

International Space Centers Collaboration Request for Information on Human Health Science for Gateway Lunar Space Station

Space Operations Mission Directorate Number: NNJ25ZSA001L

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1. Request Summary

This is a Request for Information (RFI) only and does not constitute a commitment, implied or otherwise, that the National Aeronautics and Space Administration (NASA), European Space Agency (ESA), Canadian Space Agency (CSA), nor Japan Aerospace Exploration Agency (JAXA) will take procurement action in this matter. The information gathered will be used by members of the Gateway Program-sponsored Human Health Discipline Working Group (HHDWG), including NASA, ESA, CSA, and JAXA to make decisions regarding potential human health science for the Gateway space station.

2. Background

With Artemis missions, NASA will land the first woman and first person of color on the Moon, utilizing innovative technologies to explore more of the lunar surface than ever before. These missions will be accomplished through collaboration with commercial and international partners and will establish the first long-term human presence on the Moon. Then, lessons learned on and around the Moon will be used to accomplish the next giant leap: sending the first astronauts into deep space exploration destinations.

Artemis consists of several vehicles, or platforms including: the Orion Spacecraft, Space Launch System (SLS) Rocket, Exploration Ground Systems, Gateway, Human Landing System (HLS), and Extravehicular activity and Human Surface Mobility.

The NASA-led Gateway Program is an international collaboration to establish humanity's first space station around the Moon as a vital component of the Artemis campaign. Gateway will help NASA and its partners test the technologies and capabilities required for a sustained human presence in deep space and chart a path for the first deep space human exploration missions. Gateway will offer unique opportunities to leverage the deep space lunar environment for scientific research and discovery. Gateway will serve as a year-round deep space laboratory, offering both internal and external study capabilities, and thus enabling a diverse array of scientific research. One of Gateway's tenets is to have a multidisciplinary approach to utilization, or science opportunities.

Specifically for human health science, Gateway offers inherent risks and hazards to the crew that are representative of an exploration-class mission and cannot be accurately simulated using space analogs or on the International Space Station (ISS). The vehicle platform provides an opportunity to study effects of deep space radiation, farther distance from Earth, isolation and confinement, hostile/closed environments, weightlessness, and most importantly, the holistic combination of these hazards acting on the human systems all in one mission.

NASA, ESA, CSA, and JAXA participate in a Gateway Program-sponsored Human Health Discipline Working Group (HHDWG). The goal of the HHDWG is to develop strategic objectives that integrate international human health science, medical operations, and applicable technology advancement efforts, with the aim of best utilizing the Gateway to reduce risks to human health and performance on future human exploration missions. These objectives intend to support both the successful completion of the missions and

the preservation of astronaut health over the life of the astronaut. The HHDWG objectives are:

1. Exploration Medical Operations Advancement
 - *Evaluate and validate crew health and medical operational functions, technologies, measures, and various countermeasures to demonstrate near-autonomous operations, analysis, and effective protective measures for future human exploration mission.*
2. Integrated Human-System Research
 - *Perform human subject research to obtain data on changes to the human system in the exploration class missions and characterize impacts on the overall health and performance of exploration crew.*
3. Living Environment
 - *Evaluate and validate how the interaction of exploration habitat systems and spaceflight hazards affect crew health and performance for exploration-class missions.*
4. Special Task-Related Issues
 - *Evaluate and validate operational implementation of specific tasks' protocols, procedures, and human factors, and how it affects crew health and performance.*

3. Requested Information

NASA, ESA, CSA, and JAXA are requesting information from the community on human health science that should be performed on the Gateway space station. These science ideas must be implementable within the following constraints:

- Gateway research resources are very limited compared to those of the ISS. Gateway is a relatively small vehicle with little external real estate and limited internal volume and stowage. Since logistics flights are infrequent, up-mass is limited. Currently, Orion is the only vehicle with return capabilities, and this NASA resource must be assumed as unavailable for non-NASA research activities. Crew presence on Gateway is also limited (~17 days per year initially, with two crewmembers on the lunar surface for seven of these days). Further, compared to the ISS, Gateway missions have a much broader scope that includes many things beyond research, thus making crew time even more constrained.
- To best maximize available resources, collaborative, multi-lateral payloads, data sharing, and equipment sharing is highly important. Internal payloads are expected to be simple, require little to no crew time, and come plug-in ready. Most of the crew time will be focused on logistics and preparation for lunar surface work. While two crewmembers are on the lunar surface, the two that remain on Gateway may have time to perform some research, perhaps as much as three hours per day.
- The vehicle is expected to be controlled mostly with gyros, but there will be times in each 6.5-day orbit when thrusters fire. There will be a limited amount of propellant, which will contribute to vehicle attitude constraints. Orientation changes will affect external viewing opportunities for Earth, Sun, Moon, and Deep Space-observing payloads.

- Dormancy environment --- During periods without crew, Gateway will stay pressurized but may have reduced temperatures and humidity.

Assumptions, resources, and capabilities are subject to change as design and mission requirements develop.

More information on Gateway research can be found on the Gateway Capabilities website (<https://www.nasa.gov/gateway-capabilities/>).

It is important to note that all implemented science activities on Gateway are required to be sponsored by a Gateway partner agency. Ideas requested through this RFI, however, can be submitted by anyone. However, this RFI is not a mechanism for sponsorship. Gateway partner agencies will use the information obtained as a result of this RFI on a non-attribution basis. No information or questions received will be posted to any website or public access location.

The Government does not intend to give an award on the basis of this RFI or to otherwise pay for the information solicited. As stipulated in Federal Acquisition Regulation (FAR) 15.201(e), responses to this notice are not considered offers, shall not be used as a proposal, and cannot be accepted by the Government to form a binding contract. Inputs shall be compliant with all legal and regulatory requirements concerning limitations on export controlled items. To the full extent that it is protected pursuant to the Freedom of Information Act and other laws and regulations, information identified by a respondent as "Proprietary or Confidential" will be kept confidential.

Responses to this RFI will be collected through the NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES, see Instructions below).

Each response to the RFI will address the following topics:

- a. Describe your human health science idea. Include capabilities that might be needed to execute the idea, and the interaction by/with the crew, if any. (1000 characters max.)
- b. What challenges, if any, might be encountered given the spaceflight constraints (limited crew time, up/down-mass, power, volume, etc.)? (1000 characters max.)
- c. Explain why this idea requires Gateway and its unique environment versus the International Space Station (ISS)/Low Earth Orbit (LEO) or an Earth-based analog? (1000 characters max.)
- d. How does this idea help advance human exploration beyond LEO and how does it do that beyond the Moon? (1000 characters max.)
- e. Would this idea require access to the crew pre-flight and/or post-flight?

No proprietary information should be provided in response to this RFI.

This RFI is open to responses from all parties including commercial entities, international organizations, academia, NASA Centers, and other government agencies.

4. Response Instructions

Responses must be submitted electronically using the NSPIRES website (<https://nspires.nasaprs.com>). It is important to note that some of the functionality of the NSPIRES system uses terminology that does not exactly track to the collection of RFI data. For instance, when submitting responses to this RFI, use of the term "proposals" or "NOIs" in these instructions does not mean that NASA is inviting proposals or offers in response to this RFI.

All respondents are required to register with NSPIRES first, and are urged to access this site well in advance of the RFI due date to familiarize themselves with its structure and enter the requested identifier information. Requests for assistance in accessing and/or using the NSPIRES website should be submitted by E-mail to nspireshelp@nasaprs.com or by telephone to (202) 479-9376 Monday through Friday, 8:00 AM – 6:00 PM Eastern Time. FAQs on NSPIRES may be accessed through the Proposal Online Help site at <https://nspires.nasaprs.com/external/help.do>. Tutorials of NSPIRES are available at <https://nspires.nasaprs.com/tutorials/index.html>. This data site is secure and all information entered is strictly for NASA use only.

Only one person may be nominated in each response. Responses to this RFI shall be submitted no later than 5:00 PM EST on November 25, 2024. Responses must be submitted using the “Notice of Intent (NOI)” module within the NSPIRES system.

To initiate an RFI Response:

- Log in using your NSPIRES username and password.
- Access Proposals/NOIs in the NSPIRES Options Page.
- Click on the “Create NOI” button on the right-hand corner of the screen. Select the **“Request for Information (RFI): "International Space Centers Collaboration: Human Health Science for Gateway Lunar Space Station"”**
- Follow the step-by-step instructions provided in NSPIRES to complete your RFI. The

following three elements are mandatory for this RFI submission. The first two should NOT contain identifiable information (such as names and affiliations):

- o Utilize the “Summary” element of the RFI to provide a concise response limited to 4000 characters
- o Complete any requested “Program Specific Data” questions

No solicitation exists; therefore, do not request a copy of the solicitation. When a solicitation is released, it will be synopsisized on the NASA Acquisition Internet Service. Any solicitation will be posted on the same site where you accessed this RFI.

5. Additional Information

NASA, ESA, CSA, and JAXA intend to use the results of this RFI for informational purposes only. This RFI does not constitute a Request for Proposal (RFP), and it is not to be construed as a commitment by a Government to enter into a contract, nor will the Government pay for the information submitted in response to this request. At NASA, ESA, CSA, and JAXA discretion, we may contact respondents to further discuss their RFI input. No proprietary information should be provided in response to this RFI. Follow-up inquiries regarding future intentions or the status of information provided will not be answered. Promising ideas will be used to provide input to human health science activities on Gateway. A dedicated solicitation may be released in the future based on the information received in response to this RFI.

VIRTUAL WORKSHOP

There will be a coordinated virtual workshop to explain the RFI on 10/28/2024 from 1:00pm to 2:00pm (Eastern Time).

6. References

[NASA Human Research Roadmap](#)
[Gateway Utilization Townhall](#)
[Moon2Mars Architecture Definition Document](#)
[Gateway Capabilities](#)

7. Point of Contact

Questions concerning this Request for Information should be addressed to:

NASA Human Research Program
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European Space Agency
Human and Robotic Exploration
SciSpace@esa.int

JAXA Gateway Utilization team
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