



Draft  
Cooperative Agreement  
Notice (CAN)

Solar System Exploration  
Research Virtual Institute

**NOTICE: Comments on this DRAFT CAN are to be submitted by July 3, 2018 via email to [HQ-SSERVI@mail.nasa.gov](mailto:HQ-SSERVI@mail.nasa.gov). Those who submit comments may not receive individual responses. However, on release of the final CAN, NASA will enumerate significant changes made between the draft and final CAN, either through a FAQ or changes document.**

NASA SOLAR SYSTEM EXPLORATION RESEARCH VIRTUAL INSTITUTE  
COOPERATIVE AGREEMENT NOTICE  
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DRAFT SOLAR SYSTEM EXPLORATION RESEARCH VIRTUAL INSTITUTE  
COOPERATIVE AGREEMENT NOTICE

## 1.0 FUNDING OPPORTUNITY DESCRIPTION

### 1.1 Introduction to the Funding Opportunity

NASA, through the release of this Cooperative Agreement Notice (CAN), is announcing an opportunity for the submission of multi-institutional team-based proposals for research as participating members of the Solar System Exploration Research Virtual Institute (SSERVI), hereafter referred to as "the Institute." Proposals must clearly articulate an innovative research program addressing basic and/or applied research fundamental to understanding the nature of the Moon, Near Earth Asteroids (NEAs), the Martian moons Phobos and Deimos, and the near space environments of these bodies, to enable eventual human exploration of these destinations. Although the Institute will continue to support research addressing all of these potential human exploration destinations, in light of the administration's focus on returning to the Moon, as well as the near-term opportunities that will be provided by the burgeoning commercial lunar industry, proposals which address these near-term lunar needs and opportunities will be given preference. Proposed research that complements current CAN-2 Institute Teams, and/or addresses important research areas not currently covered in the Institute, will be given strong consideration (see: <http://sservi.nasa.gov/sserviteams/>).

This CAN will, henceforth, use the term "Target Body(s)" to refer to Earth's Moon, Near Earth Asteroids, and the Martian moons Phobos and Deimos and their near-space environments.

CAN objectives specific to this release can be found in Section 1.3. The Institute is supported by a partnership between the NASA Science Mission Directorate (SMD) and the Human Exploration and Operations Mission Directorate (HEOMD). NASA anticipates that several new teams will be selected through this solicitation at up to \$1.5M per team per year for five years. These values are firm caps per award, which represent everything, including indirect costs, as well as civil servant costs. Additional solicitations are planned for release at approximately two and a half to three-year intervals as previously selected CAN teams complete their awards. Proposers are free to propose amounts less than noted above for all years.

SSERVI's mission extends beyond scientific goals to encompass community development, training of the next generation of planetary scientists, fostering of international and commercial partnerships, and integration of science and exploration strategic goals. Therefore, proposals must also articulate plans to advance the full scope of Institute objectives (see Section 4.2.3.3 and <http://sservi.nasa.gov/overview/>).

Participation in this solicitation is open to all categories of organizations including educational institutions, industry, not-for-profit institutions, Federally Funded Research and Development Centers (FFRDCs) (e.g. the Jet Propulsion Laboratory), as well as NASA Centers and other U.S. Government agencies (see Section 3.1). Proposals involving multiple cooperating organizations

must be submitted by a single institution, which becomes the Lead Institution. The Lead Institution must be the Principal Investigator's (PI's) home institution. The intent of this solicitation is to provide funding to U.S. institutions. However, U.S. proposers are strongly encouraged to identify collaborations involving existing SSERVI or other international partners (<http://sservi.nasa.gov/internationals/>) on a no-exchange-of-funds basis.

NASA recognizes and supports the benefits of having diverse and inclusive communities and fully expects that such values will be reflected in the composition of all proposal teams.

Detailed proposal content and submission requirements for responding to this CAN are contained in Section 4. Additionally, the *2018 NASA Guidebook for Proposers* contains overarching policy and procedural information for responding to this CAN. In the event that information in this CAN differs from, or contradicts, the information in the *2018 NASA Guidebook for Proposers*, the information in this CAN takes precedence. The *2018 NASA Guidebook for Proposers* can be found at: <http://www.hq.nasa.gov/office/procurement/nraguidebook/>.

## 1.2 Overview of the Institute

The SSERVI Institute is an innovative, virtual research organization that leverages knowledge and expertise from the science and exploration communities to support NASA's goals in lunar and planetary science and human exploration of the Solar System. It also supports NASA goals in astrophysics and heliophysics that are enabled through human and robotic exploration of the Target Bodies. The Institute is based on the premise that exploration and science are fundamentally intertwined: exploration enables science, and science enables exploration. The Institute catalyzes collaborative research that fosters cross-disciplinary partnerships within, and between, the science and exploration communities beyond the scope supported by traditional Research and Analysis (R&A) grants. Linking a diverse community of researchers, Institute teams investigate basic and applied science questions that enable a deeper understanding of the formation, evolution, and current state of the Solar System, including questions relevant to human exploration.

The Institute consists of a geographically distributed network of peer-reviewed and competitively selected teams managed by a Central Office (SSERVI Central) located at NASA Ames Research Center. The Institute brings interdisciplinary teams together, each with their own set of disciplines and capabilities, to solve science and exploration problems. The Institute achieves broad representation across both the domestic and international science and exploration communities by partnering with industry, international academic and government research organizations. Teams are expected to collaborate across team lines, as well as within their team, to increase and accelerate the overall scientific return of the Institute and explore new areas of complementary research. In addition, SSERVI's international partners form a core part of the Institute and work closely with domestic teams in a wide variety of scientific, exploration, programmatic, and public engagement activities.

The prime product of the Institute is research, disseminated through professional publications, workshops, conferences, and other communication methods. The Institute serves as a community leader through sponsorship of conferences and activities focused on science and exploration. The

Institute also supports a robust program to communicate the excitement of science and exploration to teachers, students, and the public, while also developing programs to train the next generation of space science explorers.

For more information about the Institute, please visit the Institute website, <https://sservi.nasa.gov/overview/>.

### 1.2.1 Principal Investigators and the Executive Council

The selected team Principal Investigators (PIs), together with the Institute Director and Deputy Director, constitute the Institute Executive Council (EC). This Council meets regularly, either by videoconference or in person, to serve as a forum for the exchange of technical and scientific information, as well as the exchange of individual viewpoints concerning priorities and opportunities for further collaboration. The Executive Council is charged with the following specific roles:

- Raise, discuss, and provide insight into issues such as Institute-wide research objectives, mission opportunities for science and exploration missions, and priorities for technology development;
- Comment on the conduct of the Institute and evaluative approaches and metrics aimed at assessing the progress of the Institute;
- Develop reports and provide summary science and exploration accomplishments to NASA Headquarters;
- Consider and provide perspective on other issues at the request of the Institute Director.

### 1.2.2 Team expectations for Integration into the Virtual Institute Structure

The virtual institute structure derives its strength from the interdisciplinary and collaborative nature of its teams. To this end, teams will be expected to explore areas for collaboration with other SSERVI teams, as well as with international partners of the Institute. Virtual communication only succeeds if everyone has the means to participate. Therefore, multi-institutional teams must insure that each institutional component of the team has the technological capability to fully participate in all virtual meetings.

In addition, proposals must clearly discuss plans that address each of the following items: (\*denotes items that must also be included in the proposal budget.)

The following roles must be explicitly assigned:

- The Principal Investigator (PI), who is expected to participate in all Institute events.\*
- A Deputy PI(s) who will assist the PI to meet institute requirements. The Deputy PI(s) will have the authority to speak for the PI/team. In the rare event where a PI cannot attend an Institute event, a Deputy PI should represent the team
- A technical liaison for the lead institution (see section 1.2.3)\*
- A science activation/citizen science/public engagement (SA/CS/PE) liaison for the Team (see section 1.4)\*

Each selected team will be expected to:

- Participate in virtual monthly Executive Council meetings (PI or Deputy PI)
- Attend in-person quarterly Executive Council meetings (PI or Deputy PI)\*
- Host visiting Central Office and other team PIs for a lead-institution site-visit (once per 5-year award period)\*
- Have team representative(s) participate in annual Exploration Science Forum at NASA Ames Research Center, including serving on Science Organizing Committee as requested\*
- Attend and participate in the annual Human Research Program (HRP) investigators' workshop for teams performing research relevant to the HRP \*
- Give virtual/in-person\* presentations as part of the Director's Seminar Series
- Participate in, and develop topics for, Workshops Without Walls (workshops conducted online)
- Develop white papers and participate in studies consistent with team expertise and proposed research, as requested by NASA
- Provide timely communication and be responsive to the SSERVI Central Office
- Support SMD's Science Activation partners (see section 1.4).

Each selected team will be expected to provide:

- Monthly reports at virtual EC meetings (1-page template plus publications, 3-minute oral report)\*
- Team annual reports (~5 page summary due in January following the end of the reporting year)\*
- New technology reports as necessary (per <https://invention.nasa.gov>)\*
- Summary science and exploration accomplishments (referred to as "Nuggets") after completing a major milestone of research

Finally, each selected team is expected to possess the appropriate collaboration infrastructure:

- Provide collaborative technology suitable for virtual participation as specified by the Institute Central Office (<http://sservi.nasa.gov/collaboration-technology-requirements/>) (See Section 1.2.3). Existing systems which meet the minimum requirements are acceptable\*
- Develop and maintain an up-to-date team website that will be linked to from the main SSERVI website\*

### 1.2.3 Electronic Communication and Collaboration

The Institute uses a variety of modern telecommunications and information technology tools to conduct virtual meetings, seminars, and conferences; link the Institute Teams; share knowledge; and enable effective interactions both within and amongst teams. Proposals must present a plan (and budget) for the adequate availability of Information Technology (IT) expertise and equipment to support Team members as they incorporate these tools into their activities. Existing systems which meet the minimum requirements (see <http://sservi.nasa.gov/collaboration->

[technology-requirements/](#)) are acceptable. Additionally, proposals must identify a representative from their team who will serve as a technical liaison. The Institute's management office will advise on hardware and software for virtual communications and train the technical liaison, who will be responsible for the setup and use of equipment and other virtual collaborative tools.

### 1.3 CAN Research Objectives

The research scope for this CAN is in the fields of lunar, NEA, and martian moon studies, with preference given to topics that emphasize studies related to the Moon and those that relate to joint interests of the Science Mission Directorate (SMD) and the Human Exploration and Operations Mission Directorate (HEOMD). The proposed research should address NASA's basic (science) and applied (exploration) research goals and should include multidisciplinary investigations that address the objectives of this CAN. The proposed research should be integrated; thus, proposals consisting of tasks addressing multifaceted questions must demonstrate significant scientific and/or technical connections among the tasks. Proposals that only address a single question should strive to integrate interdisciplinary expertise and methodologies. It is expected that teams bring together expertise from more than a single institution.

This CAN supports the broad spectrum of lunar, NEA, and Martian moon studies encompassing investigations of the surface, interior, exosphere, genesis, evolution, and the near-space environments of these bodies. Investigations that link science and exploration are highly encouraged. Fundamental research having clear, critical and longer-term implications for acquiring or interpreting data regarding potential human destinations is encouraged (for example, addressing Target Body Strategic Knowledge Gaps), as are research efforts that are relevant to (but are not dependent upon) current or future space missions. Proposals in the areas of astrophysics and heliophysics that are enabled through human and robotic exploration of the Target Bodies are also solicited through this Cooperative Agreement Notice. Efforts to develop new technological approaches to scientific exploration of Target Body(s), are encouraged, including but not limited to telerobotics, AR/VR, and autonomous systems. Supported investigations include, but are not limited to, theoretical investigations, numerical modeling of physical or chemical processes, experimental/laboratory investigations, development of technical/technological approaches, and field studies.

Proposers are encouraged to align their research efforts with one or more of NASA's relevant guiding documents, such as the Planetary decadal ([Vision and Voyages for Planetary Science in the Decade 2013-2022](#)) as well as those related to lunar science and exploration: , [HEOMD Strategic Knowledge Gaps](#) (SKGs), [Scientific Context for the Exploration of the Moon \(SCEM\) 2007 report](#), LEAG's [ASM-SAT](#) and [NEXT SAT](#) reports. Also of potential relevance are the Astrophysics and Heliophysics decadal surveys ([Astro2010: The Astronomy and Astrophysics Decadal Survey](#), [Solar and Space Physics: a Science for a Technological Society](#)), as well as [NASA's Strategic Plan 2014](#), the [Global Exploration Roadmap](#), and NASA's Human Research Program and Life and Physical Sciences research plans ([HRP Integrated Research Plan \(IRP\)](#), [Recapturing a Future for Space Exploration: Life and Physical Sciences Research for a New Era](#)). These documents may be found in the Program Library ([5](https://sservi.nasa.gov/mission-</a></p></div><div data-bbox=)

[documents/](#)). The research, training, and other activities described in each proposal must demonstrate how they relate strategically to NASA’s science and exploration goals.

While the topics of this CAN focus on potential destinations for human exploration (the Moon, NEAs, Phobos and Deimos), these topics can sometimes be considered within the broader context of comparative planetology. Therefore, innovative proposals that focus on Target Body(s) and include comparative studies with other Solar System bodies (e.g. Mercury, main belt asteroids and comets) are appropriate. Mission planning as related to the basic and/or applied research objectives of the proposal may also be appropriate as part of a larger scientific effort. Studies that use mission planning, laboratories, or field sites to investigate questions relevant to future human exploration—including ISRU-related production, autonomous systems, augmented and/or virtual reality and other technological approaches—are also welcome. Also appropriate are the development and/or enhancement of tools and techniques that facilitate research efforts as described in this section. Although this call is not designed for instrument development (refer to [ROSES elements PICASSO](#), [MatISSE](#), and [DALI](#)), some instrument development tasks to raise technology or instrument concepts up to TRL 6 are acceptable as long as that effort is part of, and well-integrated into, the proposal’s larger scientific plan and the development efforts compose a small portion of the overall team budget.

Although SSERVI maintains efforts across all Target Bodies, this call is particularly interested in emphasizing studies related to the Moon. The following non-exhaustive list of broad topics apply to both basic (science) and applied (exploration) research and include examples that may be used as guidelines. Proposals are not expected to address all of these topics. Development of capabilities to support this scientific research and/or technology development (e.g., environmental chambers), leading to the advancement in understanding of the science and/or approaches for exploration of relevant Target Body environments, is appropriate as part of a larger science effort.

- Studies of the origin and evolution of the Solar System as informed by the Moon, NEAs, Phobos and Deimos:
  - o Inner Solar System history
  - o Origin(s) of Target Body(s)
  - o Inventory and evolution of impactor population through time
  - o Crater mechanics and distributions
  - o Volatile origin, sequestration, and transport
  - o Influence of impacts on the evolution of the Earth-Moon system
- The Moon, NEAs, Phobos and Deimos as windows into origin and evolution of planetary bodies:
  - o Gravitational properties, interior structure, and thermal history
  - o Core formation mechanisms and core structure
  - o Magnetic properties
  - o Magma ocean studies
  - o Role of volatiles in planetary differentiation and evolution
  - o Geomorphology as indicators of subsurface processes

- Physical characterization of objects that are potential exploration targets, including Potentially Hazardous Objects (PHOs):
  - Populations
  - Physical and chemical properties such as size, mass, spin state, and composition
  - Structure
  - Mechanical and thermal properties
  - Electrostatic and plasma environment
  - Radiation environment in near space and at the surface
  - Orbital evolution
  - Relationship to meteorites
  - Impact hazards for Earth and possible mitigation approaches
- Regolith of Target Body(s):
  - Geophysical and Geotechnical properties
  - Structure
  - Volatile content
  - Mobility
  - Regolith origin and evolution
  - Resource prospecting and ISRU potential
  - Development of simulants for high-fidelity technology/systems testing
  - Toxicology, physical properties, and reactivity relating to human health concerns
  - Robotic/System performance affected by regolith/dust
  - Regolith comparison between Target Bodies
- Sample Science
  - Geology and Petrology investigations
  - Geophysical and Geotechnical properties
  - Volatile content
  - New sample analysis techniques
  - Sample preservation and storage
  - Sample return protocols
  - Planetary protection
- ISRU
  - Resource identification and prospecting
  - Materials acquisition, processing, storage, and transport
  - Technology and integrated systems
  - Manufacturing and construction
- Dust and plasma interactions on Target Body(s):
  - Dust composition and size distribution
  - Dust mobility
  - Plasma contribution to dust transport and space weathering

- Robotics- and human-centered investigations:
  - o Accessibility
  - o Exploration relevant radiation environments in near space and at the surface
  - o Science enabled via the Lunar Orbital Platform-Gateway
  - o Propulsion-induced ejecta
  - o Field studies and concept of operations
  - o Teleoperated and autonomous systems (including human/robot interactions) for science and human exploration
  - o Augmented and virtual reality systems for field science and Target Body exploration
  - o Physical, chemical, and geotechnical properties of dust that affect human health
  - o Other potential environmental effects on surface operations and systems for human exploration
  
- Other innovative investigations:
  - o Leverage exploration of target bodies in order to advance our understanding of fundamental physical laws, composition, and origins of the Solar System and the Universe
  - o Enable future science or human exploration missions by reducing risk
  - o Contribute to the safety of humans in deep space

### 1.3.1 Data Analysis

Where appropriate, proposed research should make use of public data relevant to the Moon, NEAs, Phobos and Deimos, and meteorite and lunar samples (see Section 8.1 for more information).

An investigator may propose a study (e.g., scientific, landing site science, cartographic, topographic, geodetic research, etc.) based on analysis of spacecraft data. Proposals may incorporate the analysis of data from more than one mission. Additional information about NASA and other missions can be found at NASA's National Space Science Data Coordinated Archive (NSSDCA) at <http://nssdc.gsfc.nasa.gov/planetary/>. Additional guidelines for flight team members proposing to use flight data in their proposals can be found in Section 8.1.

Investigators may propose to produce data products (e.g., cartographic products, such as geologic, topographic, or mineral maps, and/or calibration data). Such investigations need not have associated scientific tasks; however, the utility of the proposed data products to the planetary science and/or human exploration communities must be clearly specified in the proposal and will be judged on this basis. Scientific research tasks may also result in data products. Proposed investigations that will result in a geologic map suitable for publication by the U.S. Geological Survey (USGS) should clearly indicate this intention in the *Proposal Summary*, as well as in the text of the proposal, and must follow the guidelines for USGS map products outlined in [ROSES Program Element C.1](#).

Regardless of the nature of the proposal, a plan for archiving and making products readily available must be included in any proposed investigation that will result in the production of data products. See Section 4.2.3.3 for guidelines for developing a data management plan, and for more information see: <http://science.nasa.gov/researchers/sara/faqs/dmp-faq-roses/>

Researchers are encouraged to facilitate discovery and dissemination of any spatial data products they generate by coordinating with SSERVI's Solar System Treks Project (SSTP) for potential integration into the project's online mapping and modeling portals for the Moon and other target bodies. Relevant data products should be produced using the GeoTIFF format for ease of inclusion within the SSTP architecture. Selected teams proposing to produce software tools that are to be made generally available should coordinate with SSTP to determine the appropriateness of implementing these tools as web services within the portals. See SSTP at <https://sservi.nasa.gov/lunar-and-planetary-mapping-and-modeling/>.

#### 1.4 Science Activation, Citizen Science, and Public Engagement (SA/CS/PE)

SMD utilizes its unique assets (*e.g.* content, Subject Matter Experts (SME's), authentic experiences) to enable the science activation/citizen science/public engagement ecosystem. Teams are expected to implement activities furthering some aspect(s) of Science, Technology, Engineering, Art, and Math (STEAM) engagement.

For science education, SMD no longer funds independent efforts, so proposers are encouraged to leverage efforts within SMD's Science Activation (SciAct) network to reach learners of all ages. SciAct is funded outside of this CAN and more information on SciAct teams is available at <https://science.nasa.gov/science-activation-team>.

For citizen science, activities facilitating members of the public being able to contribute their time and expertise to advancing research and solving problems can be particularly inspirational and have the potential to provide researchers with valuable data. Implementing citizen science activities, including those implemented through crowdsourcing and challenges, may be greatly facilitated by partnering with one or more of the existing programs described at <https://www.nasa.gov/solve/index.html> and at <https://science.nasa.gov/citizenscientists>.

For public engagement, activities furthering Science, Technology, Engineering, Art and Math (STEAM) goals, consistent with the stated SSERVI Objectives identified in Section 1.3 are encouraged. Public engagement activities should be designed to share scientific discoveries and the excitement of science but should not include formal education objectives.

In support of all three areas (SciAct, citizen science, and public engagement), proposals should identify Subject Matter Experts (SMEs), as well as any supporting personnel/materials and corresponding budgets within the "Other Institute and NASA Objectives" section of your proposal. Each team should identify a SA/CS/PE liaison to coordinate efforts within and between teams and that will be available, as needed, to interact with SMD's STEAM partner teams. Up to \$75,000 per year of each CAN award can be designated to support activities in these areas.

## 1.5 Institute Collaborations

### 1.5.1 Commercial Partnerships

NASA and Administration policy call for the promotion of the nascent Lunar Commerce industry; efforts such as [the Lunar CATALYST program](#) sponsored by the HEOMD Advanced Exploration Systems division have been developed to further these goals. Innovative methods of partnering with Lunar Commerce companies to enable science and exploration goals are encouraged.

### 1.5.2 International Partnerships

The Institute has a robust program of partnerships with international organizations, including space agencies, to provide collaborative research opportunities for all members of the international lunar and planetary science community; these international collaborations provide critical interdisciplinary scientific and technical expertise to the Institute. The Institute encourages collaborations between international partners and domestic teams. The current international partners are: Australia, Canada, France, Germany, Israel, Italy, The Netherlands, Saudi Arabia, South Korea, and the United Kingdom. Given the collaborative structure of the Institute, proposed activities that support the development and strengthening of relationships with current and potential future Institute international partnerships are highly encouraged.

Further information, including the contacts for current international partners and the application process for those interested in becoming a new international partner, may be obtained at <http://sservi.nasa.gov/internationals/>. Note that applications for international partnership are not part of this call for proposals.

### 1.5.3 Underrepresented Groups and Minority Institutions

NASA is dedicated to broadening the participation of underrepresented groups and minority institutions in NASA missions, research, and education programs. The Institute is committed to increasing the participation of underrepresented groups in its activities and strongly encourages minority institutions to participate in proposals. Underrepresented groups and minority institutions are able to participate within SSERVI in multiple ways: either as a team lead, as funded elements within a team, or as unfunded partners (for the former two, see Section 3.0). NASA's Office of Equal Opportunity Programs recognizes the definition of a Minority Institution as identified by the Office of Civil Rights, U.S. Department of Education.

## 1.6 NASA Safety Policy

All prospective proposers to this CAN are advised that the highest priority in all of NASA's programs is safety. 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 public, astronauts and pilots, the NASA workforce (including employees working under NASA award instruments), and high value equipment and property.

## 2.0 AWARD INFORMATION

### 2.1 Award Type and Funding Information

NASA anticipates that several new teams will be selected through this solicitation at up to \$1.5M per team per year for all five years of the award. These values are firm caps per award, which represent everything including indirect costs as well as civil servant costs. Additional solicitations are planned for release at approximately two and a half to three-year intervals. Proposers are free to propose amounts less than these for all years.

Annual funding allotments after the first award year will be provided only after the submission of an acceptable progress report (see Section 6.3). Note that all funding awards are contingent upon the availability of appropriated funds.

NASA reserves the right to redirect, within your team, up to 20 percent of your award towards focused strategic needs within your research topic(s), based on relevant expertise within your selected team. This reallocation would be directed if needed to respond primarily to changing strategic needs and priorities within NASA and will be done to maximize SSERVI's strategic relevance and responsiveness to the Agency and the administration as a whole.

NASA Ames Research Center will negotiate cooperative agreements with the selected lead institutions and will administer all funding. Except as provided below, cooperative agreements will be used as funding instruments for the Institute teams in accordance with regulations at 2 CFR Part 200, 2 CFR Part 1800, and non-regulatory guidance in the NASA Grant and Cooperative Agreement Manual for all institutions except commercial organizations required to provide a cost share. Commercial organizations required to provide a cost share must follow 14 CFR Part 1274. All regulations/guidance are available at [http://prod.nais.nasa.gov/pub/pub\\_library/srba/index.html](http://prod.nais.nasa.gov/pub/pub_library/srba/index.html).

Specific resource arrangements established under this notice will vary depending on the nature of the lead institution, as follows:

- a. Institutions of Higher Education and State and Local Governments: Cooperative Agreements will be negotiated.
- b. Nonprofit and For-Profit Organizations: Cooperative agreements will be negotiated. See Section 3.4 for information on cost sharing.
- c. U.S. Government-Owned, Contractor-Operated National Laboratories (not including Civil Service or military staff laboratories): Necessary resources will be provided via an interagency funds transfer and documented under a Memorandum of Agreement between the sponsoring organization and NASA Ames Research Center.
- d. Non-NASA Government-Owned and Operated Laboratories: Necessary resources will be funded via an interagency funds transfer and will be documented using a Memorandum of

Agreement between the other agency laboratory and NASA Ames Research Center. Negotiated project resources may be used to cover direct project costs.

- e. NASA Centers (and the JPL): The necessary resources for NASA-led or JPL-led proposals will be provided via NASA's internal funding procedures. If researchers from other institutions are included on a successful NASA-led proposal, then the necessary resources will be provided by the Center or JPL through the funding mechanisms listed above, as appropriate.

All funding to non-Governmental Co-Is or organizational entities must be routed through the PI's home institution, the Lead Institution. Thus, one Cooperative Agreement will be negotiated per selected proposal. NASA will fund NASA (including JPL) and other Governmental Co-Is directly. If the PI holds a joint appointment in more than one institution, either organization could be the "home institution" contingent on their willingness to make the institutional commitment (see Section 4.2.3.3) and handle the funds for the entire multi-institutional team.

## 2.2 Period of Performance

The Cooperative Agreements will have a five-year period of performance. A Cooperative Agreement implies a substantial involvement between, and contribution by, NASA and the recipient, in addition to the provision of research funding.

## 2.3 Cancellation of CAN

NASA reserves the right to make no awards under this CAN for any reason, including the absence of program funding. NASA assumes no liability (including bid and proposal costs in case of cancellation) for canceling the CAN or for anyone's failure to receive actual notice of cancellation. Should cancellation be necessary, notice will be made to all institutions submitting a Step-1 proposal and it will also be sent to the SMD research solicitations Email list (free to all registered users of the NASA proposal data base system at <http://nspires.nasaprs.com>).

## 2.4 Schedule for Awards

NASA's goal for announcement of selections is approximately five months after receipt of proposals with initial awards in place three months after selection announcement. However, these estimates can change, based on the workload experienced by NASA, the availability of funds, the status of NASA's annual appropriation, and any necessary post-selection negotiations with the proposing organization(s) needed for the award(s) in question.

## 2.5 Description of NASA Contribution

The Institute is a distributed consortium that represents a partnership between NASA and competitively selected member Teams to promote, conduct, and lead integrated multidisciplinary research. The Director and administrative staff of the Institute are located at the NASA Ames Research Center. NASA's contribution to the proposed cooperative relationship under this CAN,

through the Institute Central Office, is to coordinate and integrate the work of the individual Teams, facilitate collaboration among the members of the Institute, including its international partners, support links between the NASA science and exploration communities, develop and implement the full scope of other programs and activities, and otherwise further advance the fields of lunar and planetary science and exploration. NASA does this, in part, by providing funding, structure, and management to support the research and other activities of the individual Institute Teams. The Institute will provide access to certain collaborative tools (e.g. Adobe Connect licensing) required for virtual collaboration, strategic and programmatic direction for the Institute through direct communication with NASA HQ/Ames/community stakeholders, and marketing/coordination of Team research results, facilities, and partnerships. See also Section 1.2.3. Note that the Institute will not provide equipment required for virtual collaboration at investigator institution(s); this equipment needs to be specified and budgeted for in the proposal.

### 3.0 ELIGIBILITY INFORMATION

#### 3.1 Proposing Organizations

NASA welcomes proposals in response to this CAN from all qualified proposers. Participation in this solicitation is open to all categories of organizations including educational institutions, industry, not-for-profit institutions, Federally Funded Research and Development Centers (FFRDCs) (ex. the Jet Propulsion Laboratory), as well as NASA Centers and other U.S. Government agencies. This CAN does not solicit for international lead institutions (see section 3.3). Historically Black Colleges and Universities (HBCU), Hispanic Serving Institutions (HSI), and Tribal Colleges and Universities (TCU), as well as other minority educational institutions, small disadvantaged businesses, veteran-owned small businesses, service-disabled veteran-owned small businesses, historically underutilized business zones small businesses, women-owned small businesses, and organizations owned and controlled by socially and economically disadvantaged individuals are encouraged to apply. In accordance with Federal statutes and NASA policy, no eligible applicant shall be excluded from participation in, denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NASA on the grounds of race, color, creed, age, sex, national origin, or disability.

#### 3.2 Principal Investigators and Co-Investigators

Every organization submitting a proposal in response to this CAN must designate a single Principal Investigator (PI) who will be responsible for the quality and direction of the entire proposed investigation and for the use of all awarded funds. Note that this solicitation does not accept the designation of a Co-Principal Investigator; there must be only one PI who is solely responsible for the proposed investigation. SSERVI PIs may not serve as PI for multiple teams, e.g. PIs from current teams that are continuing on (CAN-2 Teams) may not be identified as the PI of a new proposal. They may serve as a Co-Investigator or Collaborator on proposals submitted to this CAN. A deputy PI(s) must also be named as an individual(s) who will have the full authority of the PI in the event that the PI is unavailable for any reason.

NASA encourages proposers to identify by name those who are most important for the execution of the proposed research. Individuals who are critical for the successful completion of an investigation through the contribution of unique expertise and/or capabilities, and who serve under the direction of the PI, must be identified as deputy PI(s) and/or Co-Investigators (Co-Is). Postdoctoral fellows funded as part of this CAN should be listed as Co-Is. A Co-I must have a well-defined role in the investigation that is explicitly defined in the Management sections of the proposal (see Section 4.2.3.3 below).

### 3.3 Guidelines for Non-U.S. Participation

This CAN does not solicit for international lead institutions. U.S.-based teams may have team members as unfunded Co-Is or collaborators from international research institutions, and/or industry. International institutions or industry wishing to participate in such a manner may only do so on a no-exchange-of-funds basis. International Co-Is providing critical expertise and/or capabilities should include a letter from their home institution demonstrating support for their participation.

#### 3.3.1 Working with Foreign Collaborators

Foreign collaborations are strongly encouraged through this CAN. These collaborations strengthen the Institute scientifically and may provide linkages with other NASA priority activities such as the International Space Exploration Coordination Group. As always, NASA is involved in research with foreign institutions exclusively on a no-exchange-of-funds basis; therefore, funding team members at foreign institutions, even for travel to attend meetings in the United States, is not allowed. However, subject to export control restrictions, foreign nationals who are affiliated with a U.S. institution may be funded investigators and are eligible to receive remuneration through a NASA award for the conduct of research while employed or serving as an invited visitor by a U.S. organization.

#### 3.3.2 Procurement Guidelines from Non-U.S. sources

U.S. research award recipients under this CAN, where appropriate, may directly use NASA funds to procure goods, supplies, or services from non-U.S. sources, as opposed to research. Award funds may not be used to fund research carried out by non-U.S. organizations. Further information is available at: <http://science.nasa.gov/researchers/sara/faqs/#14> and in the [\*NASA Guidebook for Proposers\*](#).

Finally, the People's Republic of China is a special case. Proposals must not include bilateral participation, collaboration, or coordination with China or any Chinese-owned company or entity, whether funded or performed under a no-exchange-of-funds arrangement. Please see Appendix A of the [\*NASA Guidebook for Proposers\*](#) for more information and details for compliance and certification with this restriction.

### 3.3.3 Export Control Guidelines

Proposers are advised that, under U.S. law and regulations, spacecraft and their specifically designed, modified, or configured systems, components, and parts are generally considered 'Defense Articles' on the United States Munitions List and subject to the provisions of the International Traffic in Arms Regulations (ITAR), 22 CFR Parts 120-130. Export Control Information regarding U.S. export regulations is available at <http://www.pmdtc.state.gov/> and at <http://www.bis.doc.gov>. While explicit inclusion of such material in a proposal is not prohibited, it may, in some circumstances, complicate NASA's ability to evaluate the proposal since occasionally NASA may use the services of foreign nationals who are neither U.S. citizens nor lawful permanent residents of the U.S. to review proposals submitted in response to this CAN. Therefore, proposers to this CAN are strongly encouraged not to include material subject to the provisions of ITAR in their proposals, although the effort being proposed may itself be subject to ITAR (see website noted above). If it is essential to include any export-controlled information subject to ITAR in a proposal, a notice to that effect must be prominently displayed on the title page of the proposal that shall state:

"The information (data) contained in [insert specific identification such as page, section and paragraph numbers] of this proposal is (are) subject to U.S. export laws and regulations. It is furnished to the Government with the understanding that it will not be exported without the prior approval of the proposer under the terms of an applicable export license or technical assistance agreement. The identified information (data) is (are) printed in a red font and figure(s) and table(s) containing the identified information (data) is (are) placed in a red-bordered box."

Note that it is the responsibility of the proposer to determine whether any proposal information is subject to the provisions of ITAR.

### 3.4 Cost Sharing or Matching

Cost sharing is required for commercial organizations to receive a cooperative agreement, unless the commercial organization can demonstrate that it will not receive substantial compensating benefits for the partnership effort. If no substantial compensating benefits will be received, then cost sharing is not required, but may be offered voluntarily and may be accepted. See Section 3.18 Required Budget Details of the [NASA Guidebook for Proposers](#). Reference also 2 CFR §1800.922 and 14 CFR §1274.204, (Costs and Payments), paragraph (b), Cost Sharing.

If an institution of higher education, hospital, or other nonprofit organization wants to receive a grant or cooperative agreement, cost sharing is not required. The award would be made in accordance with the requirements of 2 CFR §200, 2 CFR §1800, and the [Grant and Cooperative Agreement Manual](#).

NASA may accept cost sharing from any type of organization if it is voluntarily offered. Reference 2 CFR §200.306 (cost sharing or matching).

Cost sharing is not part of the peer-review evaluation criteria. However, the Selection Official may take cost sharing into account in decisions between proposals of otherwise equal merit.

## 4.0 PROPOSAL AND SUBMISSION INFORMATION

### 4.1 Proposal Submission Process

All proposals submitted in response to this CAN must be submitted in a fully electronic form. No hard copy of the proposal is required or permitted. Electronic proposals must be submitted by one of the officials at the PI's organization who is authorized to make such a submission. Electronic submission of the proposal by the authorized organization representative (AOR) serves as the required original signature by an authorized official of the proposing organization.

Proposers may opt to register and submit proposals in response to this CAN via either of two different electronic proposal submission systems: either via the NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES) at <http://nspires.nasaprs.com> or via Grants.gov at <http://www.grants.gov>. Early registration is advised. The NSPIRES Help Desk is available at: (202) 479-9376, or by email at [nspires-help@nasaprs.com](mailto:nspires-help@nasaprs.com).

#### 4.1.1 Questions Related to this CAN

Clarification questions regarding this solicitation should be submitted via email no later than 15 calendar days prior to the Step-2 proposal due date to the designated points-of-contact given in Section 7.0.

Note that, where appropriate, questions and answers will be made publicly available as a "frequently asked questions" (FAQ) on the NSPIRES web page on which this CAN is posted. It is the responsibility of interested proposers to check for such information prior to the submission of their proposals.

#### 4.1.2 Late Proposals

Any proposal submitted after the date and time specified in Section 4.2 of this CAN will be handled in accordance with [SMD's Policy on Late Proposals](#), which reads in part:

Proposals or proposal modifications received after the latest date specified for receipt may be considered only if a significant reduction in cost to the Government is probable or if there are significant technical advantages, as compared with proposals previously received. However, in most cases, proposals submitted after the due date will not be reviewed or considered for selection. In such cases, it is entirely at the discretion of the proposer to decide whether or not to resubmit it in response to a subsequent appropriate solicitation.

### 4.1.3 Withdrawal of Proposals

The proposer may withdraw a proposal at any time prior to the official award. Proposers must notify NASA if the research proposed in response to this CAN is funded, in whole or in part, by another proposal or organization. Additionally, NASA must be notified of other changed circumstances that dictate withdrawal of the proposal or termination of evaluation.

### 4.2 The Two Step Proposal Submission Process

To facilitate the early recruitment of a conflict-free review panel this solicitation will use a two-step proposal submission process, in which a mandatory "Step-1 proposal" is submitted in place of a Notice of Intent (NOI). Although similar to an NOI in content, a Step-1 proposal differs from an NOI in a few important ways, please see Section 4.2.1, below. The PI and roles of other team members may be changed up to 14 days prior to the Step-2 proposal due date. Proposers who want to add funded investigators or change the PI between the Step-1 and Step-2 proposals must inform the point(s) of contact identified in the summary table of key information (Section 7.0) at least two weeks in advance of the Step-2 due date. Additions of funded investigators within two weeks of the Step-2 deadline require explicit permission from the NASA point of contact. The PI cannot be changed within two weeks of the Step-2 deadline.

Step-1 Proposals are Due: 11:59 p.m. Eastern, XXMONTH XXDAY, 2018.

Changes may be made to funded investigators without explicit permission up until 11:59 PM Eastern on XXMONTH XXDAY, 2018 (14 days prior to the Step-2 proposal due date).

Questions are permitted up until 15 calendar days prior to proposal due date.

Step-2 (Full) Proposals are Due: 11:59 PM Eastern on XXMONTH XXDAY, 2018.

#### 4.2.1 Step-1 Proposals

Like an NOI, the Step-1 proposal is an abbreviated summary of the intended research, but a Step-1 proposal differs from an NOI in a few critical ways. First, a Step-1 proposal must be submitted by the organization Authorized Organizational Representative (AOR), as opposed to the traditional NOI, which may be submitted by any individual. This means that prospective PIs should allow their organizations adequate time to submit these proposals. Second, since this process is to facilitate the assembly of a conflict free review panel, we encourage PIs to invite team members to participate as early as is practicable, so prospective PIs should allow their team members time to confirm their participation via NSPIRES. Finally, a Step-1 proposal is a prerequisite for submission of a full Step-2 proposal later. Only proposers who submit a Step-1 proposal are eligible to submit a Step-2 proposal.

The Step-1 proposal will be limited to the contents of the 4000-character limited Proposal Summary field in the NSPIRES cover pages. No budget is required. Full (Step-2) proposals must broadly contain the same scientific goals proposed in the Step-1 proposal. Submission of the Step-1 proposal does not obligate the proposer to submit a Step-2 (full) proposal later. Step-1 Proposals will be treated as competition-sensitive material. Step-1 Proposals are to be submitted electronically by entering the requested information through the NSPIRES system at

<http://nspires.nasaprs.com>. Additional information about the NSPIRES system can be found in Section A.1 of Appendix A. For the purpose of generating a Step-1 Proposal, the system will request the following information:

- Principal Investigator's name, institution, mailing address, phone number, and email address
- Name(s) and institution(s) of any Co-Investigator(s) known
- Descriptive title of the intended investigation
- Brief description of the investigation to be proposed

A separate Step-1 Proposal should be submitted for each intended proposal. Note that this Step-1 Proposal is also the preliminary version of the Proposal Cover Page/Proposal Summary; the information will carry over into the final Step-2 Proposal cover pages for your convenience. Additional details regarding the Proposal Cover Page/Proposal Summary can be found in Section 4.2.3.3.

In order to be able to submit a Step-1 proposal including the required Proposal Cover Page/Proposal Summary, all organizations proposing to this CAN and all participating investigators must be preregistered in the NASA proposal database system (NSPIRES) and have received a User ID and password. This includes the PI and all Co-Investigators and Collaborators. This applies equally for proposals submitted via Grants.gov, as well as for proposals submitted via NSPIRES. NSPIRES registration can be done at the website <http://nspires.nasaprs.com>. Early registration is advised; organizations must first be registered in the System for Award Management (SAM; <https://www.sam.gov>), which can take several days. An NSPIRES Help Desk is available at (202) 479-9376 or by email at [nspires-help@nasaprs.com](mailto:nspires-help@nasaprs.com).

#### 4.2.2 Step-2 Proposal Scope

Step-2 proposals are the full proposal and should clearly address the scope of this CAN in Section 1.3, requirements outlined in section 4.2.3.3, as well as the six evaluation criteria (see Section 5.1.2):

1. **Scientific and Technical Merit** - The innovative research program to be pursued
2. **Science Management Plan** - A plan that describes how the staff, facilities, and other resources identified in the proposal will be managed to integrate the research and achieve the research objectives
3. **Data and Sample Management Plan** - A plan that describes how data and samples produced will be disseminated and archived
4. **Other Institute Objectives** - A plan to support other Institute and NASA objectives (which are described in Section 4.2.3.3).
5. **Relevance** - The relevance of the proposed research to the research goals in Section 1.3 and specific areas in which the Team's activities will contribute to strategic goals for exploration and science
6. **Cost** - The budget and institutional commitments

### 4.2.3 Detailed Step-2 Proposal Format and Content

It is required that each proposal submitted to NSPIRES be prepared as a single PDF document (except the NSPIRES-generated Proposal Cover Page) prior to upload of the proposal. The strict file size limit for this single PDF file is 20MB. Although the NSPIRES system will accept files larger than 20MB, this limit will be strictly adhered to and those proposals received that exceed 20MB will be returned without review. Proposers must comply with all format requirements identified in this CAN and in the [NASA Guidebook for Proposers](#). Please refer to Section 3 of the [NASA Guidebook for Proposers](#) for more information on proposal submission procedures. Section 3.6 of the [NASA Guidebook for Proposers](#) provides complete guidelines for style formats.

#### 4.2.3.1 Standard Proposal Style Formats

The standard formats for proposals submitted in response to this CAN are as follows:

- Required paper size is 8.5x11". Pages must have at least 1-inch (2.5 cm) margins on all sides.
- Proposal must be single-spaced, typewritten, in English-language text, formatted using one column, and use an easily read 12 pt font. The font size for symbols in equations must be consistent with this guideline. Proposers may not adjust or otherwise condense a font or line from its default appearance.
- While text within figures and tables may use a smaller font, it must, in the judgment of reviewers, be legible without magnification. Figure and table captions must follow the same font requirements and restrictions as the main proposal text. Expository text necessary for the proposal may not be located solely in figures or tables, or in their captions.
- Units must be reported in the common standard for the relevant discipline.
- Fold-out pages, illustrations, and/or photographs are allowed, for the display of unique and critically important proposal data. Fold-out pages will count as multiple pages, dependent on number of fold out sections, against the required page limit. For example, a three-section fold-out would be equal to three pages on the page limitation.
- Proposals may not rely on references to materials outside the proposal (e.g. published articles and sites on the internet) for information or material needed to complete or allow reviewers to understand the proposal.
- Headers and footers are allowed as long as they do not contain proposal material. Only non-proposal material, e.g., page numbers, section titles, disclaimers, etc., is permitted in headers and footers.
- Proposals must strictly adhere to the fixed page limits given in Section 4.2.3.2.

#### 4.2.3.2 Checklist and Page Guidelines for Proposal Preparation

All proposals are to include the following materials in the order and using the titles as given. Details for each item are given in the same order below in Section 4.2.3.3.

PAGE GUIDELINES  
(In order shown)

| <u>SECTION</u>  | <u>PAGE LIMITS*</u>     |
|---|-------------------------|
| Proposal <i>Cover Page/Proposal Summary</i>             | As per NSPIRES Proposal |
| Title Page  | 1                       |
| Table of Contents                                       | 1                       |
| Executive Summary                                       | 3                       |
| Summary Table of Personnel and Work Effort              | As needed               |
| Research Plan   | 35                      |
| Science Management Plan                                 | 5                       |
| Data and Sample Management Plan                         | 3                       |
| References  | As required             |
| Plan to Support Other Institute and NASA Objectives     | 5                       |
| Relevance   | 1                       |
| Facilities and Equipment (as appropriate)               | 5                       |
| Curriculum Vitae  |                         |
| For the PI:   | 3                       |
| For each Deputy PI/Co-I:                                | 1                       |
| Current and Pending Support                             | As required             |
| Statement(s) of Commitment from Co-Is and Collaborators | As required             |
| Letters of Support from Consortium Institutions         | As required             |
| Letter of Commitment for SA/CS/PE plans                 | As required             |
| Budget Summary and Details                              | As required             |

\*including illustrations, tables, and figures.

#### 4.2.3.3 Details of Proposal Contents

All proposals in response to this CAN should include the following parts in the order listed (note that some are optional). Proposals that omit any of their required parts will be returned without review.

- *NSPIRES Proposal Cover Page/Proposal Summary*

NASA will not fund institutions that do not appear on the Proposal Cover Page. The NSPIRES Proposal Cover Page (see Section 3.7 of the [NASA Guidebook for Proposers](#)) contains the following elements:

*Proposal Summary: (maximum 4000 characters):* Provide a brief description of the project, including objectives, method of approach, relevance to SSERVI, and expected outcomes. (NSPIRES will initially populate this with the NOI summary, which can be edited to reflect any changes to your proposal concept.)

*Business Data:* PI information, proposal title, proposed start and end dates, submitting institution information, certification and authorization

*Budget Figures:* Include figures for all five years of the proposed project in the spaces provided. This is the total budget, including any subawards.

*Program Specific Data:* Answers to questions specific to this opportunity.

*Team Members:* Names, institution, and contact information (Notes: each team member must register themselves in NSPIRES and complete all required data. Each team member must establish an organizational relationship; i.e., identify the organization or other auspices through which the person is participating in the proposal. A proposal cannot be submitted if an organizational relationship within NSPIRES is missing from any team member.)

- *Proposal Title Page*

The *Proposal Title Page* design is at the discretion of the proposer. At a minimum it must include the full title of the proposal, the name of the Principal Investigator, the name and address of the proposing institution, and a list of any other institutions participating in the proposed investigation. In addition, as required, this page shall contain the Export Control statement (see Section 3.3.3) and may contain a "Notice of Restriction on Use and Disclosure of Proposal Information" in accordance with the following policy:

- *Restriction on Use and Disclosure of Proposal Material*

It is NASA policy to use information contained in proposals for evaluation purposes only. While this policy does not require that the proposal bear a restrictive notice, offerors or quoters should, in order to maximize protection of trade secrets or other information that is commercial or financial and confidential or privileged, place the following Notice on the Title Page of the proposal and specify the information subject to the Notice by inserting appropriate identification, such as page numbers, in the Notice. In any event, information (data) contained in proposals will be protected to the extent permitted by law, but NASA assumes no liability for use and disclosure of information not made subject to the Notice.

Example: Notice of Restriction on Use and Disclosure of Proposal Information

The information (data) contained in [insert page numbers or other identification] of this proposal constitutes a trade secret and/or information that is commercial or financial and confidential or privileged. It is furnished to the Government in confidence with the understanding that it will not, without permission of the offeror, be used or disclosed other than for evaluation purposes; provided, however, that in the event a contract (or other agreement) is awarded on the basis of this proposal, the Government shall have the right to use and disclose this information (data) to the extent provided in the cooperative agreement

(or other agreement). This restriction does not limit the Government's right to use or disclose this information (data) if obtained from another source without restriction.

- *Table of Contents*

A *Table of Contents* shall identify each of the key parts of the proposal, including the subsections of the proposal's central Research and Management section. To facilitate developing and assembling the proposal, each of its principal sections may be individually numbered.

- *Executive Summary*

The *Executive Summary* should clearly describe the proposed program: its rationale, innovations, distinguishing features, unifying intellectual focus, proposed research, and training plans; and its approach to management of its participating personnel and institutions. In addition, this *Summary* should briefly address the proposed institutional commitment(s), as well as the commitment to implementing the collaborative and networking concepts of the Institute.

- *Summary Table of Personnel and Work Effort*

The proposal must contain a summary table, in simple tabular form, that gives the names and intended work commitment for the PI and every Co-I of the proposed investigation in FTEs/WYEs (rounded to the nearest 0.01 of a Work Year – WY=2080 hrs) for each year of the proposed period of performance. Provide the names and roles of investigators if known, or the role for each individual if unknown (e.g., unnamed postdoctoral). Proposers are strongly encouraged to use the PSD Table of Personnel and Work Effort template, <https://science.nasa.gov/templates-planetary-science-division-appendix-c-roses-proposals>

- *Research Plan*

The proposal should contain sufficient detail to fully describe the proposed effort in order to enable a reviewer to make informed judgments about the overall merit of the proposed research and about the probability that the investigators will be able to accomplish their stated objectives with the resources requested and with their own resources during the time allotted. In addition, the proposal should clearly indicate the interdisciplinary nature and innovative approaches of the research.

This section is the main body of a proposal and should cover the following topics in the order given, all within the specified limit of 35 pages:

- The objectives and expected significance of the proposed research, including a complete description of any instruments or hardware proposed to be built in order to carry out the research (Note: see also the Facilities and Equipment section below for the description of critical equipment needed for carrying out the proposed research).
- How the proposed work is expected to build on and otherwise extend the state of knowledge in the field.

- The technical approach and methodology to be employed in conducting the proposed research, including any special facilities of the proposing institution(s) and/or capabilities of the proposer(s) for carrying out the work.
- An outline of the general plan of work, including anticipated key milestones for accomplishments
- A statement of the expected contribution by the PI and each Co-I identified on the proposal, even if they do not derive support from the proposed budget (Note: Inclusion of Co-Is who have either insignificant or unjustified roles will be considered a weakness for purposes of the proposal evaluation).

This section may contain illustrations that amplify and demonstrate key points in the main text of the proposal (including milestone schedules, if appropriate). Any illustrations and figures must be of publication quality, of an easily viewed size, and have self-contained captions that do not contain critical information not provided elsewhere in the proposal.

- *Science Management Plan*

It is expected that individual Teams will often be comprised of members of more than one institution, and in many cases an interdisciplinary approach is also appropriate. Proposals should thoughtfully address the approach to Team management, discussing how Team members and their individual contributions will be integrated into a productive whole. This should include the use of information technology (IT) to promote participation and cohesion both within and between Teams.

Each proposal must indicate how the activities of the researchers from different science disciplines will be integrated in implementing the proposed research program. This part should define the roles and responsibilities of each participant and note the proportion of each individual's time to be devoted to the proposed research activity.

If multiple institutions are involved in the proposal, this part should provide a specific plan for bringing the separate elements together into a well-functioning unit. If a consortium of institutions is proposed, letters verifying cooperation, coordination, and commitments of resources from administrative officials of the consortium members must be included as an appendix to the proposal.

Each proposal must describe how the staff, facilities, and other resources identified in the proposal will be managed to achieve the research objectives. This plan must include:

- A structure for administering personnel, with particular emphasis on how the activities of researchers from different science disciplines will be integrated in implementing the proposed research program;
- A definition of the roles and responsibilities of each participant, noting the proportion of each individual's time to be devoted to the proposed research activity and the management structure for the personnel involved;
- A specific plan, when multiple institutions are involved in the proposal, for bringing separate elements together into a well-functioning unit. (If a consortium of institutions is proposed, letters verifying cooperation, coordination, and commitments of resources from

administrative officials of the consortium members must be included as an appendix to the proposal.);

- A plan for maintaining communication among team members (e.g., weekly tag-ups, videoconferencing, annual meetings).

- *Data and Sample Management Plan*

In order to broaden access to the results of NASA-funded research, proposals are required to include a data and sample management plan (DMP). The guiding philosophy behind this requirement is that all relevant data should be made publicly available (i.e., without fee or restriction of use) at the time of publication, or at the earliest practical time thereafter, through a stable and long-term supported data repository.

Proposers are strongly encouraged to use the PSD DMP template, which may be downloaded as a word doc, or a latex template in the form of a .txt file from the SARA web page at <https://science.nasa.gov/templates-planetary-science-division-appendix-c-roses-proposals>. The DMP must cover any data needed to validate the scientific conclusions of peer-reviewed publications, particularly data underlying figures, maps, and tables.

The DMP should also cover any other data and software that would enable future research or the replication/reproduction of published results. Software, whether a stand-alone program, an enhancement to existing code, or a module that interfaces with existing codes, created as part of a NASA award should be made publicly available when it is practical and feasible to do so and when there is scientific utility in doing so. Stand-alone code that is not straightforward to implement or whose utility is significantly outweighed by the costs to share it is not expected to be made available. NASA expects that the source code, with associated documentation sufficient to enable the code's use, will be made publicly available via the Planetary Science GitHub site (<https://github.com/NASA-Planetary-Science>), as well as any appropriate community-recognized depository (for instance, the homepage of the code base for which a module was developed). Archiving software in a public repository does not require the proposer to maintain the code. Awards that derive from proposals including plans to post code in GitHub will contain a Rights in Data clause reflecting this expectation.

The DMP should also cover any astromaterials planned to be collected or purchased over the course of the research. These include meteorites, micrometeorites, and cosmic dust. The DMP should demonstrate that any such astromaterials with scientific value not consumed during the proposed research will be made publicly available. Proposers are also encouraged, but not required, to discuss how other physical materials collected, purchased, or synthesized during the planned research would be made publicly available when it is practical and feasible to do so and when there is scientific utility in doing so. These might include analog materials collected or synthesized or analytical standards developed.

For proposals that use data that are not publicly available (in the PDS or other archive, in the literature, etc.), for example, laboratory results, Earth-based observations, non-US mission data, or Apollo data that has not yet been archived, the project is expected to make the data available following the Data Management Plan guidelines.

"Data" does not include preliminary and other unpublished data, data in prepublication documents, private communications, or certain other types of information that have been specifically exempted from the DMP requirement.

In the case of a project that would produce no data, as defined above, or only data specifically exempted, the DMP should state that no data preservation or data sharing is needed, but must also explain why. In a case where no appropriate archive exists for a particular data set, the DMP should discuss alternative methods for making the data publicly available.

The DMP must contain the following elements, as appropriate to the project, in adequate detail for review:

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

Proposers intending to archive data or products in the PDS must obtain and include confirmation, in the form of a letter from the appropriate Discipline Node, that the PDS is willing to accept their submission. This letter must be included in the proposal package. Proposers should communicate with the PDS Discipline Node responsible for curating similar data (links to the PDS Discipline Nodes are at <http://pds.nasa.gov/>) to discuss procedures and requirements prior to proposing.

Data products deposited in the Planetary Data System, must be in PDS4 format. Guidelines for planning for the submission data in this format to the PDS are available at <http://pds.nasa.gov/pds4>.

Additional information can be found in <http://science.nasa.gov/researchers/sara/faqs/dmp-faqs-roses/>.

All investigators are to share their data at the time of publication. This rule applies to data that are displayed in charts and figures. This requirement could be met by including the data as supplementary information to the published article or through other means. The published article should indicate how these data can be accessed. Awards will include terms and conditions requiring that as-accepted manuscript versions of peer-reviewed publications that result from SSERVI awards must be uploaded into NASA's part of the [PubMed Central \(PMC\)](#) repository called [NASA PubSpace](#).

- *References*

All citations given in the *Research and Management Plan* must be included, in full, in a list of references, without page limits. It is highly desirable that references use the full title of the paper

or article being referenced. In all cases, standard and easily understood abbreviations for journals must be used.

- *Plan to Support Other Institute and NASA Objectives*

SSERVI's success is based not only on the quality of its research but many other factors which unite this geographically disparate Institute into a functioning whole. The plan to support other Institute and NASA Objectives should address the merits of the proposed activities (in addition to and distinct from the technical quality of the research plan) that will contribute to the objectives of the Institute as a multidisciplinary collaborative consortium (also see Section 1.2). Although Teams are generally expected to be multi-institutional, every Team and individual member of the Institute is expected to be an active participant in the Institute's cooperative endeavors (e.g., video seminars, workshops, focus groups, mentoring of students, and public engagement).

This section should include, in full, the proposers' efforts toward science activation, citizen science, and public engagement (SA/CS/PE). For more details, see Section 1.4.

In addition to the required SA/CS/PE plan, the following categories are presented as nonexclusive examples of activities that contribute to the objectives of the Institute. The potential activities below exemplify the Institute's commitment to: expansion of the professional community, training of young career scientists and engineers, and support of the NASA mission. Evidence of these efforts, presented via statements of support, letters of commitment, or other means is encouraged.

- **Training:** development of the next-generation of researchers through undergraduate and/or graduate courses, degree programs, seminar series, field classes, internships, or other formalized curricula in science and engineering.
- **Professional Community Development:** activities that strengthen and support the development of the profession of Target Body(s) science and exploration, such as publications, programs, workshops, seminar series, and/or focus groups.
- **Information Technology:** creative and innovative ways to use modern communication and other information technologies to enable scientific research, training, collaboration, and other interactions among Institute members.
- **IT Applications:** Development and sharing of applications (hardware and software) for research, simulations, data visualization, modeling, and potential dissemination of algorithms to become online data analysis tools for the broader community.
- **Teaming with Minority Institutions:** efforts to include underrepresented groups in a broad cross-section of Team activities, including scientific research, training, engagement, and other collaborative activities. See Section 1.5.3 for further information.
- **Staff:** institutional commitment in the form of faculty or staff positions and/or effort that support Institute goals, including personnel for research and/or support of engagement activities.
- **Facilities:** major laboratory or other scientific research facilities, especially facilities that can be made available to researchers from other institutions.

- Synergistic collaboration: collaborations with other funding agencies, or other NASA programs, particularly between science and exploration.
- Commercial Space Development: activities that support the development of, and strengthen ties with, commercial space enterprises.
- International Partnerships: activities that support the development and strengthening of relationships with current and potential future Institute international partnerships are highly encouraged. See also Section 1.5.2. (Links to current partnerships are available at <http://sservi.nasa.gov/internationals/>.)
- Other: any additional evidence of commitment to building a strong interdisciplinary science community, enhancement of the effectiveness of the Institute, or demonstration of the proposing Team's commitment to the virtual institute concept.

A proposal is not required to show strength in all of these areas, although every proposal shall address the areas of Training and Teaming with Minority Institutions. A proposal is not required to include a Minority Institution in its membership, but it should describe efforts to include Minority Institutions in a broad cross-section of team activities, including research, training, and other collaborative activities.

The term "institutional commitment" is intended to include those aspects of existing or proposed infrastructure that will contribute in a substantial way to the success of the proposed research. Contributions by both the lead institution and other team members or institutions can be considered.

In general, the cooperative offer of these and other critical resources will be considered *prima facie* evidence of institutional commitment. If provided at no-cost, these contributions will be considered cost-sharing and will only factor into decisions made between proposals of otherwise equal merit (Section 3.4). See the [NASA Guidebook for Proposers](#) for further details.

Statements regarding institutional commitment should provide, in detail, the specific resources that the proposing institution(s) will make available to this effort at reduced and/or no cost to NASA's SSERVI Program, together with an estimate of the value of those resources to this program. The basis for this estimate should be clearly articulated so that the Government can accurately assess the proposed institutional commitment. This part should clearly show how these resources would benefit the implementation of the proposed research effort, the proposed training, and/or the development of the networked institute concept.

- *Relevance*

Proposals must demonstrate specific relevance to the CAN's scope defined in Section 1.3 and the Institute's guiding premise that science enables exploration and exploration enables science. Proposals should also include expected results and a specific discussion of how these results would improve the effectiveness of the Institute, contribute to the success of the planetary/astrophysics/heliophysics scientific communities, and/or the effectiveness of human exploration systems.

- *Facilities and Equipment*

As appropriate, this section should describe any facilities (including any U.S. Government owned facilities) and/or major equipment, critical for carrying out the proposed project, which are already available or would need to be purchased or developed in order to carry out the proposed investigation. Existing facilities/equipment may be considered cost sharing; costs for facility/equipment purchases should be entered in the required proposal Budget Summary and described in accompanying budget details.

- *Curriculum Vitae*

The PI must submit a *Curriculum Vitae* (not to exceed three pages) that includes a history of his/her professional training and positions and a bibliography of publications relevant to the proposal. The proposal must also include a one-page *Vita* for each Deputy PI/Co-I.

- *Current and Pending Support*

Information must be provided for all ongoing and pending projects and proposals that involve the proposing PI and any Co-Is who are expected to perform a significant share of the proposed work (see Section 3.2), whether or not their contributions are specific costs in the proposal's budget. Information is required for each of two categories of support awards that exist at the time of the proposal submission deadline, namely:

- (a) Current Support (for any of the periods that overlaps with the proposal being submitted to this CAN), and
- (b) Pending Support (including the proposal to this CAN).

For each of these categories, provide the following information for each such key individual on the proposal team as noted above:

- Title of award or project
- Program name (if appropriate) and sponsoring agency or institution (including point of contact with telephone number)
- Role of the investigator on the project (e.g., PI, Co-I etc.)
- Proposed period of performance
- Commitment in fractions of a full time Work Year (WY = 2080 hours).

In addition, provide the name of any other institution/agency (Government or private), including an individual point of contact with their telephone number, to which the proposal submitted to this CAN, or any part thereof, has been or will be submitted for consideration of funding. For such pending research, the PI must notify NASA immediately of any successful proposals that are awarded any time after the proposal submission date until the time of selections.

- *Statement(s) of Commitment from Co-Is and Collaborators*

Every PI, Co-I, and Collaborator identified as a participant on the proposal's cover page and/or in the proposal's *Research and Management Plan* must acknowledge his/her intended participation in the proposed effort and identify the organization through which they are participating. The NSPIRES proposal management system allows for participants named on the Proposal Cover Page to acknowledge a statement of commitment electronically. For proposals submitted via Grants.gov, a letter that outlines the team member's role and organization, and commits to their participation, is required.

- *Letters of Support from Consortium and Foreign Co-I Institutions*

Each member institution proposing as part of a consortium proposal must provide a letter signed by an appropriate member of its administration that certifies its commitment to the resources offered in the proposal (e.g.; office space, computer or laboratory facilities, in-kind services, etc.). Additionally, a letter of support from foreign Co-I (but not foreign collaborator) institution(s) must be provided.

- *Letter of Commitment for Science Activation, Citizen Science, and Public Engagement (SA/CS/PE)*

Each proposal may contain letters of commitment to support the proposed SA/CS/PE plan and identification of SMEs. For additional information see Section 1.4. These letters of commitment may be combined with other Statements of Commitment from Co-I's/etc as applicable.

- *Budget Summary and Details*

The budget requirements in this CAN differ from those in SSERVI CAN-1, so please read carefully. The presentation is a little unusual in an attempt to balance NASA's need to have all budget details, while having peer reviewers evaluate only work effort but not salary costs and indirect rates, which are beyond the scope of peer review.

The required NSPIRES *Proposal Cover Page* contains a section in tabular form for the submission of budget figures, including all labor, for each year of the proposed effort, as well as for the total period of performance. This section must be complete, including labor and indirect rates, which will not be included in the body of the proposal, and will be partly redacted from the version of the proposal evaluated by the peer review panel.

In addition to the budget summary information provided in the NSPIRES Cover Page forms, and the Summary Table of Personnel and Work Effort all proposals must include budgets divided into three parts: the "*Budget Justification: Narrative*" and the "*Budget Justification: Details*," both included in the proposal, as described in Section 3.18 of the *NASA Guidebook for Proposers*, and a separately uploaded "*Total Budget*" PDF file. Proposers to this CAN must provide the *Total Budget* in a file called "totalbudget.pdf", which is uploaded as an attachment in NSPIRES separate from the main proposal or

Grants.gov (using the attachment place for Appendices on the NASA-Other Project Information form).

The first two parts, the "*Budget Justification: Narrative*" and the "*Budget Justification: Details*", are within the proposal and available for peer review, so they may not include any salary or overhead information. The *Budget Justification: Narrative* must describe facilities and equipment, as well as the rationale and basis of estimate for all components of cost (without revealing labor and overhead) including procurements, travel, publication costs, and all subawards/subcontracts. The *Budget Justification: Details* must include the detailed proposed budget of all of the Other Direct Costs and Other Applicable Costs as specified in the *NASA Guidebook for Proposers* (except labor and overhead). For this CAN, neither the *Budget Justification: Narrative* nor the *Budget Justification: Details* should specify the Total Estimated Cost, nor the cost of any Direct Labor, or any Administrative Costs (e.g., overhead) for any personnel. Proposed Cost Sharing, if any, may be explained in the *Budget Justification: Narrative*, but cost sharing will not be taken into account in the peer review evaluation of cost, see Section 3.4.

The *Total Budget* file must specify the complete set of cost components including all costs discussed in the *Budget Narrative* and *Budget Details*, as well as the Total Estimated Cost, cost of Direct Labor (including civil servant labor), and Administrative Costs (overhead). The *Total Budget* document will not be provided to the peer review, but will be used by NASA in the evaluation of total cost and comparison of the proposed cost to available funds.

Below are the items that should be in the separately uploaded "*total budget*" file, only a subset of which may be presented in the body of the proposal, as described above.

1) Provide a complete Budget Summary for the total, as well as each individual year of the proposed period of performance. The proposed costs are to be summarized according to the following general categories, which are consistent with the budget section of the *Proposal Cover Page*:

- Direct Labor (salaries, wages, and fringe benefits)
- Other Direct Costs:
  - Subawards/Subcontracts
  - Consultant Services
  - Equipment
  - Materials and Supplies
  - Travel
  - Other
- Indirect Costs (Facilities and Administrative Costs)
- Total Estimated Costs

2) Provide detailed computations of all estimates in each cost category with narratives as required to fully explain each proposed cost as follows.

- Direct Labor (salaries, wages, and fringe benefits): list the number and titles of personnel, amounts of time to be devoted to the grant, and rates of pay.

- Other Direct Costs:
  - a. Subawards/Subcontracts: describe the work to be subawarded/subcontracted, estimated amount, recipient (if known), and the reason for subawarding/subcontracting.
  - b. Consultants: identify consultants to be used, why they are necessary, the time they will spend on the project, and rates of pay (not to exceed the equivalent of the daily rate for Level IV of the Executive Schedule, exclusive of expenses and indirect costs).
  - c. Equipment: list separately. Explain the need for items costing more than \$5,000. Describe basis for estimated cost. General purpose and special purpose equipment are not allowable as a direct cost unless specifically approved by the NASA Grant Officer. Any equipment purchase requested to be made as a direct charge under this award must include the equipment description, how it will be used in the conduct of the basic research proposed, and why it cannot be purchased with indirect funds.
  - d. Supplies: provide general categories of needed supplies, the method of acquisition, and the estimated cost.
  - e. Travel: describe the purpose of the proposed travel, including required trips as outlined in Section 1.2.2, in relation to the grant and provide the basis of estimate, including information on destination and number of travelers, where known.
  - f. Other: enter the total of direct costs not covered by above. Include an itemized list explaining the need for each item and the basis for the estimate.
  - g. Proposed Cost Sharing (if any): Any proposed cost sharing may be reflected within the amounts entered in the separately uploaded "*total budget*" file and the nature of it may be described in the narrative. There is no ability to demonstrate cost sharing as a negative number within the *Budget Summary* forms.

- Indirect Costs/Facilities and Administrative (F&A) Costs: Identify indirect/F&A cost rate(s) and base(s) as approved by the cognizant Federal agency, including the effective period of the rate. Provide the name, address, and telephone number of the Federal agency official having cognizance. Unapproved indirect cost rates are not allowable. Applicants without an approved indirect cost rate may either charge costs directly or, if eligible, use the 10% de minimus rate described at 2 CFR 200.414(f).

- Subtotal-Estimated Costs: Enter the sum of all items listed above.

- Other Applicable Costs: Enter total explaining the need for each item.

- Total Estimated Costs: Note that this amount must match the amount presented on the *Proposal Cover Page*.

- Note also the following important considerations when completing the proposed budget:

(i) If a proposal is selected for award, failure to adequately address the provisions of these budget instructions may require that NASA contact the proposing institution for more information. Such activity may delay the award until missing information is provided.

(ii) If a PI from a non-Government institution proposes to team with a Co-I from a U.S. Government institution (for this purpose, JPL is considered a NASA Center), then the full and complete budget for that Government Co-I institution must be included in the proposal's separately uploaded "*total budget*" file, and the cost for this Government Co-I is to be listed under Other Applicable Costs of the Budget Summary. However, no institutional indirect/F&A may be applied to these costs, since NASA will fund the Government organizations directly.

Salary costs for NASA Civil servants should be phased by fiscal year. Conversely, if a Government PI institution teams with a private sector Co-I institution, that Government institution is expected to cover such Co-I costs through a subaward/subcontract that they execute. Therefore, such private sector Co-I costs should be entered under Subawards/Subcontracts on the Budget Summary.

(iii) In general, the proposing (PI) institution should presume that it will subaward/subcontract the funding of all proposal Co-I's who reside at other institutions (except for a Government Co-I for a private sector PI as noted above); that is, proposers should assume that NASA will not separately make awards to Co-Is at distributed institutions even though this may result in a higher proposal cost because of subcontracting fees. However, exceptions may be considered on a case by case basis when requested in the proposal and found to be in the interest of the Government and consistent with appropriate law, regulation, policy, and practice.

(iv) Whether functioning as a team Institutional PI or as a team member, personnel from NASA Centers must propose budgets based on Full Cost Accounting (FCA). Non-NASA U.S. Government organizations should propose based on FCA unless no such standards are in effect; in that case such proposers should follow the Managerial Cost Accounting Standards for the Federal Government as recommended by the Federal Accounting Standards Advisory Board (for further information, see <http://www.hq.nasa.gov/fullcost>).

#### 4.3 Proposal Budget and Funding Restrictions

- (1) Regardless of whether functioning as a team lead or as a team member, personnel from NASA Centers must propose budgets consistent with the current NASA accounting implementation for the requested year of performance. All NSPIRES cover page budgets must include all costs that will be paid out of the resulting award, including costs of NASA civil servants. Costs that will not be paid out of the resulting award, but are paid from a separate NASA budget (e.g., center management and overhead; CM&O) and are not based on the success of this specific proposal, should not be included in the proposal budget. For example, CM&O should not be included in the proposal budget while other direct charges (including procurements and labor) to the proposed research task should be included.
- (2) Non-NASA U.S. Government organizations should propose based on the Managerial Cost Accounting Standards for the Federal Government, as recommended by the Federal Accounting Standards Advisory Board (see <http://www.hq.nasa.gov/fullcost/> for further information). Proposal budget totals must include all costs that will be paid out of the resulting award. Include figures for all years (up to 5 years for this CAN) of the proposed project in the cover pages, describing total budget, including any subawards. All labor costs, including civil servant labor, shall be provided in this part of the cover page and should be included in your overall budget totals. However, labor figures will automatically be redacted by NSPIRES for presentation to the peer reviewers. It is incumbent upon the civil servant Co-I to provide their center's total burdened amounts to the proposing PI/institution.
- (3) NASA or non-NASA flight team members of U.S. or non-U.S. missions may not request or use funds procured under this solicitation to support Flight Mission Operations. Additional

guidelines for flight team members proposing to use flight data in their proposals can be found in Section 8.1.

- (4) Partnering between NASA scientists and scientists from other Federal laboratories can take a number of forms, both formal and informal. Any and all valid mechanisms are open for consideration by NASA. Examples include: Intergovernmental Personnel Act (IPA) appointments, an interagency agreement, leaves of absence or sabbaticals to participate on-site at any of the institutions, Memoranda of Understanding (MOUs) for shared facility usage, and/or arrangements for joint appointments at accredited universities.
- (5) Travel, including foreign travel, is allowed as may be necessary for the completion of the proposed investigation and representing the Team at various Institute meetings. Travel for the purpose of presenting research results at appropriate professional meetings is also allowed under this CAN.
- (6) Costs for the purchase and/or usage of specific hardware or software, or associated with the use of high performance networks essential for the proposed research, must be included in the budget. If an adequate system does not already exist, Teams should also budget for the purchase and installation of collaborative tools as outlined in Section 1.2.3. Proposed purchases of hardware, software, and telecommunications devices should be clearly indicated as dedicated to the proposed efforts in response to this CAN.
- (7) U.S. research award recipients may directly purchase supplies and/or services from non-U.S. sources that do not constitute research, but award funds may not be used to fund research carried out by non-U.S. organizations. NASA funds cannot be used to bring a foreign researcher to the US, however, subject to export control restrictions, a foreign national may receive remuneration through a NASA award for the conduct of research while employed either full- or part-time by a U.S. organization or while making an official visit to a U.S. organization.
- (8) The construction of facilities (buildings) is not an allowed activity for any of the programs solicited in this CAN. For further information on the allowable costs, refer to 2 CFR 200 Subpart E and 2 CFR 1800 ([http://prod.nais.nasa.gov/pub/pub\\_library/srba/index.html](http://prod.nais.nasa.gov/pub/pub_library/srba/index.html)).
- (9) Profit for commercial firms is not allowable under grant or cooperative agreement awards. Recovery of costs only (no profit) for commercial organizations is allowed. Costs for managing the project may be allowed. These costs, whether direct charges or part of the indirect cost agreement, must be consistent with 2 CFR 200 Subpart E.

## 5.0 PROPOSAL EVALUATION AND SELECTION

### 5.1 Evaluation Criteria

#### 5.1.1 Step-1 Evaluation Process and Criteria

Step-1 proposals shall be evaluated by the HQ SSERVI Program Scientist, the Director of SSERVI, and the Deputy Director of SSERVI.

Criteria to be applied are:

Step-1 Criterion 1: The compelling nature of the focus of the proposed research program and the appropriateness of its scope.

Step-1 Criterion 2: The relevance of the proposed research program to the goals of SSERVI, SMD, and HEOMD.

Step-1 Criterion 3: The complementarity of the proposed research program to the research programs of the SSERVI teams selected through SSERVI CAN-2.

Based on evaluations of the Step-1 proposals, Step-2 proposals will be categorized as either Encouraged or Discouraged and the proposer will be notified electronically within two weeks after submission of the Step-1 proposal. Step-2 proposals may still be submitted even if Discouraged.

#### 5.1.2 Step-2 Evaluation Process and Criteria

The six criteria for evaluation of proposals in response to this CAN are:

1. Scientific and Technical Merit
2. Plan to support other Institute and NASA objectives
3. Merit of the Science Management Plan
4. Merit of the Data and Sample Management Plan
5. Relevance
6. Cost Reasonableness

Selection is expected to be highly competitive, and deficiencies in any of the six evaluation criteria may result in the non-selection of a proposal.

##### *5.1.2.1 Scientific and Technical Merit*

This criterion addresses the scientific and technical merit of the proposed research program with respect to the topics described in Section 1.3. Particular emphasis will be placed upon innovative and interdisciplinary approaches to fulfill the research objectives and the formulation of a research plan that addresses the scope of this call. This criterion also includes appropriate breadth of the research and quality of the Team. In addition, this criterion includes the probability of success (i.e., bringing the proposed tasks to successful closure) based on the period of performance and available resources. Prior relevant accomplishments can be used as one form of positive evidence that the proposed research plan can be carried out successfully. Finally,

research that complements but does not duplicate ongoing activities of the four SSERVI CAN 2 teams selected in 2017 is desirable (<https://sservi.nasa.gov/sserviteams/>).

#### *5.1.2.2 Plan to Support Other Institute and NASA Objectives*

Proposals will be evaluated on the specific plans for aligning their work with the overall mission statement of SSERVI (<https://sservi.nasa.gov/overview/>) and efforts including (but not limited to) those found in Section 4.2.3.3. Discussing efforts that relate to “other Institute objectives” may represent evidence of institutional commitment from the proposing organizations.

#### *5.1.2.3 Merit of the Science Management Plan*

Each proposal must include a separate plan that describes how the staff, facilities, and other resources identified in the proposal will be managed to achieve the research objectives. Reviewers will assess the details of the plan to determine if it is sufficient to successfully complete the research objectives of the proposal. Reviewers will consider the staffing plans and their science disciplines, the roles and responsibilities and time allocated for said support. They will also consider the plan’s proposal for effectively integrating the proposed research efforts and managing multiple institute collaborations plans, schedules and communication mechanisms. Reviewers will assess the degree to which proposers understand the demands of participating in the Institute structure and how well they are prepared to meet those demands.

#### *5.1.2.4 Merit of the Data and Sample Management Plan*

The data and sample management plan should ensure that results are relevant and that data and samples are made available in a timely fashion for broader community use (See Section 1.3.1).

#### *5.1.2.5 Relevance*

This criterion addresses the relevance of the overall, integrated proposal to the science and exploration goals of SSERVI and NASA as expressed through this CAN. Proposals must demonstrate, in a one-page summary, the potential contribution of the effort to the Institute’s guiding premise that science and exploration are fundamentally entwined: science enables exploration and exploration enables science. Relevant proposals must also demonstrate an understanding of, and articulate how, the proposed research relates to and influences understanding of the Target Body(s). Proposals will be evaluated on their relevance to the topics in Section 1.3, the Institute’s mission, and their strategic relevance to NASA. Proposals of high relevance must articulate and demonstrate understanding of how the proposed research relates to and will influence the fields of study in this call as well as ongoing and planned research activities and flight missions of NASA. Proposals will also be evaluated on how well they draw specific connections to, and describe how the results of the work will have strategic impact on, NASA's space flight programs and its broader research communities (e.g., in HEOMD, Astrophysics, etc).

### 5.1.2.6 Cost Reasonableness

Cost data for U.S. proposals will be evaluated by peer review for cost reasonableness. Proposers must follow the budget requirements in Section 3.18 of the [NASA Guidebook for Proposers](#). In evaluating the cost reasonableness of the proposals, reviewers will assess three components of cost: 1) Work Effort, 2) Other direct costs, 3) Support of other institute and NASA objectives are commensurate with those required to accomplish the goals of the investigation. Salary levels, fringe benefit rates, and overhead rates are not part of that evaluation, and will be hidden from peer reviewers.

- 1) Work Effort will determine whether the proposed level of effort (i.e., labor Full Time Equivalent or FTEs) is sufficient to complete proposed scientific objectives. Salary levels, fringe benefit rates, and overhead rates are not part of that evaluation. Proposers are urged to make sure that adequate funds are included for partners commensurate with their level of involvement in proposed activities.
- 2) The proposed other direct costs (i.e., supplies, equipment, travel) will be assessed to determine if they are adequate to accomplish the goals of the investigation.
- 3) Proposers are required to participate in all listed institute meetings/events per Section 1.2.2 and the evaluation of budget will include an assessment of whether adequate support of other institute and NASA objectives has been included.

Failure to adequately provide detailed cost data will require NASA Procurement Personnel to contact the proposing organization for the required information. This will result in a delay of the award. All Proposers are required to submit a thoroughly detailed cost breakdown. NASA Procurement Personnel must be able to determine that all proposed costs are allowable and reasonable. A detailed budget will facilitate this cost analysis. See Reference Section A - Exhibit A of the Grant and Cooperative Agreement Handbook located at the following URL: [http://prod.nais.nasa.gov/pub/pub\\_library/srba/index.html](http://prod.nais.nasa.gov/pub/pub_library/srba/index.html).

Although cost sharing is not part of the peer-review evaluation criteria and is not required, the Selection Official may take cost sharing into account in decisions between proposals of otherwise equal merit. See Section 3.4 for further information.

### 5.2 Evaluation Process

Step-2 proposals submitted under this CAN will be evaluated by peers of the proposing personnel who have been screened for conflicts of interest. In addition, one or more external reviews, solicited by the SMD and/or HEOMD Program Officers and made available to the review panel, may augment the panel review. As a general rule, a peer review panel may wholly or partially accept or reject external reviews. The final panel evaluation will be reviewed and approved for completeness and clarity by the chairperson of the panel and the SMD and HEOMD Program Officers.

The strengths and weaknesses delineated by the review panel for each of the six criteria (Science and Technical Merit, Science Management Plan, Data and Sample Management Plan, Plan to

Support Other Institute and NASA Objectives, Relevance, and Cost Reasonableness) will be used to evaluate the proposal. The composite score will be calculated from the component criteria using the following formula: Science and Technical Merit - 50%; Merit of the Science Management Plan -10%, Merit of the Data and Sample Management Plan - 5%, Merit of the Plan to Support Other Institute Objectives - 20%, Relevance to NASA - 10% and Cost Reasonableness – 5%. However, a serious deficiency in any criterion is reason for non-selection.

Review panels will base proposal evaluations on the criteria and objectives stated in this CAN. To help ensure uniformity of the reviews, NASA asks its reviewers to document their findings using clear, cogent language that is understandable to the non-specialist. NASA asks reviewers to organize their comments into major and minor strengths and weaknesses, where it is understood that a minor weakness is a comment of value to the selecting official and/or the proposers which is noteworthy but often correctable if addressed early in the period of performance, but that a major weakness is considered a serious flaw that could: a) effectively prevent, in whole or in part, the proposed objectives from being accomplished, and/or, b) may render the proposal unsuitable for consideration for funding (e.g., the proposal fails to address the CAN’s objectives, or does not show promise of making a significant advance in its field).

To aid in the review process, proposals should clearly delineate the sections that deal with technical merit, science management plan, data and sample management plan, support for other institute and NASA objectives, relevance, and cost as these criteria will be scored separately.

The number and significance of strengths and weaknesses for a proposal determines its final summary evaluation based upon the following adjectival scale:

| Evaluation       | Basis for Summary Evaluation  | Potential for Selection   |
|------------------|---|---|
| <i>Excellent</i> | A comprehensive, thorough, and compelling proposal of exceptional merit that fully responds to the objectives of the CAN as documented by numerous and/or significant strengths and having no major weaknesses. | Top priority for funding subject to the availability of funds and programmatic balance in the context of the objectives of the CAN and/or the existing program as a whole.  |
| <i>Very Good</i> | A highly competent proposal of very high merit that fully responds to the objectives of the CAN, whose strengths fully out balance any weaknesses.  | Second priority for selection subject to:<br>(i) the availability of funds,<br>(ii) considerations of programmatic balance, and<br>(iii) the constraint that no Excellent proposal having substantially the same objective(s) be displaced. |

|             |  |  |
|-------------|--|--|
| <i>Good</i> | A competent proposal that represents a credible response to the CAN whose strengths and weaknesses essentially balance.  | May be selected as funds permit for purposes of programmatic balance once dissimilar programmatic areas represented by Excellent and Very Good proposals have been funded. |
| <i>Fair</i> | A proposal that provides a nominal response to the CAN but whose weaknesses outweigh any perceived strengths.  | Not selectable regardless of the availability of funds.  |
| <i>Poor</i> | A seriously flawed proposal having one or more major weaknesses (e.g., an inadequate or flawed plan of research, or lack of focus on the objectives of the CAN). | Not selectable regardless of the availability of funds.  |

### 5.3 Review of Applicants in the Federal Awardee Performance and Integrity Information System (FAPIIS)

Prior to making a Federal award with a total amount of Federal share greater than the simplified acquisition threshold (currently \$250,000), NASA is required to review and consider any information about the applicant that is in the designated integrity and performance system (currently the Federal Awardee Performance and Integrity Information System—FAPIIS) accessible through the System for Award Management (SAM, <https://www.sam.gov>) (see 41 U.S.C. 2313). An applicant, at its option, may review information in FAPIIS and comment on any information about itself that NASA previously entered and is currently in FAPIIS. NASA will consider any comments by the applicant, in addition to the other information in FAPIIS, in making a judgment about the applicant's integrity, business ethics, and record of performance under Federal awards when completing the review of risk posed by applicants as described in 2 CFR 200.205 Federal awarding agency review of risk posed by applicants.

### 5.4 Selection Process

At the conclusion of the review process, draft selection recommendations will be developed by the Institute Director and submitted for concurrence to the SSERVI Program Scientist. The Program Scientist will submit final recommendations to the Selecting Official, together with the evaluation report and materials. The Selecting Official for this CAN is the Director of the Planetary Science Division of SMD, in consultation with the director of the Advance Explorations Systems Division of HEOMD.

Note that NASA reserves the right to offer selection to only a portion of a proposed investigation; in such a case, the proposer will be given the opportunity to accept or decline NASA's offer. For this program, it is expected that a cooperative agreement will be sought for all selected institutions other than Government agencies, for which an interagency transfer of funds

will be used, or NASA Centers, for which internal funding procedures will be used (see Section 2.1).

Proposers should note that issues of programmatic balance can be a major discriminator in proposal final selections. Programmatic balance can be defined as balancing proposal selection based upon considerations with respect to the objectives of the program. For example, the potential need to represent multiple scientific topics in the final selected Institute Team portfolio may be a major factor in Team selection.

## 6.0 AWARD ADMINISTRATION INFORMATION

### 6.1 Notice of Award

As soon as possible after the selection is concluded, NASA will inform each proposer of the selection or non-selection of his/her proposal by phone or electronic mail and will offer a debriefing. For selected proposals, a NASA Grants Officer, who is the only official authorized to obligate the Government, will contact the offeror's business office. Per 2 CFR 1800.209, NASA allows pre-award costs of up to 90 days prior to the award date to be reimbursed. Awards are made to the proposing institution, not directly to the proposal PI.

### 6.2 Administrative and National Policy Requirements

All administrative and national policy requirements may be found at 2 CFR 200, 2 CFR 1800, 14 CFR 1274 (commercial firms when cost share is required) and the NASA Grant and Cooperative Agreement Manual (all available at [http://prod.nais.nasa.gov/pub/pub\\_library/srba/index.html](http://prod.nais.nasa.gov/pub/pub_library/srba/index.html)).

If research involving human subjects is funded, requirements found in NASA Policy Directive 7100.8E and NASA Procedural Requirement 7100.1A will apply.

- NASA Policy Directive 7100.8E Protection of Human Research Subjects  
[http://nodis3.gsfc.nasa.gov/displayDir.cfm?Internal\\_ID=N\\_PD\\_7100\\_008E\\_&page\\_name=main&search\\_term=7100](http://nodis3.gsfc.nasa.gov/displayDir.cfm?Internal_ID=N_PD_7100_008E_&page_name=main&search_term=7100)
- NASA Procedural Requirement 7100.1A Protection of Human Research Subjects  
<https://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPR&c=7100&s=1A>

### 6.3 Award Reporting Requirements

Annual funding allotments after the first award year will be provided only after the submission of an acceptable progress report. The requirement for annual reporting is met by satisfactory input to the Institute's Annual Science Report.

All information disseminated as a result of this cooperative agreement shall contain a statement that acknowledges the Institute's support and identifies the award by number (e.g., "These results are based upon work supported by the Institute under award No(s) GRNASM99G000001", etc.).

Award recipients will also be subject to reporting requirements (such as uploading publications to PubSpace) under the [NASA Plan for Increasing Access to the Results of Scientific Research](#). Any such requirements will be identified in the Notice of Award.

If the Federal share of any award issued under this CAN is more than \$500,000 over the period of performance, additional reporting requirements will apply. See 2 CFR 200 Appendix XII—Award Term and Condition for Recipient Integrity and Performance Matters ([http://www.ecfr.gov/cgi-bin/text-idx?SID=4b63b1740bdb186d3bf5d346f5ddf42c&mc=true&node=ap2.1.200\\_1521.xii&rgn=div9](http://www.ecfr.gov/cgi-bin/text-idx?SID=4b63b1740bdb186d3bf5d346f5ddf42c&mc=true&node=ap2.1.200_1521.xii&rgn=div9))

## 7.0 POINTS OF CONTACT FOR FURTHER INFORMATION

Please send specific questions to: [HQ-SSERVI@mail.nasa.gov](mailto:HQ-SSERVI@mail.nasa.gov)

Gregory Schmidt, Deputy Director  
Solar System Exploration Research Virtual Institute  
NASA Ames Research Center, N17-1  
Moffett Field CA 94035-1000  
Phone: 650-604-2611  
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Dr. Sarah Noble, Program Scientist  
Science Mission Directorate  
NASA Headquarters  
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NASA Headquarters  
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## 8.0 ANCILLARY INFORMATION

### 8.1 Sources of Information and Data

The Institute supports research investigations relevant to the scientific interpretation of data from past missions/telescope observations that are now in the public domain and to the science and exploration objectives of future missions. It supports investigations that use only publicly available and released data.

US spacecraft data to be used in proposed investigations must be available in the Planetary Data System (PDS) (<http://pds.nasa.gov>) or other publicly accessible archive(s) no later than 30 days prior to the submission due date for proposals. US spacecraft data that have not been placed in the public domain or that have not yet been acquired may not be proposed for use in these investigations. Data in peer-reviewed publications are considered available. Once a proposal has been awarded, investigators are free to augment the proposed dataset under analysis with data deposited in the PDS (or other publicly available archive) subsequent to 30 days prior to the submission date of this CAN.

Members of current mission flight teams proposing to this CAN must clearly demonstrate that their proposed investigation will use only released and publicly available data. Additionally, current flight team members, who have proposed to this CAN in any category (PI, Deputy PI, Co-I or Collaborator status), must clearly demonstrate how the proposed research does not overlap – and is not redundant with – data analysis duties/responsibilities already funded within their respective mission. In all cases, it is the responsibility of the investigator to acquire any necessary flight data. Data for most planetary missions may be accessed through the Planetary Data System <https://pds.nasa.gov/>.

Proposers who will be taking new data (other than NASA flight data) are not subject to the 30 day prior to CAN release rule as outlined above. Examples of such "new data" include – but are not limited to – experimental, laboratory, or telescope data. Proposers are free to propose a telescopic data acquisition plan or campaign but must accurately reflect the cost involved in such a campaign in their budgets. Example costs include: labor for data acquisition, data management, data analysis and science publication; travel (if not remote observing); telescope use fees (if justified over a public access facility); and required equipment. Proposers are encouraged to explore methods to minimize such costs, such as remote telescopic operations.

### 8.2 Public Access to Data

As a matter of policy, all data taken or products created in the performance of a NASA research award is expected to be made available to the public as rapidly as possible.

In addition, award recipients will be required to archive all as-accepted manuscript versions of publications that result from NASA awards in the NASA-specific part of National Institutes of Health PubMed Central full-text archive, PubSpace.

### 8.3 Accessibility and Usability Guidelines

NASA shall ensure that employees with disabilities have access to and use of information and data that are comparable to information and data available for other employees or members of the public without disabilities. The proposal shall address how electronic and information technology accessibility will be met. For additional information regarding the Architectural and Transportation Barriers Compliance Board (Access Board) policies, see:

- Accessibility Guidelines <http://www.hq.nasa.gov/webmaster/accessibility/>
- Usability Guidelines <http://www.usability.gov>.

### 8.4 NASA-Provided High-end Computing Resources

NASA's Science Mission Directorate provides a specialized computational infrastructure to support its research community, managed on its behalf by NASA's High-End Computing (HEC) program (<http://www.hec.nasa.gov/>). Two major computing facilities are offered, namely, the NASA Center for Computational Sciences (NCCS) at Goddard Space Flight Center (GSFC), and the NASA Advanced Supercomputing (NAS) facility at Ames Research Center (ARC). The HEC program facilities maintain a range of capacity and capability computing systems, with significant data storage resources. These offerings are summarized at <http://www.hec.nasa.gov/about/overview.html>. Augmentation and refreshment of these central systems occur on a periodic basis. The HEC program also provides user services in code porting, performance tuning, scientific data visualization, and data transfer.

Any need for computing time and other HEC program resources for the proposed research must be explicitly described. The proposal should include identification of the computing system and location, rationale, and justification of the need, how it supports the investigation, when during the proposed period the resources will be required, and an estimate of processor hours and storage capacity needed. An aggregated computing time per year (number of runs times number of processors per run times number of hours required per run) should also be included.

The box provided on the *Cover Page* for proposals submitted in response to this CAN should also be "checked" to indicate that a request for computing resources is included in the proposal. As they review the intrinsic merit of the proposed investigation, science peer review panels will be asked to consider the realism and reasonableness of the computing time request and whether it is an appropriate utilization of a highly constrained resource.

To receive an allocation of HEC resources, proposed investigations selected for funding must make annual requests. The fully requested levels cannot be guaranteed. SMD will make every attempt to satisfy the needs in the context of the overall set of requirements, resource constraints, and science priorities.

The HEC website provides the mechanism for PIs to formally request full computing time allocations as identified in their funded proposals. Computing time awards are for one year and

nontransferable. PIs may make large requests, greater than 100,000 aggregated computing hours, at any time during the year, but requests will be considered only twice a year (November and April). Small requests of less than 100,000 aggregated computing hours may be allocated throughout the year.

To expedite the set-up of new user accounts (especially for foreign nationals that require additional documentation and take longer to process), the HEC program will immediately award any selected proposal that has requested HEC resources a small allocation of start-up computing time. Selected PIs may then request accounts for themselves and all users on their team. For guidance on requesting computing time, getting accounts, and using computing systems, visit <http://www.hec.nasa.gov/>.

For further information contact:

Tsengdar J. Lee  
Earth Science Division  
Science Mission Directorate  
NASA Headquarters  
Washington, DC 20546-0001  
Email: [Tsengdar.J.Lee@nasa.gov](mailto:Tsengdar.J.Lee@nasa.gov)  
Telephone: 202-358-0860

#### 8.5 Electronic Notification of NASA Research Solicitations

NASA Headquarters maintains an electronic notification system to alert interested researchers of its research program announcements. Subscription to this service is free to all registered users of the NASA proposal data base system at <http://nspires.nasaprs.com/>. To add or change a subscription to the electronic notification system, users should login to the data base system and select "Account Management" then "Email Subscriptions." This Email service will notify all subscribers of:

- (i) All NASA Headquarters research program solicitations (within a given Directorate), regardless of their type or science objectives;
- (ii) Amendments to those solicitations, including this CAN; and
- (iii) Special information that NASA Headquarters wishes to communicate to those interested in proposing to its sponsored research programs.

Regardless of whether or not this service is used, all NASA Headquarters research announcements and amendments may be accessed at <http://nspires.nasaprs.com/> (select "Solicitations" then "Open Solicitations") as soon as they are posted (typically by ~9:00 a.m. Eastern Time on their release date).

## 9.0 CONCLUDING STATEMENT

Through this solicitation, NASA seeks to strengthen and enrich the planetary research community and the U.S. capability to support scientific and human exploration of the Moon and other Solar System destinations. It is hoped that the science Teams selected under this CAN and the research and discoveries stemming from their work, will inspire future scientists and explorers. We enthusiastically invite the submission of proposals to this announcement in order to help NASA achieve these goals.

DRAFT

## APPENDIX A

### DETAILED PROPOSAL CONTENT AND SUBMISSION REQUIREMENTS FOR SOLAR SYSTEM EXPLORATION RESEARCH VIRTUAL INSTITUTE

#### Appendix A Table of Contents:

A.1 Electronic Submission through the NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES)

A.2 Definitions and Terms

A.1 Electronic Submission through the NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES)

Offerors must submit proposals in response to this CAN must be submitted in a fully electronic form. Hard copies of the proposal will not be accepted. Electronic proposals must be submitted by the Authorized Organization Representative (AOR) at the proposer's institution. Electronic submission by the AOR serves as the required original signature by an authorized official of the proposing institution. Offerors must submit proposals in response to this CAN via NSPIRES, located at <http://nspires.nasaprs.com/> or Grants.gov, located at <http://www.grants.gov>. NASA plans to use the NSPIRES system to facilitate the review process.

Note carefully the following requirements for submission of an electronic proposal:

- Every organization that intends to submit a proposal to NASA electronically must be registered in NSPIRES (this requirement applies even for proposals submitted via Grants.gov).
- Organizations must obtain a Data Universal Numbering System (DUNS) number. Note that an organization must also be registered in the System for Award Management Assistance (SAM) where the approval process can take several days (at minimum). SAM registration should be performed by an organization's electronic business primary point-of-contact. Organizations new to NSPIRES or any offeror new to the NASA CAN process should visit and register in the SAM system (<https://www.sam.gov>) early in the proposal preparation process.
- Any partner institution requesting NASA funds through the proposed project must be listed on the Proposal Cover Page. NASA will not fund institutions that do not appear on the Proposal Cover Page.
- In addition, every individual named on the proposal's electronic Proposal Cover Page form (ref. [NASA Guidebook for Proposers](#), Section 3.7) as a proposing team member in any role, including Co-Is and collaborators, must be registered in NSPIRES even if the proposal is submitted via Grants.gov. Such individuals must perform this registration themselves; no one may register a second party, even the PI of a proposal in which that person is committed to participate. This data site is secure and all information entered is strictly for NASA's use only.
- Each individual team member named on the proposal's cover page must specify a participating institution. The institution specified must be the institution through which the

team member is participating in the proposed project. A proposal cannot be submitted if an organizational relationship is missing for any team member. If the individual has multiple affiliations, then this institution may be different from the individual's primary employer or preferred mailing address.

Submission of electronic proposals via NSPIRES requires several coordinated actions within the proposing institution. 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 project description section), an official at the PI's institution 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. 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 institution.

Only appendices/attachments that are specifically requested in either this CAN or in the [NASA Guidebook for Proposers](#) will be permitted. Proposals containing additional appendices/attachments may be declared noncompliant and returned without peer review. In the event the information in this CAN is different from or contradicts the information in the [NASA Guidebook for Proposers](#), the information in this CAN takes precedence.

Important note on creating PDF files for upload: It is essential that all PDF files generated and submitted meet the NASA requirements below. This will ensure that the submitted files can be transferred into NSPIRES. At a minimum, it is the responsibility of the offeror to: (1) ensure that all PDF files are unlocked, searchable, and that edit permission is enabled – this is necessary to ensure that all submitted files can be ingested by NSPIRES; and (2) ensure that all fonts are embedded in the PDF file and that only Type 1 or TrueType fonts are used. In addition, any offeror who creates files using TeX or LaTeX is required to first create a DVI file and then convert the DVI file to Postscript and then to PDF. See <http://nspires.nasaprs.com/tutorials/index.html> for more information on submitting PDF documents into NSPIRES. PDF files that do not meet the NASA requirements cannot be transferred into the NSPIRES system; such files may be declared noncompliant and not submitted to peer review for evaluation.

NSPIRES will provide a list of all elements that make up an electronic proposal, and the system will conduct an element check to identify any item(s) that is (are) apparently missing or incomplete. The element check may produce warnings and/or identify errors. Uploading the proposal in one PDF file is likely to create "warnings" as part of the element check. These warnings should be ignored, as these warnings do not preclude proposal submission; however, an "error" in the element check will preclude submission.

Offerors are encouraged to begin their submission process early. Tutorials and other NSPIRES help topics may be accessed through the NSPIRES online help site at <http://nspires.nasaprs.com/external/help.do>. For any questions that cannot be resolved with the available on-line help menus, requests for assistance may be directed by Email to

[nspires-help@nasaprs.com](mailto:nspires-help@nasaprs.com) or by telephone to (202) 479-9376, Monday through Friday, 8:00 a.m. to 6:00 p.m. Eastern Time (excluding Federal holidays).

## A.2 Definitions and Terms

- *Authorized Organizational Representative's (AOR)*: Proposing institution's business office representative responsible for requests and agreements between NASA and awarded institution.
- *Citizen Science*: Scientific research conducted, in whole or in part, by amateur or nonprofessional scientists. Formally, citizen science has been defined as "a form of open collaboration in which individuals or organizations participate voluntarily in the scientific process in various ways, including— (A) enabling the formulation of research questions; (B) creating and refining project design; (C) conducting scientific experiments; (D) collecting and analyzing data; (E) interpreting the results of data; (F) developing technologies and applications; (G) making discoveries; and (H) solving problems."
- *Co-Investigator (Co-I)*: A member of the proposal's investigation team who is a critical "partner" for the conduct of the investigation through the contribution of unique expertise and/or capabilities. A Co-I must have a well-defined, sustained, and continuing role in the proposed investigation, serve under the direction of the PI, and may or may not receive funding through the award (see Section 3.2).
- *Collaborator*: An individual who is less critical to the proposal than a Co-I but who is committed to provide a focused, but unfunded, contribution for a specific task(s). (See Section 3.2)
- *FTE*: Full-Time Equivalent
- *HEOMD*: NASA's Human Exploration and Operations Mission Directorate
- *HRP*: Human Research Program
- *Institute*: Solar System Exploration Research Virtual Institute
- *Institution*: Any research organization
- *IRP*: Integrated Research Plan
- *ISRU*: *In Situ* Resource Utilization
- *ITWG*: Information Technology Working Group: A group comprised of representatives from all Institute teams tasked with assisting teams in getting connected and developing methods and technologies that push the boundaries of collaborative technologies
- *Institute member*: An individual Team participant identified as such by a Team PI
- *Lead Institution*: PI's home institution and the research organization submitting the proposal, either individually or on behalf of a group of cooperating institutions
- *Moon (Lunar)*: Earth's moon and its environs, including first and second Earth-Moon Lagrange points
- *Martian moons*: Phobos and Deimos
- *NASA HQ*: NASA Headquarters
- *NEA*: Near Earth Asteroids
- *NEO*: Near Earth Objects
- *Science Activation/Citizen Science and Public Engagement (SA/CS/PE) Working Group*: A group comprised of representatives from each team who lead Team SA/CS/PE activities and support the Institute Central Office in engagement efforts

- *Science Activation*: Collaborative network transforming NASA SMD unique assets for learners of all ages, efficiently and effectively. SSERVI CAN awardees shall work with network post-award. See <https://science.nasa.gov/learners>
- *Science Communications*: Activities aimed at sharing the findings and excitement of science.
- *SSERVI Central Office*: The management headquarters based at NASA Ames Research Center
- *Subject Matter Experts (SMEs)*: Scientists and engineers with bona fide expert knowledge to ask compelling scientific questions and then find ways to answer them within the objectives of NASA SMD.
- *PHO*: Potentially Hazardous Objects
- *Principal Investigator (PI)*: An individual who is the leader of the proposing research team *and responsible for the quality and direction* of the entire proposed investigation and for the use of all awarded funds (see Section 3.2)
- *PSD*: Planetary Science Division
- *SMD*: NASA's Science Mission Directorate
- *STEAM*: Science, Technology, Engineering, Art, and Mathematics
- *Target Body(s)*: One or more of the following Solar System bodies: Moon, Near Earth Asteroids, martian moons (Phobos, Deimos)
- *Team*: A Group of individuals who will carry out the proposed research
- *Workshops without Walls*: Virtual one- to three-day workshops done entirely by videoconference
- *WYE*: Work Year Equivalent