

Title: Request for Information – Commercial Low Earth Orbit Destinations and Lunar Surface and Orbit Exploration

1. INTRODUCTION

The Canadian Space Agency (CSA) is soliciting opinions and ideas under this Request for Information (RFI) to collect information that will help support the development of options for Canada's future procurement needs in priority areas of space exploration. Firstly, on Canadian industry's interest both in taking part in and capacity to supply and support future plans and developments in different areas of space exploration. Secondly, on the needs, requirements and perspectives of Canadian organizations, suppliers or individuals with regards to Low Earth Orbit (LEO) utilization for science investigations, technology development and demonstration, and other uses of LEO for commercial or scientific purposes. Thirdly, on potential future investments and procurement needs related to Lunar Surface and Orbit Exploration.

This exercise is needed for CSA's strategic planning, and does not imply future budgetary commitments by the CSA or the Government of Canada. This RFI provides Canadian industry, academia and individuals with the opportunity to submit information in a couple of key areas. Firstly, on how they plan or envision supporting space exploration or using LEO destinations in the post-International Space Station (ISS) era and, secondly, provide their opinion and vision on how Canada could engage with and position itself in the current context of global LEO commercialization and human deep space exploration (in particular, the Moon's orbit and surface), while ensuring global competitiveness of Canadian space industry. The outcomes of this consultation will allow the CSA to advance multiple objectives of Canada's Space Strategy, and most importantly, position Canada's commercial space sector to help grow the economy and create the jobs of the future.

2. BACKGROUND

In January 2022, NASA announced its intention to extend its participation in the ISS until 2030. The other ISS partners are now in the process of seeking their respective government approvals to do the same. However, this decision is fundamentally different than previous ISS extensions, as NASA has also announced that the ISS will be retired subsequently, with a transition to commercial destinations in LEO. This transition is currently under way as NASA has already awarded funding to several U.S. consortia to advance their respective commercial space station concepts in December 2021. NASA's goal is to establish access to commercial human destinations in LEO before the ISS is decommissioned after 2030.

In addition to the intended shift towards a sustainable commercial economy in LEO, the ISS partners are now focusing their efforts on exploration in deep space. While partners will continue to maintain the ISS to end-of-life, institutional planning and new investments are clearly being positioned towards lunar orbit and the lunar surface. As such, decisions that Canada makes in relation to extending its participation in the ISS to 2030 will be as much about the future of its human spaceflight and space exploration programs as they will be about its participation in the ISS and how it will engage and position itself in a commercial LEO environment.

Fortunately, recent space exploration decisions and investments (including extending participation in the ISS to 2024, formalizing participation in the U.S.-led Lunar Gateway, establishing the Lunar Exploration Accelerator Program (LEAP), and signing the Artemis Accords) have established a strong foundation and clear trajectory for maintaining Canada as a key space exploration partner.

In alignment with the above, the CSA recently commenced the Lunar Surface Exploration Initiative (LSEI) to define potential opportunities for Canadian participation in an international space exploration campaign that will explore the Moon, establish a sustained human presence on the lunar surface and plan ahead for future Mars exploration. As part of the LSEI, the CSA is seeking innovative concepts for future Canadian contributions beyond Gateway and beyond LEAP, which provide critical capabilities, on the flagship level, in support of common international goals and objectives related to lunar surface exploration. It should be noted that the CSA is also consulting with the Canadian scientific community on space exploration science priorities via its upcoming Canadian Space Exploration Workshop (CSEW 2022).¹

3. PURPOSE OF THE RFI

The purpose of this RFI is to consult Canadians and Canadian organizations to help the CSA and the Government of Canada to better define future procurement needs related to these areas:

- Lunar surface and lunar orbit exploration
- Commercial LEO destinations (CLD) utilization for human exploration and research and development (R&D)

4. UNDERSTANDING COMMERCIAL LEO DESTINATIONS (CLD) AND LUNAR EXPLORATION

Lunar Exploration:

Canada has numerous forthcoming lunar activities associated with Artemis II, LEAP and Gateway. In addition, future Canadian focus is on planning of other lunar activities in orbit and even more so, supporting sustainable presence on the lunar surface. The international landscape has significantly converged and prioritized on the Moon, as is well illustrated by the International Space Exploration Coordination Group's (ISECG) Global Exploration Roadmap Supplement. To ensure Canada's place in these growing lunar activities, the CSA has initiated the LSEI which is studying options for major Canadian contributions to lunar surface exploration and sustainable human presence on the Moon. The CSA is also interested in assessing the potential to translate investments into new knowledge and capabilities that leverage technologies to empower innovation, value creation and improve the quality of life for Canadians. The intent of LSEI is to create a suite of major Canadian contributions that may be implemented between 2030 and 2045. Enabling science is also of high priority and critical to these future activities.

Post-ISS Commercial LEO Destinations:

The ISS is entering an era of increased commercial use as it is engaged in its last decade of use. The utilities provided by the ISS support the development of the capabilities industry needs to move from being dependent on ISS partners for space station utilization to providing the platform(s) the space agencies will need to continue its mission in LEO after the lifetime of the ISS. For example, commercial crew and cargo transportation currently provide the vital lifeline from Earth to the ISS. In addition, there are over 20 commercial facilities presently operating aboard ISS that are available for use by

¹ More information on the Canadian Space Exploration Workshop (CSEW 2022) can be found here: <https://asc-csa.gc.ca/eng/events/2022/canadian-space-exploration-workshop-2022.asp>

both ISS partners and other paying customers. Commercial engagement is one step towards ensuring space continues to thrive beyond the ISS decommission in 2030.

In this context, NASA has awarded the use of an ISS docking port to Axiom Space, which plans to attach a series of commercial modules that will eventually detach to become a LEO free-flying destination. In addition, NASA has also signed agreements with three U.S. companies (Blue Origin, Nanoracks LLC and Northrop Grumman Systems Corporation) to develop commercial destinations in space that go directly to orbit, i.e., free-flyers. These LEO platform concepts are the first part of a two-phase approach to ensure a transition of activity from the ISS to commercial destinations. During this first phase, private industry, in coordination with NASA, will formulate and design CLD capabilities suitable for potential Government and private sector needs. The first phase is expected to continue through 2025. For the second phase of NASA’s approach to a transition toward CLDs, NASA intends to certify for NASA crew member use CLDs from these and potential other entrants, and ultimately, purchase services from destination providers for crew to use when available.

It is NASA’s goal to be one of many customers of commercial LEO destination services. CLDs, along with commercial crew and cargo transportation, will provide the backbone of the human LEO ecosystem after the ISS retires.² Ultimately, the development of a LEO economy with CLDs will allow the NASA and all the ISS partners, including the CSA, to redirect resources and focus on the next steps of space exploration.

4.1 REFERENCE DOCUMENTS

The following reference documents are publicly available sources of information on current developments about CLDs and lunar exploration. RFI respondents are free to consult these sources according to their needs.

RD No.	Document Title	Date
RD-1 (EN)	NASA releases updated plan to de-orbit the international space station by the end of 2030 (SpaceQ)* https://spaceq.ca/nasa-releases-updated-plan-to-de-orbit-the-international-space-station-by-the-end-of-2030/	February 2022
RD-2 (EN)	ISS transition to commercial stations poses challenges for partners (Space News)* https://spacenews.com/iss-transition-to-commercial-stations-poses-challenges-for-partners/	February 2022
RD-3 (FR)	The end of the International Space Station scheduled in 2031 [<i>La fin de la Station spatiale internationale prévue en 2031</i>] (Radio Canada)* https://ici.radio-canada.ca/nouvelle/1859490/station-spatiale-internationale-fin-2031-nasa	February 2022
RD-4 (EN)	International Space Station Transition Report (NASA)* https://www.nasa.gov/sites/default/files/atoms/files/2022_iss_transition_report-final_tagged.pdf	January 2022
RD-5 (EN)	3 privately owned, commercial space stations get NASA funding (CBC)* https://www.cbc.ca/news/science/orbital-reef-1.6272055	December 2021
RD-6 (EN)	Europe opens up a new space to commercial services (ESA)* https://www.esa.int/Science_Exploration/Human_and_Robotic_Exploration/Europe_opens_up_a_new_space_to_commercial_services	December 2021
RD-7 (EN)	ESA invites companies to build Europe’s post-ISS era (Spacewatch Europe)* https://spacewatch.global/2021/12/esa-invites-companies-to-build-europes-post-iss-era/	December 2021

² NASA (January 2022): International Space Station Transition Report

RD-8 (FR)	For the future, NASA will count on private space stations [<i>Pour l'avenir, la NASA mise sur des stations spatiales privées</i>] (Radio-Canada)* https://ici.radio-canada.ca/nouvelle/1844542/nasa-stations-spatiales-privées-blue-origin-nanoracks-northrop-grumman	December 2021
RD-9 (EN)	Terrae Novae 2030+ Strategy Roadmap (ESA)* https://esamultimedia.esa.int/docs/HRE/RD4_ESA_Terrae_Novae_2030+Strategy_Roadmap.pdf	November 2021
RD-10	Canada's role in Moon exploration (CSA) https://www.asc-csa.gc.ca/eng/astronomy/moon-exploration/canada-role.asp	November 2021
RD-11 (FR)	What are the new commercial space services? [<i>Quels sont les nouveaux services spatiaux commerciaux?</i>] (Polytechnique Insights)* https://www.polytechnique-insights.com/dossiers/espace/conquete-de-mars-fantasmé-ou-projet-realiste/quelle-place-pour-leurope-dans-la-conquete-spatiale/	September 2021
RD-12 (EN)	NASA to offer funding for initial studies of commercial space stations (Space News)* https://spacenews.com/nasa-to-offer-funding-for-initial-studies-of-commercial-space-stations/	March 2021
RD-13 (FR)	What future awaits the International Space Station? [<i>Quel avenir pour la Station spatiale internationale?</i>] (Radio-Canada)* https://ici.radio-canada.ca/nouvelle/1777362/station-spatiale-ssi-avenir-spacex	March 2021
RD-14 (EN)	Global Exploration Map Supplement – Lunar Surface Exploration Scenario Update (ISECG)* https://www.globalspaceexploration.org/wp-content/uploads/2020/08/GER_2020_supplement.pdf	August 2020
RD-15 (EN)	NASA selects Axiom Space to build commercial space station module (Space News)* https://spacenews.com/nasa-selects-axiom-space-to-build-commercial-space-station-module/	January 2020
RD-16	Space Strategy for Canada (CSA) Space Strategy for Canada Canadian Space Agency (asc-csa.gc.ca)	March 2019
RD-17	The future of space exploration: beyond the International Space Station (CSA) https://www.asc-csa.gc.ca/eng/astronomy/moon-exploration/the-future-of-space-exploration-beyond-the-international-space-station.asp	February 2019

*External document available only in either English or French.

5. NATURE OF REQUEST FOR INFORMATION

This RFI is neither a call for tender nor a Request for Proposal (RFP). This RFI will not result in the award of any contract. This RFI is not a pre-selection process. There will be no short listing of firms for purposes of undertaking any future work, as a result of this RFI, nor it will a condition or a prerequisite for participation in any related RFP, should one be generated.

This RFI is simply intended to gather participants from industry, academia and the public who wish to provide information and ideas to influence and shape how Canadian-led exploration activities will be conducted on lunar orbit and surface, and in LEO destinations.

6. CONFIDENTIALITY

Respondents are advised that any information submitted to CSA in response to this RFI may be used by CSA in the finalization of a competitive RFP. However, the Government is not bound to accept any Expression of Interest or to consider it further in any associated documents such as an RFP.

All industry consultations will be documented and this information is subject to the Access to Information Act. Consequently, respondents should avoid submitting information that is to be considered as either company confidential or proprietary.

7. ELIGIBILITY

Respondents to this RFI must be either Canadians or representatives of a Canadian organization.

8. RFI SUBMISSION AND RESPONSE

Participation to this RFI is a two-step process.

First Step: RFI Participation Confirmation

Organization representatives and individuals interested in participating in this consultation have to submit their interest by email to the Procurement Authority (see section 10 below) by using the email subject in Section 8.1 and the message template in Section 8.2. In the message template, participants have to indicate the requested contact information.

Second Step: RFI Survey Response

After reception of a submission to participate, an email invitation will be sent, within five (5) working days after reception, to the contact indicated in the submission. It will include a hyperlink to access an online survey form where the participant can provide their responses to a series of questions. Instructions on how to use the online survey platform and how to submit answers will be included in the survey.

Respondents are requested to submit the completed RFI survey through the survey platform. Responses have to be provided in one of the two Official Languages of Canada (English or French).

8.1 TITLE OF RESPONSE

Each respondent should entitle the email submission to participate 'Subject' as:

9F055-22-0009 – Request for Information: Commercial Low Earth Orbit Destinations and Lunar Surface and Orbit Exploration

8.2 RESPONSE TEMPLATE

Each respondent should use the following template in the email submission:

By the following email, we confirm our intent to participate to the Commercial Low Earth Orbit Destinations and Lunar Surface and Orbit Exploration consultation.

Contact information

Name:

Title:

Organization name:

Organization address:

Email:

If answering as an individual (unaffiliated to or not a representative of an organization), please indicate your individual address.

9. CLOSING DATES

This RFI is a two-step process (as stated above in Section 8) that requires a closing date for each of its steps.

First Step: RFI Participation Confirmation

The closing date to submit a RFI Participation Confirmation by email is: **June 8, 2022**

Second Step: RFI Survey Response

The closing date to submit the RFI Survey Response through the survey platform is: **June 10, 2022**

10. RESPONSE SUBMISSION AND ENQUIRIES

RFI Participation Confirmation must be sent to the Procurement Authority, identified below, by email. It is the sole responsibility of respondents to confirm whether their RFI Participation confirmations have been successfully received.

Procurement Authority:

Julie Mercier

Canadian Space Agency

Email: julie.mercier@asc-csa.gc.ca

Because this is not a bid solicitation, Canada will not necessarily respond to enquiries in writing or by circulating answers to all potential respondents. However, respondents with questions regarding the RFI participation or process may direct their enquiries to the Procurement Authority stated above.

11. RFI FOLLOW-UP

Once responses are received and reviewed by CSA, respondents may be invited to present and/or explain their responses in a post RFI discussion meeting with representatives of the CSA or by email.

The CSA reserves the right to send a follow-up survey to the respondents if the CSA considers it necessary. In this case, respondents will be advised prior to receiving the follow-up survey invitation. The follow-up survey would be accomplished using the same survey platform. Respondents will be free to answer the follow-up survey.

12. ACRONYMS

CLD	Commercial Low Earth Orbit Destination
CSA	Canadian Space Agency
EN	English
ESA	European Space Agency
FR	French
HSF	Human Spaceflight
IPs	International Partners
ISECG	International Space Exploration Coordination Group
ISS	International Space Station
JAXA	Japanese Aerospace Exploration Agency
LEAP	Lunar Exploration Accelerator Program
LEO	Low Earth Orbit
LSEI	Lunar Surface Exploration Initiative
NASA	National Aeronautics and Space Administration
R&D	Research & Development
RFI	Request for Information
RFP	Request for Proposals
U.S.	United States