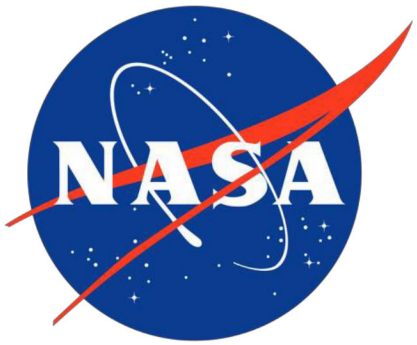

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)
Office of STEM Engagement

Fiscal Year 2024

Established Program to Stimulate Competitive Research (EPSCoR)

International Space Station Flight Opportunity (EPSCoR ISS)

NASA Notice of Funding Opportunity (NOFO)
Cooperative Agreement Notice (CAN)

ANNOUNCEMENT NUMBER: NNH24ZHA004C

ASSISTANCE LISTING NUMBER: 43.008

ANNOUNCEMENT TYPE:
Initial Announcement

DATE ISSUED: January 10, 2024

KEY DATES

Release Date:	**January 10, 2024**
Proposals Due:	**April 15, 2024**

OMB Control Number: 2700-0092 (Expires 10/31/2025)

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A. Program Description

The NASA Authorization Act for Fiscal Year 1993, Public Law 102-588, and the Established Program to Stimulate Competitive Research (EPSCoR) Reauthorization Act of 2017, Public Law 114-32, authorized NASA to initiate NASA EPSCoR to strengthen the research capability of jurisdictions that have not historically participated equably in competitive aerospace research activities. The goal of NASA EPSCoR is to provide seed funding that will enable jurisdictions to develop an academic research enterprise directed toward long-term, self-sustaining, nationally competitive capabilities in aerospace and aerospace-related research. This capability will, in turn, contribute to the jurisdiction's economic viability and expand the nation's base for aerospace research and development.

Based on the availability of funding, NASA will continue to help jurisdictions achieve these goals through NASA EPSCoR. Funded jurisdictions' proposals shall be selected through a merit-based, peer-review competition and presented for review to a NASA HQ Mission Directorate Review Panel.

The following are the specific objectives of NASA EPSCoR:

- Contribute to and promote the development of research capability in NASA EPSCoR jurisdictions in areas of strategic importance to NASA's mission;
- Improve the capabilities of the NASA EPSCoR jurisdictions to gain support from sources outside the NASA EPSCoR program;
- Develop partnerships among NASA research assets, academic institutions, and industry; and
- Contribute to the overall research infrastructure and economic development of the jurisdiction.

The NASA Office of Science, Technology, Engineering, and Mathematics (STEM) Engagement (OSTEM), in cooperation with the International Space Station (ISS) Research Office, Space Operations Mission Directorate (SOMD), Exploration Systems Development Mission Directorate (ESDMD), Science Mission Directorates (SMD), Space Technology Mission Directorate (STMD), and NASA's nine Centers, plus NASA's Jet Propulsion Laboratory (JPL), solicits proposals for the NASA EPSCoR ISS Flight Opportunity. Each funded NASA EPSCoR proposal is expected to establish research activities that will make significant contributions to the strategic research and technology development priorities of one or more of NASA's Mission Directorates, and contribute to the overall research infrastructure, science and technology capabilities, higher education, and economic development of the jurisdiction receiving funding.

Each selected NASA EPSCoR flight project shall perform scientific and/or technical research in areas that support NASA's strategic research and technology development priorities. Proposals shall emphasize how a flight in microgravity will influence/improve the results/quality of any ground-based research.

NASA will designate a Technical Monitor (TM) for every cooperative agreement award. The TM's role will encompass monitoring research progress and ensuring ongoing alignment with the established project objectives. Each award recipient is required to furnish an annual report detailing research advancement. These reports will encompass anticipated performance goals, key indicators, target outcomes, baseline data, data collection methods, and other resulting insights. Following evaluation by the TM, these reports will be subject to approval by the NASA EPSCoR

Project Manager. Moreover, they will be disseminated among the NASA Mission Directorates, NASA Centers, and NASA's JPL, for broader awareness and visibility.

Jurisdictions shall submit electronic progress reports to the NASA Shared Services Center (NSSC) at NSSC-Grant- Report@mail.nasa.gov and the technical officer at agency-epscor@mail.nasa.gov. The reporting requirements for awards made through this Notice of Funding Opportunity (NOFO) shall be consistent with the *NASA Grant and Cooperative Manual* (GCAM), Appendix D, https://www.nasa.gov/wp-content/uploads/2023/09/grant-and-cooperative-agreement-manual-oct.-2022-0.pdf. Recipients also shall comply with reporting requirements at 2 CFR § 180.335, Financial Reporting, and 2 Code of Federal Regulations (CFR) §180.350, Monitoring and reporting program performance. Additionally, if the federal share of any award issued under this NOFO is more than $500,000 over the award's total period of performance (PoP), additional reporting requirements shall apply. See 2 CFR Part 200 Appendix XII— Award Term and Condition for Recipient Integrity and Performance Matters (http://www.ecfr.gov/cgi-in/text-idx?SID=4b63b1740bdb186d3bf5d346f5ddf42c&mc=true&node=ap2.1.200_1521.xii&rgn=div9).

The program parameters are:

- Jurisdictions responding to this NOFO may submit only one proposal each in accordance with Section C, Eligibility Information of this NOFO. Proposals will be selected from this solicitation for FY 2024 funding.
- The maximum funding request per proposal is $150,000. This amount is to be expended over a three-year period.
- Cost sharing/matching is not required but may be voluntarily offered.
- It is anticipated that five awards may be made under this NOFO in accordance with the rules and policies set forth in Title 2 CFR Part 200, Uniform Administrative Requirements, Cost Principles and Audit Requirements for Federal Awards (https://www.ecfr.gov/current/title-2/subtitle-A/chapter-II/part-200?toc=1), as adopted and supplemented by NASA through Title 2 CFR Part 1800: Grants and Agreements (https://www.ecfr.gov/current/title-2/subtitle-A/chapter-II/part-200?toc=1), and in the NASA GCAM.
- The Government's obligation to make an award is contingent upon the availability of appropriated funds from which payment can be made.
- This NOFO is available in electronic form through the NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES) and Grants.gov. However, all proposals shall be submitted through NSPIRES.

To access this NOFO through NSPIRES, go to http://nspires.nasaprs.com and click on Solicitations.

To access this NOFO through Grants.gov, go to https://www.grants.gov/web/grants/search-grants.html and select the link for NASA under Agency.

International Space Station (ISS)

Utilization of the ISS will further strengthen the relationships between NASA and the EPSCoR jurisdictions in the pursuit of national priorities for the advancement of science. This use of the ISS

will also open new paths for the jurisdictions to compete for and win much larger spaceflight research projects.

The ISS, including its large solar arrays, spans the area of a U.S. football field, including the end zones, and weighs 827,794 pounds. The complex has more livable room than a conventional five- bedroom house, and has two bathrooms and a gymnasium. The ISS provides the microgravity (less than 10^{-5}g) environment in a work volume accessible to the ISS crew of astronauts. The broader ISS Program provides launch capabilities, crew time, training, data downlink, commanding, thermal control, and electrical power. General information about the ISS is available at: International Space Station Overview - NASA

Connections between the NASA's EPSCoR and the ISS

NASA EPSCoR, through the jurisdiction's proposed research projects, will provide the ground based research for this effort. All proposed projects shall be mature enough to transition to a flight experiment with little or no additional NASA funding during the PoP.

Through this NOFO, the ISS will provide the integration and flight opportunity. There are a variety of laboratory facilities and capabilities designed to support a range of scientific disciplines on the ISS. A general overview of the research facilities and capabilities is at https://www.nasa.gov/mission_pages/station/overview/index.html.

ISS experts will evaluate each proposal's potential for integration and flight based on:

Criterion	Strong	Average	Weak
Feasibility	No impediment	Minor impediment	Major impediment
Time to hardware readiness	Less than 1 year	Less than 2 years	More than 2 years
Crew time requirements	No crew involvement beyond installation and removal	Requires less than 1 hour of crew intervention per increment period (6 months)	Requires more than 1 hour of crew intervention per increment period (6 months)
Power requirements	None	Less than 500w	More than 500w
Physical Space Requirements	Fits in 3U CubeSat (100mm X 100mm X 340.5mm)	Fits in a single Express Rack Locker	Larger than a single Express Rack Locker

* Proposers are not required to fund launch costs. However, proposers shall fund the cost of their research equipment/hardware unless such hardware is already available in the NASA/ISS inventory (see Appendix C of this NOFO, ISS Available Services, and Appendix G of this NOFO, ISS Information). Proposers shall also be responsible for providing data for the required flight documentation. For guidance, please refer to the "Payload Engineering" section in the "Quick Start Guide to Payload Design": pdguide_complete_20220302.pdf (nasa.gov).

The ISS Program will develop a payload unique Applicable Verification Matrix, identifying all of the required and recommended design interfaces and associated verifications. NASA test facilities may be utilized by the Payload Developer (PD) to complete verification testing; however, it is the PD's responsibility to cover all costs associated with this testing (see Appendix G of this NOFO, ISS Information), unless otherwise documented in the proposer's Payload Integration Agreement (PIA). For further explanation of these products, please contact the ISS Research Portfolio Manager, Jorge Sotomayor at jorge.l.sotomayor@nasa.gov.

B. Federal Award Information

1. Available Funding for this NOFO

Available funding: $750,000

2. Projected Number of Awards

Up to five awards of $150,000 each

3. Maximum Award Amount

Maximum Award Amount (per award): $150,000

4. Anticipated Period of Performance

NASA EPSCoR awards will support cooperative agreements, each with a three-year Period of Performance (PoP). It is anticipated that this PoP will enable the researchers to achieve the performance task objectives of the proposal and/or as included in any amendments submitted with the recipient's annual progress reports and accepted by the NASA EPSCoR project office.

5. Projected Period of Performance Start Date(s)

For planning purposes, PIs should assume that the award start date will be approximately six months after the proposal deadline date. The project start date may be negotiated with the NSSC Grant Officer.

6. Projected Period of Performance (PoP) End Date(s)

The PoP end date will be three years from the PoP start date.

7. Funding Instrument Type(s): Cooperative Agreement

NASA will assign a TM to each award. Cooperative Agreements have substantial government involvement to support the recipient's performance of the project. Therefore, the TM will monitor the progress of the research and collaborate as required to keep the research aligned with the approved project's objective(s). Each recipient shall provide an annual report on the progress of the research; this report shall be reviewed by the TM and approved in writing by the NASA EPSCoR Project Manager. These reports shall be shared with the NASA Mission Directorates, NASA Centers, and JPL.

C. Eligibility Information

1. Eligible Applicants

The National Science Foundation (NSF) determines overall jurisdiction eligibility for NASA EPSCoR. The latest available NSF eligibility tables are used to determine overall jurisdiction eligibility for NASA EPSCoR. The NSF 2023 eligibility table is available at: https://nsf-gov-resources.nsf.gov/2022-06/EPSCoR%20Eligibility%20Table%20Fiscal%20Year%202023.pdf.

The following jurisdictions are eligible to submit a proposal in response to this NOFO: Alabama, Alaska, Arkansas, Delaware, Guam, Hawaii, Idaho, Iowa, Kansas, Kentucky, Louisiana, Maine, Mississippi, Montana, Nebraska, Nevada, New Hampshire, New Mexico, North Dakota, Oklahoma, Puerto Rico, Rhode Island, South Carolina, South Dakota, US Virgin Islands, Vermont, West Virginia, and Wyoming.

While proposals can be accepted only from institutions for which the NASA EPSCoR Directors are serving currently, all institutions of higher education within the jurisdiction shall be given the opportunity to propose by making them aware of this NOFO. Only one proposal per jurisdiction shall be accepted, which must be submitted by the NASA EPSCoR Jurisdiction Director (or their designee). The list of NASA EPSCoR jurisdiction directors can be found at:

https://www.nasa.gov/learning-resources/established-program-to-stimulate-competitive-research/epscor-directors/.

All proposals submitted in response to this NOFO shall be submitted electronically via NSPIRES (http://nspires.nasaprs.com). Hard copy proposals will not be accepted. Electronic proposals must be submitted in their entirety by 11:59 p.m., Eastern Time on April 15, 2024.

Proposers without access to the internet or who experience difficulty using the NSPIRES proposal site (http://nspires.nasaprs.com) may contact the **Help Desk at** nspires-help@nasaprs.com **or call 202-479-9376 between 8:00 a.m. and 6:00 p.m. (EDT), Monday through Friday, except for Federal Government holidays.** Proposals received after the due date may be returned without review and not considered for award. If a late proposal is returned, it is entirely at the proposer's discretion whether to resubmit it in response to a subsequent opportunity.

All EPSCoR institutions in eligible jurisdictions shall be made aware of this solicitation. *All proposals shall be submitted through the jurisdiction's NASA EPSCoR Director's office*. Existing EPSCoR awards that already demonstrate partnerships or cooperative arrangements among academia, government agencies, business and industry, private research foundations, jurisdiction agencies, and local agencies shall not be submitted. No requests for renewals or extensions of previous projects will be accepted in response to this NOFO.

2. Cost Sharing or Matching

The maximum funding that a jurisdiction can request from NASA is $150,000 per proposal. This amount is to be spent in accordance with the budget details and budget narrative set forth in the approved proposal.

Cost sharing/matching is not required but may be voluntarily offered. However, the proposer shall be aware of costs such as hardware and/or software development and documentation development support (i.e. data to the ISS), which are not covered by this award (see Appendix G of this NOFO, ISS Information). Although methods of voluntary? cost-sharing are flexible, NASA encourages the EPSCoR jurisdiction committees to consider methods that would add value to the jurisdiction's existing research capabilities. All contributions, including cash or in-kind, shall meet the criteria set forth in 2 CFR 200.306, Cost sharing or matching (https://www.ecfr.gov/current/title-2/subtitle-A/chapter-II/part-200/subpart-D/section-200.306).

Statements of commitment and letters of support are important components of the proposal. However, NASA does not solicit or evaluate letters of endorsement. Review the *NASA Proposer's Guide (https://www.nasa.gov/wp-content/uploads/2023/09/2023-nasa-proposers-guide-final.pdf)* for the distinctions among statements of commitment, letters of support, and letters of endorsement.

Pre-award costs are those incurred prior to the effective date of an award directly pursuant to the negotiation and in anticipation of the award where such costs are necessary for efficient and timely performance of the scope of work. Such costs are not allowed under this NOFO.

3. Other Eligibility Criteria

None

NASA's Commitment to Diversity and Inclusion

NASA recognizes and supports the benefits of having diverse and inclusive scientific, engineering, and technology communities and fully expects the reflection of such values in the composition of all panels and teams, including peer review panels, proposal teams, science definition teams, and mission and instrument teams. Per Federal statutes and NASA policy, no eligible applicant shall experience exclusion from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NASA on the grounds of their race, color, religion, age, sex, national origin, or disability. NASA welcomes proposals from all qualified and eligible sources, and strongly encourages proposals from Minority Serving Institutions (MSIs), small-disadvantaged businesses (SDBs), veteran-owned small businesses, service-disabled veteran-owned small businesses (SDVOSB), HUBZone small businesses, and women-owned small businesses (WOSBs), as eligibility requirements apply. Note that all proposals must be approved and submitted by the NASA EPSCoR Jurisdiction Director.

Ineligibility of Proposals That Include Participation of China or Chinese-Owned Companies

Proposals involving bilateral participation, collaboration, or coordination in any way with China or any Chinese-owned company or entity, whether funded or performed under a no-exchange-of-funds basis, shall be ineligible for award.

D. Application and Submission Information

1. Address to Request Application Package

All proposals submitted in response to this NOFO shall be submitted electronically via NSPIRES

(http://nspires.nasaprs.com). Hard copy proposals will not be accepted.

2. Content and Form of Application Submission

Required elements of the proposal are described below and shall be submitted as one or more PDF documents that are uploaded for proposal submission. Please refer to Section 2 of the *NASA Guidebook for Proposers* for more information on Proposal Preparation and Organization. The table below lists the sections required in the proposal. All compliant proposals shall not exceed 15 pages, which does not include budget, biographies, letters of support, or certifications.

REQUIRED SECTIONS OF THE PROPOSAL (in order of assembly)	**PAGE LIMIT**
Proposal Cover Page	NSPIRES proposal cover page that is available at http://nspires.nasaprs.com/
Proposal Summary (abstract)	4,000 characters including spaces
Data Management Plan	4,000 characters, including spaces
Table of Contents	As needed
Scientific/Technical Plan	15*
Management Plan	As needed (not included in 15 page limit)
References and Citations	As needed
Biographical Sketches for:	
The Principal Investigator	2
the Science Investigator (Sc-I)	2
each Co-Investigator (Co-I)	1
Current and Pending Support	As needed
Statements of Commitment and Letters of Support	As needed
Budget Justification: Narrative and Details • *Includes proposed budget, itemized list detailing expenses within major budget categories, detailed subawards and summary of personnel (NASA Guidebook for Proposers, Appendix C).* • *For grants/cooperative agreements, the table of personnel and work effort shall immediately follow the proposal budget and is not included in the budget.*	As needed
Facilities and Equipment	As needed
Special Notifications and/or Certifications	As needed
** includes all illustrations, tables, and figures, where each "n-page" fold-out counts as n-pages and each side of a sheet containing text or an illustration counts as one page.*	

Data Management Plan (DMP)

All proposals submitted under this NOFO are required to submit a Data Management Plan (DMP) in accordance with the *NASA Plan for Increasing Access to the Results of Scientific Research* located at http://www.nasa.gov/sites/default/files/files/NASA_Data_Plan.pdf.

In keeping with the *NASA Plan for Increasing Access to the Results of Scientific Research*, new terms and conditions, consistent with the Rights in Data clause in the award (see Appendix D.11 in the GCAM), information about making manuscripts and data publicly accessible may be included in each award document. As a general rule, proposals are required to provide a DMP or shall provide an explanation as to why a DMP is not necessary given the nature of the work proposed. *The DMP shall be submitted by responding to the NSPIRES cover page question about the DMP (limited to 4000 characters)*. Example explanations are as follows:

- This is a development effort for flight technology that will not generate any data that the proposer/recipient can release;
- The data that the proposer/recipient will generate will be subject to ITAR; or
- The proposer/recipient may explain why its project is not going to generate data.

The proposal type that requires a DMP is described in the *NASA Plan for Increasing Access to the Results of Scientific Research* (see above link). The DMP shall contain the following elements, as appropriate to the project:

- A description of data types, volume, formats, and (where relevant) standards;
- A description of the schedule for data archiving and sharing;
- A description of the intended repositories for archived data, including mechanisms for public access and distribution;
- A discussion of how the plan enables long-term preservation of data; and
- A discussion of roles and responsibilities of team members in accomplishing the DMP. (If funds are required for data management activities, these should be included in the budget and budget justification sections of the proposal).

Proposers that include a plan to archive data should allocate suitable time for this task. Unless otherwise stated, this requirement supersedes the data sharing plan mentioned in the *NASA Guidebook for Proposers*.

In addition, researchers submitting NASA-funded articles in peer-reviewed journals or papers from conferences shall make their work accessible to the public through NASA's *TechPort* at https://sti.nasa.gov/submit-to-pubspace/#.YD5lRJNKhTY.

See NASA's Scientific and Technical Information Program's DMP FAQ at https://sti.nasa.gov/faq/ and the Science Mission Directorate's DMP FAQ at https://science.nasa.gov/researchers/sara/faqs/ for more information.

3. Unique Entity Identifier (UEI) and System for Award Management (SAM)

Each applicant for NASA funding (unless the applicant is an individual or is excluded per 2 CFR § 25.110) is required to:

- Be registered in the System for Award Management (SAM) before submitting a proposal;
- Maintain an active SAM registration with current information, including information regarding a recipient's immediate and highest-level owner and subsidiaries, as well as regarding all predecessors that have been awarded a Federal contract or grant within the last

three years, if applicable, for all times during which it has an active Federal award or an application or plan under consideration by NASA; and

- Provide its Unique Entity Identifier (UEI) in each application or plan it submits to NASA. UEIs may be obtained by registering in SAM.gov.
- Each individual team member (e.g., PI, co-investigators), including all personnel named on the proposal's electronic cover page, shall be individually registered in NSPIRES.

NASA may not issue an award or financial modification to an existing award to an applicant or recipient entity until the entity has complied with the requirements to provide a valid UEI and maintain an active SAM registration with current information. At the time of issuing an award, if the intended recipient has not complied with the UEI or SAM requirements, NASA may determine that the applicant is not qualified to receive an award and use that determination as a basis for not making an award to that applicant.

4. Submission Method, Dates and Times

Submission Method

All proposals submitted in response to this NOFO shall be submitted electronically via NSPIRES (http://nspires.nasaprs.com). Hard copy proposals will not be accepted. Electronic proposals must be submitted in their entirety by 11:59 p.m., Eastern Time on **April 15, 2024**.
Proposers without access to the Web or who experience difficulty using the NSPIRES proposal site (http://nspires.nasaprs.com) may contact the **Help Desk at** nspires-help@nasaprs.com **or call 202-479-9376 between 8:00 a.m. and 6:00 p.m. (EDT), Monday through Friday, except for Federal Government holidays.** Proposals received after the due date may be returned without review. If a late proposal is returned, it is entirely at the proposer's discretion whether to resubmit it in response to a subsequent appropriate solicitation.

All proposals **must** be received by the established deadline.

NASA will not review proposals that are received after the deadline or consider these late applications for funding. However, NASA may extend the application deadline upon the request of any applicant that can demonstrate good cause exists to justify extending the deadline. Good cause for an extension may include technical problems outside of the applicant's control that prevent submission of the proposal by the deadline or other exigent or emergency circumstances.

Applicants experiencing technical problems outside of their control must notify NASA as soon as possible and before the application deadline. Failure to notify NASA in a timely manner of the issue that prevented the on-time submission of the proposal may prevent the proposal from being considered for award.

While every effort is made to ensure the reliability and accessibility of the NSPIRES website and to maintain a help center via e-mail and telephone, difficulty may arise at any point on the internet, including with the user's own equipment. Prospective proposers are strongly urged to familiarize themselves with the NSPIRES site and to submit the required proposal materials well in advance of the proposal submission deadline. Difficulty in registering with or using NSPIRES

is not, in and of itself, a sufficient reason for NASA to consider a proposal that is submitted after the proposal due date.

5. Funding Restrictions

All costs charged to awards covered by this NOFO must comply with the Uniform Administrative Requirements in 2 CFR Part 200 and 2 CFR Part 1800, unless otherwise indicated in the NOFO, the terms and conditions of the award, and the NASA Grants and Cooperative Agreement Manual (GCAM). Additionally, the following restrictions apply:

1. All proposed funds must be allowable, allocable, and reasonable. Funds may only be used for the project. All activities charged under indirect cost must be allowed under 2 CFR Part 200 cost principles.
2. Grants and cooperative agreements shall not provide for the payment of fee or profit to the recipient.
3. Unless otherwise directed in 2 CFR Part 200, for changes to the negotiated indirect cost rate that occur throughout the project period, the recipient must apply the rate negotiated for that year, whether higher or lower than at the time the budget and application was awarded.
4. Proposals must not include bilateral participation, collaboration, or coordination with China or any Chinese-owned company or entity, whether funded or performed under a no-exchange-of-funds basis.
5. Any funds used for cost sharing or matching must be allowable under 2 CFR Part 200.
6. The non-Federal entity must use one of the methods of procurement as prescribed in 2 CFR §200.320, Methods of procurement to be followed.
7. Funds may not be used to fund research carried out by non-U.S. institutions. However, U.S. research award recipients may directly purchase supplies and/or services that do not constitute research from non-U.S. sources. Subject to export control restrictions, a foreign national may receive payment through a NASA award for the conduct of research while employed either full or part time by a U.S. institution. For additional guidance on foreign participation in awards, see Section 3.2 of the *NASA Guidebook for Proposers* and the NASA FAR Supplement (NFS) part 1835.016-70.
8. Subject to export control restrictions, a foreign national may receive payment through a NASA award for the conduct of research while employed either full or part-time by a U.S. institution. For additional guidance on foreign participation, see Appendix A of the *NASA Guidebook for Proposers* and NFS part 1835.016-70.
9. EPSCoR support shall be acknowledged by the EPSCoR research project number in written reports and publications. Note that there is no limit for funds for domestic travel, defined as travel that does not require a U.S. passport, and shall be appropriate and reasonable to conduct the proposed research.
10. NASA EPSCoR funding shall not be used to purchase general purpose equipment, e.g. desktop workstations, office furnishings, reproduction, and printing equipment as a direct charge. However, special purpose

equipment purchases (i.e., equipment that is used only for research, scientific, and technical activities directly related to the proposed research activities) are allowed and shall be reflected as a direct charge as per cost principles cited in the GCAM, Appendix D9, Equipment and Other Property. In addition, proposers shall comply with 2 CFR §200.216: Prohibition on certain telecommunication and video surveillance services or equipment. Equipment and other capital expenditures, special purchase equipment items with a unit cost of $5,000 or more must have the prior written approval of the Federal awarding agency (i.e., the NASA Grant Officer).

11. NASA EPSCoR funding shall not be used to support NASA employees' (full time equivalent (FTE)) participation in a research project unless that funding is provided through a separate funding instrument between the jurisdiction and NASA Center, such as a Space Act Agreement or other reimbursable agreement. NASA EPSCoR will not set aside award funding to send to a NASA Center for FTE support, including travel.
12. NASA EPSCoR funds shall be spent on NASA EPSCoR institutions. If a Co-Investigator (Sc-I/Co-I) with NASA EPSCoR award transfers to a non-EPSCoR institution, the EPSCoR funding amount, or the amount that remains unobligated at the time of the Sc-I/Co-I transfer, shall not be transferred to the non-EPSCoR institution.
13. Procurement contracts shall not be awarded as a result this NOFO.
14. Pre-award costs are those incurred prior to the effective date of an award directly pursuant to the negotiation and in anticipation of the award where such costs are necessary for efficient and timely performance of the scope of work. Such costs are not allowed under this NOFO.
15. Researchers from proposals selected for this ISS opportunity should consider attending an ISS workshop (Jul 29 – Aug 1, 2024) at the ISS Research and Development Conference (ISSRDC) to be held in Boston, MA.

Direct Costs Limitations

Travel, including foreign travel, is allowed for the meaningful completion of the proposed investigation, as well as for reporting results at appropriate professional meetings. Foreign travel to meetings and conferences in support of the jurisdiction's NASA EPSCoR research project is an acceptable use of NASA EPSCoR funds, with a limit of $3,000 per proposal. NASA EPSCoR support shall be acknowledged by the NASA EPSCoR research project number in written reports and publications.

Pre-Award Costs

Pre-award costs are those incurred prior to the effective date of an award that are directly pursuant to the negotiation and in anticipation of the award where such costs are necessary for efficient and timely performance of the scope of work. Per 2 CFR §1800.210, Pre-award costs, NASA waives the requirement for applicants to obtain prior approval for pre-award costs incurred 90 days or less before an award's PoP start date. Pre-award costs more than 90 days prior to an award's PoP start date are not allowable under this NOFO. Any costs that the applicant incurs in

anticipation of an award is the applicant's sole responsibility and will be subject to the rules described in 2 CFR §1800.210.

Indirect Facilities & Administrative (F&A) Costs

Unless otherwise directed in 2 CFR Part 200, for changes to the negotiated indirect cost rate that occur throughout the project period, the proposer/recipient shall apply the rate negotiated for that year, regardless of whether it is higher or lower than at the time the proposal (including the submitted budget) was awarded.

6. Other Submission Requirements

Researchers receiving awards for this ISS opportunity shall assist in completing Part 1 of the PIA. See Appendix A of this NOFO, *ISS Payload Integration Agreement (PIA) Part 1 Template*, for a sample PIA template. *Note: Part 1 of the PIA does not need to be filled out in response to this NOFO.*

Experiments shall fit within the mass and volume constraints of existing ISS launch vehicles and shall adhere to ISS integration requirements. Experiments can be launched pressurized or unpressurized. The proposer shall include specific requirements for mass, volume, power, and data from the ISS. Also, it is strongly recommended that proposers include drawings or photographs of any flight hardware.

All ISS flight experiments shall undergo a three -phase safety review process and the Payload Developer (PD) shall provide a letter certifying that the experiment is safe for flight. This is a very stringent safety review process that may be accomplished via WebEx, but travel to NASA's Johnson Space Center (JSC) is much preferred. *It is strongly recommended that all selected projects appoint a safety representative to interface with NASA safety experts,* provide the required documentation, and lead the project's safety review at JSC. Information on external payload accommodations is at http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20110013510.pdf.

The use of NASA EPSCoR funds for support of research assistants is allowable and encouraged, and shall be detailed in the budget justification and described in the narrative and evaluation sections of the proposal.

If post-flight labs are required, the ISS requires each jurisdiction to provide this lab support.

Funding requirements: The selected research project will be an EPSCoR project. The NASA ISS Program will fund the required use of its equipment, ISS research integration, and the flight to and from the ISS.

Jurisdictions shall provide funding/resources for the research project's faculty, students, and PIs; the basic (ground) research; and program integration documentation inputs and any specific hardware not already available in the ISS Program inventory. See Appendix G of this NOFO, ISS Information, for additional funding considerations.

Collection of Demographic Information

NASA is implementing a process to collect demographic data from grant applicants for the purpose of analyzing demographic differences associated with its award processes. Information collected

will include name, gender, race, ethnicity, disability status, and citizenship status. Submission of the information is voluntary and is not a precondition of award.

Therefore, NASA requests additional demographic data to ensure its compliance with Title VI of the Civil Rights Act of 1964, 42 U.S.C. § 2000d et seq., Title IX of the Education Amendments of 1972, 20 U.S.C. § 1681 et seq., Section 504 of the Rehabilitation Act of 1973, 29 U.S.C. § 701 et seq., and NASA's implementing regulations at 14 CFR 1250, 1251, and 1253. Submission of the requested information on NASA Form 1839 is purely voluntary and will not affect an entity's eligibility for award.

E. Application Review Information

Successful ISS Payload proposals shall provide sound contributions to both immediate and long-term scientific and technical needs of NASA as explicitly expressed in current NASA documents and communications.

Proposals will be evaluated based on the following criteria: Intrinsic Merit, Project Management, and Budget Justification. The bulleted lists after each criterion below should not be construed as any indication of priority or relative weighting. Rather, the bullets are provided for clarity and facilitation of proposal development.

1. Application Evaluation Criteria

EPSCoR Project Office:

All compliant proposals shall not exceed 15 pages, which does not include budget, biographies, letters of support, or certifications. Proposals will be peer reviewed via NSPIRES and by representatives of the ISS Program Office in consultation with the NASA HQ Mission Directorates. The EPSCoR Program Office will ensure that all proposals are evaluated based on:

- Intrinsic merit of microgravity requirement (i.e., what is the added value of flying what is proposed on the ISS);
- Approach to flight safety process; and utilization requirements of available ISS resources; and
- Budget (shall be adequate, appropriate, reasonable, and realistic, and demonstrate the effective use of funds that align to the proposed project).

ISS Program Office:

Proposals will be evaluated by ISS Program personnel based on the following:

- Feasibility;
- Time to flight;
- Crew time requirements;
- Power requirements; and
- Physical space requirements.

Intrinsic Merit of Microgravity Requirement (40% of total score)

- Existing Research - If relevant, the narrative shall include a very brief history of the NASA EPSCoR Research project (include the grant number assigned by the NSSC); and

- Benefit of a microgravity environment to the research – Each proposal shall provide a detailed technical narrative of the proposed research activity and the potential impact of a microgravity environment on the proposed research (i.e. Project Description, Microgravity Goals and Objectives, Anticipated Results, and Timeline).

The evaluation criteria for award are as follows:

Approach to Flight and Ground Safety Review Process (40% of total score)

The ISS Payload Safety Review Panel (PSRP) is an ISS Safety Review Panel (SRP) located at NASA JSC. The purpose of the PSRP is to ensure that the PD complies with technical and process safety requirements. Specifically, the PSRP performs the following functions:

- Assists the PD in the interpretation of safety requirements;
- Conducts safety reviews during appropriate phases of the payload development to assess the payload compliance to the relevant program safety and process requirements;
- Evaluates hazard assessment revisions resulting from modifications to payloads that may affect a safety critical subsystem or create a potential hazards to the crew, ISS, or other ISS/International Partner visiting vehicles;
- Evaluates the safety analyses, safety reports, and waiver/deviation requests prepared by the PD and elevates to Program Management (for written approval) those noncompliance that are above the delegated authority of the PSRP; and
- Ensures the resolution of payload safety issues, including (as required) the formation of splinter groups, subpanels, and/or coordination with other organizations to perform technical activities required to accomplish assigned responsibilities.

The PD will be required to work with the PSRP to produce a Safety Data Package (SDP) as a part of the payload integration process. The SDP usually contains the following two parts:

- Part one of the SDP is descriptive text that contains information (usually drawings) to describe the payload, its systems, sub-systems, and interfaces, as well as flight and ground operations. Part one also summarizes hazard analyses used in the identification and control of payload hazards.
- Part two of the SDP is typically a hazard report. The hazard report summarizes controls and verifications to ensure compliance to safety requirements. Elements of a hazard report include technical requirement references, description of hazard, hazard category, hazard cause, hazard controls, and safety verification methods.

More information on the SDP can be found in the "Payload Safety Overview" section in the "Quick Start Guide to Payload Design": pdguide_complete_20220302.pdf (nasa.gov).

Budget (20% of total score)

A detailed budget is required for the entire three year PoP. A suggested format to use in preparing the proposed budget is contained in the *NASA Guidebook for Proposers*, Appendix C. The budget will be evaluated based upon the clarity and reasonableness of the funding request. A budget narrative shall be included in the proposal.

The proposed budget shall be adequate, appropriate, reasonable, and realistic, and demonstrate the effective use of funds; reflect clear alignment with the content and text of

the proposal; and contain sufficient cost detail and supporting information to facilitate evaluation. Note- Cost-sharing or matching is not required, nor will it be considered in the evaluation process if offered.

ISS Program Vetting of Proposals

As the first step of the evaluation process, proposals that have been submitted to the EPSCoR Project Office (from the jurisdiction directors) will be evaluated by ISS Program personnel for flight feasibility based on the following rubric; a maximum of ten points will be awarded per the following table:

Criterion	Strong (10 points)	Average (5 points)	Weak (0 points)
Feasibility	No impediment	Minor impediment	Major impediment
Time to hardware readiness	Less than 1 year	Less than 2 years	More than 2 years
Crew time requirements	No crew involvement beyond installation and removal	Crew intervention required less than once per 1hr period per increment period (6 months)	Crew intervention required more than once per 1hr period per increment period (6 months)
Power requirements	None	Less than 500w	More than 500w
Physical Space Requirements	Fits in 3U CubeSat (100mm X 100mm X 340.5mm)	Fits within a single Express Rack Locker	Larger than a single Express Rack Locker; does not fit within one
Funding Feasibility (EPSCoR)	Sufficient budget to complete experiment	Budget risks exist that shall be addressed	Insufficient budget to complete The proposed experiment

The ISS Program Office requires information for each selected project to complete Part 1 of the PIA by the time of the kick-off meeting at JSC. See Appendix A of this NOFO, ISS Payload Agreement (PIA) Part 1 Template.

The EPSCoR Project Office will request that the NSSC include the Exhibit E of the GCAM, which is a required *Cross-Waiver of Liability for International Space Station Activities* in the ISS Flight Opportunity awards. This same information is also set forth in Appendix B of this NOFO.

Appendix C of this NOFO, ISS Available Services, includes a list of possible services that can be negotiated with the ISS Program.

2. Review and Selection Process

Review of proposals submitted in response to this NOFO shall be consistent with the general policies and provisions contained in the *NASA Guidebook for Proposers*, Appendix D. Selection

procedures will be consistent with the provisions of the *NASA Guidebook for Proposers*, *Section 5*. However, the evaluation criteria described in this NOFO under Section E.1 of this document, Proposal Evaluation, takes precedence over the evaluation criteria described in Section 5 of the *NASA Guidebook for Proposers*.

The selection process will be a two-step process. The proposals will first be reviewed by subject matter experts (SME) in the field and then will be reviewed by the Mission Directorates to determine alignment with NASA's research needs. The selecting official for this NOFO is the EPSCoR Project Manager or their appointed representative.

Successful research proposals are likely to be those that provide sound contributions to both immediate and long-term scientific and technical needs of NASA as explicitly expressed in current NASA documents and communications. Also, successful proposals are likely to contribute to the overall research infrastructure and economic development of the proposing jurisdiction.

Risk Analysis

NASA Grant Officers will conduct a pre-award review of risk associated with the proposer as required by 2 CFR §200.206, Federal awarding agency review of risk posed by applicants. For all proposals selected for award, the Grant Officer will review the submitting organization's information available through multiple government-wide repositories such as the System for Award Management (SAM.gov), Federal Awardee Performance and Integrity Information System (FAPIIS), the Contractor Performance and Assessment Reporting System (CPARS), the Federal Audit Clearinghouse (FAC), USAspending.gov, and GrantSolutions Recipient Insight.

Risk Review

For any Federal award, if NASA anticipates that the total Federal share of funds provided to the recipient will be greater than the simplified acquisition threshold (SAT) (currently $250,000) during the PoP:

- Prior to making a federal award with a total amount of the federal share greater than the SAT, NASA is required to review and consider any information about the applicant in the designated integrity and performance system accessible through SAM (see 41 U.S.C. §2313);
- An applicant, at its option, may review information in the designated integrity and performance systems accessible through SAM and comment on any information about itself that a Federal awarding agency previously entered and is currently in the designated integrity and performance system accessible through SAM;
- NASA will consider any comments by the applicant, in addition to the other information in the designated integrity and performance system, in making a judgment about the applicant's integrity, business ethics, and record of performance under Federal awards when completing the review of risk posed by applicants as set forth in 2 CFR §200.206, Federal awarding agency review of risk posed by applicants.

3. Anticipated Announcement and Federal Award Dates

Open Application Period:	January 10, 2024 through April 15, 2024
Application Period Closes:	April 15, 2024, 11:59 PM ET

Anticipated Award Announcement date: July 2024
Planned Award Date: Prior to September 30, 2024

F. Federal Award Administration Information

1. Notice of Award

NASA's stated goal is to announce selections as soon as possible. However, NASA does not usually announce new selections until the funds needed for those awards are approved through the Federal budget process. Therefore, a delay in NASA's budget process may result in a delay of the selection date(s). After 180 days past the proposal's submitted date, proposers may contact the NASA EPSCoR Project Manager for a status.

NASA will notify successful grant recipients of funding via a Notice of Award (NASA Form 1687) signed by the Grant Officer. This Notice of Award is the authorizing document and will be sent to the business office of the proposer's institution via email and NSPIRES]. All expenses incurred on grant activities prior to the PoP start date listed on the Notice of Award are the sole responsibility of the proposer/recipient until the Notice of Award is received and the PoP commences.

NASA's goal is to issue Notices of Award as soon as possible after selections are announced (anticipated in the July 2024 timeframe) to the proposers. However, delays may be caused by:

- The need for additional materials from the proposer (e.g., revised budgets and/or budget details) before NASA may legally obligate federal funds; and/or
- A delay in NASA receiving its appropriation from Congress for the current fiscal year.

A proposer has the right to be informed of the major factor(s) that led to the acceptance or rejection of its proposal. Debriefings will be available upon written request. Again, it is emphasized to proposers that proposals of high intrinsic and programmatic merit may be declined for reasons entirely unrelated to any scientific or technical weaknesses (i.e., sufficient funding may not be available to make an award).

2. Administrative and National Policy Requirements

In addition to the requirements in this section and in this NOFO, NASA may incorporate specific terms and conditions into individual awards in accordance with 2 CFR Part 200. Specifically, recipients of NASA grant funding shall adhere to requirements set forth in 2 CFR 200, 2 CFR 1800, 2 CFR 170, 2 CFR 175, 2 CFR 182, and 2 CFR 183, and the NASA Grant and Cooperative Agreement Manual (GCAM). These are available at: https://www.nasa.gov/offices/ocfo/gpc/regulations_and_guidance.

Research Terms and Conditions

Awards from this funding announcement that are issued under 2 CFR 1800 are subject to the Federal Research Terms and Conditions (RTC) located at https://www.nsf.gov/awards/managing/rtc.jsp . In addition to the RTC and NASA-specific guidance, three companion resources can also be found on the website: Appendix A— Prior Approval Matrix, Appendix B—Subaward Requirements Matrix, and Appendix C—National Policy

Requirements Matrix.

Environmental Statement
Awards of proposals related to this NOFO must comply with the National Environmental Policy Act (NEPA); thus, proposers are encouraged to plan and budget for any anticipated environmental impacts. While most research awards will not trigger action specific NEPA review, some activities (including international actions) will.

The majority of grant-related activities are categorically excluded as research and development (R&D) projects that do not pose any adverse environmental impact. A blanket NASA Grants Record of Environmental Consideration (REC) provides NEPA coverage for these anticipated activities. The NSPIRES award application cover page includes questions to determine whether a specific proposal falls within the Grants REC and must be completed as part of the proposal submission process. Activities outside of the bounding conditions of the Grants REC will require additional NEPA analysis. Examples of actions that will likely require NEPA analysis include but are not limited to suborbital-class flights not conducted by a NASA Program Office, activities involving ground-breaking construction/fieldwork, and certain payload activities such as the use of dropsondes.

Questions concerning environmental compliance may be addressed to the NASA NEPA Manager via the NASA program official listed in this NOFO.

3. Reporting

Federal Financial Reporting
Recipients of NASA funding must submit quarterly financial reports. Financial reports must be submitted via the Payment Management System (PMS):

- Quarterly Federal Cash Transaction Reports (FCTR) are due no later than 30 days past the reporting period end date
- Final Financial Status Reports/Final Federal Financial Report (FSR/FFR) are due no later than 120 days after the end of the Period of Performance (PoP)

Performance Reporting
NASA award recipients must submit a final performance report. Final reports are due to NASA within 120 after the end of the award's POP. Descriptions of reporting requirements are as follows:

Annual Performance Report – Used to describe a grant's scientific progress, identify significant changes, report on personnel, and describe plans for the subsequent reporting period.

Due: N/A

Final Performance Report – Used as part of the grant closeout process to submit project outcomes in addition to the information submitted on the annual Performance Report.

Due: within 120 days after the end of the award's PoP

For all NASA awards, recipients must utilize the Research Performance Progress Report (RPPR) format. The RPPR is not a template or form but rather a set of standard data elements against

which award recipients will report, and it is not available as a template or form from NASA. All performance reports must contain the mandatory data elements and reporting category required for RPPRs.

All reports **shall** include the following data elements on the report's cover page:

- Federal agency (i.e., NASA) and program office to which the report is submitted
- Award number
- Project title
- Principal Investigator name, title, and contact information (e-mail address and phone number)
- Name of submitting official, title, and contact information (e-mail address and phone number), if other than PI
- Submission date
- Unique Entity Identifier (UEI) number and EIN number
- Recipient organization name and address
- Recipient identifying number or account number, if any
- PoP start and end date
- Reporting period end date
- Report term or frequency (annual, semi-annual, quarterly, other)
- Final Report? Indicate "Yes" or "No"
- Signature of submitting official (either handwritten or electronic)

In addition to the data elements above, all NASA performance reports **shall** report on one mandatory reporting category, "accomplishments." Accomplishments data elements are:

1. What were the major goals and objectives of this project?
2. What was accomplished under these goals?
3. What opportunities for training and professional development has the project provided?
3. How were the results disseminated to communities of interest?
5. What do you plan to do during the next reporting period to accomplish the goals and objectives?

Jurisdictions shall submit electronic progress reports to the NSSC at NSSC-Grant-Report@mail.nasa.gov and the technical officer at agency-epscor@mail.nasa.gov on the results of Years-1 &2 ISS flight integration activities (as PDF files) no later than 60 days prior to the end of the first anniversary of the award. The EPSCoR Project Office Program Coordinator shall notify the Jurisdiction PI in advance and in writing when a report is coming due and provide specific formats and data entry forms. The Program Coordinator shall also provide a Research Project Progress/Performance Reporting Outline, which is a template of the required data. This will be followed by notification from the NSSC that the report is due.

A NASA TM shall evaluate accomplishments toward project goals by reference to indicators such as, but not limited to, the metrics outlined above. NASA may approve no-cost extensions when requested by the recipient and in accordance with the *GCAM, Appendix D5, Extensions*.

The ISS staff, EPSCoR staff, and a NASA TM shall review the annual and final reports for completeness. A recipient's failure to provide an annual project report and/or final report with

Invention Disclosures shall delay or preclude the participation of the respective jurisdiction in other funding opportunities related to NASA EPSCoR.

For further details on reporting project performance, please refer to the Post-Award Phase section of the GCAM.

Access to Research

Awards issued under this NOFO must comply with the provision set forth in the NASA Plan for Increasing Access to the Results of Scientific Research (http://www.nasa.gov/sites/default/files/files/NASA_Data_Plan.pdf) including the responsibility for:

- Submitting as-accepted peer-reviewed manuscripts and metadata to a designated repository; and
- Reporting publications with the annual and final performance reports.

Recipient Integrity and Performance Matters

Awards under this solicitation that are $500,000 or more may be subject to post award reporting requirements reflected in 2 CFR 200 Appendix XII.

FFATA Reporting Requirements

Per 2 CFR Part 170, Reporting Subaward and Executive Compensation Information, award recipients that issue first-tier subawards above $30,000 shall report those subawards in the Federal Award Accountability and Transparency Act (FFATA) Subaward Reporting System (FSRS). The regulation at 2 CFR Part 170 provides detailed information regarding what information needs to be reported in these systems and the deadlines for submitting this information. Recipient information that is reported to FSRS is ultimately transferred to USAspending.gov, for public display.

Suspension and Debarment Disclosure

This reporting requirement pertains to disclosing information related to government-wide suspension and debarment requirements. Before a recipient enters into a grant award with NASA, the recipient must notify NASA if it knows if it or any of the recipient's principals under the award fall under one or more of the four criteria listed at 2 CFR §180.335, What are the causes for debarment?, as follows:

- Are presently excluded or disqualified;
- Have been convicted within the preceding three years of any of the offenses listed in 2 CFR §180.800(a) or had a civil judgment rendered against it or any of the recipient's principals for one of those offenses within that time period;
- Are presently indicted for or otherwise criminally or civilly charged by a governmental entity (federal, state or local) with commission of any of the offenses listed in 2 CFR §180.800(a); or
- Have had one or more public transactions (federal, state, or local) terminated within the preceding three years for cause or default.

At any time after accepting the award, if the recipient learns that it or any of its principalsfalls under one or more of the criteria listed at 2 CFR §180.335, the recipient must provide immediate written notice to NASA in accordance with 2 CFR §180.350.

Additional Reporting Requirements
NASA recipients must conform to all reporting requirements outlined in the Required Publications and Reports section of the GCAM, currently Appendix F.

G. NASA Contact Information

1. Program Office Contact

EPSCoR
Kathleen B. Loftin, Ph.D.
Project Manager, NASA EPSCoR
NASA Kennedy Space Center
Kennedy Space Center, FL 32899-0001
E-mail: kathleen.b.loftin@nasa.gov
Telephone: (321) 603-9971

ISS Capabilities/Integration Process
Jorge L. Sotomayor
Research Portfolio Manager
ISS NASA Research Integration Office
NASA, Johnson Space Center, OZ3
Houston, Texas 77058
E-mail: jorge.l.sotomayor@nasa.gov
Telephone: (281) 217-6341

Inquiries regarding the submission of proposals via NSPIRES may be addressed to:

NASA Research and Education Support Services (NRESS)
Althia Harris
2345 Crystal Drive, Suite 500
Arlington, VA 22202-4816
E-mail: aharris@nasaprs.com
Telephone: (202) 479-9030 X-310
Fax: (202) 479-0511

Questions concerning environmental compliance may be addressed to:

NASA EPA Manager
Tina Norwood
E-mail: tina.norwood-1@nasa.gov
Telephone: (202)358-7323

2. Systems Information

NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES)
NSPIRES is a web-based system that supports the entire lifecycle of NASA research solicitation and selection, from the release of solicitation announcements through proposal submission, the peer review process, and the selection decision. Applicants may search for and apply for funding opportunities available at NASA through NSPIRES. For technical assistance with NSPIRES, please contact the NSPIRES Help Desk at nspires-help@nasaprs.com or (202) 479-9376, Monday through Friday, 8:00 AM – 6:00 PM ET, except on Federal Government holidays.

Grants.gov
Grants.gov is the government-wide electronic grants portal and interested parties can search for grant opportunities on this site. For technical assistance with Grants.gov, call the customer support hotline 24 hours per day,7 days per week (except on Federal Government holidays) at (800) 518-4726 or e-mail support@grants.gov.

H. Other Information

Cancellation of Program Announcement

NASA HQ OSTEM reserves the right to not make any awards under this NOFO and to cancel this NOFO at any time. NASA assumes no liability (including bid and proposal costs) for cancelling this NOFO or for any entity's failure to receive such notice of cancellation.

Intellectual Property

Data Rights: NASA encourages the widest practicable dissemination of research results at any time during the investigation. The award will contain the Rights in Data clause in the GCAM, see Appendix D.11, Award Terms and Conditions. This clause allows a recipient to assert copyright in any work that is subject to copyright and was developed, or for which ownership was acquired, under the NASA award.

NASA will reserve a royalty-free, nonexclusive, and irrevocable right to reproduce, publish, or otherwise use the work for Government purposes, and to authorize others to do so, in any such copyrighted work. Note that the Grants Officer may revise the language under the Rights in Data clause to modify each party's rights based on the circumstances of the program and/or the recipient's need to protect specific proprietary information.

Patent Rights: Recipients will be allowed to elect to retain title to any inventions made under the award. Awards will include the provisions of 37 CFR §401.3(a), which requires use of the standard clause set forth at 37 CFR §401.14 "Patent Rights (Small Business Firms and Nonprofit Organizations)," and the NASA GCAM, Appendix D.10, Award Terms and Conditions, the clause titled "Patent Rights."

Announcement and Updates/Amendments to Solicitation

This NOFO will be available via NSPIRES and Grants.gov, but proposals shall be submitted on time and electronically via NSPIRES (http://nspires.nasaprs.com). Proposers shall carefully note

the information described in the paragraph below for submission of an electronic proposal via NSPIRES. Instructions for submission of proposals are also detailed in the *NASA Guidebook for Proposers*, Section 3.

While every effort is made to ensure the reliability and accessibility of the website and to maintain a help center via e-mail and telephone, difficulty may arise at any point on the internet, including with the user's own equipment. Therefore, proposers are strongly urged to familiarize themselves with the NSPIRES site and to submit the required proposal materials well in advance of the proposal submission deadline. Difficulty in registering with or using the proposal submission system (NSPIRES) is not, in and of itself, a sufficient reason for NASA to consider a proposal that is submitted after the proposal due date. Additional programmatic information for this NOFO may become known before the proposal due date. If so, such information shall be added as a formal amendment to this NOFO and posted on its homepage at http://nspires.nasaprs.com.

It is the proposer's responsibility to regularly check this NOFO's homepage for updates.

Access to NASA Facilities/Systems

All recipients shall work with NASA project/program staff to ensure proper credentialing for any individuals who need access to NASA facilities and/or systems. Such individuals include U.S. citizens, lawful permanent residents (green card holders), and foreign nationals (those who are neither U.S. citizens nor permanent residents).

Limited Release of Proposers' Confidential Business Information

- For proposal evaluation and other related administrative processing actions (i.e., funding actions), NASA may find it necessary to release information submitted by the proposer to individuals not employed by NASA (e.g. NASA support contractor and subcontractor employees). Business information that would ordinarily be entitled to confidential treatment may be included in the information released to these individuals. Accordingly, by submission of this proposal, the proposer hereby consents to a limited release of its confidential business information (CBI).
- Except where otherwise provided by law, NASA will permit the limited release of CBI only pursuant to non-disclosure agreements signed by the NASA's support contractor and/or subcontractor, and their individual employees who may require access to the CBI in order to perform the support contract or subcontract.

Cross-Waiver of Liability for International Space Station, Science or Space Exploration Activities

Per NASA's GCAM Appendix E, Additional Terms and Conditions, for work that involves the International Space Station, additional requirements apply. Cross-waivers will require the recipient to extend the cross-waiver terms and conditions to their subcontractors at any tier and related entities, ensuring those subcontractors and related entities also waive all claims against any entity or person defined in the provision for damages arising out of Protected Space Operations. This cross-waiver is intended to be broadly construed, and NASA extends it to its related entities as set forth in the provision. See Appendix E of the NASA GCAM for additional terms and conditions that will apply to an approved award.

APPENDICES

Appendix A: ISS Payload Integration Agreement (PIA)

Part 1 Template

Payload Integration Agreement (PIA) Part 1 for {Payload Name}

> *{If this is an update or replacement to an approved PIA, use this paragraph, otherwise delete}*
> This PIA supersedes and replaces PIA *{insert previously approved PIA number}* dated *{insert the date of the previously approved PIA}*.

This PIA documents joint management agreements and expectations between the International Space Station (ISS) Program and the Payload Developer (PD) to integrate and execute the mission preparation, ground processing and handling, transportation services, on-orbit operations, and conditioned stowage for the payload in accordance with the Standard Payload Integration Agreement (SPIA). Any unique agreements or agreed deviations from the SPIA shall be documented in this PIA.

The PD is responsible for defining and meeting functional requirements for payload mission success. The ISS Program will assess the unique services and other needs in support of the payload's mission success. Those agreed to by the ISS Program will be documented in this PIA.

The ISS Program will support the payload's development, planning, operations, and overall integration with the ISS and visiting vehicles. The PD is responsible for on-time delivery of payload data in order to support these integration processes. If data is not provided on-time, the ISS Program cannot guarantee successful integration which may result in not meeting target manifest and operations timeframes.

The ISS Program shall develop a payload unique Applicable Verification Matrix, identifying all of the required and recommended design interfaces and associated verifications. NASA test facilities may be utilized by the PD to complete verification testing; however, it is the responsibility of the PD to cover all costs associated with this testing, unless otherwise documented in this PIA.

The Research Portfolio Manager shall serve as the focal point for development of Part 1. Following a handoff, the Payload Integration Manager (PIM) and Research Integration Manager (RIM) shall serve as the focal points for development of PIA Part 2 and overall maintenance.
Updates to this PIA can be made as often as needed with joint approval of the PD and ISS Research Integration Office Manager.

PART 1 *{Developed by OZ3/OZ4 (sponsors). Submit to the PIP chair for approval and addition to the IPL. Once approved, the PIA is transitioned to OZ6 (PIM/RIM) to manage changes.}*

Payload Description	
Payload Name	{enter payload OpNom name if known, otherwise Project name}
PD	{enter payload developer organization or appropriate office. Include Organization name, Project Manager name, email, and phone #}
Sponsor	{select one of the following ISS sponsoring orgs, delete the others} **NASA/STEM Engagement/EPSCoR** Technology and Science Research Office National Lab Office/CASIS ESA JAXA CSA
Funding Authority	{select or enter the appropriate funding source(s) to the equivalent NASA Directorate / Division level} **NASA/STEM Engagement/EPSCoR** NASA / Human Exploration & Operations / Advanced Exploration Systems NASA / Human Exploration & Operations / Exploration Systems Development NASA / Human Exploration & Operations / ISS NASA / Human Exploration & Operations / Space Life and Physical Sciences NASA / Science / Astrophysics NASA / Science / Earth NASA / Science / Heliophysics NASA / Science / Planets NASA / Space Technology / Centennial Challenges NASA / Space Technology / Flight Opportunities NASA / Space Technology / Game Changing Development NASA / Space Technology / NASA Innovative Advanced Concepts NASA / Space Technology / Small Business Innovation Research NASA / Space Technology / Small Business Technology Transfer NASA / Space Technology / Small Spacecraft Technology Program NASA / Space Technology / Space Technology Research Grants NASA / Space Technology / Technology Demonstration Missions Center for Advancement of Science in Space (CASIS) NIH NOAA Commercial Entity
Research Objectives	{Enter a description of the Research objectives or goals, including minimum mission success criteria}

Ground Processing	
Ground Processing Plan	{Enter a brief summary of ground processing plan, with focus on services needed. Normally ambient payloads go to CMC, conditioned payloads go to cold stowage, externals are delivered directly to the launch vehicle provider.} Integrated at {customer or program facility} and turned over to {the ISS Cargo Mission Contract (CMC) or launch vehicle provider}.
Launch Plan	{Enter a brief summary of launch/ascent plan, with focus on launch vehicle interfaces – power, cold stowage, late load, early return} Launched {pressurized or external} on {default should be "any available ISS carrier". Exclusions or request specific carriers should include valid justification. Do not specify specific flight number as the PIA does not guarantee manifesting.}
Operations Concept	{Enter a brief summary of the operations concept, with focus on resources/interfaces if known (crew time, power, data, thermal, structural, etc.). Identify the intent to utilize any payload facilities (e.g. EXPRESS, HRF, MSG, Cold Stowage Fleet, SAMS, etc.), payload/system laptops (EXPRESS Laptop Computer, Station Support Computer) and/or payload software to be loaded on the laptops, or ISS systems support/resources (e.g. EVA/EVR, JEM Airlock, EXPRESS Logistics Carrier, JEM EF, UOP/SUP, VES/VRS, etc.). Identify general operational or life-cycle requirements (i.e., operated for X months to satisfy primary objects and another Y months for secondary objectives, collected X number of subjects data, changes to nominal ISS environment). For external payloads, include their viewing requirements (Nadir, Zenith, etc.).}

Return / Disposal Plan	{Select from the appropriate return / disposal paragraphs below} *{All pressurized payloads use this paragraph if they plan to have their hardware disposed of on-orbit.}* The ISS Program shall dispose of the payload after the payload has completed its experiment objectives. *{All pressurized payloads use this paragraph if they plan to have their hardware returned to the ground.}* All payload hardware and/or samples transported to ISS shall be returned to the ground. *{All pressurized payloads use this paragraph if they plan to have part of their hardware disposed of on-orbit and part of their hardware returned to the ground.}* The PD agrees that the ISS Program shall dispose of the payload with the exception of *{list the payload hardware that will return to the ground}* that will be returned to the ground. *{All payloads use this paragraph if they plan to dispose of their payload by jettison.}* The payload will be disposed of by jettison from the ISS, and shall meet ISSP PPD 1011, Multilateral ISS Jettison Policy. *{All external payloads being disposed via return use this paragraph and customize if appropriate for specific disposal vehicles.}*

	The PD agrees that the ISS Program shall dispose of the payload after the payload has completed its experiment objectives. The PD shall design the payload to be compatible with all known disposal options. The PD shall design its payload such that its configuration for disposal allows for robotics transfer from the ISS to the disposal vehicle, and stowage within the return/disposal vehicle allocated external volume. *{All payloads use this paragraph if they plan to have their hardware remain on board for the duration of the ISS. IP payloads may delete this paragraph if their hardware is stowed in their own specific IP module.}* All hardware will remain on-orbit for the duration of the ISS in collection of the payload's science objectives and in agreement with the ISS Research Integration Office.

Governing Agreements	
SPIA	{enter either or both of the following} SSP 57072, Standard Payload Integration Agreement for ISS Pressurized Payloads SSP 57061, Standard Payload Integration Agreement for External Payloads
Export Classification	{enter payload Export Classification obtained for the payload hardware/software/data.}
Proprietary Considerations	{enter any information relative to proprietary protections that need to be applied to the payload's integration data, drawings, etc., otherwise state "Not Applicable"}
Cross Waiver of Liability	{Sometimes there will be multiple agreements that are invoked and more than one third party that has rights in the payload or its results. In those instances, all applicable cross waivers shall be referenced.} {If no cross-waiver of liability is needed (i.e. the payload is NASA-sponsored and there is no other third party that has any involvement or rights to either the payload or the results of the payload), include the following statement.} No Cross Waiver of Liability is required. {If the payload is flown on the ISS under a binding agreement (a Space Act Agreement (SAA), contract, cooperative agreement, grant, etc.) between the PD and NASA, provide that binding agreement in the sentence below.} Liability related to transporting the payload to and, if applicable, from the ISS is covered by {enter the binding agreement}, cross-waiver. {Use this sentence if International Partner sponsored.} Liability related to transporting the payload to and, if applicable, from the ISS is subject to the Cross-waiver of Liability as found in the Intergovernmental Agreement Concerning Cooperation on the Civil International Space Station of January 1998.
GFE Provisioning	*{Does the payload's development contract with NASA [SAA, MOU, or other type contract] contain a GFE provisioning clause which authorizes NASA Logistics/Property Management to ship government furnished equipment to the PD organization if necessary? Enter Yes/No and state the contracting mechanism, otherwise state "Not Applicable"}*

RS Operations	*{U.S. payloads which operate within Russian Segment use this paragraph, otherwise delete}* Since the payload plans to operate within the Russian Segment, it shall be designed to meet the requirements in the latest revision of P32958-106, Technical Requirements for Hardware to be Stored or Operated on the ISS Russian Segment, as negotiated/documented with the Russian side via the Joint Cargo Certification Team (JCCT) coordination.
Additional Agreements	{Add additional narrative to document and describe any binding agreements that impact ISS integration activities, such as Program Directives, Space Act Agreements, Contracts, etc.} {If International Partner (IP) resources are needed use this paragraph. If not, delete this paragraph.} The scope of this PIA accounts only for the payload's involvement with NASA resources {ex. US launch/return vehicle transportation, operations within U.S. Segment, use of NASA cold stowage assets, use of NASA provided equipment, or installation into a NASA on-orbit facility}. This PIA does not address the payload's use, interfaces, or installation within, or on, non-U.S. modules or vehicles. The activities, services and items provided by NASA under this PIA reflect the implementation of obligations contained in the {name of IP agreement}. Any activities beyond the scope of the {name of IP agreement} require a separate agreement between NASA and {IP} prior to implementation.

Appendix B: Cross-Waiver* of Liability for ISS Activities

* Same as Appendix E of the NASA GCAM

Each Proposer shall attach the language below to its proposal; this language will be included in a resulting cooperative agreement. This language does not count towards the proposal page count limit.

CROSS-WAIVER OF LIABILITY FOR INTERNATIONAL SPACE STATION ACTIVITIES (DEC 2014)

(a) The Intergovernmental Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America concerning Cooperation on the Civil International Space Station (IGA) for the International Space Station (ISS) contains a cross-waiver of liability provision to encourage participation in the exploration, exploitation, and use of outer space through the ISS. This cross-waiver of liability is to be broadly construed to achieve this objective.

(b) As used in this provision, the term:

(1) "Agreement" refers to any NASA agreement, grant, cooperative agreement, or contract that contains the cross-waiver of liability provision authorized by 14 CFR Part 1266.102.

(2) "Damage" means:

(i) Bodily injury to, or other impairment of health of, or death of, any person;
(ii) Damage to, loss of, or loss of use of any property;
(iii) Loss of revenue or profits; or
(iv) Other direct, indirect, or consequential damage.

(3) "Launch Vehicle" means an object, or any part thereof, intended for launch, launched from Earth, or returning to Earth which carries payloads or persons, or both.

(4) "Partner State" includes each Contracting Party for which the IGA has entered into force, pursuant to Article 25 of the IGA or pursuant to any successor agreement. A Partner State includes its Cooperating Agency. It also includes any entity specified in the Memorandum of Understanding (MOU) between NASA and the Government of Japan's Cooperating Agency in the implementation of that MOU.

(5) "Party" means a party to an Agreement involving activities in connection with the ISS, including a party that is the prime recipient under this grant\cooperative agreement.

(6) "Payload" means all property to be flown or used on or in a Launch Vehicle or the ISS.

(7) "Protected Space Operations" means all Launch or Transfer Vehicle activities, ISS activities, and Payload activities on Earth, in outer space, or in transit between Earth and outer space in implementation of the IGA, MOUs concluded pursuant to the IGA, implementing agreements, and contracts to perform work in support of NASA's obligations under these Agreements. It includes, but is not limited to:

(i) Research, design, development, test, manufacture, assembly, integration, operation, or use of Launch or Transfer Vehicles, the ISS, Payloads, or instruments, as well as related support equipment and facilities and services; and

(ii) All activities related to ground support, test, training, simulation, or guidance and control equipment and related facilities or services. "Protected Space Operations" also includes all activities related to evolution of the ISS, as provided for in Article 14 of the IGA. "Protected Space Operations" excludes activities on Earth which are conducted on return from the ISS to develop further a Payload's product or process for use other than for ISS-related activities in implementation of the IGA.

(8) "Related Entity" means:

(i) A contractor, recipient or subcontractor of a Party or a Partner State at any tier;

(ii) A user or customer of a Party or a Partner State at any tier; or

(iii) A contractor or subcontractor of a user or customer of a Party or a Partner State at any tier. The terms "recipient," "contractor," and "subcontractor" include suppliers of any kind.

(9) "Transfer Vehicle" means any vehicle that operates in space and transfers Payloads or persons or both between two different space objects, between two different locations on the same space object, or between a space object and the surface of a celestial body. A "Transfer Vehicle" also includes a vehicle that departs from and returns to the same location on a space object.

(c) The Recipient agrees to a cross-waiver of liability pursuant to which it waives all claims against any of the entities or persons listed in paragraphs ©(1)(i) through©(c)(1)(iv) of this provision based on Damage arising out of Protected Space Operations.

(1) This cross-waiver shall apply only if the person, entity, or property causing the Damage is involved in Protected Space Operations and the person, entity, or property damaged is damaged by virtue of its involvement in Protected Space Operations. The cross-waiver shall apply to any claims for Damage, whatever the legal basis for such claims, against:

(i) A Party as defined in (B)(5) above;

(ii) A Partner State including the United States of America;

(iii) A Related Entity of any entity identified in paragraph (c)(1)(i) or (c)(1)(ii) of this provision; or

(iv) The employees of any of the entities identified in paragraphs (c)(1)(c) through (c)(1)(iii) of this provision.

(2) In addition, the Recipient shall, by contract or otherwise, extend the cross-waiver of liability set forth in paragraph (c)(1) of this provision to its Related Entities at any tier by requiring them, by contract or otherwise, to:

Waive all claims against the entities or persons identified in paragraph©(c)(1)(i) through (c)(1)(iv) of this provision; and

(i) Require that their Related Entities waive all claims against the entities or persons identified in paragraph (c)(1)(i) through (c)(1)(iv) of this provision.

(3) For avoidance of doubt, this cross-waiver of liability includes a cross-waiver of claims arising from the Convention on International Liability for Damage Caused by Space Objects, which entered into force on September 1, 1972, where the person, entity, or property causing the Damage is involved in Protected Space Operations and the person, entity, or property damaged is damaged by virtue of its involvement in Protected Space Operations.

(4) Notwithstanding the other conditions of this provision, this cross-waiver of liability shall not be applicable to:

(i) Claims between a Recipient and its own Related Entities;

(ii) Claims made by a natural person, his/her estate, survivors or subrogates (except when a subrogate is a Party to an Agreement or is otherwise bound by the terms of this cross-waiver) for bodily injury to, or other impairment of health of, or death of, such person;

(iii) Claims for Damage caused by willful misconduct;

(iv) Intellectual property claims; or

(v) Claims for Damage resulting from a failure of the Recipient to extend the cross-waiver of liability to its Related Entities, pursuant to paragraph (c)(2) of this provision.

(5) Nothing in this provision shall be construed to create the basis for a claim or suit where none would otherwise exist.

(6) This cross-waiver shall not be applicable when 51 U.S.C. 50101 et seq. is applicable.

(7) This cross-waiver shall not apply to or affect the rights and obligations arising from any other Term and Condition or provision of this grant/cooperative agreement.

Appendix C: ISS Available Services

Coordinated Services

ISS Program Coordinated Services are defined services that explicitly require Program and Payload Developer (PD) negotiations, technical coordination, and possible funding agreements with the specific NASA organization providing the service. These services, if requested by the PD and approved by the Program, shall be documented as a unique agreement in the PIA.

A. 1553 Remote Terminal (RT) Validation Test – Each payload requiring commanding needs to perform a Validation Test to ensure that the payload hardware is compliant with the Mil Spec protocols. The ISS Program offers this test capability.

B. STELLA Software Package – This Software Toolkit for Ethernet Lab-Like Architecture (STELLA) can easily adapt Ethernet based software communications to the ISS. PD ground software that communicates with their ISS onboard payload software using Transmission Control Protocol/Internet Protocol (TCP/IP) or User Datagram Protocol (UDP) protocols can use STELLA to transition to the ISS C&DH interfaces.

C. Joint Station LAN (JSL) On-Board Usage – The JSL provides wired and wireless Ethernet connectivity between all segments of the ISS, and between the ISS and MCC-H. The JSL team supports the PD in the necessary verification activities (analysis, test, inspection or demonstration) for connectivity to the ISS JSL to certify that the payload hardware/software meets all appropriate sections of SSP 50892, Ethernet Requirements for Interoperability with the Joint Station LAN (JSL).

*Note 1***:** The PD is required to identify the need for a Wireless Access Point (WAP – Bellaire/MOXA) resource for development purposes.

Note 2: All testing will be coordinated utilizing the current SDIL test process which identifies all testing and necessary resources via a Schedule Issues Form (SIF).

D. JSL Laboratory Testing – If requested, payloads can perform a functional demonstration test of their payload Ethernet interface at the JSL laboratory located at the SCTF. Payloads using external wireless Ethernet for communications can request to perform a functional demonstration test of their payload Ethernet interface at the JSL lab located at the SCTF. In addition, JEM-EF installed payloads are required to perform a functional demonstration test that their payload Ethernet interface can communicate with the LEHX hardware found on the JEM.

Note 1: All testing will be coordinated utilizing the current SDIL test process which identifies all testing and necessary resources via a SIF.

E. Johnson Space Center (JSC) Frequency Management Analysis – This analysis ensures that payloads with Radio Frequency transmissions do not interfere with ISS frequencies. The PD shall provide data into the JSC Frequency Management database. *This is a mandatory test.*

F. ISS Payload Power Quality Testing – This testing can help ensure the PD is collecting power data in a manner that satisfies the electrical interface verification requirements. The ISS Program offers power testing support to payloads using various electrical interfaces on ISS. This test service is available at JSC in the SCTF Integrated Power Lab

(IPL), at the Kennedy Space Center (KSC) in the SSPF, or it can be performed at the payload's development site with the proper coordination. The JSC Energy System Test Area (ESTA) Power Testing Lab also can support power quality testing to verify a payload works properly with the various electrical power supplied by ISS. This testing includes 120Volt (V) Direct Current (DC), 28VDC, 120V Alternating Current (AC), and various DC load testing. The ESTA lab can also test compliance with turn on/off current, AC and DC impedance, and voltage excursions. Since JSC ESTA lab services are independent of the ISS Program, there typically are costs associated with use of this lab. (Identify all tests requested in the PIA).

G. Payload Rack Checkout Unit (PRCU) – Utilized to test payload hardware interfaces to the ISS and conduct end-to-end development or functional testing. In this capacity the PRCU serves as a high fidelity emulator of on-orbit ISS interfaces and allows experiment developers to ensure that their payload will interact properly once connected on-orbit. PRCUs are located at NASA JSC, KSC, MSFC, and GRC.

H. MSFC Telescience Resource Kit (TreK) – TreK is a remote operations solution for PDs. It can be used to monitor and control ISS payloads from anywhere in the world. TreK is comprised of a suite of software applications and libraries that provide generic data system capabilities and access to HOSC services. TreK also includes a suite of lightweight libraries and applications that can be used onboard ISS. This includes support for communicating using standard network protocols (UDP, TCP), working with packets (creating, populating, building, and decomposing), recording data, transferring files using the CCSDS File Delivery Protocol (CFDP), configuring and managing a Delay Tolerant Networking (DTN) node, and support for EXPRESS Payload to ISS C&DH System Ethernet interfaces (Payload Health and Status, PEP Bundle Request, PEP Procedure Execution Request, Rack Time Request, Ancillary Data Configuration Control, Payload Telemetry Downlink Data). TreK is available for Windows (ground and flight computers) and Linux (ground and flight computers). Users can register for use of TreK at http://trek.msfc.nasa.gov.

I. EXPRESS Program Specialized Test Equipment (STE) – Payloads requiring specialized equipment to support testing and/or verification shall identify such equipment (STEP, ScS, and Remote Advanced Payload Test Rig [RAPTR]) and process a hardware request using the Payload Hardware Request Process. STE requests will be coordinated through the PIP and approved by the respective hardware owners.

J. KSC Coordinated Services are identified below and if agreed upon will require input by the PD into the KSC Support Requirements:

1. KSC services that require coordination/negotiation:
   - Payload hardware and/or science processing lab for short duration usage
   - Animal Care Facility usage;
   - Use of low profile dollies and associated lifting/handling gear;
   - Internal Thermal Control System (ITCS) fluid servicing of payload hardware;
   - Use of KSC FRAM-based shipping containers, low profile dollies, and associated lifting/handling gear;
   - Use of EXPRESS Payload Adapter (ExPA) or Columbus External Payload Adapter (CEPA) test cables; and

- Developmental and/or final payload end-to-end verification testing support with the ELC Simulator.

2. KSC services that may require detailed coordination, supplemental funding, and allocation of additional resources:
   - Payload processing that requires a facility other than the SSPF;
   - Non-standard facility environmental and/or cleanliness controls;
   - Large quantities or unique consumables/bench stock items;
   - Payload fueling services;
   - Domestic and International shipping services;
   - Technical shop support (cable shop, failure analysis lab, etc.);
   - Component cleaning (flex hoses, gauges, valves, etc.); and • Fabrication / repair of flight hardware.

K. Payload Operations Integration Center (POIC) Coordinated Services – The services available to the PD are outlined in SSP 50304.

L. JSC Receiving, Inspection, and Testing Facility (RITF) – Facility available to perform a variety of mechanical testing, such as fastener testing. Its use shall be coordinated through OB.

M. Attitude and Pointing Support Services – The Flight Operations Directorate (FOD) Attitude Pointing Group (CM36) can provide a variety of attitude and pointing support services to payloads requiring orbital timing or target opportunity information. The analysis can calculate line of sight to any target, incorporate payload instrument restrictions, integrate ISS static and dynamic blockage, and fold in communication requirements/availability into a single output (FOD/CM36).

Services for Pressurized Payloads:

N. Flight Media Production/Testing – The PSIVF can be utilized to create and test flight certified media (Compact Discs [CDs] or Digital Video Discs [DVDs]) containing payload software for launch to ISS. The ISS CD Library Process owned by JSC/ISS Avionics & Software Office (OD) is the ISS Program's preferred method for manifesting media for use onboard the ISS. The Payload Software Control Panel (PSCP) allows PDs to simply turnover their payload media and supporting documentation to the PSIVF for all ISS CD Library processing. The PSIVF and the Software Configuration Management team will then build, verify, and deliver flight media which meets the requirements in SSP 50613, ISS CD Library Requirements Document. Using a PSCP-owned and managed media duplicator and the process described in the Payload CD Library Process flow diagram, the PSCP will ensure a consistent, timely, repeatable, and highly successful flight media delivery process for the PD.

O. SSC Software/Integration Testing – Testing of PD provided software can occur in the SCTF along with integration into ISS Service Packs.

P. Freezer Verification Testing – The Cold Stowage team can provide freezer verification testing for payload containers if negotiated and coordinated in advance.

Q. Cold Stowage Late Load Launch Services – The Cold Stowage team can perform late Coldbag and GLACIER integration of PD hardware later than L-48hrs, if appropriate scientific rationale is documented in the PIA.

R. Cold Stowage Early Samples Return (Los Angeles) – Requests for early return of conditioned science samples to the PD after SpaceX recovery boat docking will be evaluated based on appropriate scientific rationale documented in the PIA. If approved, real-time ground transportation factors will determine the precise time of PD pickup. Typically early return will occur at a Los Angeles area airport facility between R+48hours and R+72hours. Cold Stowage representatives shall deliver the payload hardware/samples to the PD.

S. CMC Early Hardware Return (Los Angeles) – Requests for early return of hardware and/or non-cold conditioned science samples to the PD after SpaceX recovery boat docking will
be evaluated based on appropriate scientific rationale documented in the PIA. If approved, real-time ground transportation factors will determine the precise time of PD pickup. Typically, early return will occur at a Los Angeles area airport facility between R+48hours and R+72hours. CMC representatives shall deliver the payload hardware/samples to the PD.

T. CMC Early Hardware Return (Houston) – Hardware and/or science samples are available for early return pickup by the PD in Houston at the CMC LM16 facility, typically as early as R+72hours. Appropriate scientific rationale shall be documented in the PIA. Real-time air/ground transportation as well as overall CMC workload and prioritization factors will determine the precise time available for pickup.

Services for External Payloads:

U. Coordinated External Contamination Analysis – The standard service provided by the Boeing External Contamination Group becomes a coordinated service if out-gassing and venting properties for materials used by the PD are not readily available.

Note 1: This service will not be available for Payloads that integrate to the JEM-EF or the COL EPF.

V. EVA Worksite Analysis – For payloads robotically installed on to a USOS payload site, with the exception of JEM element sites, NASA via Boeing EVA and Systems Engineering and Integration will be responsible for payload contingency EVA data products and requirements definition. This includes an EVA Analysis Report (EAR) for each payload and an EVA Verification Report for each payload's integrated EVA requirements. These reports will be provided to the PD and will include all documentation required to support verification closure of the payload's integrated EVA requirements.

For payloads robotically installed on to JEM elements, EVA verification NASA and JAXA, with input from the PD, shall jointly determine if the payload has unique EVA requirements not enveloped by existing JEM-EF verification work. If an agreement is not reached, the issue shall be brought to the EVA Analysis Integration Team (AIT) for resolution. When required, JAXA shall perform EVA verification. JAXA shall develop the Integrated EVA verification analysis report (worksite and translation path) and provide it

to the NASA Vehicle Office. NASA Vehicle Office representatives shall be responsible for producing any necessary exceptions paperwork, which shall be reviewed by JAXA and then presented to the EVA AIT for approval. The JAXA report of the Integrated EVA verification analysis shall be archived as part of the payload verification records.

W. JSC Dexterous Manipulator Trainer (DMT) – The JSC DMT provides an SPDM trainer which can be used for payload robotic interface engineering unit testing and training.

X. Glint/Obstruction Analysis – The JSC Graphics Research and Analysis Facility Lab is used for glint analysis of an ISS external payload and can also be used for truss site PAS obstruction analysis.

Appendix D: Definitions

- Center – NASA Centers, located throughout the United States, provide leadership for and execution of NASA's work. There are nine NASA Centers, plus NASA's only Federally Funded Research and Development Center, the Jet Propulsion Laboratory (JPL). The nine NASA Centers are: Ames Research Center (ARC), Armstrong Flight Research Center (AFRC), Glenn Research Center (GRC), Goddard Space Flight Center (GSFC), Johnson Space Center (JSC), Kennedy Space Center (KSC), Langley Research Center (LaRC), Marshall Space Flight Center (MSFC), and Stennis Space Center (SSC). For purposes of collaboration in NASA EPSCoR, JPL is eligible to be a collaborator in the same manner as a NASA Center.

- Cooperative Agreement – An award of federal assistance similar to a grant with the exception that NASA will be substantially involved in the recipient's performance of the project. Cooperative agreements are managed pursuant to the policies set forth in 2 CFR Part 200, 2 CFR Part 1800, and the *NASA Grant and Cooperative Agreement Manual* (GCAM).
- Jurisdiction – A State or Commonwealth that is eligible to submit a proposal in response to this NOFO.
- NASA Research Contact – The primary NASA point of contact during the proposal writing stage for the proposed research area. If the proposer has contacted and received permission from a NASA scientific or technical person, that individual may be listed in the proposal as the NASA Research Contact. Otherwise the NASA Research Contact is the University Affairs Officer at the NASA Center, or the NASA Mission Directorate contact at NASA Headquarters.
- Principal Investigator (PI) – For this NOFO, the Principal Investigator (PI) is the jurisdiction's EPSCoR Director. The PI has an appropriate level of authority and is responsible for proper conduct of the research, including appropriate use of funds and administrative requirements such as the submission of the scientific progress reports to the Agency. The PI is the administrator for the proposal.
- Science-Investigator (Sc-I) – For this NOFO, the Sc-I will serve as the POC with the ISS Program. The formally stated PI will remain responsible for the overall direction of the effort and the use of funds.
- Research area – One of the areas of research interest for the NASA Mission Directorate(s).
- Research Assistant – A student (undergraduate, graduate, or postdoctoral) who receives a research appointment in direct support of the NASA EPSCoR research in a research proposal.

Appendix E: NASA Points of Contact

Technical and scientific questions about this NOFO may be directed to:

EPSCoR

Kathleen B. Loftin, Ph.D.
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NASA Kennedy Space Center
Kennedy Space Center, FL 32899-0001
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ISS Capabilities/Integration Process

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Inquiries regarding the submission of proposals via NSPIRES may be addressed to: Althia Harris

NASA Research and Education Support Services (NRESS)
2345 Crystal Drive, Suite 500
Arlington, VA 22202-4816 E-mail:
aharris@nasaprs.com
Telephone: (202) 479-9030 x310
Fax: (202) 479-0511

Appendix F: Certifications

Certification of Compliance, Assurances, and Representations

Awards from this funding announcement that are issued under 2 CFR 1800 are subject to the Federal Research Terms and Conditions (RTC) located at http://www.nsf.gov/awards/managing/rtc.jsp . In addition to the RTC and NASA-specific guidance, three companion resources can also be found on the website: Appendix A— Prior Approval Matrix, Appendix B—Subaward Requirements Matrix, and Appendix C—National Policy Requirements Matrix.

By submitting the proposal identified in the Cover Sheet/Proposal Summary in response to this Research Announcement, the Authorized Organizational Representative (AOR) of the proposing organization (or the individual Proposer if there is no proposing organization) as identified below—

(a) Certifies that the statements made in this proposal are true and complete to the best of his/her knowledge;

(b) Agrees to accept the obligation to comply with NASA award terms and conditions if an award is made as a result of this proposal; and

(c) Confirms compliance with all applicable terms and conditions, rules, and stipulations set forth in the Certifications, Assurances, and Representations contained in this NOFO. Willful inclusion of false information in this proposal and/or its supporting documents, or in reports required under an ensuing award, is a criminal offense (U.S. Code, Title 18, Section 1001).

The AOR's signature on the Proposal Cover Page automatically certifies that the proposing organization has read and is in compliance with all certifications, assurances, and representations as detailed in the NASA GCAM Appendix A, Standard Format for a NASA Notice of Funding Opportunity (NOFO).

Note: On February 2, 2019, the System for Award Management (SAM) implemented a new process that allows financial assistance registrants to submit common Federal Governmentwide certifications and representations. The new process will be required effective January 1, 2020. Guidance on the new process and system change can be found at: https://interact.gsa.gov/blog/certifications-and-representation-improvements-sam

Appendix G: ISS Information

ISS National Lab Implementation Partners

The ISS is supported by an ever-growing network of individuals and organizations that actively and passionately share in the mission of promoting and sustaining space-based research. Search the database of Implementation Partners at the link below to find organizations that may be ideal to support and facilitate your research project, including translating your science from the bench to a space-based platform.

https://www.issnationallab.org/implementation-partners/?_sft_vertical=commercial-serviceproviders

Environmental Testing Funding Matrix

This matrix shows how the cost of testing will be funded. Some items will be funded by the ISS office while others will be funded by the payload developer (PD). Please account for these costs in your proposal.

Environmental Test	ISS Funded	PD Funded
Battery testing	x	
Offgas/flammability	x	
Vacuum Outgas		x
JSL	x	
RITF	x	
Pressure Testing		x
Materials Characterization Testing		x
Cold Stowage Testing	x	
EMI/EMC	x	
Acoustics	x	
Power Quality	x	
PRCU	x	
Thermal Cycle		x
Thermal Vacuum		x
Imparted Vibration		x
Workmanship Vibration		x
Random vibration		x