

Analogue Deployments Request for Information (RFI)

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1 INTRODUCTION

1.1 PURPOSE

The Canadian Space Agency (CSA) is seeking information from interested parties on the nature and extent of their participation in the execution of CSA-led Exploration Core Analogue Deployments, for specific scenarios described below, as well as for other scenarios of their own that they might wish to propose in the future.

1.2 GENERAL INFORMATION

This Request for Information (RFI) shall not be construed to be a Request for Proposal (RFP) and/or Announcement of Opportunity (AO), and no agreement/contract will be entered into with/awarded to any vendor based on responses to this RFI, and it shall in no way be considered as authorization by Canada for vendors to undertake any work. This RFI shall in no way be considered as authorization by the CSA for respondents to undertake any work, which would result in costs to the CSA. The CSA shall not be liable for, nor shall it reimburse any of the respondents, or any third-party, for any costs, fees or expenses, incurred in the preparation or submission of a response to this RFI.

Nothing in this RFI shall be construed as a commitment to issue a RFP or an AO. Response to this RFI will not create any obligation. The CSA shall not be bound by anything stated herein. Respondents shall not be bound by any aspect of their response to this RFI.

All responses to this RFI will be held by the CSA on a confidential basis (subject to applicable legislation) and remain the property of the CSA once they have been received. Respondents are advised, however, that information submitted may be used in the development of future RFPs or AOs. Vendors answering this RFI shall specify if the information or comments provided are confidential or exclusive to the company. Not responding to this RFI shall in no way penalize bidders to any future RFP or AO.

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2 DOCUMENTS

2.1 APPLICABLE DOCUMENTS

There are no applicable documents in this RFI.

2.2 REFERENCE DOCUMENTS

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

TABLE 2-1 - REFERENCE DOCUMENTS

RD No.	Document Number	Document Title	Rev. No.	Date
RD1.		Global Exploration Strategy (http://www.asc-csa.gc.ca/pdf/global_exploration.pdf)		May 2007
RD2.	CSA-ESM-DD-0001	Exploration Surface Mobility Analogue Mission Scenarios (ftp://ftp.asc-csa.gc.ca/users/TRP/pub/Science%20Scenario%20Development/CSA-ESM-DD-0001%20Rev%20B%20Exploration%20Surface%20Mobility%20Analogue%20Mission%20Scenarios%20-%20signed.pdf)	Rev. B	May 2010
RD3.		Analogue Terrain Overview Sheet (ftp://ftp.asc-csa.gc.ca/users/excore/pub/Infrastructures/AT%20Overview%20Sheet.docx)	2.3	August 14, 2012
RD4.		Rover Integration Facility Overview Sheet (ftp://ftp.asc-csa.gc.ca/users/excore/pub/Infrastructures/RIF%20Overview%20Sheet.docx)	1.4	December 13, 2013
RD5.		Exploration Development and Operation Centre (ExDOC) Overview Sheet (ftp://ftp.asc-csa.gc.ca/users/excore/pub/Infrastructures/ExDOC%20Overview%20Sheet.docx)	1.3	August 17, 2012
RD6.		Portable Command and Control Shelter (PCCS) Overview Sheet (ftp://ftp.asc-csa.gc.ca/users/excore/pub/Infrastructures/PCCS%20Overview%20Sheet.docx)	1.4	August 17, 2012
RD7.		“Science Scenario Development for a Planetary Analogue Robotic Field Deployment: Site Identification and Characterization” RFP (https://buyandsell.gc.ca/procurement-data/tender-notice/PW-13-00504329)		October 2013
RD8.		The Global Exploration Roadmap (http://www.globalspaceexploration.org/wordpr		August 2013

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RD No.	Document Number	Document Title	Rev. No.	Date
		ess/wp-content/uploads/2013/10/GER_2013.pdf)		

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3 BACKGROUND

The CSA Exploration Core Program operates in the context of Canadian Space Exploration Plan that was issued at the end of 2012 where CSA's vision for space exploration is stated as "Canada will join in the human and robotic exploration of the solar system and space-based astronomical observation of the Universe beyond. The CSA will maintain a robust and balanced space exploration program to ensure that, as a nation, Canadians share in the discoveries, technological breakthroughs, societal impact and economic benefits stemming from the global exploration endeavour". Canada is one of the fourteen national space agencies that endorsed the Global Exploration Strategy (GES) in 2007, see RD1. The Global Exploration Strategy is a non-binding action plan that provides a basis for collaboration among participating countries so that they may strengthen both their own individual space exploration projects as well as the larger collective effort. The GES presents a vision for robotic and human space exploration, focusing on destinations in the solar system where humans may establish sustained and ultimately self-sufficient presence supported by robotic pathfinders. Exploration of the Moon and Mars is the focal point of the GES.

In order to attain its vision, the CSA has created in 2007 the Exploration Core Program to develop a capability in certain niche areas that will help determine which contributions Canada might provide to the global exploration undertaking. The Exploration Core Program aims at developing prototypes of space exploration systems and deploys them in end-to-end realistic analogue scenarios that will involve operations and science activities.

As part of these activities, the CSA conducts Analogue Deployments, which aim at testing various prototypes in relevant analogue sites in the context of realistic science driven mission scenarios, in line with potential future missions where Canada could be involved. The final objective under this activity is to perform realistic science with payloads operated remotely and as autonomously as possible in order to increase the maturity of the science, the operation protocols and tools while testing the systems in relevant environment.

4 SCENARIOS

This RFI addresses two kinds of scenarios: CSA-defined scenarios and unsolicited scenarios.

4.1 CSA-DEFINED SCENARIOS

CSA has defined the following two scenarios:

1. Mars Sample Return: the objective is to perform a geological survey, take scientific measurements, select samples, and perform the acquisition and manipulation required to store the samples;
2. Lunar Prospecting & Science [In-Situ Resource Utilisation (ISRU)-focused]: the objective is to determine the geological context and the geophysical properties of an area.

Full details on these two scenarios are provided in sections 3 and 5 respectively of RD2 "Exploration Surface Mobility Analogue Mission Scenarios". Moreover, it is very important that these scenarios be driven by real science to be executed in analogue sites and that the systems are operated in a realistic context compared to a real mission. The objective is to increase the preparation level not only in terms of technology aspects but also in terms of science and operational aspects.

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In the last few years, CSA has developed rovers and payloads and has built the required infrastructure to perform the integration, deploy the systems in the field and operate them remotely. This infrastructure includes the CSA Analogue Terrain (RD3), the Rover Integration Facility (RD4), a remote control facility (ExDoc, RD5) and a portable version named the Portable Command and Control Shelter (RD6). Activities related to the above scenarios span the period from 2010 to 2017. They include deployments at the CSA Analogue Terrain, as well as at other scientifically relevant sites. Figure 4-1 shows the current timeline of these activities, but this is subject to change, and in particular may be influenced by responses to this RFI. Analogue Deployments (AD01 to AD03) will be conducted with an increased level of complexity every year with a goal of conducting fully autonomous science driven scenarios during the summer of 2016. Systems will be operated remotely in order to test operation procedures and the related developed software to support the mission.

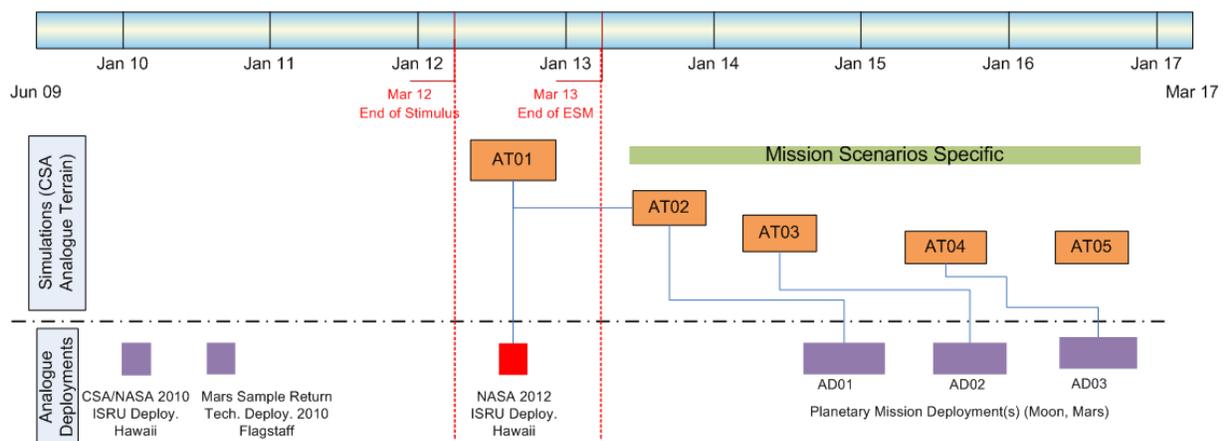


FIGURE 4-1: PLANETARY EXPLORATION ANALOGUE DEPLOYMENTS UNTIL 2016-17

As part of the above activities, CSA has recently (October 2013) issued a RFP titled “Science Scenario Development for a Planetary Analogue Robotic Field Deployment: Site Identification and Characterization” (RD7). The main goal of this work is to identify and describe a viable field site, preferably in Canada, to be used for these science-led, technology-enabled robotic field deployments in upcoming years (AD01, AD02 and AD03 in Figure 4-1). This RFP resulted in two contracts, each addressing one of the above scenarios.

4.2 UNSOLICITED SCENARIOS

This RFI is also open to inputs related to potential future contributions to scenarios other than the two scenarios described in section 4.1, provided that they fall in the domain of Planetary Exploration and meet science or technology development objectives acceptable to CSA. These objectives will be proposed by CSA at a later date, and will be aligned with, and relevant for, missions indicated in the Canadian Space Exploration Plan soon to be disclosed publicly. The respondents are referred to the Global Exploration Roadmap (RD8) for which CSA is a signatory to get an idea of potential missions being discussed at the international level.

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5 REQUESTED INFORMATION

Respondents are invited to submit information related to either or both of the scenarios described in section 4.1, as well as to unsolicited scenarios as described in section 4.2. Information provided should address two aspects: the nature of the proposed contribution, and the preferred funding mechanisms.

5.1 NATURE OF PROPOSED CONTRIBUTION(S)

This information should describe the kind of contribution that the respondent proposes to make, based on its expertise, knowledge, equipment, software, etc. Respondents should also indicate how their contribution will relate to the targeted scenario. CSA is open to all kinds of contributions.

CSA is not asking for specific projects or payloads at this point in time, but more for the kind of contribution respondents can offer. Following are examples of contributions that would be of interest, however, CSA is open to other ideas – this is not a limiting list:

- Support in integration and operation of rovers and payloads that CSA already owns;
- Support in integration of a payload (hardware and software) owned by the respondent or partners for use in an analogue deployment;
- Logistics handling (for example in far north deployments);
- Provision of scientific expertise in support of analogue deployments;
- Etc.

Please note that this RFI is concerned with integration of existing hardware, not with new hardware development.

Contributions may also be provided through participations in collaboration activities such as the NSERC Canadian Field Robotic Network (NCFRN) (<http://ncfrn.mcgill.ca/>) or the NSERC CREATE program “Technologies and Techniques for Earth and Space Exploration” (<http://cpsx.uwo.ca/research/nserc-create-2>) in which CSA is a partner. These are two examples of programs very well aligned with CSA’s interests where CSA’s involvement is limited to in-kind contributions. CSA is interested in getting information on alternative collaboration activities aligned with the scenarios described in sections 4.1 and 4.2 that could be pursued with the respondent. Amongst others, access to CSA’s Exploration Core Infrastructure (RD3, RD4, RD5 and RD6) could be negotiated and available as in-kind contributions.

5.2 FUNDING MECHANISMS

The other type of information that this RFI seeks is in the areas of funding. CSA is aware that the respondents might have opportunities to participate in deployments (e.g. NASA led deployment) without any prior involvement from CSA. Such opportunities could include teaming with a non-Canadian team in a proposal to be submitted following a call for proposals issued in another country. In some cases, when these opportunities are aligned with CSA’s objectives, CSA might want to provide funding to recipients such that CSA can benefit from these opportunities by getting access to the results both directly and indirectly. CSA’s involvement could range from loaning equipment up to funding the respondent’s involvement in whole or in part. CSA is interested in hearing the views of respondents on this subject, for example:

- Possible examples/contexts/needs where the respondents would benefit from CSA funding;
- The nature of the activities that would benefit from CSA funding;
- The level of funding that would be required, as well as ideal periodicity and response time for CSA to respond to proposals;

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- Any other suggestions regarding funding mechanisms.

Based on the type of requests and needs, CSA will select the best funding mechanism to meet its objectives. Of course, in the final selection of mechanisms, compliance with government rules and regulations will be followed, with an emphasis on fairness.

6 RESPONSE PROTOCOL

Responses should be as concise as possible. Respondents may submit more than one proposal for consideration.

Respondents are encouraged to submit a brief description of their experience and expertise in this area. Each response should include sufficient contact information (names, address, e-mail address, telephone number) in order to allow CSA to contact the respondent for further clarification, if required. Aside from potential clarifications, CSA does not expect to provide any response or acknowledgement to any respondent to this RFI.

7 SUBMITTAL OF RESPONSES

Written responses to this RFI shall be transmitted to the CSA by mail or facsimile or e-mail (PDF or Microsoft Office document) no later than **Thursday, March 20th, 2014 at 4:00 pm (EST)**. Questions and formal written responses to this RFI shall be addressed to:

Robert Kardum
Contracting Officer
Procurement and Contract Administration

Canadian Space Agency
6767 route de l'Aéroport
St-Hubert, Quebec J3Y 8Y9
Canada

Telephone: 450-926-4875
Fax: 450-926-4969
E-mail: robert.kardum@asc-csa.gc.ca

APPENDICES

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APPENDIX A ACRONYMS

CREATE	Collaborative Research and Training Experience (Program)
CSA	Canadian Space Agency
G&C	Grants and Contributions
ISRU	In-Situ Resource Utilisation
NCFRN	NSERC Canadian Field Robotic Network
NSERC	Natural Sciences and Engineering Research Council of Canada
RFI	Request for Information
RFP	Request For Proposal