development is part of the Exploration Core program of the Canadian Space Agency. Through Requirement Development, Exploration Core supports CSA's exploration planning activities and defines the science and technology developments most likely to be required in future space exploration missions of interest to Canada, and assesses potential contributions that Canada could make to such missions. Concept Studies are part of the Requirement Development activity

Science Definition studies allow for initial investigation of science needs in areas of CSA priority through the development of science approaches, models and tools. These tools developed under this initial phase are important for trade studies and analysis of de-scope options later in the mission development cycle, and typically have a long lead time for development.

This requirement requests Science Definition Studies proposals in the following areas of space exploration:

- Planetary science investigations associated with priority planetary target bodies for future CSA mission contributions. Priority planetary target bodies are Mars and the moon.



- Space life sciences investigations. The space life sciences program aims to identify, characterize and mitigate risks associated with human exploration of space

Proposals are sought in four Science Definition Study (SDS) Categories, described in the Statement of Work. This includes both requests for Science Definition Studies (SDS) proposals for planetary science (SDS 1 and SDS 2) as well as in life sciences (SDS 3 and SDS 4). Multiple contracts may be awarded from this RFP

The complete description of the work to be completed under this requirement in the Statement of Work provided in [Annex "A"](#).

Interested bidders are required to submit their proposals in accordance with the instructions provided in this RFP.

### **3. Communications Notification**

As a courtesy, the Government of Canada requests that successful bidders notify the Contracting Authority in advance of their intention to make public an announcement related to the award of a contract.

### **4. Debriefings**

After contract award, bidders may request a debriefing on the results of the bid solicitation. Bidders should make the request to the Contracting Authority within 15 working days of receipt of notification that their bid was unsuccessful. The debriefing may be provided in writing, by telephone or in person.



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## PART 2 - BIDDER INSTRUCTIONS

### 1. Standard Instructions, Clauses and Conditions

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

The [2003 \(2012-03-02\) Standard Instructions - Goods or Services - Competitive Requirements](#), are incorporated by reference into and form part of the bid solicitation. The Standard Instructions 2003 (2012-03-02) - Goods or Services - Competitive Requirements, is amended as follows:

1. Subsection 5.2.d. is deleted in its entirety.

2. In subsection 5.4,

Delete: sixty (60) days

Insert: one hundred and twenty (120) days.

3. In Sections 06 and 07,

Delete: PWGSC

Insert: Canada.

4. Section 08 is deleted in its entirety.

5. Subsection 20.2. is deleted in its entirety.

6. In subsections 12.1.a. and 12.1.b.,

Delete: "Vendor Performance Corrective Measure, under the Vendor Performance Corrective Measure Policy"

Insert: "corrective measure, under the CSA's Contractor Performance Evaluation policy".

This solicitation and any resulting Contract(s) are being issued directly by the CSA and not by PWGSC acting as Contracting Authority on the CSA's behalf. As a result, for the purposes of this RFP, all references to "Canada", "Crown", "Her Majesty" or "the Government" in the Standard, Instructions, Clauses and Conditions referenced in this document shall mean Her Majesty the Queen in right of Canada as represented by the Minister of Industry, acting through the Canadian Space Agency (CSA).

If there is a conflict between the provisions of 2003 and this document, this document prevails.

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

### 1.1 SACC Manual Clauses

[A7035T \(2007-05-25\) List of Proposed Subcontractors](#)

### 2. Submission of Bids

Bids must be submitted only to the CSA's Tenders Reception Office/Mailroom and Shipping/Receiving bay area located at the rear of the John H. Chapman Space Centre in St-Hubert, QC, by the date, time and at the address



indicated on the front page of this bid solicitation. A Bid is considered received only when it reaches this area and nowhere else at the Agency.

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

### 3. Enquiries - Bid Solicitation

All enquiries must be submitted in writing to the [Contracting Authority](#) no later than **five (5) calendar days** before the bid closing date. Enquiries received after that time may not be answered. Bidders should reference as accurately as possible the numbered item of the bid solicitation to which the enquiry relates. Care should be taken by bidders to explain each question in sufficient detail in order to enable Canada to provide an accurate answer. Technical enquiries that are of a proprietary nature must be clearly marked "proprietary" at each relevant item. Items identified as "proprietary" will be treated as such except where Canada determines that the enquiry is not of a proprietary nature. Canada may edit the questions or may request that the Bidder do so, so that the proprietary nature of the question is eliminated, and the enquiry can be answered with copies to all bidders. Enquiries not submitted in a form that can be distributed to all bidders may not be answered by Canada.

### 4. Applicable Laws

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

### 5. Maximum Funding

The maximum funding available, Goods and Services Tax (GST) or Harmonized Tax (HST) and/or Quebec Sales Tax (QST) extra as appropriate, for the four (4) studies resulting from the bid solicitation is \$150,000 each for a total of \$600,000.00, excluding Applicable Taxes (GST and QST). Bids valued in excess of this amount will be considered non-responsive, as per [PART 4- Evaluation Procedures and Selection Process, section 1.2 Financial Evaluation](#). This disclosure does not commit Canada to pay the maximum funding available.

In the event that funding priorities change during or after the bidding process but before the contract award, the CSA may at its sole discretion elect to award fewer or more contracts than advertised ([see section 2.1.8 of PART 4](#)). The number of contracts awarded will depend on the value of the awarded contracts and the availability of funds.



## PART 3 - BID PREPARATION INSTRUCTIONS

### 1. Bid Preparation Instructions

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

Section I: Technical/Managerial Bid, 1 hard copy and 1 soft copy on CD or DVD;

Section II: Financial Bid, 1 hard copy and 1 soft copy on CD or DVD;

Section III: Certifications, 1 hard copy.

The acceptable electronic formats are:

Microsoft Word™, Corel WordPerfect™, Microsoft Excel™, Adobe PDF™ and HTML.

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

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

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

- (a) the total number of pages for Section I should not exceed 60 pages, including bid appendices;
- (b) font size should be at least 11pt, including bid appendices;
- (c) use 8.5 x 11 inch (216 mm x 279 mm) paper;
- (d) use a numbering system that corresponds to the bid solicitation;
- (e) each electronic file should be named by using the Bid reference number and the applicable Bid Section;
- (f) the cover pages of the Bid (Sections I, II and III) should include the following table duly filled:

Company Name	Company Address
Project Title	
Project Summary (8 lines of text)	

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

- 1) use paper containing fibre certified as originating from a sustainably-managed forest and/or 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/Management Bid

In their technical/management 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/management 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, and 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.



[Attachment 1 to Part 4, Technical and Financial Criteria and Evaluation Procedures](#), contains additional instructions that bidders should consider when preparing their technical bid. The structure and content request for Section I is detailed in [Attachment 2 to Part 3, Outline and Content of the Technical/Managerial Bid](#).

## Section II: Financial Bid

- 1.1 Bidders must submit their financial bid in Canadian funds and in accordance with the pricing schedule detailed in [Attachment 1 to Part 3](#). The total amount of Goods and Services Tax (GST) or Harmonized Sales Tax (HST) and/or Quebec Sales Tax (QST) is to be shown separately, as applicable.
- 1.2 Bidders must submit their prices and rates FOB destination, as applicable, Canadian customs duties and excise taxes included, as applicable, and GST or HST and/or QST excluded.
- 1.3 When preparing their financial bid, bidders should review clause [1.2, Financial Evaluation, of Part 4](#) and [Section 1.1 of Attachment 1 to Part 4](#).
- 1.4 Bidders are requested to detail the cost elements for each work package of the Contract Work Breakdown Structure (CWBS). At a minimum, the following information shall be provided for each work package for the firm price quoted in response to the pricing schedule detailed in [Attachment 1 to Part 3](#) for the entire work. At a minimum, the following information shall be provided for each work package:

1- Professional fees: For each individual and (or) labour category, bidders should indicate: a) the quoted hourly rate, inclusive of overhead and profit, if any; and b) the estimated corresponding time (i.e., hours). If daily or monthly rates are proposed, bidders should specify the number of hours included in a working day or month, exclusive of meal breaks.

2- Equipment, if applicable: Bidders shall specify each item required for purchase and provide the pricing basis for each one.

3- Materials and Supplies, if applicable: Bidders shall identify each category of materials and supplies required for purchase and provide the pricing basis of each one. Bidders shall indicate, on a per category basis, whether the items are likely to be consumed during the performance of the contract.

4- Travel and Living Expense, if applicable. Indicate the number and cost of journeys, together with the basis of these costs. Refer to Appendices B, C and D of the National Joint Council (NJC) Travel Directive (<http://www.njc-cnm.gc.ca/directive/travel-voyage/index-eng.php>), and with the other provisions of the directive referring to "travellers", rather than those referring to "employees". Travel and Living expenses are not to be included in the Firm Price portion of the financial proposal, but quoted separately as specified in [Attachment 1 to Part 3](#). Any travel and living expenses for the relocation of resources to satisfy the terms of any resulting contract as well as travel within the local area of the Bidder's place of business cannot be charged directly and separately from the professional fees (included in the firm price) to any contract that may result from the bid solicitation.

5- Subcontracts, if applicable: Bidders shall identify any proposed subcontractor and provide in their financial bid for each one a price breakdown in accordance with this section.

6- Other Direct Charges, if applicable: Bidders shall identify any category of other direct charges anticipated, such as long distance communications and rentals, providing the pricing basis for each and explaining the relevance to the work.

7- Applicable value added taxes: any applicable GST and (or) HST and (or) QST is (are) to be shown separately.



Date: December 13<sup>th</sup>, 2013

The bidder should use a Microsoft Excel™ spreadsheet to present the cost breakdown for each of the work packages.

### 1.5 Cash flow Estimates:

The Bidder shall provide in its proposal a Cash Flow estimates for the work to be carried out based on the Table 1 below:

Milestones	Fiscal Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter
	2013-2014				
	2014-2015				
	2015-2016				

### 1.6 Bidders should include the following information in their financial bid:

- 1 Their legal name;
- 2 Their Procurement Business Number (PBN) and GST number; and
- 3 The name of the contact person (including this person's mailing address, phone and facsimile numbers and email address) authorized by the Bidder to enter into communications with Canada with regards to:
  - a) their bid; and
  - b) any contract that may result from their bid.

### 1.7 SACC Manual Clauses

[C3011T \(2013-11-06\), Exchange Rate Fluctuation](#)

### Section III: Certifications

Bidders must submit the certifications required under [Part 5](#).



### ATTACHMENT 1 to PART 3 PRICING SCHEDULE

The Bidder must provide a pricing schedule in the following format and include it in its financial bid.

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

Milestone	Title	Description of the deliverable	Schedule of the delivery	Firm Price
1	Specify			\$ _____
2	Specify			\$ _____
3	Specify			\$ _____
Etc.				\$ _____
<b>Estimated Travel and Living Expenses</b> (see <a href="#">PART 6 – RESULTING CONTRACT CLAUSES, section 6.1.2, Reimbursement of Travel and living expenses</a> )				\$ _____
<b>*Evaluated Price (GST/HST and QST excluded):</b>			\$ _____	
* not to exceed \$150,000.00				



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## ATTACHMENT 2 to PART 3 OUTLINE AND CONTENT OF TECHNICAL/MANAGERIAL BID

The required outline and content of Section I Technical/Management Bid, is detailed herein. Should clarification be required, it is the responsibility of the Bidder to contact the Contracting Authority prior to submitting the bid.

Section I should address only one project and be contained within a single document/file, not exceeding 30 pages, excluding 6) Bid Appendices. The information should be organized in the following order:

- 1) Title / Project Identification Page;
- 2) Executive Summary;
- 3) Table of Contents;
- 4) Technical Bid;
- 5) Managerial Bid;
- 6) Bid Appendices:
  - 6.1) List of acronyms used in the Bid;
  - 6.2) Bidder's Criteria Substantiation ([refer to Section 1.2.1 of Attachment 1 to PART 4](#));
  - 6.3) Résumés or NSERC form 100 or equivalent (including résumés of subcontractors); and
  - 6.4) List of Contacts.

*If applicable:*

- 6.5) Corporate literature;
- 6.6) Relevant technical papers published by team members;
- 6.7) Any other Bid appendices deemed appropriate by the Bidder.

*Note: The structure of Section I and subsections are described below. Some of the subsection headings are followed by numbers in brackets. These numbers represent the Evaluation Criteria ([see Section 1.2.2 of Attachment 1 to PART 4](#)) that are applicable to that specific section/subsection.*

### 1. Title / Project Identification Page

This is the first page of the Bid and should clearly state:

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

### 2. Executive Summary

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



- 1) Project objectives;
- 2) Targeted Technology;
- 3) Main technical innovations;
- 4) Major milestones and deliverables; and
- 5) Relevance to CSA strategy and programs;

### 3. Table of Contents

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

### 4. Technical Bid

The Bid should describe the proposed project as outlined in the following subsections. The bidder should refer to the evaluation criteria ([see Section 1.2.2 of Attachment 1 to PART 4](#)) and strive to achieve a "D" rating for all sections.

#### 4.1 Science Merit Criteria

This subsection should provide the substantiated evidence describing the relevance and merit of the proposed science investigation relative to the scope of work past, ongoing, and planned future related activities. It should address and substantiate how the proposed contribution addresses the specific objectives presented in the [Statement of Work - Annex A](#).

##### 4.1.1 Description of the science objectives (Evaluation Criterion 1)

Planetary Science: The proposal should: (i) clearly state the project's scientific objectives; (ii) demonstrate familiarity with the most recent scientific advances in the field through a review of current literature, and; (iii) explain how the project's objectives can advance the state of the art by addressing relevant gaps in understanding.

Life Science: The proposal should: (i) clearly state the project's scientific objectives; (ii) demonstrate familiarity with the most recent scientific advances in the field through a review of current literature, and; (iii) explain how the project's objectives can advance the state of the art by addressing relevant gaps in understanding.

##### 4.1.2 Expected impact of the proposed science objectives (Evaluation Criterion 2)

Planetary Science: The proposal should elaborate on: (i) how meeting the proposed objectives would impact the field of planetary science; (ii) how the scientific objectives address challenging questions central to the field of planetary exploration that are likely to persist beyond 2020.

Life Science: The proposal should elaborate on the potential of the project to advance knowledge in human health, as well as behavioural and performance risks associated with human space flight. It should describe how the project will contribute to reduction of risks identified in Table 2 of the SOW.

##### 4.1.3 Relevance of the science objectives to CSA (Evaluation Criterion 3)

Planetary Science: The proposal should: (i) demonstrate the relevance of the proposed science objectives to CSA program goals through clear traceability to scientific objectives presented in the CSEW6 report "Canadian scientific priorities for the Global Exploration Strategy" (MRD-2), and; (ii) outline the potential for advancing Canadian instruments for the exploration of the Moon and/or Mars.



Life Science: The proposal should substantiate traceability to CSEW6 report (MRD-2) and life science risks identified in Table 2 of the SOW.

#### *4.2 Feasibility Criteria*

##### *4.2.1 Scope of the science definition study (Evaluation Criterion 4)*

This subsection should provide the substantiated evidence describing how the proposed contribution addresses the Scope presented in the [Statement of Work - Annex A](#).

##### *4.2.2 Feasibility of achieving the definition study goals and objectives (Evaluation Criterion 5)*

The criterion assesses the overall feasibility of the science definition study – the degree to which it is capable of delivering a science definition report that meets SRL 2.

The proposed effort should be well described and substantiated. The Bidder should present a well thought-out, feasible and valid concept, including methods applied to obtain the desired results. The bid should show and substantiate that the overall scenario is valid.

### **5. Managerial Bid**

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

#### *5.1 Team Capability (Evaluation Criterion 6)*

##### *5.1.1 Team expertise*

This subsection should identify the Principal Investigator, co-investigators (including highly qualified personnel) and Project Manager and outline their respective qualifications. It should identify the key members of the project's technical and management teams and state their specific and relevant qualifications and experience for the work involved. Detailed résumés are to be put in an appendix in Section I of the Bid. Provisions for back-up personnel for key positions are to be stated.

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

##### *5.1.2 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. 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.

##### *5.1.3 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.*

## 5.2 Study Management Plan (Evaluation Criterion 7)

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 Break-down Structure, WP definitions, personnel allocation, managerial risk assessment, milestones and deliverables, schedule, and project control system.

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

### 5.2.1 Work Package Definition

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.

WPs stem from the WBS. The WBS should be taken to a low enough level and the associated WP 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.

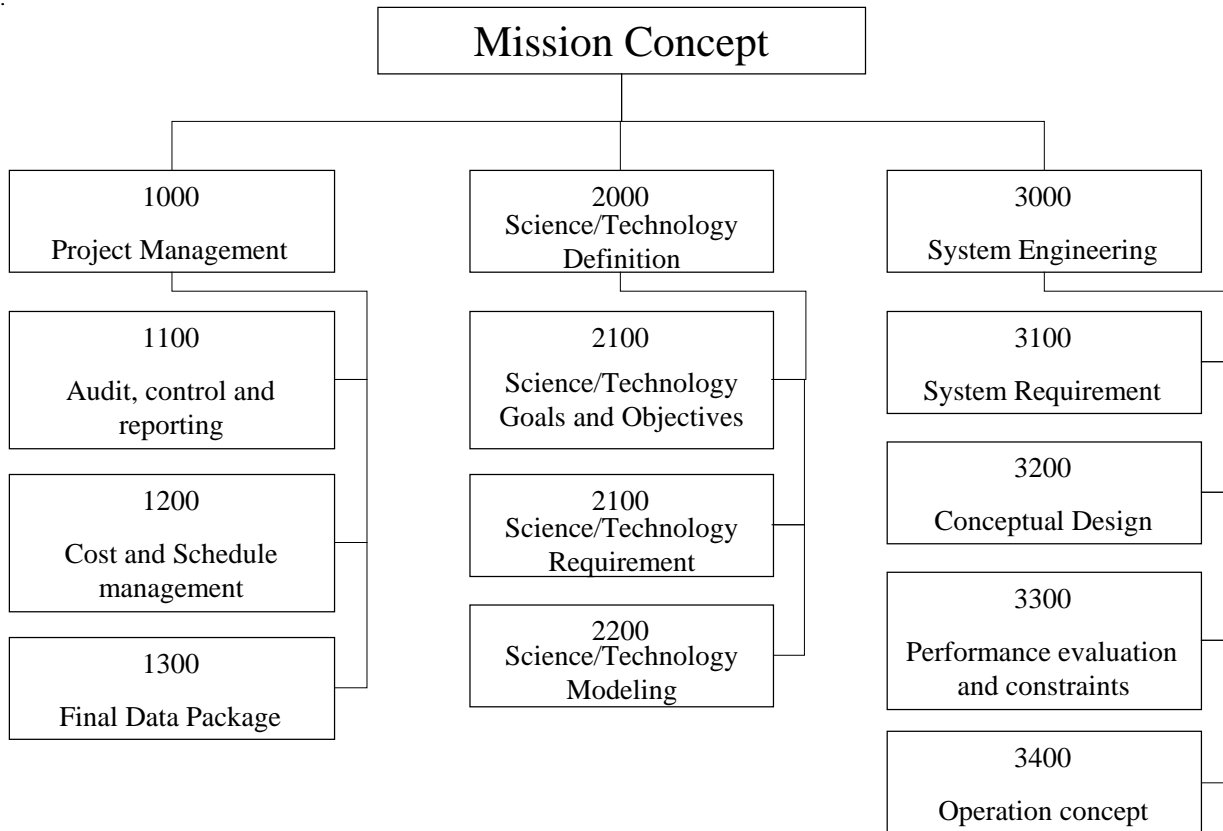
As a guideline, Table 1 of this attachment presents a fictitious example of a Work Package Definition Sheet.

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 1: Example of Work Package Definition Sheet**

<b>Project: Novel T/R Unit Demonstration</b>		
<b>Work Pack Title:</b>		
<b>TEST SETUP</b> <b>WBS Ref: 2200</b>		
1 of 1 Sheet:	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		
<b>Objectives:</b>		
➤ 1. Deliver a functional test setup for the T/R unit		
<b>Inputs:</b>		
➤ 1. Test plan and procedure		
➤ 2. Unit drawings		
➤ 3. Unit Interface Control Documents		
<b>Tasks:</b>		
➤ 1. Review input documentation		
➤ 2. Define requirements		
➤ 3. Produce initial concept		
➤ 4. Design test setup		
➤ 5. Fabricate test setup		
➤ 6. Commission and debug		
<b>Outputs and Deliverables:</b>		
➤ 1. Fully functional T/R unit test setup		
➤ 2. Test setup log manual		
➤ 3. Test setup user manual		



**Figure 1: Example of a Work Breakdown Structure**

5.2.2 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 2 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/Managerial Bid and the Financial Bid.

**Table 2: 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***5.2.3 Managerial Risk Assessment**

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

**5.2.4 Milestones and Deliverables**

Milestones and deliverables should be detailed in accordance to what is specified in Table 6 in Annex A - Statement of Work.

**5.2.5 Schedule**

This Management Plan subsection should relate tasks, milestones and deliverables to a project timetable. For planning purposes, the project expected start date is January, 2014.

**5.2.6 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 Monthly Progress Report (DID-0005). Additionally, the Project Control System should provide the capability to report the amount of work per WBS item for each individual on a monthly basis.

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

**6. Bid Appendices**

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

*Required Bid Appendices*

6.1) List of acronyms used in the Bid

6.2) Bidder's Criteria Substantiation (refer to Section 2 of Attachment 3).

6.3) Résumés: The Bid should include résumés (and/or NSERC form 100) of all key personnel including those of subcontractors and these should be appended to Section I.

6.4) List of Contacts: The list of contacts should be appended to Section I, in a format suitable for distribution and should include all of the Bidder's points-of-contact involved in the Bid development and/or contract negotiations. The following example format should be used:

**Table 3: Sample List of Contacts**

Role	Name	Telephone	Fax	E-mail
Project Manager				
Project Engineers/ Principal Investigator				



Contracting Authority				
Claims officer				
Communications (for press release)				
Etc.				

*Applicable Bid Appendices*

The following Bid appendices are to be provided, *if applicable*, with Section I:

- 6.5) Corporate literature: Only literature that is relevant and will be useful to support the Bid.
- 6.6) Relevant technical papers published by team members.
- 6.7) Any other Bid appendices deemed appropriate by the Bidder.

**Bidders are reminded that there is a limited number of pages that the Bid should not exceed.**



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## PART 4 – EVALUATION PROCEDURES AND BASIS OF SELECTION

### 1. Evaluation Procedures

- (a) Bids will be assessed in view of awarding a contract for each category of Science Definition Study (SDS1 to SDS4) in accordance with the entire requirement of the bid solicitation including the technical and financial evaluation criteria.
- (b) An evaluation team composed of representatives of Canada will evaluate the bids.

#### 1.1 Technical and Financial Criteria

##### 1.1.1 Mandatory Technical and Financial Criteria

Refer to [Attachment 1 to Part 4](#).

##### 1.1.2 Point Rated Technical Criteria

Refer to [Attachment 1 to Part 4](#). Point-rated technical criteria not addressed will be given a score of zero.

#### 1.2 Financial Evaluation

- 1.2.1 For bid evaluation and contractor(s) selection purposes only, the evaluated price of a bid will be determined in accordance with the Pricing Schedule detailed in [Attachment 1 to Part 3](#).

### 2. Basis of Selection

#### 2.1 Basis of Selection - Highest Combined Rating of Technical Merit 70 % and Price 30 %

2.1.1 To be declared responsive, a bid must:

- (a) comply with all the requirements of the bid solicitation;
- (b) meet all the mandatory evaluation criteria; and
- (c) obtain the required minimum number of points specified in [Attachment 1 to Part 4](#) for the point rated technical criteria.

2.1.2 Bids not meeting (a) or (b) or (c) will be declared non-responsive. Neither the responsive bid obtaining the highest number of points nor the one with the lowest evaluated price will necessarily be accepted.

2.1.3 The lowest evaluated price (LP) of all responsive bids will be identified and a pricing score (PS), determined as follows, will be allocated to each responsive bid (i):  $PS_i = LP / P_i \times 30$ .  $P_i$  is the evaluated price (P) of each responsive bid (i).

2.1.4 A technical merit score (TMS), determined as follows, will be allocated to each responsive bid (i):  $TMS_i = OS_i \times 70$ .  $OS_i$  is the overall score (OS) obtained by each responsive bid (i) for all the point rated technical criteria specified in [Attachment 1 to Part 4](#), determined as follows: total number of points obtained / maximum number of points available.

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- 2.1.5 The combined rating (CR) of technical merit and price of each responsive bid (i) will be determined as follows: **CRi = PSi + TMSi**.
- 2.1.6 The responsive bid with the highest combined rating of technical merit and price will be recommended for award of a contract. In the event two or more responsive bids have the same highest combined rating of technical merit and price, the responsive bid that obtained the highest overall score for all the point rated technical criteria detailed in [Attachment 1 to Part 4](#) will be recommended for award of a contract.
- 2.1.7 The table below illustrates an example where the selection of the contractor is determined by a 70/30 ratio of the technical merit and price, respectively.

<b>Basis of Selection - Highest Combined Rating of Technical Merit (70%) and Price (30%)</b>			
<b>Bidder</b>	<b>Bidder 1</b>	<b>Bidder 2</b>	<b>Bidder 3</b>
<b>Overall Technical Score</b>	<b>92%</b>	<b>82%</b>	<b>88%</b>
<b>Bid Evaluated Price</b>	<b>C\$60,000</b>	<b>C\$55,000</b>	<b>C\$50,000*</b>
<b>Calculations</b>	<b>Technical Merit Points</b>	<b>Price Points</b>	<b>Total Score</b>
<b>Bidder 1</b>	92 % x 70 = 64.4	50,000* / 60,000 x 30 = 25	89.4
<b>Bidder 2</b>	82 % x 70 = 57.4	50,000* / 55,000 x 30 = 27.3	84.7
<b>Bidder 3</b>	88 % x 70 = 61.6	50,000* / 50,000 x 30 = 30	91.6 (winning bidder)

\* represents the lowest evaluated price

- 2.1.8 In the event that there are no responsive bids in one particular Category, Canada may at its sole discretion elect to award an additional contract under another Category where there are sufficient responsive bids. The responsive bid(s) with the next highest number of points will be recommended for award of a contract, provided that the total evaluated price does not exceed the budget available for this requirement. If there are two or more bids not yet recommended for award with the same highest overall number of point, the bid with the highest score in the Technical Criteria group as identified in [Attachment 1 to Part 4](#) will have precedence for recommendation of award of a contract.



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## ATTACHMENT 1 TO PART 4 TECHNICAL AND FINANCIAL CRITERIA

### 1.1 Mandatory Criteria

The bid must meet the mandatory technical and financial criteria specified below. The Bidder must provide the necessary documentation to support compliance with this requirement.

Bids which fail to meet the ALL mandatory criteria will be declared non-responsive. Each mandatory criterion should be addressed separately.

To be compliant, the bidder's proposal must meet the following mandatory criteria:

#### **M1. Separate Bid for each Category**

The Bidder must bid on at least one of studies and may bid on up to all of them. If bidding more than one study, the Bidder must prepare a separate bid for each scenario as per the instructions in part 3 of this RFP. Each bid will be evaluated separately. The Bidder must clearly identify which Science Definition Study Category it is bidding on in each bid package sent.

#### **M2. Compliance with Established Budget**

The financial proposal for each Study being bid on must respect the maximum established budget of \$150,000.00, this includes all Travel and Living Expenses. Goods and Services Tax and Quebec Sales Tax are extra, if applicable. This disclosure does not commit Canada to pay the maximum funding available. The price of the bid will be evaluated in Canadian dollars, Applicable Taxes excluded, FOB destination, Canadian customs duties and excise taxes included.

No points are awarded for the mandatory criteria, but they must be met in order for the bidder's proposal to be considered for further evaluation according to the point rated criteria.

### 1.2 Point Rated Criteria

Proposals meeting all the mandatory criteria will be evaluated and scored as specified in the table inserted below.

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 1: "List of Evaluation Criteria and Associated Ratings". Bids will be evaluated according to the point-rated criteria as specified in Table 1 and at subsection 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 the maximum point rating

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- 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 “Description of the investigation science objectives” criterion is 10 points. If a Bid receives a “C” for this criterion in the evaluation process, the score attributed will be:

75% of 10 points = 7.5 points (score)

Table 1 identifies:

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

**Table 1: List of Evaluation Criteria and Associated Ratings**

<b>Evaluation Criteria and Ratings</b>	
	<b>Ratings</b>
<b>Science Merit Criteria</b>	
1. Description of the science objectives	10
2. Impact of the science objectives	15
3. Relevance of the science objectives to CSA	15
<b>Minimum Score</b>	<b>25</b>
<b>Maximum Score</b>	<b>40</b>
<b>Feasibility Criteria</b>	
4. Scope of the science definition study	10
5. Feasibility of achieving the definition study goals and objectives	30
<b>Maximum Score</b>	<b>40</b>
<b>Management Criteria</b>	
6. Team Capability	10
7. Study Management Plan	10
<b>Maximum Score</b>	<b>20</b>
<b>Maximum Overall Score</b>	<b>100</b>
<b>Minimum Overall Score Requirement</b>	<b>70</b>

### 1.2.1 Bidder’s Evaluation

The Bidder is requested to provide a substantiation, which should be submitted as an appendix to their Section I.

For each of the applicable criteria, provide the substantiation and summarized cross-reference(s) to the bid.

The substantiation should be concise yet sufficiently comprehensive to ensure that the evaluators get a good overall appreciation of the bid's merit relative to the specific criterion. Cross-references to appropriate sections of



the bid should be provided and the essence of the referenced information should be summarized in the substantiation.

For convenience, a template for the Self-Evaluation Table is provided in Table 1. Enter each merit/feasibility/management criterion section number, and the substantiation. It is expected that approximately half a page should be sufficient to make the Bidder's case for the rating chosen in the substantiation column.

Table 1: Bidder's Criteria Substantiation.

<b>Company:</b>	
<b>Project Title:</b>	
<b>Criteria</b>	
<b>Substantiation</b>	
<i>Ex.: 1</i> <i>(criterion number)</i>	<i>Criterion substantiation and Bidder's bid cross-reference.</i> <i>It is expected that 300 words or so should be sufficient to make your case.</i>

## 1.2.2 Evaluation Criteria and Benchmark Statements

### Science Merit Criteria

#### 1 Description of the science objectives

***This criterion evaluates the proposal science objectives for clarity, understanding and substantiation***

0)

- The proposed science objectives can't be evaluated because necessary information is missing.

A)

- The proposed science objectives are described but not substantiated.

B)

- The proposed science objectives are described and substantiated with a literature review but key references are missing.

C)

- The proposed science objectives are clearly described in the context of international planetary exploration, astronomy or life sciences goals and substantiated with a literature review that indicates good understanding.

D)

- The proposed science objectives are clearly described in the context of recent results and international planetary exploration, astronomy or life sciences goals and the literature review that provides substantiation is complete and indicates full understanding.



## 2 Expected impact of the proposed science objectives

***This criterion evaluates the scientific impact of meeting the proposed objectives to the field of planetary and life sciences.***

0)

- It is unclear how the science objectives will advance planetary exploration, astronomy or life sciences.

A)

- The scientific objectives address questions that are of weak interest to the field of planetary exploration, astronomy or life sciences.

B)

- The scientific objectives address questions central to the field of planetary exploration, astronomy or life sciences

C)

- The scientific objectives address challenging questions central to the field of planetary exploration or astronomy that are likely to remain important beyond 2020 or for life sciences, addresses risks to human spaceflight, AND,
- The impact of results, should objectives be met, is broad and will advance at least one discipline of planetary exploration, astronomy or life sciences.

D)

- The scientific objectives address challenging questions central to the field of planetary exploration, astronomy that are likely to remain important beyond 2020, or for life sciences, addresses risks to human spaceflight, AND,
- The impact of results, should objectives be met, is broad and will likely advance several disciplines of the international planetary exploration and astronomy science program or for life sciences, identify, characterize or mitigate risks associated with human spaceflight.

## 3 Relevance of the proposed science objectives to CSA

***This criterion evaluates the relevance of the proposed science objectives to CSA program goals, including priority planetary bodies and the potential for advancing Canadian instruments or risks associated with human spaceflight,.***

0)

- It is unclear how the science objectives will advance CSA Program Goals, OR,
- Space qualified instrumentation exists capable of making the measurements required to address these objectives, and there is no Canadian heritage.

A)

- Space qualified instrumentation exists capable of making the measurements required to address these objectives, and Canadian industry are the leading suppliers, OR
- Animal model, habitat and remote monitoring systems proposed exist and have been qualified or tested on the ISS or in science satellites in LEO.

B)

- Clear traceability is provided to the CSEW6 report "Canadian scientific priorities for the Global Exploration Strategy", or for life sciences, targets a risk identified in Table 2 of SOW, AND,





- The scientific objectives require novel measurements for which space qualified instrumentation does not yet exist (this includes the new capabilities of any of the CSA prototype instruments described in the SOW, and enhancements to Canadian heritage instruments).

## C)

- Clear traceability is provided to the CSEW6 report “Canadian scientific priorities for the Global Exploration Strategy” or for life sciences, targets a risk identified in Table 2 of SOW AND
- The scientific objectives address Mars or the Moon for planetary science,
- The scientific objectives require novel measurements for which space qualified instrumentation does not yet exist (this includes the new capabilities of any of the CSA prototype instruments described in the SOW, and enhancements to Canadian heritage instruments), AND,
- The science objectives build on scientific strengths at Canadian institutions

## D)

- Clear traceability is provided to the CSEW6 report “Canadian scientific priorities for the Global Exploration Strategy” or for life sciences, targets a risk identified in Table 2 of SOW, AND
- The scientific objectives address Mars or the Moon for planetary science, AND,
- The scientific objectives require novel measurements for which instrumentation has not yet been designed for space or terrestrial field use, AND,
- The science objectives are uniquely enabled by scientific expertise at Canadian institutions

### **Feasibility Criteria**

#### **4 Scope of the science definition study**

***This criterion assesses the degree to which the Proposal addresses the Statement of Work. It assesses the scope of the science definition study itself.***

## 0)

- The proposal does not address any category of the Statement of Work, OR,
- No plan is described to identify sensitivity requirements for the measurements needed to address the proposed science objectives.

## A)

- The proposal clearly addresses one of the four categories of the Statement of Work, AND,
- A plan is described to identify sensitivity requirements for the measurements needed to address the proposed science objectives

## B)

- The proposal clearly addresses one of the four categories of the Statement of Work, AND,
- A plan is described to identify sensitivity requirements for the measurements needed to address the proposed science objectives, AND,
- The experiments, tools, models and/or approaches being developed under this study are necessary to achieve the study goals.

## C)

- The proposal clearly addresses one of the four categories of the Statement of Work, AND,
- A detailed plan is described to identify sensitivity requirements for the measurements with good traceability to the proposed science objectives, AND,
- The experiments, tools, models and/or approaches being developed under this study will be essential for this study and for future development of this investigation

**D)**

- The proposal clearly addresses one of the four categories of the Statement of Work, AND,
- A detailed plan is described to identify sensitivity requirements for the measurements with good traceability to the proposed science objectives, AND,
- The experiments, tools, models and/or approaches being developed under this study are essential for this study and for future development of this investigation and are of broad use for definition and development of other investigations in the area of interest.

**5 Feasibility of achieving the science definition study goals and objectives**

***The criterion assesses the overall feasibility of the science definition study – the degree to which it is capable of delivering a science definition report that meets SRL 2.***

**0)**

- The methodologies for the science definition study work are inappropriate

**A)**

- The broad methodology for the science definition study is appropriate but better approaches exist, OR,
- The methodologies for the elements of the science definition study are appropriate but significant doubts exist that planned study goals will be achieved.

**B)**

- The methodologies for the elements of the science definition study are appropriate and substantiated by a literature review, AND,
- The chosen methodologies suggest that there is a reasonable likelihood that the work will be completed and planned study goals achieved, but some doubts remain

**C)**

- The methodologies for all tools and approaches being developed under the science definition study are appropriate and substantiated by a literature review, AND,
- The chosen methodologies suggest there is a high likelihood that planned study goals will be achieved, AND,
- The planned study goals ensure that science tools developed under this study will be mature enough to provide meaningful science definition results, AND,
- For planetary exploration and astronomy, the planned study goals ensure that data product requirements will be sufficiently defined to drive future trade studies for instrument development. For life sciences, planned study goals should advance scientific requirements or measurements using comparable animal models in space.

**D)**

- The methodologies for all tools and approaches being developed under the science definition study are appropriate and substantiated by a thorough literature review, AND,
- The chosen methodologies suggests there is a high likelihood that planned study goals will be achieved, AND,
- The planned study goals ensure that science tools developed under this study will be mature enough to provide meaningful science definition results and their future development path will be well understood, AND,
- For planetary exploration and astronomy, the planned study goals ensure that data product requirements will be sufficiently defined to drive future trade studies for instrument development, and a detailed concept study plan will be produced. For life sciences, planned study goals should advance scientific requirements or measurements using comparable animal models in space and will promote or refine the design of detailed animal model studies for space.



## **Management Criteria**

### **6 Team Capability**

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

0)

- The proposed team does not have the required expertise; OR
- The proposal does not address this criterion.

A)

- The proposed team has no experience in conducting work similar in complexity and scope to what is requested in the SOW; OR
- The proposed team lacks 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 key personnel identified in the proposed team has been involved in at least one project similar in complexity and scope to what is requested in the SOW; AND
- The proposed team is lacking some expertise but demonstrates that it is capable of fulfilling the statement of work (SOW); AND
- The team may have deficiencies in the completeness of the skills of its members

C)

- The key personnel identified in the proposed team has been involved in at least two projects similar in complexity and scope to what is requested in the SOW; AND
- The 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 science definition study; AND
- The roles and responsibilities for most of the team members are defined

D)

- The key personnel identified in the proposed team has been involved in more than two projects similar in complexity and scope to what is requested in the SOW; AND
- The 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 science definition study; 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 science definition study
- The roles and responsibilities of all the team members, including HQP, are defined, AND,
- The proposed study will develop new capacity relevant to future space science investigations

### **7 Management Plan**

***This criterion assesses the effectiveness of the management plan, specifically risk, schedule and resource allocations***

0)

- The schedule is missing or insufficient detail exists for assessment, OR,
  - The resource allocations are missing or insufficient detail exists for assessment, OR,
  - The proposal does not address this criterion.
-



**A)**

- The schedule is underestimated to the degree that there is uncertainty in whether the study objectives will be achieved, OR,
- The resource allocations are significantly under or over-estimated, OR,
- Risks are not identified.

**B)**

- A basic schedule is provided that seems appropriate, AND,
- A basic resource allocation is provided and seems appropriate, AND,
- Risks are identified but mitigation strategies are insufficient.

**C)**

- A detailed schedule is provided that includes key study milestones and deliverables and seems appropriate, AND,
- A detailed resource allocation is provided, associating equipment and personnel with study elements, AND,
- Risks are identified and mitigation strategies are discussed.

**D)**

- A detailed schedule and Work Package description is provided for each study element, including key study milestones, deliverables, personnel and resource allocations, AND
- Comprehensive risk analysis and mitigation strategies are provided.



## **PART 5 - CERTIFICATIONS**

Bidders must provide the required certifications to be awarded a contract. Canada will declare a bid non-responsive if the required certifications are not completed and submitted as requested. Bidders should provide the required certifications in Section III of their bid.

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

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

### **1. Certifications Precedent to Contract Award**

The certifications included in [Attachment 1 to Part 5](#), Certifications Precedent to Contract Award, should be completed and submitted with the bid, but may be submitted afterwards. If any of these required certifications is not completed or submitted as requested, the Contracting Authority will so inform the Bidder and provide the Bidder with a time frame within which to meet the requirement. Failure to comply with the request of the Contracting Authority and meet the requirement within that time period will render the bid non-responsive.



## ATTACHMENT 1 TO PART 5 CERTIFICATIONS PRECEDENT TO CONTRACT AWARD

### 1.1 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](http://www.labour.gc.ca/eng/standards_equity/eq/emp/fcp/list/inelig.shtml)" list ([http://www.labour.gc.ca/eng/standards\\_equity/eq/emp/fcp/list/inelig.shtml](http://www.labour.gc.ca/eng/standards_equity/eq/emp/fcp/list/inelig.shtml)) available from [Human Resources and Skills Development Canada \(HRSDC\) - 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.

### 1.2 Former Public Servant Certification

Contracts with 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 spending public funds. In order to comply with Treasury Board policies and directives on contracts with FPS, bidders must provide the information required below.

#### Definitions

For the purposes of this clause,

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 up 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 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:



- a) name of former public servant,; and
- 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 Reduction Program**

Is the Bidder a FPS who received a lump sum payment pursuant to the terms of a work force reduction program?

**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,; and
- g) number and amount (professional fees) of other contracts subject to the restrictions of a work force reduction program.

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

### **1.3 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.

### **1.4 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.



### 1.5 Certification

By submitting a bid, the Bidder certifies that the information submitted by the Bidder in response to the above requirements is accurate and complete.

\_\_\_\_\_  
**Signature of Bidder's Authorized Representative**

\_\_\_\_\_  
**Date**





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## PART 6 - RESULTING CONTRACT CLAUSES

### 1. Statement of Work

The Contractor must perform the Work in accordance with the Statement of Work at [Annex A](#) and the technical and management portions of the Contractor's bid entitled \_\_\_\_\_, dated \_\_\_\_\_.

### 2. Standard Clauses and Conditions

All clauses and conditions identified in the Contract by number, date and title are set out in the [Standard Acquisition Clauses and Conditions](#) Manual issued by Public Works and Government Services Canada.

For the purposes of this contract, all references to "Canada", "Crown", "Her Majesty" or "the Government" in the clauses and conditions herein, including those incorporated by reference, shall mean Her Majesty the Queen in right of Canada as represented by the Minister of Industry, acting through the Canadian Space Agency;

#### 2.1 General Conditions

[General Conditions – Higher Complexity – Services 2035 \(2013-06-27\)](#) apply to and form part of the Contract with the following modification:

Paragraph "2035 41 (2012-11-09) Code of Conduct and Certifications – Contract" is deleted in its entirety and replaced with the following:

"2035 41 (2010-01-11) Code of Conduct for Procurement

The Contractor certifies that it has read the [Code of Conduct for Procurement](#) and agrees to be bound by its terms. "

### 3. Security Requirements

There are no specific security requirements associated with the work to be performed under this Contract. However, the proposed resource(s) may be required to sign non-disclosure agreements associated with documents received, the work performed and the deliverables submitted under the contract.

Contractor personnel **MAY NOT ENTER** sites where (PROTECTED/CLASSIFIED) information or assets are kept, without an escort provided by the CSA.

### 4. Term of Contract

#### 4.1 Period of the work

Duration of twenty four (24) months after Contract Award.

### 5. Authorities

#### 5.1 Contracting Authority

The Contracting Authority for the Contract is:



Robert Kardum  
Canadian Space Agency  
6767 Route de l'Aéroport  
Saint-Hubert, QC  
Canada J3Y 8Y9

Telephone: (450) 926-4875  
Facsimile: (450) 926-4969  
E-Mail: [robert.kardum@asc-csa.gc.ca](mailto:robert.kardum@asc-csa.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.

## 5.2 Project and/or Technical Authority

To be identified at contract award.

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

## 5.3 Contractor's Representative

(to be specified at contract award)

## 6. Payment

### 6.1. Basis of Payment – Firm Price for Professional Fees and Cost Reimbursable Subject to a Limitation of Expenditure for Travel and Living Expenses

#### 6.1.1 Professional Fees

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid a firm price of \$\_\_\_\_\_. Customs duties are included and Goods and Services Tax or Harmonized Sales Tax and/or Quebec Sales Tax are extra, if applicable.

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

#### 6.1.2 Reimbursement of Travel and Living Expenses

In accordance with:

- a) The *National Joint Council Travel Directive*, Appendices B, C and D <http://www.njc-cnm.gc.ca/directive/travel-voyage/index-eng.php>, and
- b) The "Special Travel Authorities", Section 7 for "Persons on contract" [http://www.tbs-sct.gc.ca/pubs\\_pol/hrpubs/tbm\\_113/statb-eng.asp](http://www.tbs-sct.gc.ca/pubs_pol/hrpubs/tbm_113/statb-eng.asp):



The contractor will be reimbursed for authorized travel and living expenses reasonably and properly incurred in the performance of the Work, with no allowance for profit and/or administrative fees, upon presentation of supporting documentation except for meals, mileage and incidentals which will be reimbursed without receipts in accordance with the allowances specified in Appendices B, C and D and with the other provisions of the directive referring to "travellers", rather than those referring to "employees" to a limitation of expenditure of \$\_\_\_\_\_. Customs duties are included and Goods and Services Tax or Harmonized Sales Tax and/or Quebec Sales Tax are extra, if applicable...

The department will reimburse Contractors up to full-fare economy class only, upon presentation of an electronic ticket receipt indicating the class and price of the ticket.

All travel must have the prior authorization of the Project authority.

All payments are subject to government audit.

## 6.2. Limitation of Expenditure

1. Canada's total liability to the Contractor under the Contract must not exceed \$ \_\_\_\_\_. Customs duties are included and Goods and Services Tax or Harmonized Sales Tax is extra, if applicable.
2. No increase in the total liability of Canada or in the price of the Work resulting from any design changes, modifications or interpretations of the Work, will be authorized or paid to the Contractor unless these design changes, modifications or interpretations have been approved, in writing, by the Contracting Authority before their incorporation into the Work. The Contractor must not perform any work or provide any service that would result in Canada's total liability being exceeded before obtaining the written approval of the Contracting Authority. The Contractor must notify the Contracting Authority in writing as to the adequacy of this sum:
  - a. when it is 75 percent committed, or
  - b. four (4) months before the contract expiry date, or
  - c. as soon as the Contractor considers that the contract funds provided are inadequate for the completion of the Work,

whichever comes first.

3. If the notification is for inadequate contract funds, the Contractor must provide to the Contracting Authority a written estimate for the additional funds required. Provision of such information by the Contractor does not increase Canada's liability.

## 6.3 Method of Payment

Canada will make milestone payments in accordance with the Schedule of Milestones detailed in the Contract and the payment provisions of the Contract if:

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

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



(See [Attachment 1 to Part 3](#) )

#### **6.4 T1204 Supplementary Slip Requirement - Invoicing Procedures**

1. Pursuant to paragraph 221 (1)(d) of the Income Tax Act, R.S. 1985, c.1 (5th Supp.), payments made by departments and agencies to contractors under applicable services contracts (including contracts involving a mix of goods and services) must be reported on a T1204 Government Service Contract Payments slip.
2. To enable departments and agencies to comply with this requirement, the Contractor must provide the following information:
  - (a) the legal name of the Contractor, i.e. the legal name associated with its business number or Social Insurance Number (SIN), as well as its address and postal code;
  - (b) the status of the Contractor, i.e. an individual, a sole proprietorship, a corporation, or a partnership;
  - (c) the business number of the Contractor if the Contractor is a corporation or a partnership and the SIN if the Contractor is an individual or a sole proprietorship. In the case of a partnership, if the partnership does not have a business number, the partner who has signed the Contract must provide its SIN;
  - (d) in the case of a joint venture, the business number of all parties to the joint venture who have a business number or their SIN if they do not have a business number.
3. The information must be sent with the first invoice to the [invoicing address](#) specified herein. If the information includes a SIN, the information should be provided in an envelope marked "PROTECTED".

#### **7. Invoicing Instructions**

1. The Contractor must submit invoices in accordance with the section entitled "Invoice Submission" of the general conditions. Invoices cannot be submitted until all work identified in the invoice is completed.

Each invoice must be supported by a copy of the invoices, receipts, vouchers for all travel and living expenses, if applicable.

2. Invoices must be distributed as follows:

- (a) The original and one (1) copy must be forwarded to the following address for certification and payment.

9F052: FINANCIAL SERVICES  
EXPLORATION DEVELOPMENT  
6767 ROUTE DE L'AÉROPORT  
ST-HUBERT, QC  
CANADA J3Y 8Y9

#### **8. Certifications**

##### **8.1 Compliance**

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



## 9. Foreign Nationals (Canadian Contractor)

The Contractor must comply with Canadian immigration requirements applicable to foreign nationals entering Canada to work temporarily in fulfillment of the Contract. If the Contractor wishes to hire a foreign national to work in Canada to fulfill the Contract, the Contractor should immediately contact the nearest Service Canada regional office to enquire about Citizenship and Immigration Canada's requirements to issue a temporary work permit to a foreign national. The Contractor is responsible for all costs incurred as a result of non-compliance with immigration requirements.

## 10. Proactive Disclosure of Contracts with Former Public Servants

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

## 11. Insurance

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

## 12. Applicable Laws

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

## 13. Contractor Performance

1) Canada will evaluate the Contractor's performance during and upon completion of the work. If the Contractor's performance is determined to be unsatisfactory on more than one contract, the Contractor's bids on future work may be inadmissible for a period of 18 months or 36 months thereafter.

2) The Contractor Performance Evaluation Report Form used to record the performance is attached to the contract at Appendix \_\_\_.

## 14. 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) [General Conditions – Higher Complexity – Services 2035 \(2013-06-27\)](#);
- (c) Annex X, Statement of Work;
- (d) Annex X, Basis of Payment;
- (e) Annex X, Contractor Performance Evaluation
- (f) the Contractor's bid dated \_\_\_\_\_.



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## **ANNEX A**

# **STATEMENT OF WORK**



## A.1 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. CSA's Exploration Core program was created in 2007 to shape and determine the nature of Canada's contribution to potential future international space exploration and astronomy missions. Exploration Core engages in three types of activities: (i) requirement development; (ii) prototyping and deployment; and (iii) building and maintaining operational infrastructure required to support prototype integration and deployment. Through (i), Exploration Core supports CSA's exploration planning activities and defines the science and technology developments most likely to be required in future space exploration missions of interest to Canada, and assesses potential contributions that Canada could make to such missions. Science Definition Studies are part of the Requirement Development activity.

This Statement of Work requests Science Definition Studies proposals in the areas defined in Section A.2, Table 3 in support of the requirement development activity of CSA's Exploration Core Program. The current RFP will expand the Exploration Core program priorities to include the space life sciences priorities. The space life sciences program aims to identify, characterize and mitigate risks associated with human exploration of space.

## A.2 Objective

The objective of CSA ExCore Science Definition Studies is to define science measurement needs for future planetary science, space astronomy and life sciences mission investigations, with the goal of maturing science solutions to CSA ExCore Science Readiness Level 2, in preparation for a CSA ExCore Concept Study. The Science Readiness Level scales are further described in MRD-1.

Table 2: The CSA ExCore Science Readiness Level Scale (further described in MRD-1)

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	ExCore programs
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	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	Operations
Science investigation outcomes generated through publication of results	SRL 9	Analysis

The studies allow for initial investigation of science needs in areas of CSA priority through the development of science approaches, models and tools. These tools developed under this initial phase are important for trade studies and analysis of de-scope options later in the mission development cycle, and typically have a long lead time for development. The studies may allow for the refinement of scientific hypotheses so that possible measurements or approaches to be made in subsequent space experiments are identified.



As the first step in ExCore Requirements Development, the studies are designed to help prepare for potential contributions to ISS mission in the 2015 to 2020 timeframe for life sciences or international missions, as yet undefined, with launch timeframes beyond 2020 for planetary science and space astronomy.

### **Planetary Science**

In the context of planetary science, proposals are sought for detailed definition of an investigation in line with priority planetary bodies and astrobiology, Mars atmosphere, planetary geology and geophysics, and, space weather science objectives described in the Canadian Scientific Priorities for Global Exploration Strategy document (2009) (MRD-2).

For SDS 1, three instruments are presented that have been the focus of past Canadian Space Agency (CSA) technology development: a microscope, a LIBS instrument, and a Raman spectrometer. Science definition activities under this contract comprise two parts: first, using the instrument specifications outlined in Appendices 3-5, the contractor will provide recommendations for research activities. Scientific definition should address the use of the specified instrument, and propose what types of investigations can be conducted using these instruments. Second, the contractor will provide recommendations for modifications to the instrument specifications that will enable future high priority investigations. Science definition development can include, but is not limited to: theory, modelling and simulation, laboratory studies such as sample analysis, instrument bread-boarding and analogue field science. In some cases, the instrument is available on loan for this study.

For SDS 2, a new type of instrument must be proposed providing that the detailed definition of associated investigations are in line with objectives as outlined in (MRD-2) or are consistent with recent planetary mission findings. As with SDS 1, science definition activities can include: theory, modelling and simulation, laboratory studies such as sample analysis, instrument bread-boarding and analogue field science. Investigations proposed under this category shall not focus specifically on Raman, LIBS or microscopy techniques.

### **Life Sciences**

In the context of life sciences, proposals are sought that use either the roundworm *Caenorhabditis elegans* (*C. elegans*) or a mouse model. Risks associated with space that have been encountered by humans are listed in Table 2.

*C. elegans* and mouse models will be suitable in addressing some but not all the risks listed. Studies that will contribute to identifying targets for genomic, proteomic and/or metabolomic studies are of interest. Investigations using the worm model *C. elegans* to study the impact of interplanetary radiation on living organisms and the efficiency of protection measures are also of interest.

Table 3: Human Health, Behavioural and Performance Risk

<b>Musculoskeletal</b>	Mission risk resulting from reduced muscle strength and aerobic capacity, and increased bone fragility Long-term health risk of space-induced osteoporosis.
<b>Sensorimotor</b>	Mission risk of sensory changes/dysfunctions reducing performance.
<b>Ocular Syndrome</b>	Mission and long-term health risk of microgravity-induced visual impairment and/or elevated intracranial pressure.
<b>Nutrition</b>	Mission risk due to inability to provide appropriate quantity, quality and variety of food to meet nutritional requirements and maintain morale





<b>Behavioral Health and Performance</b>	Mission and long-term behavioural health and performance risks, for example, associated with stress, issues with team dynamics, long-term risk associated with integration into post-space flight career phase.
<b>Radiation</b>	Mission risk due to health and performance impairment associated with radiation damage. Long-term risk of carcinogenesis and degenerative tissue disease due to radiation exposure.
<b>Hypogravity</b>	Mission risk associated with adaptation during intra-vehicular activities and extra-vehicular activities (EVAs) on the Moon, asteroids, Mars (vestibular and performance dysfunctions) and long-term risk related to post-flight rehabilitation.
<b>Environmental Stressors</b>	Mission risk of exposure to a toxic environment in the spacecraft, during EVAs or while on extraterrestrial bodies without adequate monitoring, warning systems or understanding of potential toxicity (planetary dust, chemicals, infectious agents, microbial contamination).

Table 4: Statement of Work Categories, Classes and Titles

Category SDS #	Class	Science Definition Study Title	Reference information
SDS 1	S	➤ 3-D Microscope Investigation	➤ MRD-2 and Appendix 3
	S	➤ RAMAN Investigation	➤ MRD-2 and Appendix 4
	S	➤ LIBS Investigation	➤ MRD-2 and Appendix 5
SDS 2	S	➤ Other Instrument Investigation	Detailed definition of an investigation in line with priority planetary bodies and astrobiology, Mars atmosphere, planetary geology and geophysics, and, space weather science objectives described in the Canadian Scientific Priorities for Global Exploration Strategy document (2009) (MRD-2). A case can be made for studies based on more recent results. Investigations proposed under this category shall not focus specifically on Raman, LIBS or microscopy techniques.
SDS 3	S	➤ C. elegans Life Sciences Investigations	Development of science requirements for studies of impact of interplanetary radiation on animal genomes using the <i>C. elegans</i> model and the efficiency of protection measures as well as its use with other risks (Space Life Science section of MRD-2 and MRD-3). Proposed animal model, habitat and remote monitoring systems will initially be tested on the ISS or in science satellites in LEO before launch beyond Earth magnetosphere. See also Appendix 6.



Category SDS #	Class	Science Definition Study Title	Reference information
SDS 4	S	➤ Mouse Life Sciences Investigations	Definition of science requirements to study risks associated with space using mouse models. Areas of focus are defined in the Space Life Science section of MRD-2 and in MRD-3. See also Appendix 7.

### A.3 Scope

The scope of this Statement of Work (SOW) encompasses work to mature a science investigation defined by the priorities above to SRL 2, including:

- Production of a Science Definition Report (CDRL-01)
- Development as needed to provide content for the Science Definition Report. Development can include but is not limited to: theory, modelling and simulation, laboratory studies such as sample analysis, instrument breadboarding and analogue field science.
- Kick off and final review meetings, and other meetings as mutually agreed by Contractor and PA.
- Attendance at conferences or workshops for discussion and dissemination of results.

### A.4 Master Reference Documents

The documents identified in Table 4 provide additional information or guidelines that may clarify the contents or are pertinent to the history of this document.

*Table 5: Reference Documents*

MRD No.	Document Title	Rev. No.	Date
MRD-1.	CSA Science Readiness Level Guidelines <a href="ftp://ftp.asc-csa.gc.ca/users/TRP/pub/Exploration-Core-Science-Definition-Studies/2013/">ftp://ftp.asc-csa.gc.ca/users/TRP/pub/Exploration-Core-Science-Definition-Studies/2013/</a>	Draft Version 1	June 2013
MRD-2.	Canadian Scientific Priorities for the Global Exploration Roadmap document, CSEW6 report. <a href="ftp://ftp.asc-csa.gc.ca/users/Exp/pub/Publications/CSEW6/">ftp://ftp.asc-csa.gc.ca/users/Exp/pub/Publications/CSEW6/</a>	Initial	June 2009
MRD-3.	NASA Human Research Roadmap <a href="http://humanresearchroadmap.nasa.gov/explore/">http://humanresearchroadmap.nasa.gov/explore/</a>		

### A.5 Project Duration

Duration of twenty four (24) months after Contract Award.

### A.6 Task Description

This section applies to all Categories listed in Table 3.

#### A.6.1 Science Definition Report

A report shall be prepared containing the results of the study corresponding to CDRL 6 (DID 006).



### **A.6.2 Science Definition Development Activities**

The Contractor shall carry out science definition development activities as proposed in its Bid.

The science definition development activities shall include justification for the approach in terms of contribution to science definition, methodology for the approach, expected results, schedule of tasks, personnel associated with each task, and cost breakdown.

Activities can include one or more approaches including development of theory, analysis of existing mission data, model development, laboratory development including instrument breadboarding and/or sample analysis, and analogue science activities.

### **A.6.3 Project Management, Meetings and Conferences**

The Contractor shall carry out project management activities necessary to ensure the Project remains on budget and on schedule including the preparation of meeting agendas, minutes, presentations and monthly reports and project evaluation as described in CDRLs 1-5, and 7. Additional meetings may be proposed as described in section A.9.

The Contractor may participate in up to two conferences in order to increase international interest in a future investigation, and in pursuance of potential future collaboration.

All travel must be authorised in advance by the PA. Overall travel expenses should not exceed \$5k.

### **A.7 Science Definition Study Project Schedule**

The Contractor shall respect the project schedule prepared by the Contractor in its bid which must include a graphical representation of predicted tasks, milestones, dependencies, resource requirements, task duration, and deadlines.

### **A.8 Location of Work**

The work is expected to be performed at the Contractor's facilities. The Contractor is encouraged to propose a methodology which will facilitate the completion of all the requirements of the work while minimizing the need to travel. Modern communications techniques (e-mail, fax, telephone, Internet, etc.) should be used to maintain a reasonable budget for the project. The location of meetings will be arranged between the Contractor and the Project Authority. The final project review meeting is likely being held at the John H. Chapman Space Centre (CSA's main facilities) in Saint-Hubert, Quebec.

The contractor must have access to suitable facilities to host and/or join teleconferences and optionally video conferences of good quality as they will be used as main mode of communication.

### **A.9 Contract Meetings and Deliverables**

This section reviews and describes the contract meetings and deliverables.

#### **A.9.1 Contract Meetings**

The Contractor must organize the meetings listed in Table 5.

*Table 6: Meeting Schedule*

Meeting	Date	Location
---------	------	----------



Kick-off Meeting	2 weeks After Contract Award	CSA's premises or via telcon/web meeting
Mid-term Review Meeting	After approximately 12 months	CSA's premises or via telcon/web meeting
Final Review Meeting	End of contract	CSA's premises or via telcon/web meeting

All key participants under the contract, including at least one representative from each subcontractor, must attend all the meetings.

The Kick-off, Mid-term and Final Review Meetings may be face-to-face or held via teleconference and web meeting.

The Mid-Term Review Meeting is meant for discussion on the progress of the Science Definition Report. It is not necessary to have a presentation at this meeting. It is, however, necessary to have an agenda and minutes produced from the meeting, capturing any actions for either party.

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

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

#### A.9.2 Documentation, Reporting and Other Deliverables

The Contractor must submit the documentation as defined and at the date stipulated in the Contract Data Requirements List (CDRL), Table 6, to the PA. All diagrams must be clearly drawn and labelled.

***In addition to any paper copy of all project documentation and reports, the Contractor must also provide the PA with an electronic copy in a format acceptable to the CSA. Both the PDF and original version, e.g. Microsoft Word or PowerPoint, 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. Instructions on how to name electronic documents are provided in Appendix 2 of Annex A.***

Table 7: Contract Data Requirements List (CDRL)

CDRL No.	Deliverable	Due Date	Version	DID No.
1.	Meeting Agendas	Meeting - 1 week	Final	0001
2.	Kick-off Meeting Presentation	Meeting - 1 week	Final	0002
3.	Final Review Meeting Presentation	Meeting - 1 week	Final	0003
4.	Meeting Minutes	Meeting + 1 week	Final	0004



CDRL No.	Deliverable	Due Date	Version	DID No.
5.	Monthly Progress Reports	Monthly	Final	0005
6.	Science Definition Report	Draft version every quarter Draft copy at Midterm Review Meeting -2 weeks Final copy at end of contract -2 weeks	Draft Versions Final	0006
7.	Copies of presentations given at workshops or conferences	Workshop or conference + 1 week	Final	Contractor's format
8.	Copies of draft or submitted publications	End of contract - 2 weeks	As submitted	Contractor's format
9.	Contractor Performance Evaluation	End of contract - 2 weeks	Final	0007

### A.9.3 Data Items Description (DIDs)

*Table 8: Data Item Descriptions (DIDs)*

DID #	Description
DID-0001	MEETING AGENDA
DID-0002	KICK-OFF MEETING PRESENTATION
DID-0003	FINAL REVIEW MEETING PRESENTATION
DID-0004	MEETING MINUTES
DID-0005	MONTHLY PROGRESS REPORT
DID-0006	SCIENCE DEFINITION STUDY REPORT
DID-0007	CONTRACTOR PERFORMANCE EVALUATION

#### A.9.3.1 DID-0001 – Meeting Agenda

##### PURPOSE:

To specify the purpose and content of a meeting.

##### PREPARATION INSTRUCTIONS:

The Meeting Agendas must contain the following information, as a minimum:

##### 1) Document Header:

- a) Title;
- b) Type of meeting;
- c) Project title, project number, and contract number;
- d) Date, time, and place;
- e) Chairperson; and



f) Expected duration.

**2) Document Body:**

- a) Introduction;
- b) Opening Remarks: CSA;
- c) Opening Remarks: Contractor;
- d) Review of previous minutes and all open action items;
- e) Project technical and/or scientific issues;
- f) Project management issues;
- g) Other topics; and
- h) Set or confirm dates of future meetings.

**A.9.3.2 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;
- 4) Project's funding and expected cash-flow; and
- 5) Other items as deemed appropriate

**A.9.3.3 DID-0003 – Final Review Meeting Presentation**

**PURPOSE:**

To present the overall results of the work done in the project including the assessment of Science Readiness Level 2.

**PREPARATION INSTRUCTIONS:**



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

- 1) Detailed presentation of the work conducted;
- 2) Review of Science Definition Report against required elements, including review of 2-page illustrated summary for publication on CSA website;
- 3) Technical and/or scientific and programmatic issues if any;
- 4) Contractor's assessment of completed study against Science Readiness Level 2;
- 5) Discuss proposed science development work;
- 6) Discuss proposed concept study work;
- 7) Final Funding and cash-flow;
- 8) Discuss project management issues;
- 9) Other items as deemed appropriate; and
- 10) Presentation's slides to include the required copyrights and intellectual property disclosure.

#### **A.9.3.4 DID-0004 – Meeting Minutes**

##### **PURPOSE:**

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

##### **PREPARATION INSTRUCTIONS:**

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

- 1) Title page containing the following:
    - a) Title, type of meeting and date;
    - b) Project title, project number, and contract number;
    - c) Space for signatures of the designated representatives of the Contractor, the CSA and the Public Works and Government Services Canada (PWGSC); and
    - d) Name and address of the Contractor
  - 2) Purpose and objective of the meeting;
  - 3) Location;
  - 4) Agenda;
-



- 5) Summary of the discussions, decisions and agreements reached;
- 6) Summary of action items;
- 7) List of the attendees by name, position, phone numbers and e-mail addresses as appropriate;
- 8) Listing of open action items and responsibility for each action to be implemented as a result of the review;
- 9) Other data and information as mutually agreed; and
- 10) The minutes must include the following statement:

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

#### **A.9.3.5 DID-0005 – Monthly Progress Report**

##### **PURPOSE:**

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

##### **PREPARATION INSTRUCTIONS:**

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

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

Based on the above, the Monthly Progress Report should not exceed 3 pages. This report is required even in the case of a fixed firm price contract.

#### **A.9.3.6 DID-0006 – Science Definition Report**

##### **PURPOSE:**

To fully describe the scientific and 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 science definition document must contain the following information:

1. Fact sheet – a two page illustrated summary of the proposed science investigation suitable for publication, including planetary target (for planetary science), science objectives, science approach and measurement goals, anticipated mission needs, candidate list of instrument technologies and associated data products.
  2. Table of Contents
  3. Executive Summary – a summary of completed science definition study including team information, studies undertaken, and needs for future work.
  4. Science definition activities
    - a. Description of the science definition study team and its expertise relevant to the investigation.
    - b. Description of tools and approaches developed in order to define the investigation above, e.g. as relevant: model and capabilities, laboratory set up and methodology, breadboard capability and components, analogue site and activity etc.
  5. Science Investigation
    - a. Science objectives – High value science objectives are described with traceability to CSA's strategic priorities as described in this Statement of Work. This section includes a literature review justifying objectives and traceability.
    - b. Measurement goals – Clear measurement goals are identified with spatial and temporal distributions, that are well justified and directly address the identified science objectives. This section includes a description of approach to defining measurement goals with reference to the studies described in Section A.4, and includes a justification of the proposed measurement values in terms of a specific science signature relevant to the science objective, if required, or a description of the optimization activity e.g. measurement resolution versus measurement sensitivity, and why the chosen solution is optimal to address the science objective.
    - c. Canadian science capacity - The scientific resources available in Canada to carry out the proposed investigation are summarised, identifying existing and future needs. This includes a summary of capacity as known for team member and non-team member organisations, and known complementary R&D initiatives.
    - d. Instrument techniques under consideration
      - i. Preliminary mission platform needs
      - ii. A description of one or more instrument techniques under consideration for further study, advantages and disadvantages in terms of ability to meet objectives (excellent, very good, good) and estimated technology readiness (high, medium, low)
      - iii. Recommended options for further study: preliminary description of data reduction needs, key and driving science requirements, science operations needs
  6. Priorities for future work
    - a. Science plan for continued science maturation (maturation of data analysis approaches, tools, as needed)
      - i. Justification for further investment in terms of increasing impact of science investigation
      - ii. Planned activities
      - iii. Schedule
      - iv. Cost
    - b. Plan for concept study trade studies
      - i. Justification for investment in instrument option in terms of maturity of data and science requirements
      - ii. Planned activities/trades
-



iii. Schedule

iv. Cost

7. Self-Assessment of SRL based on evaluation elements for SRL 2 in MRD-1.

#### **A.9.3.7 DID-0007 – Contractor Performance Evaluation**

##### **PURPOSE:**

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

##### **PREPARATION INSTRUCTIONS:**

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

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



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## Appendix 1 to ANNEX A

### Document Naming Conventions

#### **Context**

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

Documents must contain 3 main components:

Project identifier

Contract Number

Date Tracking number

WXYZ-TYPE-NUM-CIE\_ContractNumber\_sent2013-03-30

#### **Project Identifier**

The project identifier must contain:

WXYZ: A 4-8 letter acronym of the project

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

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

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

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

#### **Contract Number**

For example: \_9F028-07-4200-03

#### **Date Tracking Number**

\_sentYEAR-MONTH-DAY\_draft

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



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**Appendix 2 to ANNEX A**

**2013 Science Definition Studies Reference Documents**

Link to the reference documents: <ftp://ftp.asc-csa.gc.ca/users/TRP/pub/Exploration-Core-Science-Definition-Studies/2013/>



## Appendix 3 to ANNEX A

### 3D Microscope

#### Instrument Description

The CSA has built a ruggedized prototype microscopic to support field deployments. This color microscope consists of an objective, and imaging system, and an illumination system. It incorporates the following features:

- 3D Topographic information generation
- Step Zoom to greater than 1 mm field of view
- Autofocus functions
- Scripted Operations
- Integrated Spectroscopy

#### Measurement Characteristics

Function	Value	
Objective	1 for imaging + 1 for DLP	
Imaging modes	<b>Low resolution</b>	<b>High resolution</b>
Resolution (pixel)	4.4 $\mu\text{m}$	2.2 $\mu\text{m}$
Resolution (optical)	$\leq 10 \mu\text{m}$	$\leq 5 \mu\text{m}$
Depth of field	250 $\mu\text{m}$	250 $\mu\text{m}$
Field of view	5.7 $\times$ 4.3 $\text{mm}^2$	5.7 $\times$ 2.1 $\text{mm}^2$
Image size	1296 $\times$ 972	2592 $\times$ 978
Focusing	Adjustable focus over 25 mm, autofocus	
Working distance	$\geq 25 \text{ mm}$	
Colour	sRGB, lossless	
Colour resolution	12 bit	
3D resolution	$\leq 5 \mu\text{m}$ hor., 2 $\mu\text{m}$ vert.	
Illumination	8 wavelengths from 455 nm to 850 nm $\times$ 3 angles	
Fluorescence excitation	365 nm	
Mode	reflective	
Reflectance	quantitative	

#### Operational Details

A user manual is available with the instrument. It is operated via a customized application on a dedicated ruggedized laptop. Although designed to be used on the end of a manipulator, it can be operated from a test stand. It may be available on-loan from the Canadian Space Agency for the purposes of science definition activities.



## Appendix 4 to ANNEX A

### Raman Spectroscopy

#### Instrument Description

This sensor head consists of a laser, a telescope for collecting scattered light, and laser range finder to determine position of the focus stage. It is a standoff Ultra-Violet (UV) Raman sensor that will have the potential to identify key carbon compounds within mineral matrices at ranges from 2 metres to 10 metres using the Raman backscatter effect. The spectra obtained can be used to identify and quantify carbon compounds.

#### Measurement Characteristics

Function	Value
Laser	Instrument Sensing distance: 2-10m 266 nm wavelength 1 ns pulse width Energy 1 $\mu$ J 10 000Hz Repetition rate 10mW average power 90% optics Transmission 2mm beam diameter at 6m
Spectrograph	F-number 3.15 36% efficiency Spectral Resolution: 0.3 nm ( $40 \text{ cm}^{-1}$ ) with a 50 $\mu$ m spectrometer slit
Collection	100mm Primary mirror diameter 50mm obscuration diameter F-number 3.15 91% Optics transmission 70% bundle packing fraction Gated Intensifier and CCD Intensifier: 1.2 ns gate, gain of up to $10^6$ 12-bit CCD Digital output 2 e-/s/pixel CCD Dark current @ 20°C 8 e- RMS CCD Read-out noise

#### Operational Procedures / Protocol

This instrument is not available on loan from the Canadian Space Agency.



## Appendix 5 to ANNEX A

### Laser Induced Breakdown Spectroscopy (LIBS)

#### Instrument Description Summary

The CSA is currently developing an instrument for mapping planetary elemental composition for mineralogy, in-situ resources and astrobiology based on laser-induced breakdown spectroscopy (LIBS) technology. This sensor consists of an imaging module, a pulsed laser, a reflective telescope, employing closed-loop focalization at the target distance using a motorized axial displacement of the secondary mirror using a laser rangefinder.

#### Measurement Characteristics

Although this instrument will not be ready for loan from the Canadian Space Agency until mid-2015, a more simplistic hand-held version may be loaned, as well as a user manual.

This table identifies both the specifications for the future LIBS instrument, and the currently available handheld instrument. Where the specifications are different, this is noted in brackets (). Note that there is no imaging module in the handheld instrument.

Function	Value
Spectrometer Module	10 micron by 800 micron input slit 2048 pixel Sony arrays 16 bit A/D electronics Four spectrometers: 200-365 nm at 0.12 nm FWHM 364-508 nm at 0.1 nm FWHM 507-627 nm at 0.09 FWHM 627-830 nm at 0.15 nm FWHM
Imaging Module (Note: no imaging module in the handheld LIBS)	Sapphire protective 25 mm OD window 3.2 Mpixel colour autofocus camera with USB interface LED-based controlled illumination for imaging shadowed areas
Pulsed Laser Module	Pulse rate 1-20Hz 8m max working distance to sample (70cm for handheld LIBS) 1570 nm pulsed laser at 7-8 mJ with 5 ns pulse width (1064nm, 20mJ, 0.3nm for handheld LIBS) Beam spot 0.5-1.0mm
Varifocus Telescope	100 mm OD primary mirror 200 to 1600 nm spectral range of operation Linear drive motorized focal length selection Bore-sighted EDS-C (Dimetix) visible laser range finder (+/- 3 mm) and visible beam pointer

#### Operational Procedures / Protocol

As stated above, this instrument will not be ready for loan from the Canadian Space Agency until mid-2015. A more simplistic, and less ruggedized, hand-held version may be loaned, as well as a user manual.



## Appendix 6 to ANNEX A

### C. *elegans* Life Sciences Investigations

Radiation exposure alters genetic information contained in DNA, causing cell malfunction or death. These mutations have the potential to transform a normal cell into a tumor if several natural mechanisms that normally prevent this transformation are inactivated. At high doses, these biological responses can lead to cancer, radiation sickness or death. After several decades of robotic or human space flight, space radiation environment is now better known, whether in Low Earth Orbit (LEO), interplanetary space, or at the confines of the solar system. The space 'vacuum' is actually filled with high energy particles such as electrons, neutrons, gamma-rays or atomic nuclei emitted by the sun or by other galactic sources, an environment extremely difficult to mimic on Earth. Little is known regarding the biological response to this complex mixture of radiation particles. Most of the experiments performed in relation to this question have been either performed on the ground using particle accelerators in animal studies, or in LEO within Earth's magnetosphere and its protective effect against interplanetary radiation.

The first proposal to use the round worm *C. elegans* (nematode) to study space biology was published in 1991. Since then, this well known animal model has mostly been used to study biological responses such as development and reproduction in LEO in US Shuttle or International Space Station (ISS) experiments. These worms can be maintained in Petri dishes or liquid media and are widely used by researchers to understand fundamental biological processes using genetic-based approaches. Their genome has been completely sequenced and the scientific community has developed over the years an impressive collection of mutants to inactivate or influence genes that are usually conserved with humans.

This animal model would be extremely useful to study the impact of interplanetary radiation on the genome of living organisms and to test the efficiency of protective measures. The study will define the science requirements for studies of the impact of interplanetary radiation on animal genomes using the *C. elegans* model and the efficiency of protection measures as well as its use with other risks (MRD-2 and MRD-3). Animal model, habitat and remote monitoring systems will be proposed to collect the information by telemetry, to avoid the requirement to recover the animals. Experiments performed on-board micro- or nano-satellites can be proposed. The scientific objectives, the choice of orbit and satellite system will have to be justified. This project may initially be tested on the ISS or in science satellites in LEO before launch beyond the Earth magnetosphere.





## Appendix 7 to ANNEX A

### Mouse Life Sciences Investigations

Rodents such as mice and rats are widely used in life sciences to investigate basic biological functions as well as mechanisms behind specific diseases. Rodents have also been used very early in the space program to understand the mechanisms involved in physiological adaptation to weightlessness (microgravity). Rodents were launched to Low Earth Orbit (LEO) in the Russian program to perform studies in science satellites such as Sputnik II or Cosmos. Many rodent experiments were performed in the US space shuttle and in the International Space Station (ISS). Rodent research has vastly improved our understanding of life adaptation to microgravity. Recent use of genetically modified strains such as transgenic mice has initiated the assessment of the role of specific genes in bone adaptation to microgravity.

In 2011, a US Decadal survey recommended using in-flight animal studies to improve our understanding of the mechanisms behind physiological adaptation to weightlessness. NASA is currently developing and testing a new rodent habitat on the ISS. This habitat will house 10 mice for a minimum duration of 30 days. This development provides an opportunity to perform animal studies in the context of long term exposure to microgravity.

Definition of science requirements for rodent studies is required to determine the best animal models and experimental conditions that will help reduce health risks during human space flight. The use of genetically modified models is considered in order to identify potential countermeasures that will reduce health risks such as muscle atrophy, bone loss, cardiovascular de-conditioning, or any risk described in the NASA human research roadmap (MRD-3). The proposed Science Definition Studies should include a literature review related to the risk being targeted, justify the genetic model selection, explain the desired duration of the exposure to microgravity, and describe the post-flight analysis that should be performed on the ground. Some in-flight dissection capability may be available in the medium term and potential in-flight biopsy or tissue collection can be suggested. The proposed studies will help prepare for potential contributions to ISS mission in the 2015 to 2020 timeframe in life and health sciences.