



**National Aeronautics and Space Administration
Johnson Space Center
Human Exploration and Operations Mission Directorate
2101 NASA Parkway
Houston, TX 77058**

RESEARCH OPPORTUNITIES FOR ISS UTILIZATION

NASA Research Announcement: NNJ13ZBG001N

**Soliciting Proposals for Exploration Technology Demonstration and
National Lab Utilization Enhancements**

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**PROPOSALS ACCEPTED November 30, 2012 THROUGH December 31,
2024**

Contents

| | |
|--|----|
| I. Funding Opportunity Description..... | 4 |
| A. Scope..... | 4 |
| B. Overview of ISS Utilization Focus Areas..... | 4 |
| 1. Focus Area 1 – In Space Production Applications (InSPA) | 6 |
| 2. Focus Area 2 – (Deleted)..... | 12 |
| 3. Focus Area 3 – Purchase of Resources for Commercial Purposes | 13 |
| 4. Focus Area 4 – Private Astronaut Missions to the International Space Station (ISS)..... | 14 |
| 5. Focus Area 5 – (Deleted)..... | 23 |
| C. ISS Integration Requirements | 24 |
| D. References to Unique NASA Capabilities..... | 24 |
| E. NASA Safety Policy..... | 24 |
| F. Availability of Funds for Award | 24 |
| G. Additional Funding Restrictions..... | 24 |
| H. Guidebook for Proposers Responding to a NASA Notice of Funding Opportunity (NOFO) | 24 |
| II. Award Information..... | 25 |
| III. Eligibility Information..... | 26 |
| A. Eligibility of Applicants..... | 26 |
| B. Guidelines for International Participation..... | 26 |
| C. Cost Sharing or Matching | 27 |
| IV. White Paper, Proposal and Submission Information..... | 27 |
| A. Address to Request Proposal Package | 27 |
| B. Content and Form of Proposal Submission..... | 28 |
| 1. Electronic White Paper and Proposal Submission..... | 28 |
| 2. White Paper and Proposal Submission Information | 29 |
| 3. Proposal Format and Contents..... | 29 |
| C. Funding Restrictions | 31 |
| V. Proposal Review Information | 31 |
| A. Evaluation Criteria..... | 31 |
| B. Review and Selection Process..... | 32 |
| VI. Award Administration Information | 33 |
| A. Award Notices | 33 |

B. Administrative and National Policy Requirements.....33
C. Program Reporting/Individual Researcher Reporting.....34
VII. Contacts.....34
VIII. Other Information35
A. Proprietary Information35
B. General References35

I. Funding Opportunity Description

A. Scope

This announcement is for the development of research or related hardware with enhanced capabilities; modification of existing hardware to enable increased efficiencies (e.g. less crew time or up mass); development of tools that allow analyses of samples and specimens on orbit; enhanced infrastructure capabilities on the International Space Station (ISS) (e.g. communications or research throughput); concepts contributing to the development of a sustainable, scalable, and profitable non-NASA demand for LEO services; broad commercial use of the ISS; development of flight, training, and outreach products; and specific commercialization, technology demonstration, and other ISS program-supported projects as detailed in specific Focus Areas.

B. Overview of ISS Utilization Focus Areas

The unprecedented opportunity exists in using the ISS platform to advance key technologies and other capabilities for the next steps in commercialization of space, in-space operations, and advancing space exploration. The ISS is a one of a kind laboratory that offers access to microgravity, constant crew support, robotic servicing, and the harshness of the space environment.

For reference, below are links to research guides detailing the capabilities of the ISS:

https://www.nasa.gov/connect/ebooks/researchers_guide_tech_demo_detail.html

http://www.nasa.gov/mission_pages/station/research/researcher_guide/

The 2005 NASA Authorization Act designated the U.S. segment of the ISS as a National Laboratory and directed NASA to develop a plan to "increase the utilization of the ISS by other Federal entities and the private sector..." As the nation's newest national laboratory, the ISS will further strengthen relationships among NASA, other Federal entities, and private sector leaders in the pursuit of national priorities for the advancement of science, technology, engineering, and mathematics. The ISS National Laboratory will also open new paths for the exploration and economic development of Space.

The National Laboratory concept is an opportunity to expand the U.S. economy in space-based research, applications and operations. The ISS represents a unique and highly visible national asset with surplus capacity available for a wide spectrum of applications. NASA will continue to cover the cost of operating and maintaining the ISS and is highly motivated to work with other agencies and organizations to pursue applications.

NASA seeks proposals to enhance the unique capabilities of the ISS and utilize the ISS to develop and/or operate systems or facilities that may lead to a sustainable non-NASA demand for a human-rated LEO platform. These proposals should demonstrate ability to provide a stimulus to the U.S. economy through development of a sustainable, scalable, and profitable non-NASA demand for LEO services.

The topics listed in the Focus Areas below span the broad interests of NASA but should not be considered as the entire scope. NASA welcomes white papers and proposals in all areas relevant to the National Lab mission, NASA's LEO commercialization goals (<https://cms.nasa.gov/leo-economy/low-earth-orbit-economy>), and NASA's technology development and other interests, not only those listed in this document.

General Focus Areas

- 1) Innovative uses of the ISS or ISS hardware that leverage existing capabilities to stimulate both utilization of the ISS and economic development in the U.S.
- 2) Other improvements to existing ISS capabilities, including but not limited to infrastructure, in-situ analytical tools, and communication/data transmittal, to increase the efficiency and effectiveness of the technology demonstrations and science investigations performed on the ISS.
- 3) Unique partnering arrangements that leverage NASA's existing capabilities but increase the commercial participation in research, technology development, on board services, and other commercial activities.
- 4) Broad uses of the ISS and its resources by the U.S. commercial sector.

Specific Focus Areas

1. Focus Area 1 – In Space Production Applications (InSPA):

Introduction: The International Space Station (ISS) remains the premier microgravity research and development laboratory for those seeking to develop and demonstrate advanced materials and emerging technologies for in-space production and manufacturing of products for use on Earth. NASA intends to make awards through this Focus Area to small and large U.S. businesses that seek to develop and demonstrate technologies on the ISS that lead to commercially viable and sustainable InSPA in low-Earth orbit (LEO) that advance solutions for national interest or public benefit by leveraging the capabilities and resources of the ISS. NASA intends through these awards to provide the support needed by U.S. companies during early-stage development to validate game-changing materials and production processes that give U.S. industry a competitive edge amidst increasing global competition.

Strategic Goals: NASA hopes to accomplish three major goals for InSPA awards:

1. Serving national interests by developing technologies that strengthen U.S. technological leadership, improve national security, and create high-quality jobs.
2. Providing benefits to humanity by developing products that significantly improve the quality of life for people on Earth.
3. Enabling the development of an economy in LEO by stimulating scalable and sustainable non-NASA utilization of future commercial LEO destinations or orbital platforms.

Objectives of this Focus Area: Successful proposals will mature in-space manufacturing concepts that produce high-value items for use on Earth with potential for scalability and capturing sizeable markets, creating new markets, or disrupting existing Earth-based technologies by taking advantage of the unique environment of the ISS NL. Reference NASA's LEO Economy website for further information about NASA's strategic goals: <https://www.nasa.gov/leo-economy/opportunities-to-stimulate-demand>.

Areas of Special Interest: NASA is seeking proposals in the technology areas identified in Figure 1, but will consider other technologies that may lead to a scalable, financially self-sustaining in space production capability in LEO for on-Earth applications.

Figure 1: Areas of Interest with Example Technologies (Not Inclusive)

| Areas of Interest | Example Technologies |
|--------------------|--|
| Advanced Materials | <ul style="list-style-type: none">• Metal Organic Frameworks• Metamaterials• Ceramics• Container-less Processing• Exotic Glasses & Fibers• Alloys |
| Crystal Production | <ul style="list-style-type: none">• Inorganic Crystals• Large Molecule Crystals• Small Molecule Crystals |

| | |
|---|---|
| | <ul style="list-style-type: none"> • Uniform Crystals • Industrial Crystals |
| Thin Film Deposition | <ul style="list-style-type: none"> • Artificial Retinas • Semiconductors • Graphene |
| Tissue Engineering and Regenerative Medicine | <ul style="list-style-type: none"> • Disease Modelling • Tissue Chips • Organoids • Stem Cells • 3D Bio-fabrication |

Access to ISS National Lab (NL) Resources: NASA and the Center for the Advancement of Science In Space (CASIS), as operator of the ISS NL, partner with U.S. industry, academia, and other Government agencies to utilize the ISS NL to develop, demonstrate and advance technologies for in-space production applications, while leveraging experienced Implementation Partners with microgravity tested equipment. All selected payloads are subject to review processes established by CASIS, described [here](#), and will be provided access to ISS NL resources (up mass, down mass, USOS crew time, data transmission, power, etc.) including flight manifesting and increment operations planning. If selected for award through this NRA, access to ISS NL resource allocation requires a User Agreement to be signed with CASIS for utilization of the ISS NL. Experienced Implementation Partners offer Payload Hardware Development and/or Mission Integration and Operations (MI&O) services to assure the payload meets ISS interface and safety requirements (see Reference Documents below). Reference the ISS National Lab list of Implementation Partners for more information: <https://www.issnationallab.org/implementation-partners/>.

InSPA Phases: NASA has identified three InSPA phases (reference Figure 2) to characterize technology maturation from early concept studies through financially self-sustaining LEO production technologies. These are unique to InSPA and do not correlate with Small Business Innovation and Research (SBIR) Phases. The expected award ranges defined below are not provided as a guideline, but rather, to assist proposers in understanding the potential cost of developing, integrating, and operating complex research hardware on the ISS. Proposers should estimate and submit the actual cost for the specific project being proposed, consulting experts and experienced ISS National Lab implementation partners for insight as appropriate.

- 1) InSPA Phase 1: Early proof-of-concept studies and/or basic flight hardware development with a minimum set of flight demonstrations on ISS to achieve Technology Readiness Level (TRL) of 7 and a Market Readiness level (MRL) of 5. Typical awards are expected to be in the range of \$2.0M - \$3.0M for scenarios where new hardware development is required. The goals of Phase 1 (i.e. exit criteria) are:
 - To demonstrate hardware performance and validate the scientific basis for the technology benefit in a LEO space environment.
 - To establish a minimum level of production control to repeatedly produce the intended product to a quality/performance level comparable to Earth-based state of the art.
 - To refine the business case with preliminary revenue forecasts based on actual microgravity demonstrations, and letters of support from potential customers/partners.
- 2) InSPA Phase 2: Design maturation and advanced flight hardware development with additional flight

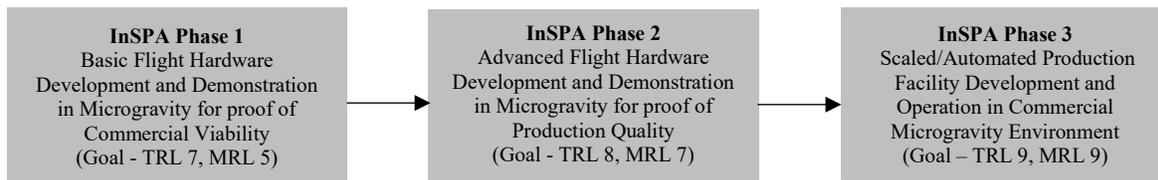
demonstrations on ISS to achieve a TRL of 8 and MRL of 7. Typical awards are expected to be in the range of \$2.5M - \$3.5M, with an expectation of some degree of cost-sharing (reference Cost Sharing guideline below). The goals of Phase 2 (i.e. exit criteria) are:

- To demonstrate full control of hardware and processes to meet specific performance standards for the application. These are often set by the customer and should be to a level of quality/performance that is significantly better than possible on Earth.
- To refine the business case to a level that successfully captures significant investor commitment.

3) InSPA Phase 3: Scaled Flight hardware production and in-flight operations on either ISS NL or an alternative commercial LEO destination/platform to demonstrate commercial operations and end-to-end logistics model producing sufficient quantities to achieve a TRL of 9 and MRL of 9 to close the business case. Typical awards are expected to be in the range of \$1.0M - \$2.0M with an expectation of significant cost-sharing (reference Cost Sharing guideline below). The goals of Phase 3 are:

- Demonstrate scaling to commercial quantities and quality to support market demand, including supply chain and regulatory approvals.
- To establish formal agreements with U.S. LEO transportation and destination partners for transition to commercial operations.
- Begin transition to commercial platform(s) and achieve sustainable revenues.

Figure 2: InSPA Phase Description



Note: Current awardees must submit a renewal proposal through this NRA for a follow-on award to either extend the current phase (if not successfully achieving the stated goals) or to move into a subsequent phase (Reference Section 2.5 of the NRA Guidebook). It is not required to receive an award for a previous phase to seek an award for a later phase.

Reference NASA Technology Readiness Levels (TRL):

https://www.nasa.gov/directorates/heo/scan/engineering/technology/technology_readiness_level

Reference Market Readiness Levels (MRL): [Market Readiness Levels](#)

Note: Reduced Gravity Risk Mitigation Flights: Parabolic or sub-orbital flight testing may be beneficial for risk mitigation and functional demonstration of hardware and procedures in a relevant environment prior to ISS on-orbit operations. Where appropriate, proposers may address how parabolic or sub-orbital flight testing is beneficial for the proposed InSPA technology. More information about how to request separate funding for parabolic and/or sub-orbital flight testing as part of a proposal to this NRA may be found at this NASA Flight Opportunities program website:

<https://www.nasa.gov/directorates/spacetech/flightopportunities/opportunities/iss-utilization>

Cost-Sharing: NASA requests that proposers attempt to achieve a cost-sharing target for Phases 2 and 3 (reference Figure 3) as a measure of market confidence in the technology and business case. This target level is

not mandatory and serves as a guideline only but will be a factor in the proposal evaluation. The size of the company and its ability to contribute will be considered.

Figure 3: Guideline for InSPA Cost-Sharing

| Award Phase | Target NASA Share | Target Non-NASA Share |
|---|-------------------|-----------------------|
| Phase 2 - Proof of Production Quality | 80% | 20% |
| Phase 3 – Scaling, Logistics and Business Case Demo | 20% | 80% |

Notes:

1. Non-NASA investment includes contributions from sources internal and external to the company, in-kind labor and materials, access to facilities and equipment, internal Research and Development funds and the like, with higher weighting on external investment as a measure of the market’s confidence.
2. Past investments made within the last 3 years may be counted, if related, however, at least 50% of the contribution must occur during the award period.
3. Does not apply to the value of access to ISS NL resources such as upmass, crew time, and downmass.

Focus Area 1A - Government Fiscal Year (GFY) 2022 Call for InSPA Proposals

NASA intends to make awards for new starts according to the schedule below (reference Table 1), with renewal of existing awards occurring throughout the year as appropriate. Renewal awards for continuation of previous NRA awards (whether an extension of the existing phase or beginning a new Phase) do not have set schedule dates, but rather are dependent on the schedule for completion of the existing contract milestones.

| Table 1: Schedule for New Starts | |
|---|-----------------|
| Action | Due Date |
| White Papers Due | 11/3/2021 |
| NASA Response | 12/3/2021 |
| Proposals Due | 2/11/2022 |
| Awards Announced (Estimated) | 3/25/2022 |
| Contract Start (Estimated) | 5/20/2022 |

The Government reserves the right to select one or multiple proposals for selection and award. In addition, the

Government reserves the right to not make award(s) based on budgetary constraints or programmatic goals. The Government may also select only parts of a proposal for award.

White Paper and Proposal Content: Respondents shall identify the InSPA phase characterizing stage of development incorporating content outlined in Section IV.B.3 of this NRA and submit a proposal for the full scope of that phase, including for renewal proposals. White papers shall also include a summary of the Business Approach as described below. In addition to the scientific/technical/management plan referenced in Section 2.13 of the NRA Guidebook, proposals shall also describe the total estimated cost (with phasing by Fiscal Year) and business approach for all phases as described below and a proposed work plan for the applicable phase, including but not limited to: major tasks, ground and flight testing, project schedule, contract payment milestones and deliverables, and price to the Government. The Work Plan shall include delivery of flight product sample(s) to the Government for independent test and evaluation tied to the contract milestones.

- i. Business Approach: Describe the business approach to reach long-term profitability (unsubsidized), including a detailed roadmap through 2030 for proposals only. The Approach should include, at a minimum, the following (not to exceed two (2) additional pages for white papers and ten (10) additional pages for proposals beyond NRA Guidebook limitations):

| Proposal Requirements | Phase 1 | Phase 2 | Phase 3 |
|---|----------------|----------------|----------------|
| - Leadership Team, including key employees leading and/or responsible for business, operational and science/technology execution. Describe current organization and staffing. | X | X | X |
| - Commercial Product Offering, including anticipated scaling, quantities and pricing with comparison to earth-based alternatives | X | X | X |
| - Target market(s), including size and anticipated annual growth rate, including key assumptions | X | X | X |
| - Self Assessment of Market Readiness Level at the beginning and end of the proposed work plan | X | X | X |
| - Marketing Plan and targeted direct customers and/or Industry Partners, and Business Development Strategy, including substantiation of interest/support (i.e. letters of intent) | | X | X |
| - Capitalization Strategy including corporate contribution/cost-sharing, as well as target ROI and exit strategy for major investors (for Phases 2, 3) | X | X | X |
| - Cash Flow Summary through 2030 showing expenses, capital investments, revenues, break-even point and profitability at the recommended transition to a commercial destination/platform. Expenses include production costs and delivery to/from LEO | | X | X |
| - Business Risks / Barriers and Mitigation Plans including Export Control and intellectual property. | X | X | X |

Note: It is advised to take into account the items in ‘Attachment A: InSPA Lessons Learned and Items of Note’ when developing implementation strategies, schedules and cost estimates for the purposes of ensuring mission success.

ISS End of Life Assumption: although discussions are still ongoing within the Government regarding official extensions of the ISS beyond 2024, proposers may assume for planning and estimating purposes only that ISS operations are extended through at least 2028.

Evaluation Criteria: Focus Area 1 proposals will be evaluated according to Section V.A of this NRA (excluding paragraph D).

2. Focus Area 2 – (Deleted)

3. Focus Area 3- Purchase of Resources for Commercial Purposes:

The International Space Station continues to be open for commercial business.

NASA is opening the International Space Station to expanded commercial and marketing opportunities that will continue the agency's efforts to develop a sustainable economy in LEO. NASA has reserved a set amount of resources, available to U.S. entities, intended to serve commercial and marketing activities. The governing policies are the [NASA Interim Directive \(NID 8600.121\)](#) on Use of International Space Station (ISS) for Commercial and Marketing Activities, the [Commercial and Marketing Pricing Policy](#), and the [Crew Code of Conduct](#).

Only U.S. entities may purchase resources to pursue the following activities on the ISS:

- Commercial activities, including any activity that can be defined as non-government, but is not considered research or technology development. This includes manufacturing, production, or transportation of goods.
- Marketing activities that are factually accurate and meet the NASA media guidelines.

All commercial and marketing activities that utilize ISS resources will require a Reimbursable Space Act Agreement (RSAA) with NASA to recover costs for the resources. Information about RSAA may be found [here](#).

Companies may not resell purchased resources under any circumstances.

To request purchase of any of the listed resources, a U.S. entity must submit a white paper (up to 6 pages) describing the cargo and/or onboard activities enabled by this purchase request, as well as the resource request form, found at:

<https://nspires.nasaprs.com/external/viewrepositorydocument/cmdocumentid=704824/solicitationId=%7B21E0270C-BC1F-EFC4-3D87-30713B5FF373%7D/viewSolicitationDocument=1/ISS%20Commercial%20Activities%20Form.pdf>

and uploaded via NSPIRES to this NRA.

Requests will be evaluated using the following pass/fail criteria:

1. Evidence that the entity requesting resources meets the criteria of a U.S. entity
2. Compliance with one or more of the following:
 - a. Require the unique microgravity environment; or
 - b. Have a nexus to NASA's missions; or
 - c. Supports a sustainable LEO economy
3. Conformance with NID, Crew Code of Conduct, and other policies governing commercial activities on the ISS
4. Reasonableness of amount of resources requested

Resource requests will be reviewed on a first come, first served basis. U.S. entities will have ability to use purchased resources during a two-year period from signing of RSAA based on a best-efforts approach; any unused resources may be utilized after that period but will only be on a non-interference basis.

Entities must indicate any foreign entity benefits. Preference will be given when primary customer of entity purchasing resources is also a U.S. entity or individual.

4. Focus Area 4- Private Astronaut Missions to the International Space Station (ISS)

~~Focus Area 4A—Private Astronaut Mission (PAM) Provider~~

~~NASA has outlined a broad strategy to facilitate the commercialization of LEO by U.S. companies (see [NID-8600.121: “Use of International Space Station for Commercial and Marketing Activities”](#)). As part of that strategy, NASA plans to enable private astronaut missions (PAMs) to the ISS. These private missions must use U.S. transportation vehicles that meet NASA’s ISS visiting vehicle requirements, policies, and procedures.~~

~~NASA has accommodated the pursuit of private astronaut missions under this NRA umbrella, and multiple companies have entered into this process. This focus area intends to build on the experience gathered to date and provides a path for additional entities to pursue private astronaut missions.~~

~~As a part of this announcement, NASA will identify up to two candidate private astronaut mission opportunities per year based on currently available scheduling information and resource availability. NASA is responsible for managing the mission opportunities and integrated requirements for all United States On-orbit Segment (USOS) partners, their researchers, and commercial entities. NASA is also responsible for integrating pertinent international partner and commercial vehicle provider constraints for the purposes of managing vehicle traffic to the ISS. *Private astronaut mission scheduling and resource availability and implementation will be subject to these overall opportunities and integrated requirements, and is subject to change given vehicle traffic changes, anomalies, or other unforeseen circumstances. NASA missions will take precedence.*~~

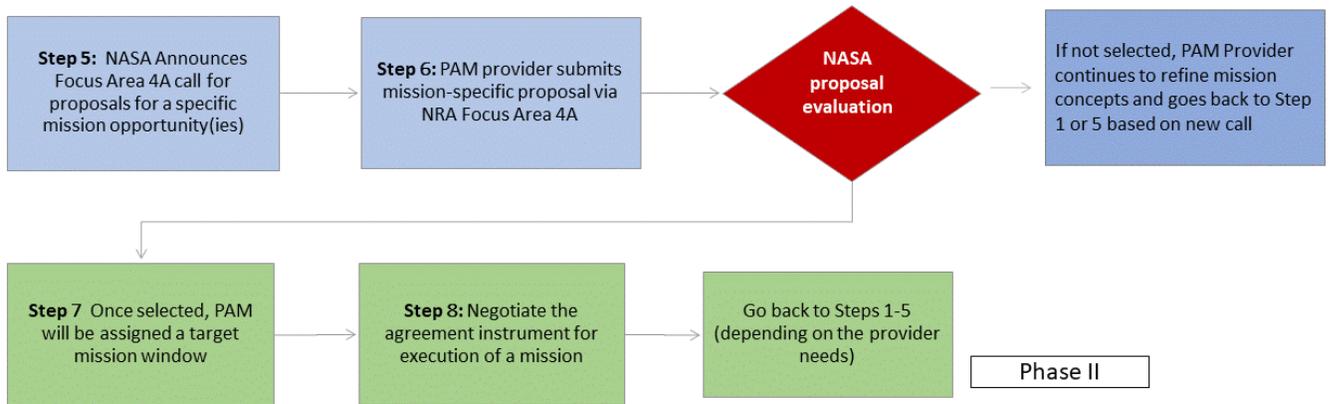
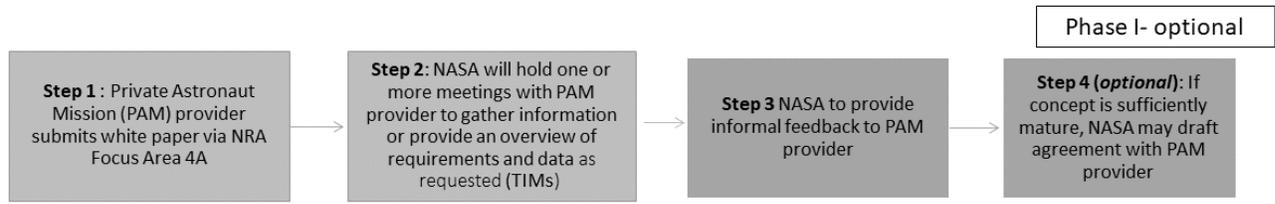
~~Private Astronaut Mission (PAM) opportunities on ISS are very limited and NASA has updated the original process to ensure increased competition in the award of specific missions to the ISS. NASA has assessed general ability to support up to two missions per year, with no individual mission exceeding thirty days. While there may be scenarios where the ISS is able to support thirty-day missions, opportunities of this duration are limited and will result in increased scheduling constraints, costs and potential impact to ISS resources. NASA will assess any missions over 14 days on a case-by-case basis, and limitations for any mission-specific solicitation will be provided at the time of the announcement.~~

~~PAM information and requirements have been consolidated into a technical library. Up to 2 potential PAM Provider representatives can request access by emailing the hq-leo-economy@mail.nasa.gov mailbox with the following information in order to be cleared for export controlled data:~~

- ~~● Name, Company Name, Citizenship, Contact Address, Contact Phone Number, Contact e-mail address, Government clearance (if applicable), and NASA Domain Consolidation (NDC) Username (if applicable)~~
- ~~● Foreign nationals will be required to complete a non-disclosure agreement (NDA)~~

~~The due date for submission of proposals will not be extended for any offeror based on additional time necessary for obtaining access. Falsified or incorrect data may result in disqualification from selection for a PAM or future NASA solicitations~~

~~A two-phase process for assessing and awarding PAM missions is outlined below:~~



Phase I (optional): Submission of a generic mission or multi-mission concept white paper to this NRA through NSPIRES:

This phase allows the PAM Provider the ability to receive initial feedback regarding their mission concept and readiness and provides for technical interchange to ensure the PAM Provider clearly understands the PAM requirements, roles, and responsibilities outlined by NASA. This focus area will remain open indefinitely. Whitepapers may be submitted at any time and should include as much information as known based on the Phase II proposal criteria including any mission specific reference information. *NASA feedback received during Phase I regarding a particular mission concept does not guarantee a mission award.* While NASA will entertain offerings of commercial services as a part of a mission concept, such as cargo transportation and crew-time, there is no guarantee that NASA will procure any services or make/have budget available to support any such offerings.

NASA may hold one or more meetings with white paper submitters to review PAM framework and expectations; PAM provider roles and responsibilities; required and available NASA provided resources, services, and pricing; and overview of ISS PAM requirements. Additionally, if a concept is sufficiently mature NASA may identify agreement mechanism (BOA or RSAA) in preparation for a potential future mission award; however, this does not guarantee a future award.

Submission of a generic mission or multi-mission concept white paper and participation in Phase I is not required in order to submit a proposal, or to be considered for a mission specific award, as part of a Phase II mission specific opportunity announcement.

Phase II: Submission of proposals to NRA mission specific opportunity announcements:

This phase provides PAM providers the ability to submit a mission specific proposal against NASA available flight opportunities that will be competitively evaluated for a possible award. Proposals will be solicited

annually, or as available. Details associated with each request for mission specific announcement will be made available through this NRA and updated as required. Required proposal content, evaluation criteria, and schedule will be updated in this NRA no later than 30 days prior to the proposal cycle. Details for each mission specific solicitation will be provided in updates to this NRA when they are available and can be found in subsections to Focus Area 4A (e.g. 4A.1). The sub-sections below outline the detailed instructions for submitting proposals to a Private Astronaut Mission specific solicitation as a part of Focus Area 4A. These instructions are unique to Focus Area 4A and are different from the other Focus Areas described in this NRA. Mission specific solicitations are located below these instructions.

4A Section 1.0—Objectives

The primary objectives of Focus Area 4A are the following:

- Successfully execute a Private Astronaut Mission (PAM) to the International Space Station (ISS) with the goal of safely flying Private Astronauts to accomplish public and private research, commercial and marketing, and utilization activities.
- To broaden and expand the capabilities of the commercial market consistent with NASA’s vision for the commercialization of LEO economy by offering ISS as a destination for PAMs, and in a manner that stimulates growth and competition.
- To allow commercial entities the opportunity to utilize the ISS through the execution of a PAM in a manner that is consistent with NASA’s commercial policy on the Use of ISS for Commercial and Marketing Activities, and as such does not reflect unfavorably on NASA, any ISS Partner, or related entity.

Through this NRA Focus Area, NASA intends to reach an agreement for flight opportunities specified in the mission specific solicitation. The responsibility for developing the commercial markets, activities, and achieving commercial viability for any PAM is on the PAM Provider, not the Government. Financial viability of the mission should not rely on the procurement of services by NASA. Although a PAM Provider may choose to offer services to NASA as part of a proposed mission, there is no commitment on the part of the government to procure such services.

4A Section 2.0—Eligibility

This Focus Area is restricted to United States industry entities. United States industry entities are defined as any corporation, partnership, joint venture, association, or other entity that meets the requirements of 51 United States Code (U.S.C.) § 50101, excluding government entities such as NASA Centers, National Laboratories, and Federally Funded Research and Development Centers.

The selected Offeror(s) shall adhere to 51 United States Code (U.S.C.) § 50131 in performance of this agreement by acquiring space transportation services from United States commercial providers. The Offeror(s) also shall comply with the National Space Transportation Policy by using U.S. manufactured launch vehicles. For a launch vehicle to qualify as a domestic end product, the cost of its components, mined, produced, or manufactured in the United States must exceed fifty (50) percent of the cost of all of its components. The cost of each component includes transportation costs to the place of incorporation into the launch vehicle and any applicable duty (whether or not a duty free entry certificate is issued). “Components” means those materials and supplies directly incorporated into the domestic end product.

4A Section 3.0—Proposal Submission

~~Except as stated below, applicants shall prepare proposals in accordance with instructions in Focus Area 4A of this NRA and in NFS 1852.235-72, *Instructions for Responding to NASA Research Announcements*. Additional information in this solicitation is subject to the default Agency rules in the *NASA Guidebook for Proposers*. Where any discrepancies exist between the instructions in this document and the *NASA Guidebook for Proposers*, the information in Focus Area 4A of this NRA takes precedence.~~

~~Proposals shall be submitted electronically to NSPIRES at <https://nspires.nasaprs.com/external/>, which requires user registration. Hard copies will not be accepted. Proposals that are late will be handled in accordance with NASA's policy as given in Section (g) of Appendix B of the *NASA Guidebook for Proposers* (also see Sections 3.2 and F.23), and in accordance with NFS 1815.208. Proposals received after the due date and time are considered late and will not be reviewed.~~

~~Proposers can only submit a proposal(s) up to the number of opportunities specified in the solicitation. Each proposal will be considered for a single flight opportunity.~~

~~Proposers must ensure information and certifications provided in <https://sam.gov/content/home> is current at the time of proposal submission in order to ensure all eligibility requirements outlined in 4A Section 2.0 are met.~~

4A Section 3.1—Proposal Content

~~Proposals should be structured as detailed in this section. **Proposals should be limited to no more than 30 pages**, not including any attachments. Only attachments that are specifically requested in the content described below should be included, and page limits for those attachments are provided in section *vii. Attachments*. Any pages submitted beyond the specified page count will be returned to the provider and will not be evaluated. For specific instructions on proposal formatting not covered in these instructions refer to section 2.6. Standard Proposal Style Formats of the *NASA Guidebook for Proposers*. Proposals and attachments must be submitted in pdf format.~~

~~Sections and content for the proposal should include, at a minimum, the following material:~~

- ~~ii.—Title Page (1 page):
 - ~~a.—Include any Notice of Restriction on Use and Disclosure of Proposal Information~~
 - ~~b.—The proposer and proposal name/title (Requirement is to be a US-owned company)~~
 - ~~c.—Date of the proposal~~
 - ~~d.—The title, NRA number, including version associated with announcement~~
 - ~~e.—Organization name and address~~
 - ~~f.—Proposer Point of Contact name, title, e-mail address, and phone number~~~~
- ~~iii.—Proposal Abstract (not to exceed 3 pages):
 - ~~a.—Provide an overview of the proposed mission concept, including key mission parameters, objectives, teaming arrangements, and constraints, as well as the proposer's experience, capabilities and qualifications.~~
 - ~~b.—Describe how proposed mission fits in with the vision of LEO commercialization and the objectives of the solicitation~~~~
- ~~iv.—Table of Contents (1 page):~~

- ~~a. Include a one page Table of Contents that provides a guide to the organization and contents of the proposal.~~
- v. ~~Mission Overview (not to exceed nine (9) pages):~~
 - ~~a. Describe the concept of operations, details and parameters of the proposed mission, as well as any areas of flexibility and/or constraints that have implications to mission execution or scheduling. This information should comply with requirements, processes, and terms and conditions as outlined in SSP 51087—ANXI, Private Astronaut Mission (PAM) Authorization, Coordination and Execution (PACE) Annex 1, the Generic PAM Basic Ordering Agreement (BOA) and Mission Specific Order (MSO). Information should include, at a minimum, the following:~~
 - ~~i. Proposed mission duration (both total duration and docked to ISS) and mission scheduling constraints~~
 - ~~1. Provide any scheduling constraints, flexibility, or preferences related to mission windows. Consider “no earlier than” or “nor later than” launch dates, order of execution for proposed missions, etc.~~
 - ~~ii. Planned launch and transportation vehicle~~
 - ~~iii. Number of primary and backup crew members, roles and planned training~~
 - ~~iv. Details of proposed crew members, including:~~
 - ~~1. Names and background of Private Astronauts and/or non-NASA related crew selection criteria or process.~~
 - ~~2. Anticipated training and experience of each crew member, and roles~~
 - ~~v. Significant mission objectives or activities to be performed during the mission, including the durations and scope of any proposed activities as well as any ISS resources being requested to support~~
 - ~~vi. Details of any ISS or commercially provided hardware to be utilized during the mission, as well as any planned operations.~~
 - ~~vii. Details of any commercial activities, public affairs and/or outreach activities proposed~~
 - ~~viii. Details of any research activities being performed as well as any ties to government or commercial entities (e.g. National Labs)~~
 - ~~b. Acknowledgement and acceptance of the terms and conditions associated with the NASA PAM framework as documented in the Generic PAM Basic Ordering Agreement (BOA) and Mission Specific Order (MSO). Specific mission needs will determine the contracting mechanism that is to be used, but the terms and conditions will apply regardless of contracting mechanism selected.~~
- vi. ~~Mission Integration Approach (not to exceed nine (9) pages):~~
 - ~~a. Describe the experience, capabilities, qualifications, resources, and key mission personnel of the PAM Provider and any key partners and contractors. Key personnel should be provided for both the proposer and from contractors/partners in key areas of mission integration.~~
 - ~~b. Describe the approach, methods, pertinent teaming arrangements, and integration schedule/milestones for key areas of mission integration. Particular focus should be given to describing how the PAM Provider will maintain compliance and adherence to requirements, processes, and integration milestones outlined in SSP 51087—ANXI, Private Astronaut Mission (PAM) Authorization, Coordination and Execution (PACE) Annex 1, in the following key areas:~~
 - ~~i. Transportation Vehicle/Provider Integration~~
 - ~~ii. Crew Training~~
 - ~~iii. Medical Certification, Support and Health Stabilization~~
 - ~~iv. Crew provisions/hardware certification and flight integration~~

- e. Describe the approach and teaming arrangements to support launch and landing services.
 - d. Provide a description of roles and responsibilities for the proposer and all related entities, including primary interfaces with NASA and the transportation provider.
 - e. Describe the major services, facilities, resources, and equipment required from NASA in order to execute the proposed mission. Use *SSP 50192—Private Astronaut Resources, Interfaces, and Services (PARIS) for ISS*, as a resource to assist in the identification of potential services needed. Include any unique or non-standard requests for services.
- vii. ~~Mission Business Approach (not to exceed nine (9) pages):~~
- a. Describe the financial health of the PAM provider executing the proposed mission in order to demonstrate the ability to accomplish mission activities for the duration of the integration and execution of the proposal. Attach financial statements (cash flow, balance sheet, and income statement) for the last three years.
 - b. Identify the total costs of the mission, including costs of services procured from NASA as described in the current NASA pricing policy, as well as those from commercial suppliers and any other government partnerships required to execute the mission. Summarize the cash flow of the mission, including phasing of revenue and cost.
 - e. Define the plan for obtaining required funds, including mission revenue, internal funds from other company operations, and/or external financing. Attach any evidence such as signed letters of intent (e.g. with private astronauts on this mission).
 - d. Provide a status of teaming/supplier agreements and/or partnerships with other commercial and/or government entities. Attach any evidence such as signed letters of intent (e.g. with transportation provider).
 - e. Provide a description of any services or commercial offerings being presented to NASA as a part of the proposal.
- viii. ~~Attachments:~~
- a. ~~Project Schedule~~
 - i. ~~Include major mission milestones, training activities and milestones, vehicle integration activities and milestones, crew provisioning and hardware procurement, delivery and flight schedules, crew medical milestones, and research and commercial marketing integration activities (no page limit; however data that is not schedule data will not be considered).~~
 - b. ~~Financial statements (not to exceed 20 pages)~~
 - e. ~~Evidence of revenue and sources of funds (not to exceed 10 pages)~~
 - d. ~~Evidence of planned suppliers, teaming agreements, etc. (not to exceed 10 pages)~~

4A Section 4.0—Proposal Evaluation Information

Except as stated below, proposals will be evaluated in accordance with the *NASA FAR Supplement, Section 1852.235-72*, and as reflected in the *NASA Guidebook for Proposers*. All information needed to apply to this solicitation is contained in Focus Area 4A of this NRA and anything not mentioned here is subject to the default Agency rules in the *NASA Guidebook for Proposers*. Proposers are responsible for understanding and complying with its procedures for the successful, timely preparation and submission of their proposals.

4A Section 4.1—Proposal Compliance

NASA will screen all proposals for compliance with requirements of this solicitation. This includes submission of a proposal that is compliant with all of the following:

- The proposal is relevant to the objectives and/or provisions of Focus Area 4A of this NRA;
- The proposal meets the requirements for proposal format, content, and organization as specified in this Guidebook and/or of Focus Area 4A of this NRA;
- The proposal is submitted by the submission due date and time;
- The proposal consists of file types that meet NASA requirements or otherwise cannot be captured by the NSPIRES system;

Non-compliant proposals may be withdrawn from the review process and declined without further review. Compliant proposals submitted in response to this NRA will undergo a full evaluation.

4A Section 4.2 — Evaluation Criteria

The evaluation criteria in this section are tailored to Focus Area 4A and will be used for the evaluation of Private Astronaut Mission specific proposals. Any materials provided in the proposal and/or the attachments may be evaluated against the evaluation criteria. Proposals that have meet the requirements to undergo a full evaluation will be evaluated against three factors, **1. Merit, 2. NASA Supportability, and 3. Relevance**. Factors 1 and 2 (Merit and Supportability) are of equal importance, and both are more important than Factor 3 (Relevance).

Factor 1: Merit will be evaluated based weighing the three criteria below against the proposed technical and business approaches:

- The credibility of executing the proposed mission within NASA’s outlined framework, and ability to meet NASA’s requirements.
- The ability of the proposer to provide the personnel, resources, financing, and partnerships necessary to plan and execute the proposed mission.
 - Note: Mission proposals should be independently financially viable, and not require procurement of services by NASA.
- The reasonableness and credibility of supporting the proposed mission integration schedule and milestones.
- Past performance for PAM providers will be assessed based on lessons learned from completed Spaceflight Participant and PAM activities (as applicable).

Factor 2: NASA Supportability will be evaluated based on the 3 criteria listed below:

- Evaluation of risk, including safety considerations for personnel, vehicle, hardware, ground infrastructure, mission objectives and operations.
- Evaluation of NASA’s ability to provide the resources, facilities, hardware, services and other items necessary to accomplish the mission.
- Evaluation of NASA’s ability to support the proposed integration timeline and support the proposed mission flight objectives.

Factor 3: Relevance will be evaluated based on the proposal’s potential contribution to NASA’s mission and the objectives stated in 4A Section 1.0 Objectives.

Note: If, at any time during evaluation a proposal is found to be not relevant, further evaluation may be suspended.

~~The adjectival ratings listed in Appendix D of the *NASA Guidebook for Proposers* will be used to evaluate factors 1-3.~~

4A Section 5.0—Selection and Award

~~NASA will make selection(s) based on the evaluation criteria in 4A Section 4.2, the flight opportunities available and the flight planning and scheduling constraints provided in the proposal. The Proposer agrees to allow the Government the right to make the flight assignment based on any constraints provided.~~

~~The Government reserves the right to award this flight opportunity with or without discussions. Therefore, the offeror's initial proposal should contain the offeror's best terms. Although a peer review may rate a proposal as excellent based on the combination of the three evaluation factors (Merit, Supportability, and Relevance), it still may not be selected due to budget limitations or for programmatic balance.~~

~~Post selection, NASA will determine the appropriate contract mechanisms based on the proposer's mission-specific proposal. A generic basic ordering agreement (BOA) and mission ordering agreement have been provided as an example but based on the proposer's commercial offering, a different agreement mechanism may be utilized. The Government reserves the right to conduct negotiations if the Contracting Officer later determines them to be necessary. It is NASA's intent not to negotiate the terms and conditions in the BOA. If proposer and government cannot agree to the terms and conditions or any mission specific details, the government reserves the right to select the next highly rated proposal.~~

Focus Area 4A.1—Solicitation for Private Astronaut Missions' Provider for Two Flight Opportunities

~~NASA is soliciting proposals for Phase II of Focus Area 4A for two (2) independent flight opportunities with launch dates between the fall of 2022 through the end of 2023. It is expected that one flight opportunity will occur between fall of 2022 and mid 2023 and the second will occur between mid 2023 and the end of 2023. The maximum number of private astronauts per mission shall not exceed four (4), and the maximum planned docked duration shall not exceed fourteen (14) days. Proposers will be allowed to submit up to two (2) proposals for this solicitation, one (1) per flight opportunity.~~

~~Note that specific launch dates are dependent on ISS vehicle traffic and on-orbit activity planning and constraints. No white papers will be accepted as a part of this solicitation. Proposals are due August 5th, 2021 at 5 PM Eastern Time.~~

Focus Area 4A – Private Astronaut Mission (PAM) Provider

NASA has outlined a broad strategy to facilitate the commercialization of low Earth orbit (LEO) by U.S. companies (see [NID 8600.121: “Use of International Space Station for Commercial and Marketing Activities”](#)). As part of that strategy, NASA plans to enable private astronaut missions (PAMs) to the ISS. These private missions must use a certified U.S. transportation vehicle that meet NASA’s ISS visiting vehicle requirements, policies, and procedures.

NASA has accommodated the pursuit of private astronaut missions under this NRA umbrella, and multiple companies have entered into this process. This focus area intends to build on the experience gathered to date and provides a path for additional entities to pursue private astronaut missions.

As a part of this announcement, NASA will identify up to two candidate private astronaut mission opportunities per year based on currently available scheduling information and resource availability. NASA is responsible for managing the mission opportunities and integrated requirements for all United States On-orbit Segment (USOS) partners, their researchers, and commercial entities. NASA is also responsible for integrating pertinent international partner and commercial vehicle provider constraints for the purposes of managing vehicle traffic to the ISS. Private astronaut mission scheduling and resource availability and implementation will be subject to these overall opportunities and integrated requirements, and is subject to change given vehicle traffic changes, anomalies, or other unforeseen circumstances. NASA missions will take precedence.

Private Astronaut Mission (PAM) opportunities on ISS are very limited and NASA has updated the original process to ensure increased competition in the award of specific missions to the ISS. NASA has assessed general ability to support up to two missions per year, with no individual mission exceeding fourteen days. While there may be scenarios where the ISS is able to support longer missions, opportunities of this duration are limited and will result in increased scheduling constraints, costs, and potential impact to ISS resources.

PAM information and requirements have been consolidated into a technical library. Subsequent revisions to documents will be provided prior to contract award. Up to 2 potential Proposer representatives can request access by emailing the Contracting Officer, Kelly Rubio, at kelly.l.rubio@nasa.gov (please cc Sumera Ali at sumera.ali-1@nasa.gov) with the following information in order to be cleared for export-controlled data:

- Name, Company Name, Citizenship, Contact Address, Contact Phone Number, Contact e-mail address, Government clearance (if applicable), and NASA Domain Consolidation (NDC) Username (if applicable)
- Foreign nationals will be required to complete a non-disclosure agreement (NDA)

The due date for submission of proposals will not be extended for any offeror based on additional time necessary for obtaining access. Falsified or incorrect data may result in disqualification from selection for a PAM or future NASA solicitations.

A two-phase process for assessing and awarding PAM missions is outlined below:

[Phase I \(optional\): Submission of a generic mission or multi-mission concept white paper to this NRA through NSPIRES:](#)

This phase allows the Submitters the ability to receive initial feedback regarding their mission concept and readiness and provides for technical interchange to ensure the Submitter clearly understands the PAM requirements, roles, and responsibilities outlined by NASA. This focus area will remain open indefinitely. Whitepapers may be submitted at any time and should include as much information as known based on the Phase II proposal criteria including any mission specific reference information. NASA feedback received during Phase I regarding a particular mission concept does not guarantee a mission award. While NASA will entertain offerings of commercial services as a part of a mission concept, such as cargo transportation and crew time, there is no guarantee that NASA will procure any services or make/have budget available to support any such offerings.

NASA may hold one or more meetings with white paper Submitters to review PAM framework and expectations; PAM provider roles and responsibilities; required and available NASA-provided resources, services, and pricing; and overview of ISS PAM requirements. Additionally, if a concept is sufficiently mature NASA may identify agreement mechanism (BOA/MSO or RSAA) in preparation for a potential future mission award; however, this does not guarantee a future award.

Submission of a generic mission or multi-mission concept white paper and participation in Phase I is not required in order to submit a proposal, or to be considered for a mission specific award, as part of a Phase II mission specific opportunity announcement.

Phase II: Submission of proposals to NRA mission specific opportunity announcements:

This phase provides Proposers the ability to submit a mission-specific proposal against NASA available flight opportunities that will be competitively evaluated for a possible award. Proposals will be solicited annually, or as flight opportunities become available. Details associated with each request for mission-specific announcements will be made available through this NRA and updated as required. NASA reserves the right to cancel or alter this solicitation. Required proposal content, evaluation criteria, and schedule will be updated in this NRA, and can be found in subsections to Focus Area 4A (e.g. 4A.1). The sub-sections below outline the detailed instructions for submitting proposals to a Private Astronaut Mission-specific solicitation as a part of Focus Area 4A. These instructions are unique to Focus Area 4A and are different from the other Focus Areas described in this NRA.

4A Section 1.0 – Objectives

The primary objectives of Focus Area 4A are the following:

- Successfully execute a Private Astronaut Mission (PAM) to the International Space Station (ISS) with the goal of safely flying Private Astronauts to accomplish public and private research, in-space manufacturing, assembling and servicing activities, and/or commercial, marketing and utilization activities.
- To broaden and expand the capabilities of the commercial market consistent with NASA's vision for the commercialization of LEO economy by offering ISS as a destination for PAMs, as well as utilizing ISS in the development of Commercial LEO Destinations.
- To allow commercial entities the opportunity to utilize the ISS through the execution of a PAM in a manner that is consistent with NASA's commercial policy on the Use of ISS for Commercial and

- Marketing Activities, and as such does not reflect unfavorably on NASA, any ISS Partner, or any ISS related entity
- To broaden the accessibility of LEO. NASA is fully committed to diversity, equity, and inclusion and NASA welcomes proposals whose crew is aligned with that vision.

Through this NRA Focus Area, NASA intends to reach an agreement for flight opportunities specified in the mission specific solicitation. The responsibility for developing the commercial markets, activities, and achieving commercial viability for any PAM is on the PAM Provider, not the Government. Financial viability of the mission should not rely on the procurement of services by NASA. Although a PAM Provider may choose to offer services of interest to NASA (such as cargo transport, task execution or crew time, services support) as part of a proposed mission, there is no commitment on the part of the Government to procure such services.

4A Section 2.0 – Eligibility

This Focus Area is restricted to United States industry entities. United States industry entities are defined as any corporation, partnership, joint venture, association, or other entity that meets the requirements of 51 United States Code (U.S.C.) § 50101, excluding government entities such as NASA Centers, National Laboratories, and Federally Funded Research and Development Centers.

The selected Offeror(s) shall adhere to 51 United States Code (U.S.C.) § 50131 in performance of this agreement by acquiring space transportation services from United States commercial providers. The Offeror(s) also shall comply with the National Space Transportation Policy by using U.S. manufactured launch vehicles. For a launch vehicle to qualify as a domestic end product, the cost of its components, mined, produced, or manufactured in the United States must exceed fifty (50) percent of the cost of all of its components. The cost of each component includes transportation costs to the place of incorporation into the launch vehicle and any applicable duty (whether or not a duty-free entry certificate is issued). “Components” means those materials and supplies directly incorporated into the domestic end product.

4A Section 3.0 – Proposal Submission

Except as stated below, Proposers shall prepare proposals in accordance with instructions in Focus Area 4A of this NRA and in NFS 1852.235-72, *Instructions for Responding to NASA Research Announcements*. Additional information in this solicitation is subject to the default Agency rules in the *Guidebook for Proposals Responding to a NASA Notice of Funding Opportunity (NOFO)*. Where any discrepancies exist between the instructions in Focus Area 4A of this NRA and the *Guidebook for Proposals Responding to a NASA Notice of Funding Opportunity (NOFO)*, the information in Focus Area 4A of this NRA takes precedence.

Proposals shall be submitted electronically to NSPIRES at <https://nspires.nasaprs.com/external/>, which requires user registration. Hard copies will not be accepted. Proposals that are late will be handled in accordance with NASA’s policy as given in Section (4.1 of the *Guidebook for Proposals Responding to a NASA Notice of Funding Opportunity (NOFO)* (also see Sections 3.2), and in accordance with NFS 1815.208. Proposals received after the due date and time are considered late and will not be evaluated. Proposers may submit up to two proposals. Each proposal shall represent a single private astronaut mission concept. The government will

evaluate each proposal for potential award of both flight opportunities, as defined by Focus Area 4A.1 – Solicitation for Private Astronaut Missions’ Provider for Flight Opportunity, that meets the launch window and sequence constraints provided in the proposal. Each proposal shall be submitted through NSPIRES separately.

Proposers must ensure information and certifications provided in <https://sam.gov/content/home> is current at the time of proposal submission in order to ensure all eligibility requirements outlined in 4A Section 2.0 are met.

4A Section 3.1 – Proposal Content

Proposals shall be structured as detailed in this section. Proposals shall be limited to no more than 65 pages, not including any attachments. Only attachments that are specifically requested in the content described below shall be included, and page limits for those attachments are provided in section *vii. Attachments*. Any pages submitted beyond the specified page count will not be evaluated. For specific instructions on proposal formatting not covered in these instructions refer to section 2.6. Standard Proposal Style Formats of the *Guidebook for Proposals Responding to a NASA Notice of Funding Opportunity (NOFO)*. Proposals and attachments must be submitted in .pdf format.

Sections and content for each mission proposed shall include, at a minimum, the following material:

- ix. Title Page (1 page):
 - a. Include any Notice of Restriction on Use and Disclosure of Proposal Information
 - b. The proposer and proposal name/title (Requirement is to be a US owned company)
 - c. Date of the proposal
 - d. The title, NRA number, including version associated with announcement
 - e. Organization name and address
 - f. Proposer Point of Contact name, title, e-mail address, and phone number
- x. Proposal Abstract (not to exceed 3 pages):
 - a. Provide an overview of the proposed mission concept, including key mission parameters, objectives, teaming arrangements, as well as the proposer’s experience, capabilities, and qualifications. Proposals shall clearly define all mission objectives Proposers are encouraged to propose multiple objectives.
 - b. Provide any constraints and flexibilities (including launch window and sequence constraints) in flight opportunity assignment.
 - c. Describe how proposed mission fits in with NASA’s vision of LEO commercialization and the objectives of the solicitation.
- xi. Table of Contents (1 page):
 - a. Include a one-page Table of Contents that provides a guide to the organization and contents of the proposal.
- xii. Mission Overview (not to exceed twelve (12) pages):
 - a. Describe the concept of operations, details, and parameters of the proposed mission, as well as any areas of flexibility and/or constraints that have implications to mission execution or scheduling. This information should comply with requirements, processes, and terms and conditions as outlined in *SSP 51087 - ANXI, Private Astronaut Mission (PAM) Authorization*,

Coordination and Execution (PACE) Annex 1, the generic PAM Basic Ordering Agreement (BOA) and Mission Specific Order (MSO).

- i. Information shall include the following:
 1. Proposed mission duration (both total duration and docked to ISS) and mission scheduling constraints
 - a. Provide any scheduling constraints, flexibility, or preferences related to mission windows. Consider “no earlier than” or “no later than” launch dates, order of execution for proposed missions, etc.
 2. Proposed launch and transportation vehicle
 - a. For any areas where the launch or transportation vehicle is not compliant with the requirements in SSP 51087 PACE Annex 1, provide details on the capability and associated schedule to meet the requirements in support of the proposed launch window.
 3. Number of primary and backup crew members, roles, and planned training
 4. Significant mission objectives or activities to be performed during the mission, including the durations and scope of any proposed activities as well as any ISS resources being requested to support. Proposals shall clearly define all mission objectives. Proposers are encouraged to propose multiple objectives.
- ii. Information should include the following:
 1. Details of proposed crew members, including:
 - a. Names and background of Private Astronauts and/or non-NASA related crew selection criteria or process.
 - b. Anticipated training and experience of each crew member, and roles
 2. Details of any NASA or commercially provided hardware to be utilized during the mission, as well as any planned operations
 3. Details of any research activities being performed as well as any ties to government or commercial entities (e.g. Center for the Advancement of Science in Space (CASIS))
 4. Details of any commercial ventures, offerings, partnerships, and/or activities proposed that significantly affect the execution of the mission.
 5. Details of any public affairs and/or outreach activities proposed
 6. Details of integrated media and filming activities proposed, including pre-flight, on-orbit, and post-flight activities. Activities, including media-related PAM activities, must follow the NASA guidelines and be approved regardless of contract negotiation or award; proposed activities falling outside of NASA policies will have to be negotiated prior to contract award. For documentaries, television series, and feature film products that are significant considerations of the proposal, Proposers shall provide details of the project that include:
 - a. Funding source and status of funding agreement
 - b. Broadcaster/Distributor and status of agreement with the broadcaster/distributor
 - c. Storyline (Script or Treatment)

For more information on NASA's policies of working on multimedia projects, see the following link: www.nasa.gov/multimedia/guidelines .

- b. Statement of acknowledgement and acceptance of the terms and conditions associated with the NASA PAM framework as documented in the generic *PAM Basic Ordering Agreement (BOA)* and *Mission Specific Order (MSO)*. Specific mission needs will determine the contracting mechanism that is to be used, but the terms and conditions will apply regardless of contracting mechanism selected.
- xiii. Mission Integration Approach (not to exceed nine (9) pages):
 - a. Describe the experience, capabilities, qualifications, resources, and key mission personnel of the Proposer and any key partners and contractors. Key personnel should be provided for both the proposer and from contractors/partners in key areas of mission integration.
 - b. Describe the approach, methods, pertinent teaming arrangements, and integration schedule/milestones for key areas of mission integration. Particular focus should be given to describing how the PAM Provider will maintain compliance and adherence to requirements, processes, and integration milestones outlined in *SSP 51087 - ANXI, Private Astronaut Mission (PAM) Authorization, Coordination and Execution (PACE) Annex 1*, in the following key areas:
 - i. Transportation Vehicle/Provider Integration
 - ii. Crew Training
 - iii. Medical Certification, Support and Health Stabilization
 - iv. Crew provisions/hardware certification and flight integration
 - v. Payload Integration and Operations
 - c. Describe the approach and teaming arrangements to support launch and landing services.
 - d. Provide a description of roles and responsibilities for the proposer and all related entities, including primary interfaces with NASA and the transportation provider.
 - e. Describe the major services, facilities, resources, and equipment required from NASA in order to execute the proposed mission. Use *SSP 50192 - Private Astronaut Resources, Interfaces, and Services (PARIS) for ISS*, as a resource to assist in the identification of potential services needed. Include any unique or non-standard requests for services.
- vi. Mission Business Approach (not to exceed nine (9) pages):
 - b. Describe the financial health of the Proposer executing the proposed mission in order to demonstrate the ability to accomplish mission activities for the duration of the integration and execution of the proposal. Identify the total costs of the mission, including costs of services procured from NASA as described in the current [NASA Pricing Policy](#), as well as those from commercial suppliers and any other government partnerships required to execute the mission. Summarize the cash flow of the mission, including phasing of revenue and cost. State any assumptions for revenue from NASA and describe in paragraph e.
 - c. Describe the plan for obtaining required funds, including mission revenue, internal funds from other company operations, and/or external financing. Attach any evidence such as signed letters of intent from investors, if applicable.
 - d. Provide a status of teaming/supplier agreements and/or partnerships with other commercial and/or government entities that will perform a role on this mission. Attach any evidence such as signed letters of intent (e.g. with transportation provider), if applicable.

- e. Provide a description of any services or commercial offerings being presented to NASA as a part of the proposal.
- vii. PAM Commander Experience (not to exceed 10 pages):
 - a) Describe the quality of performance and effectiveness of the proposed PAM Commander's previous experience with the experience requirements in Appendix F of *SSP 51087 - ANXI, Private Astronaut Mission (PAM) Authorization, Coordination and Execution (PACE) Annex 1*. The *PACE Annex 1* experience requirements are specifically described below:
 1. Former NASA (U.S.) flown government astronaut
 2. Experience maintaining a harmonious and cohesive relationship among crewmembers and an appropriate level of mutual confidence and respect through an interactive, participative, and relationship-oriented approach, having taken into account the international and multicultural nature of the crew and mission
 3. Experience leading crewmembers to accomplish a specific goal during pre-flight, on-orbit, and post-flight activities
 4. Demonstrated spacecraft system and hardware expertise (e.g., Information Technology (IT) hardware, scheduling applications, hygiene systems, food systems, still photo cameras, video cameras, microphones, communication systems, etc.) during a spaceflight mission
 5. Experience fully and accurately communicating with the chain of command and with the ground teams in a timely manner during mission activities
 6. Experience adhering to *Code of Conduct for the International Space Station Crew* (14 C.F.R. 1214.403) or equivalent
 7. Experience adhering to the *Standards of Ethical Conduct for Employees of the Executive Branch* (5 C.F.R. Part 2635)
 8. Experience following direction per the chain of command during mission activities
 9. Demonstrated ability giving critical feedback when the receiver is not receptive to the message. Demonstrated ability receiving critical feedback and implementing corrective actions.
 10. Experience maintaining order, enforcing procedures, and taking effective actions in challenging and evolving operational environments during a spaceflight mission
 - b) Provide details of applicable human spaceflight experience of proposed PAM commander.
 - c) In addition to the information above, Proposers shall have their references submit the *Attachment D: PAM Commander Reference Form* for three references, preferably from previous supervisors or managers in the Flight Operations Directorate, while the proposed PAM Commander served in their former government astronaut role. The Proposer shall request the references to complete the form and ensure that all references are directed to return directly to the Contracting Officer via e-mail per the contact information provided on the attachment so as to allow for receipt by the Government on or before the proposal due date.
- viii. Attachments:
 - a. Project Schedule
 - i. Include major mission milestones, training activities and milestones, vehicle integration activities and milestones, crew provisioning and hardware procurement, delivery and

flight schedules, crew medical milestones, and research and commercial marketing integration activities (no page limit; however, data that is not schedule data will not be considered).

- b. Financial statements (not to exceed 20 pages)
 - a. Attach financial statements (cash flow, balance sheet, and income statement) for the last three years of your company and supplementary documents (as needed) covering the period of execution.
 - c. Evidence of revenue and sources of funds (not to exceed 10 pages)
 - d. Evidence of planned suppliers, teaming agreements, etc. (not to exceed 10 pages)
 - e. *Attachment E: PAM Budget Table* (no page limit)

4A Section 4.0 – Proposal Evaluation Information

Except as stated below, proposals will be evaluated in accordance with the *NASA FAR Supplement, Section 1852.235-72*, and as reflected in the *Guidebook for Proposals Responding to a NASA Notice of Funding Opportunity (NOFO)*. All information needed to apply to this solicitation is contained in Focus Area 4A of this NRA and anything not mentioned here is subject to the default Agency rules in the *Guidebook for Proposals Responding to a NASA Notice of Funding Opportunity (NOFO)*. Proposers are responsible for understanding and complying with its procedures for the successful, timely preparation and submission of their proposals.

4A Section 4.1 – Proposal Compliance

NASA will screen all proposals for compliance with requirements of this solicitation. This includes submission of a proposal that is compliant with all of the following:

- The proposal is relevant to the objectives and/or provisions of Focus Area 4A of this NRA;
- The proposal meets the requirements for proposal format, content, and organization as specified in the *Guidebook for Proposals Responding to a NASA Notice of Funding Opportunity (NOFO)* and/or or Focus Area 4A of this NRA;
- The proposal is submitted by the submission due date and time, and be valid for 365 days;
- The proposal consists of files in Acrobat Adobe pdf; Non-compliant proposals may be withdrawn from the review process and declined without further review. Compliant proposals submitted in response to this NRA will undergo a full evaluation.

4A Section 4.2 – Evaluation Criteria

The evaluation criteria in this section are tailored to Focus Area 4A and will be used for the evaluation of Private Astronaut Mission specific proposals. Any materials provided in the proposal and/or the attachments may be evaluated against the evaluation criteria. Proposals that have met the requirements under Proposal Compliance in 4A Section 4.1 will be further evaluated against three factors, 1. Merit, 2. NASA Supportability, and 3. Relevance. Factors 1 and 2 (Merit and Supportability) are of equal importance, and each are more important than Factor 3 (Relevance).

Factor 1: Merit will be evaluated based on the criteria below against the proposed technical and business approaches:

- The credibility of executing the proposed mission within NASA's outlined framework, and ability to meet NASA's requirements, including meeting the U.S. transportation vehicle requirements in *SSP 51087 PACE Annex 1* in support of the proposed launch windows.
- The ability of the proposer to provide the personnel, resources, financing, and partnerships necessary to plan and execute the proposed mission.
 - o Note: Mission proposals should be independently financially viable, and not require procurement of services by NASA.
- The reasonableness and credibility of supporting the proposed mission integration schedule and milestones.
- Quality of performance and effectiveness of the PAM Commander to meet the experience requirements as defined in *SSP 51087 PACE Annex 1* and the *Basic Ordering Agreement*. The Government can use both data provided by the offeror and data obtained from other sources in its assessment. The Government plans to use performance information obtained by the evaluation team based on communications with listed references, as well as data independently obtained by the Government, including, but not limited to internal NASA information related to the proposed PAM Commander's performance quality and effectiveness.
- Quality of performance and effectiveness for PAM Providers will be assessed based on completed Spaceflight Participant (SFP) and PAM activities (as applicable), as well as data independently obtained by the Government.

Factor 2: NASA Supportability will be evaluated based on the criteria listed below:

- Evaluation of risk, including safety considerations for personnel, vehicle, hardware, ground infrastructure, mission objectives and operations.
- Evaluation of NASA's ability to provide the resources, facilities, hardware, services and other items necessary to accomplish the mission.
- Evaluation of NASA's ability to support the proposed integration timeline and support the proposed mission flight objectives.
- Evaluation of impact to availability of the transportation and launch vehicles for other NASA missions.

Factor 3: Relevance will be evaluated based on the proposal's potential contribution to NASA's mission and the objectives stated in 4A Section 1.0 Objectives.

Note: If, at any time during evaluation a proposal is found to be not relevant, further evaluation will be handled in accordance with 4A Section 4.1.

The adjectival ratings listed in Appendix D of the *Guidebook for Proposals Responding to a NASA Notice of Funding Opportunity (NOFO)* will be used to evaluate Factors 1-3.

4A Section 5.0 – Selection and Award

The Government reserves the right to award with or without discussions. Per Section 3.4 of the NRA Guidebook, updates to the proposal may be requested after discussions. The offeror's initial proposal should contain the offeror's best terms. The Selection Official will select proposals as judged against the evaluation criteria, the objectives of the NOFO, programmatic considerations, and available financial resources. A higher evaluated proposal may not be selected for negotiation and/or award due to budget limitations and/or programmatic considerations.

NASA reserves the right to select for negotiation two, one, or none of the proposals received in response to this solicitation. The overall number of selections for negotiation will be dependent upon the evaluation criteria in 4A Section 4.2, the flight opportunities available, the flight planning and scheduling constraints provided in the proposal, and programmatic considerations. Once an offeror has been selected for negotiation, NASA will determine the appropriate contract mechanisms based on the proposer's mission specific proposal. A generic basic ordering agreement (BOA) and Mission Specific Order (MSO) agreement have been provided in the technical library as an example but based on the proposer's commercial offering, a different agreement mechanism may be utilized. It is NASA's intent not to negotiate the terms and conditions in the BOA. If proposer and government cannot agree to the terms and conditions or any mission specific details, or the offeror significantly changes their mission scope after selection for negotiations, the Government reserves the right to select another proposal. Selection for negotiation does not guarantee selection for award.

Focus Area 4A.1 – Solicitation for Private Astronaut Missions' Provider for Flight Opportunity

NASA is soliciting proposals for Phase II of Focus Area 4A for the following flight opportunities:

- "PAM 3": expected launch window of NET late 2023 through mid-2024
- "PAM 4": expected launch window of NET mid 2024 through end of 2024

The maximum number of private astronauts per mission shall not exceed four (4), and the maximum planned docked duration shall not exceed fourteen (14) days. Mission concepts which include Extravehicular Activities (EVAs) performed by the Private Astronauts will not be considered allowable.

Note that specific launch dates are dependent on ISS vehicle traffic and on-orbit activity planning and constraints. No white papers will be accepted as a part of this solicitation. Proposals are due October 27, 2022, at 5 PM Eastern Time.

Focus Area 4B- Private Astronaut Mission (PAM) Commercial Activities

For new or complex commercial proposed activities, in order to reduce risk, potential customers of PAM providers may submit a white paper under Focus Area 4B in order to request NASA assistance in evaluation of the technical feasibility of their concept and adherence to NASA policies. The purpose of this technical exchange is to allow PAM customers to receive initial feedback from NASA regarding feasibility of proposed commercial activities in parallel or before contracting with a private astronaut mission provider. PAM customers will be expected to partner with a PAM provider as part of a mission specific proposal under Phase II of Focus Area 4A, in order to be considered for a PAM activity. NASA engagement in discussions with a potential PAM customer is for advisory purposes only. *Any NASA assistance, information exchange, or feasibility*

feedback does not guarantee that a final proposal, when integrated with a PAM provider mission, would be awarded by NASA.

Additional Resources

For additional information regarding PAM missions, please refer to the following links:

- [Private Astronaut Missions](#)
- [Pricing Policy](#)
- [NFS 1852](#)
- [1815.208 Submission, Modification, Revision, and Withdrawal of Proposals](#)
- [NPD 1383.2C NASA Assistance to Non-Government, Entertainment-Oriented Motion Picture, Television, Video & Multimedia Productions/Enterprises, & Advertising](#)
- [NASA Media Usage Guidelines](#)
- [NASA Regulations for Advertising Requests](#)

5. Focus Area #5 – Deleted

C. ISS Integration Requirements

Experiments, concepts, and/or hardware must fit within the mass and volume constraints of existing ISS launch vehicles and must adhere to ISS integration requirements. Experiments and/or hardware can be launched pressurized or unpressurized. Unpressurized payloads must attach to the ISS using a Flight Releasable Attachment Mechanism (FRAM), Payload Interface Unit (PIU), or Columbus External Payload Adapter (CEPA).

D. References to Unique NASA Capabilities

NASA's HEOMD uses a variety of specialized test and high-end computational facilities to achieve its mission. Any need for these specific facilities for the proposed research must be explicitly described in the proposal, including the asset, rationale and justification of the need, how it supports the investigation, and when during the proposed period the resource will be required. As evaluation panels review the intrinsic merit of the proposed investigation, they will be asked to consider the realism and reasonableness of the request for unique NASA capabilities and whether it is an appropriate utilization of a highly constrained asset. Proposals selected for funding will be considered for an allocation of the requested NASA resources needed for their investigation, but availability of the resource to support the fully requested level cannot be guaranteed.

E. NASA Safety Policy

Safety is the freedom from those conditions that can cause death, injury, occupational illness, damage to or loss of equipment or property, or damage to the environment. NASA's safety priority is to protect the following: (1) the public, (2) astronauts and pilots, (3) the NASA workforce (including employees working under NASA award instruments), and (4) high-value equipment and property. All research conducted under NASA auspices shall conform to this philosophy.

F. Availability of Funds for Award

The Government's ability to make award(s) is contingent upon the availability of appropriated funds from which payment can be made and the receipt of proposals that NASA determines acceptable for award under this NRA. Successful proposals will have launch and integration costs covered by NASA. Successful proposals may also be eligible for additional funding, subject to the type of award that is offered. Proposals must indicate if NASA funding is requested.

G. Additional Funding Restrictions

The construction of facilities is prohibited unless specifically required in this announcement. For further information on allowable costs, refer to the cost principles cited in the *NASA Federal Acquisition Regulations (FAR) Supplement Provision* and the *Guidebook for Proposers*. (References in Section VIII.)

Travel, including foreign travel, is allowed, as may be necessary, for the meaningful completion of the proposed investigation, as well as for publicizing its results at an appropriate professional meeting.

NASA does not allow for payment of profit or fee to commercial firms under grant awards.

H. Guidebook for Proposers Responding to a NASA Notice of Funding Opportunity (NOFO)

All policies and procedures for the preparation and submission of proposals, as well as NASA's review and selection of proposals for funding, are presented in a separate document entitled *Guidebook for Proposers Responding to a NASA Notice of Funding Opportunity (NOFO)* (Guidebook) that is located at: https://www.nasa.gov/sites/default/files/atoms/files/may_2021_ed_nasa_guidebook_for_proposers.pdf.

By reference, the newest edition of this Guidebook (April 2021) is hereby incorporated into this NRA, and proposers to this NRA are responsible for understanding and complying with its procedures before preparing and submitting their proposals. Proposals that do not conform to its standards may be declared noncompliant and returned without review.

The other chapters and appendices of this Guidebook provide supplemental information about the entire NRA process, including NASA policies for the solicitation of proposals; guidelines for writing complete and effective proposals; the NASA policies and procedures for the review and selection of proposals; as well as for issuing and managing the awards to the institutions that submitted selected proposals; and Frequently Asked Questions about a variety of the NASA proposal and award processes and procedures. Note that the NASA policy for proposals involving non-U.S. participants is given in section (I) of Appendix B of this Guidebook.

Comments and suggestions of any nature about this Guidebook are encouraged and welcomed and may be directed to Sponsored Research Business Activity (SRBA) group of the NASA Office of Procurement, NASA Headquarters, 300 E Street SW, Washington, DC 20546-0001; e-mail: SRBA@nasa.gov. SRBA's URL is http://prod.nais.nasa.gov/pub/pub_library/srba/poc.html.

II. Award Information

Awards made pursuant to this NRA will be in the form of grants, cooperative agreements, contracts, and intra- or interagency transfers, depending on the nature of the submitting organization and/or the specific requirements for awards given in each program element description. The type of award offered to selected proposers will generally follow the policies in the *NASA Guidebook for Proposers*. A NASA awards officer will determine the appropriate award instrument for the selections resulting from this solicitation.

NASA may also enter into “other transactions” as authorized by 51 USC 20113(e) and its implementing guidance.

Grants and cooperative agreements will be subject to the provisions of the *NASA Grants and Cooperative Agreement Handbook*, hereafter referred to as the *Grants Handbook* (https://prod.nais.nasa.gov/pub/pub_library/grcover.htm) and the *NASA Guidebook for Proposers*. In the case of any conflict, the *Grants Handbook* takes precedence. Contract awards will be subject to the provisions of the Federal Acquisition Regulations (FAR) and the NASA FAR Supplement <https://www.hq.nasa.gov/office/procurement/regs/nfstoc.htm>.

Successor proposals, defined as proposals for renewal or supplementation of existing projects, are eligible to compete with proposals for new awards. Please reference the *NASA Guidebook for Proposers* Section 2.5 for policies relating to such successor proposals.

NASA does not provide separate funding for direct and indirect costs; thus, the amount of the award requested is the total of all costs submitted in the proposed budget.

III. Eligibility Information

A. Eligibility of Applicants

Participation in this program is open to all categories of U.S. and non-U.S. organizations, including educational institutions, industry, and nonprofit institutions. Historically Black Colleges and Universities, other minority educational institutions, and small businesses and organizations owned and controlled by socially and economically disadvantaged individuals or women are particularly encouraged to apply.

In all such arrangements, the proposing entity is expected to be responsible for administering the project according to the management approach presented in the proposal. The proposing entity must have in place a documented base of ongoing high-quality research in science and technology, or in those areas of science and engineering clearly relevant to the specific programmatic objectives and research emphases indicated in this NRA. Present or prior NASA support of research or training in any institution or for any investigator is not a prerequisite to submission of a proposal or a competing factor in the selection process.

B. Guidelines for International Participation

Foreign entities are not eligible for funding under this NASA Research Announcement and should propose to participate on a no-exchange-of-funds basis. NASA funding cannot be used for subcontracted research efforts, such as Technology Demonstration, to non-U.S. entities. The direct purchase of supplies and/or services, which do not constitute research, from non-U.S. sources by U.S. award recipients is permitted. A proposal submitted by a non-U.S. organization, or proposing that research will be performed by a non-U.S. organization as part of a proposal submitted by a U.S. organization, should certify that a sponsoring foreign government agency or foreign institution commits to bear the cost of the research proposed to be performed by the non-U.S. organization. See the *NASA Guidebook for Proposers*, Appendix A for further details.

https://www.nasa.gov/sites/default/files/atoms/files/may_2021_ed_nasa_guidebook_for_proposers.pdf

Assurance of Compliance – China Funding Restriction - (DEVIATION FEB 2012)

(iv) An Assurance of Compliance with The Department of Defense and Full-Year Appropriation Act, Public Law 112-10 Section 1340(a); The Consolidated and Further Continuing Appropriation Act of 2012, Public Law 112-55, Section 539; and future-year appropriations herein after referred to as "the Acts", whereas:

- 1) NASA is restricted from using funds appropriated in the Acts to enter into or fund any grant or cooperative agreement of any kind to participate, collaborate, or coordinate bilaterally with China or any Chinese-owned company, at the prime recipient level and at all subrecipient levels, whether the bilateral involvement is funded or performed under a no-exchange of funds arrangement.
- 2) Definition: "China or Chinese-owned Company" means the People's Republic of China, any company owned by the People's Republic of China, or any company incorporated under the laws of the People's Republic of China.
- 3) The restrictions in the Acts do not apply to commercial items of supply needed to perform a grant or cooperative agreement.
- 4) By submission of its proposal, the proposer represents that the proposer is not China or a Chinese-owned company, and that the proposer will not participate, collaborate, or coordinate bilaterally with China or any Chinese-owned company, at the prime recipient level or at any subrecipient level, whether the bilateral involvement is funded or performed under a no-exchange of funds arrangement.

C. Cost Sharing or Matching

Cost sharing is not required for contract awards except as provided in NASA FAR Supplement (NFS)

1816.303-70 for awards resulting from unsolicited proposals for research submitted by commercial organizations. NFS 1816.303-70 is located at

<https://www.hq.nasa.gov/office/procurement/regs/nfstoc.htm>.

For an institution of higher education, hospital, or other non-profit organization seeking to receive a grant or cooperative agreement, cost sharing is not required; however, NASA can accept cost sharing if it is voluntarily offered. For those recipients, Section B, Provision & Section 1260.123 of the *NASA Grant and Cooperative Agreement Handbook*, entitled “Cost sharing or matching,” located at http://prod.nais.nasa.gov/pub/pub_library/grantb.html#1260.123, describes the acceptable forms of cost sharing.

For a commercial organization seeking to receive a grant or cooperative agreement, cost sharing is required, unless the commercial organization can demonstrate that they will not receive substantial compensating benefits for performance of the work. If no substantial compensating benefits will be received, then cost sharing is not required, but can be accepted. Section B, Provision 1260.123, “Cost sharing or matching,” and the special conditions at section A, subpart 1260.4(b) describes cost sharing and allowability for awards with commercial firms that do not require cost sharing. Section D, Provision & Section 1274.204, “Cost and payments,” located at http://prod.nais.nasa.gov/pub/pub_library/grantd.html#1274204 of the *NASA Grant and Cooperative Agreement Handbook* describes the acceptable forms of cost sharing for commercial organizations.

IV. White Paper, Proposal and Submission Information

A. Address to Request Proposal Package

All information needed to respond to this solicitation is contained in this NRA and in the companion document entitled *Guidebook for Proposers Responding to a NASA Notice of Funding Opportunity (NOFO)* (hereafter referred to as the *Guidebook for Proposers*) that is located at:

https://www.nasa.gov/sites/default/files/atoms/files/may_2021_ed_nasa_guidebook_for_proposers.pdf.

Additionally, applicants shall prepare proposals in accordance with NFS 1852.235-72 (JUL 2016), Instructions for Responding to NASA Research Announcements, hereafter referred to as the NASA FAR Supplement Provision, which is located at: <https://www.hq.nasa.gov/office/procurement/regs/NFS.pdf>.

The information in this NRA supersedes and provides additional direction to that found in the *Guidebook for Proposers* the *NASA FAR Supplement Provision*. At NASA’s discretion, Proposals that do not conform to these standards may be declared noncompliant and declined without review.

Generic white paper and proposal submission questions received will be answered and published in a Frequently Asked Questions (FAQ) document. This FAQ will be posted on the NSPIRES solicitation download site alongside this NRA and will be updated periodically between submission releases.

B. Content and Form of Proposal Submission

1. Electronic White Paper and Proposal Submission

All white papers and proposals submitted in response to this NRA must be submitted in a fully electronic form. No hard copy of the white paper or proposal will be accepted. **Electronic white papers and proposals must be submitted by one of the officials at the proposal PI's organization who is authorized to make such submission;** electronic submission by the authorized organization representative (AOR) serves for the proposal as the required original signature by an authorized official of the proposing organization. All team members must be registered in NSPIRES and confirm their organizational affiliation when added to a proposal before the PI organization official can submit.

Proposers can use either NSPIRES (<http://nspires.nasaprs.com>) or Grants.gov (<http://www.grants.gov>) for white paper and proposal submission. All proposers, team members, and agency officials must be registered before submission with NSPIRES regardless of the electronic system used to submit white papers and proposals. Proposers are discouraged from submitting the same proposal to both electronic submission systems. NASA plans to use the NSPIRES system to facilitate the review process so all proposals received through Grants.gov will be transferred into NSPIRES.

Every organization that intends to submit a white paper or proposal to NASA in response to this NRA, including educational institutions, industry, nonprofit institutions must be registered in NSPIRES. This applies equally for white papers and proposals submitted via Grants.gov, as well as for white papers and proposals submitted via NSPIRES. Such registration must be performed by an organization's electronic business point-of-contact (EBPOC) in the Central Contractor Registry (CCR).

Any organization requesting NASA funds through the proposed investigation must be listed on the Proposal Cover Page. NASA will not fund organizations that do not appear on the Proposal Cover Page. Each individual team member (e.g., PI, co-investigators, etc.), including all personnel named on the proposal's cover page, must be individually registered in NSPIRES. This applies equally for proposals submitted via Grants.gov, as well as for proposals submitted via NSPIRES.

Each individual team member (e.g., PI, co-investigators, etc.), including all personnel named on the proposal's electronic cover page, must specify an organizational affiliation. The organizational affiliation specified must be the organization through which the team member is participating in the proposed investigation. If the individual has multiple affiliations, then this organization may be different from the individual's primary employer or preferred mailing address.

Generically, an electronic proposal consists of one or more electronic forms, including an electronic cover page and one or more attachments. The attachments contain all sections of the white paper or proposal, including the science/technical/management section, as well as all required and allowed appendices; see Sections IV(b)(2) and (3) below for further requirements.

Submission of electronic proposals via either NSPIRES or Grants.gov requires several coordinated actions from the proposing organization. In particular, when the PI has completed entry of the data requested in the required electronic forms and attachment of the allowed PDF attachments, including the science/technical/management section, an official at the PI's organization who is authorized to make such a submission, referred to as the AOR, must submit the electronic proposal (forms plus attachments). Coordination between the PI and his/her AOR on the final editing and submission of the proposal materials is facilitated through their respective accounts in NSPIRES and/or Grants.gov. Note that if one individual is acting in both the PI and AOR roles, he/she must ensure that all steps in the process are taken, including

submitting the proposal from the organization.

Requests for assistance in accessing and/or using this website may be directed by e-mail to nspires-help@nasaprs.com or by telephone to (202) 479-9376 Monday through Friday, 8:00 AM – 5:00 PM Eastern Time. Frequently Asked Questions (FAQs) may be accessed through the Proposal Online Help site at <http://nspires.nasaprs.com/external/help.do>. Tutorials of NSPIRES are available at <http://nspires.nasaprs.com/tutorials/index.html>.

2. White Paper and Proposal Submission Information

Submission of a white paper is recommended in advance of a full proposal. The NASA POC may contact you via written letter or email to further clarify the aspects of the idea in the white paper. This procedure is intended to minimize unnecessary effort in proposal preparation and review. White papers and proposals may be submitted at any time prior to the date and time specified in Section IV.C. NASA will acknowledge receipt of all submissions and assign a control number that should be used in all further correspondence regarding these submissions.

NASA will respond to white papers with a letter encouraging or discouraging the submission of a full proposal based on the proposed effort's relevance to the ISS Utilization mission and a preliminary assessment of the scientific or technical merit of the concept.

All full proposals deemed acceptable under the evaluation criterion "Relevance to ISS Utilization Mission," will be reviewed using the evaluation criteria and without regard to any comments resulting from the review of a white paper.

White papers will be reviewed upon submittal; proposals may be submitted following NASA response to white paper submission. The typical proposal should express a consolidated effort in support of one or more related technical concepts or ideas. Disjointed efforts should not be combined into a single proposal.

3. Proposal Format and Contents

All proposals submitted in response to this NRA must include the appropriate required electronic forms available through either of the two proposal submission systems, NSPIRES or Grants.gov.

The science/technical/management section and other required sections of the proposal must be submitted as searchable, unlocked PDF files that are attached to the electronic submission using one of the proposal submission systems. Proposers must comply with any format requirements specified in this NRA and in the *NASA Guidebook for Proposers*. Only appendices/attachments that are specifically requested in either this NRA or in the *NASA Guidebook for Proposers* will be permitted; proposals containing unsolicited appendices/attachments may be declared noncompliant. Section 2 of the *NASA Guidebook for Proposers* provides detailed discussions of the content and organization of proposals suitable for all program elements in this NRA, as well as the default page limits of a proposal's constituent parts.

1. White Paper Format

White paper submissions are recommended in advance of full proposals in order to provide potential proposers with a rapid response to minimize unnecessary effort. White papers should follow the format below. The cover sheet should be clearly marked "WHITE PAPER" and the total length shall not exceed 6 pages, excluding cover page and official transmittal letter. A page is defined as being no larger than electronically formatted page of 8.5" by 11.0" with type not smaller than 12 point. Smaller font may be used

for figures, tables and charts. No official transmittal letter is required. All white papers must be written in English.

Section I. Administrative {not included in the page count}

A. Cover sheet to include:

- 1) NRA number (NNJ13ZBG001N)
- 2) Focus Area (Technology Demonstration, National Lab)
- 3) Proposal title
- 4) Lead Organization submitting proposal
- 5) Type of business, selected among the following categories: "LARGE BUSINESS", "SMALL DISADVANTAGED BUSINESS", "OTHER SMALL BUSINESS", "HBCU", "MI", "OTHER EDUCATIONAL", OR "OTHER NONPROFIT"
- 6) Contractor's reference number (if any)
- 7) Other team members (if applicable) and type of business for each
- 8) Technical point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available)
- 9) Administrative point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available),
- 10) Total funds requested from NASA, and the amount of cost share (if any) AND
- 11) Date proposal was submitted.

B. Official transmittal letter (not required).

Section II. Summary of Proposal {6}

- A. **Innovation.** Succinctly describe the uniqueness and benefits of the proposed investigation relative to the current state-of-art or alternate approaches.
- B. **Results.** Provide a short description of the results, products, or process that may be expected at the end of the investigation.
- C. **Technical Rationale.** Provide a short description of the impact of the proposed development on NASA missions or objectives.
- D. **Technical Approach.** Provide a short description of the technical approach and constructive plan for accomplishment of technical goals in support of claims and deliverable production.
- E. **Experience.** Provide a short general discussion of other research by corporate team members in the proposed technology area.
- F. **Risk.** Provide a short description of the unique challenges that this Proposal may experience in meeting NASA Safety Policy (See Section E).
- G. **Cost.** Provide rationale for the proposal cost and duration.

2. Proposal Format

The proposal format should follow the guidelines in the NASA Guidebook for Proposers. In addition to the requirements in the guidebook, the proposer should include a preliminary Concept of Operations, the approach to ISS integration, and on-orbit resource requirements including specific requirements for mass, volume, power and data from the ISS.

C. Funding Restrictions

Allowable costs for contract awards are covered in Part 31 of the FAR, located at <http://www.acquisition.gov/far/current/html/FARTOCP31.html#wp253693> and Part 31 of the NASA Far Supplement, located at <https://www.hq.nasa.gov/office/procurement/regs/NFS.pdf>. Pre-contract costs are covered in FAR 31.109, located at NFS 1831.205-32 and NFS 1852.231-70.

Allowable costs for grant and cooperative agreement awards with universities, hospitals, and other nonprofit organization and awards with commercial organizations that do not involve cost sharing are covered in Provision & Section 1260.127 of the *NASA Grant and Cooperative Agreement Handbook*, located at http://prod.nais.nasa.gov/pub/pub_library/grantb.html#1260.127. Pre-award costs are covered in Provision & Section 1260.125, located at http://prod.nais.nasa.gov/pub/pub_library/grantb.html#1260.125.

Allowable costs for grant and cooperative agreement awards with commercial firms involving cost sharing are covered in Provision & Section 1274.204 of the *NASA Grant and Cooperative Agreement Handbook*, located at http://prod.nais.nasa.gov/pub/pub_library/grantd.html#1274204. Pre-award costs are covered in FAR 31.109, located at http://www.acquisition.gov/far/current/html/Subpart%2031_1.html#wp1089616, and with NFS 1831.205-70, located at <https://www.hq.nasa.gov/office/procurement/regs/NFS.pdf>.

V. Proposal Review Information

A. Evaluation Criteria

White papers and proposals will be evaluated against the following criteria:

- A. The proposal shows a clear need for the use of the ISS and its unique capabilities – compliance check only (i.e. pass/fail).
- B. The proposal demonstrates relevance to the ISS utilization focus areas, commercialization of LEO or research emphases – compliance check only (i.e. pass/fail).
- C. The proposed concept is technically feasible
- D. Technology demonstration investigation proposals (not applicable to Focus Area 1 In Space Production Applications (InSPA) proposals) must clearly document why the demonstration is necessary to develop exploration enabling technologies that support the advancement, or enable the development, of a system or capability. This will include, but is not limited to, how the demonstration may advance the state of the art with respect to the following criteria:
 - 1) reduced mass
 - 2) reduced volume
 - 3) reduced power requirements
 - 4) reduced maintenance and logistics
 - 5) increased efficiency
 - 6) increased reliability
 - 7) improved safety
- E. Focus Area 1 In Space Production Applications (InSPA) proposals will clearly demonstrate a viable business case including, but not limited to, the following:
 - 1) commercial market opportunity
 - 2) capitalization strategy
 - 3) approach to marketing and plans for business development
 - 4) long-term viability
 - 5) business risk

- F. ISS Integration and Operations Impact - ISS integration and operations impact is acceptable given interface requirements for, but not limited to:
 - 1) Stowage requirements (mass, volume, conditioned vs. passive) for ascent, on-orbit and descent
 - 2) power
 - 3) thermal
 - 4) data
 - 5) location
 - 6) crew time
 - 7) timing of delivery/execution
 - 8) safety assessment
 - 9) GFE/GFD
 - 10) other resources as applicable
- G. Intrinsic merit - Evaluation of the intrinsic merit of the proposal includes consideration of the following factors:
 - 1) overall scientific, commercial, or technical merit of the proposal
 - 2) unique and innovative methods, approaches, concepts, or advanced technologies outlined
 - 3) offeror's corporate capabilities, past performance, facilities and other infrastructure, processes, or unique combination of these which are integral factors for achieving the proposal's objectives
 - 4) qualifications, capabilities, and experience of:
 - i. proposed principal investigator
 - ii. team leader
 - iii. key personnel
- H. Cost Realism - Evaluation of the cost realism of the proposal includes consideration of the following factors:
 - 1) reasonableness and manageability of project costs given the complexity of the project
 - 2) reasonableness of total cost to NASA to enable the capability/service including upmass, crew time, integration, stowage, etc.
 - 3) reasonableness of proposed cost to NASA for government use of the capability/service
- I. Schedule Realism - Evaluation of the schedule realism of the proposal includes consideration of the following factors
 - 1) realism of schedule
 - 2) inclusion of appropriate milestones to ensure successful completion of the project within the proposed timeframe

B. Review and Selection Process

Award(s) will be made to proposers whose proposals are determined to be the most advantageous to the Government, all factors considered, including the potential contributions of the proposed work to the overall research program and the availability of funding for the effort. Award(s) may be made to any proposer(s) whose proposal(s) is determined selectable regardless of its overall rating.

NASA's policy is to ensure impartial, equitable, and comprehensive evaluation of all proposals and to select the source(s) whose offer(s) best meet(s) the Government's technical, policy, and programmatic goals in accordance with the evaluation criteria contained in this NRA. Pursuant to NASA FAR 1835.016 and FAR 35.016, the primary basis for selecting proposals for acceptance shall be technical, importance to agency programs, and fund availability. In order to provide this evaluation, cognizant personnel will review each submission and will convene panels of experts in the appropriate areas when necessary. The results of these reviews will be documented in the form of recommendations and will be provided to the manager of the

NASA ISS Research Integration Office. These recommendations will indicate those proposers with whom negotiations or discussions will be conducted. They will also include questions arising from the reviews and, when appropriate, issues that need to be resolved prior to making awards.

Proposals will not be evaluated against each other since they are not submitted in accordance with a common work statement, except in the case where proposals are submitted to same Specific Focus Area (as opposed to a Generic Focus Area). NASA's intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons. For evaluation purposes, a proposal is the document described in "Proposal Format and Content", Section IV.B.3 of this announcement. Other supporting or background materials submitted with the proposal will be considered for the reviewer's convenience only and are not considered part of the proposal. All proposals must first be deemed relevant to ISS and likely to contribute to the mission as described in paragraphs I.B. "Overview of ISS Utilization Focus Areas" and I.C. "Research Emphases Specific to this Solicitation".

Restrictive notices notwithstanding, proposals may be handled for administrative purposes by support contractors. These support contractors are bound by appropriate non-disclosure requirements.

Subject to the restrictions set forth in FAR 37.203(d) and NASA FAR 1837.204, input on technical aspects of the proposals may be solicited by NASA from non-Government consultants /experts who are strictly bound by the appropriate non-disclosure requirements.

It is the policy of NASA to treat all proposals as competitive information and to disclose their contents only for the purpose of evaluation. No proposals will be returned. After proposals have been evaluated and selections made, the original of each proposal will be handled in accordance with NASA record retention policy.

VI. Award Administration Information

A. Award Notices

At the end of the selection process, each proposing organization will be notified of its selection or non-selection status. NASA will provide debriefings to those investigators who request one. Selection notification will be made by a letter signed by the designated NASA selecting official. The selection letters are not an authorization to begin performance. The selected organization's business office will be contacted by a NASA Contracting Officer to negotiate an award. Any costs incurred by the investigator in anticipation of an award are at their own risk until contacted by NASA. The NASA Contracting Officer will determine the type of award instrument, request further business data, and negotiate the resultant action. NASA Contracting Officers are the only personnel with the authority to make award and obligate Government funds. NASA reserves the right to offer selection of only a portion of a proposal. In these instances, the investigator will be given the opportunity to accept or decline the offer. Additional information can be referenced in paragraph (d) of NFS 1835.016-71, located at <https://www.hq.nasa.gov/office/procurement/regs/NFS.pdf>, and in Appendix D of the *Guidebook*.

B. Administrative and National Policy Requirements

Grant and cooperative agreement awards are subject to the NASA Grant and Cooperative Agreement Handbook. This handbook consists of four sections that prescribe the policies and procedures relating to the award and administration of NASA grants. Section A provides the text of provisions and special conditions and addresses NASA's authority, definitions, applicability, amendments, publications, deviations, pre-award

requirements and post-award requirements currently covered by 14 CFR part 1260. Section B relates to grants with institutions of higher education, hospitals, and other nonprofit organizations. Sections A and B, with the special considerations in subpart 1260.4(b), apply to awards with commercial firms that do not involve cost sharing. Section C adopts the administrative requirements of OMB Circular No. A-102 and relates to administrative requirements for grants to state and local governments. Section D relates to awards with commercial firms. The Handbook is located at https://prod.nais.nasa.gov/pub/pub_library/grcover.htm. Contract awards are subject to the FAR and NASA FAR Supplement, located at <http://www.acquisition.gov/far/> and <https://www.hq.nasa.gov/office/procurement/regs/NFS.pdf>, respectively. Applicants are advised that contract awards are subject to the subcontracting requirements of FAR and NFS Part 19. The NASA Contracting Officer will choose the appropriate award instrument.

C. Program Reporting/Individual Researcher Reporting

Required reports for contract awards will be negotiated with the contractor, subject to the terms and conditions of the FAR and NASA FAR Supplement, located at <http://www.acquisition.gov/far/> and <https://www.hq.nasa.gov/office/procurement/regs/NFS.pdf>, respectively. Required reports for grants and cooperative agreements are covered in Exhibit G, “Required Reports and Publications” of the NASA Grant and Cooperative Agreement Handbook. Required reports for Federal Demonstration Partnership (FDP) grant awards are covered in Exhibit H, “Federal Demonstration Partnership – Required Publications and Reports.” The Handbook is located at http://prod.nais.nasa.gov/pub/pub_library/grcover.htm.

VII. Contacts

Additional technical information for this NRA is available from:

Christopher Feng (General NRA)
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Commercial LEO Development Program
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Additional contracting information for this NRA is available from:

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VIII. Other Information

A. Proprietary Information

All proposals containing proprietary data should have the cover page and each page containing proprietary data clearly marked as containing proprietary data. It is the Proposer's responsibility to clearly define to the Government what is considered proprietary data. Additional information can be referenced in the Guidebook.

B. General References

Guidebook for Proposers Responding to a NASA Notice of Funding Opportunity (NOFO) is available online at the following address:

https://www.nasa.gov/sites/default/files/atoms/files/may_2021_ed_nasa_guidebook_for_proposers.pdf

NASA Federal Acquisition Regulations Supplement Instructions for Responding to NASA Research Announcements (Provision NFS 1852.235-72) is available online at the following address:

<https://www.hq.nasa.gov/office/procurement/regs/NFS.pdf>

Standard Format for NASA Research Announcements (NRAs) and other Announcements for Grants and Cooperative Agreements. This document is available online at the following address:

https://nodis3.gsfc.nasa.gov/displayAll.cfm?Internal_ID=N_PR_5810_001A_&page_name=ALL

NASA Grant and Cooperative Agreement Handbook. This document is available online at the following address: https://prod.nais.nasa.gov/pub/pub_library/grcover.htm

International Space Station Facilities and Accommodations Overview. This information is available online at the following address:

https://www.nasa.gov/mission_pages/station/research/facilities/index.html

External Payloads Proposer's Guide to the International Space Station. This document is available online at the following address:

https://www.nasa.gov/mission_pages/station/research/facilities_external_payloads_proposer_guide

Reference Guide to the International Space Station. This document is available online at the following address:

<https://www.nasa.gov/sites/default/files/atoms/files/np-2015-05-022-jsc-iss-guide-2015-update-111015-508c.pdf>

Space Station Research Explorer. This document, which contains a listing of experiments, facilities and publications for research conducted on ISS, is available online here: [Space Station Research Explorer on NASA.gov](#)

ISS Payload Safety and Integration Technical Library. The following ISS payload integration and safety documents requirements have been consolidated into a technical library.

- **ISS Science, Technology and Exploration Integration Flow (SSP 57057).** This document defines the ISS Research Integration Office process for payload integration.
- **ISS Safety Requirements Document (SSP 51721).** This document defines the safety requirements for ISS payloads and supersedes SSP 51700.
- **Safety Review Process (SSP 30599).** This document defines NASA's phased safety review process.
- **Pressurized Payloads Interface Requirements Document (SSP 57000).** This document defines the interface requirements for payloads operating inside the pressurized volume of the ISS.
- **ISS Pressurized Volume Hardware Common Interface Requirements Document (SSP 50835).** This document defines, among other things, environmental requirements during transportation to and from ISS and when operating payloads within ISS.
- **External Payloads Hardware Interface Requirements Document (SSP 57003).** This document defines the interface requirements for payloads operating outside the pressurized volume of the ISS.

Up to 2 potential proposer representatives can request access to the ISS Payload Safety and Integration Technical Library by emailing the ISS NRA Manager at christopher.feng-1@nasa.gov with the following information in order to be cleared for export controlled data:

- Name, Company Name, Citizenship, Contact Address, Contact Phone Number, Contact e-mail address, Government clearance (if applicable), and NASA Domain Consolidation (NDC) Username (if applicable)
- Foreign nationals will be required to complete a non-disclosure agreement (NDA)

The due date for submission of proposals will not be extended for any offeror based on additional time necessary for obtaining access. Falsified or incorrect data may result in disqualification from selection for award.