



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

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## **RESEARCH OPPORTUNITIES FOR ISS UTILIZATION**

**NASA Research Announcement:  
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**Soliciting Concept Papers for ISS Post-Graduate Innovation  
Awards in Space Life and Physical Science Research**

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This solicitation is requesting the development of a concept paper describing ground based research that can be enhanced by flying in a microgravity environment on the International Space Station (ISS). Concept papers selected will have the opportunity to submit a full ISS flight proposal based on the merit of the research presented. Concept papers that do not conform to the standards outlined in this solicitation may be declared noncompliant and declined without review. You must read and understand this solicitation in its entirety to prepare a competitive concept paper. Key requirements are identified here:

- The primary targets of this solicitation are graduate Ph.D. students and post-doctoral fellows at institutions from the NASA EPSCoR jurisdictions; however any US institution may submit a concept paper.
- NASA anticipates that up to 10 awards will be given for concept papers that outline innovative research that is aligned with the priorities of the ISS program. The monetary value of each award will total up to \$4,000 but the total award will not exceed \$40,000. The selected awardees will be invited to submit full ISS proposals on their research which may result in one flight opportunity for student researchers.
- The period of performance for this solicitation is 4 months. Therefore, Notices of Intent are not required.
- You and your institution must be registered with NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES). An authorized representative of your institution must submit your proposal. For all EPSCoR jurisdictions, the proposal must be submitted by the jurisdiction's EPSCoR director. All team members listed on the proposal must be registered with NSPIRES (Section IV.B.1.a).
- Your specific aims must address the research emphases in this solicitation (Section I.B)
- The length of the proposal cannot exceed 5 pages using standard 12 point type (Section IV.B.2)

## **I. Funding Opportunity Description**

### **A. Scope**

The National Aeronautics and Space Administration (NASA) International Space Station (ISS) Program and the Space Life and Physical Sciences Office (SLPS) solicit hypothesis-driven research concept papers that utilize the ISS as a microgravity platform in the Space Life and Physical Sciences disciplines.

Within NASA Headquarters, Human Exploration and Operations Mission Directorate, the Space Life and Physical Sciences Office (SLPS) serves to execute high quality, high value research and application activities in the areas of Space Life Sciences (SLS), Physical Sciences (PS), Human Research and Crew Health and Safety by mitigating the risks to the crews, and conducting research and developing technologies that will allow humans to travel safely and productively in the environment of space. The ISS Research Office serves as a “gateway” to the ISS.

The unprecedented opportunity exists in using the ISS platform to advance several key technologies and develop innovative research for the next steps in space exploration. The ISS is a one of a kind laboratory that offers access to microgravity, constant crew support, robotic

servicing, and the harshness of the space environment.

This solicitation is targeted at Graduate Ph.D. students and Post-Doctoral Fellows who have never participated in any variations of space flight research and have no experience in designing ISS spaceflight scientific investigations. Student researchers who belong to the Experiment Program to Stimulate Competitive Research (EPSCoR) jurisdiction are strongly encouraged to participate. These concept papers will be for ground-based research that can be translated into ISS flight investigations in the following disciplines: Microbiology, Space Physiology and Physical Sciences specifically Combustion Science, Fluid Physics, Material Science and Complex Fluids. NASA Space Life and Physical Science research have several goals: (1) to effectively use the microgravity and other characteristics of the space environment to enhance our understanding of basic biological, chemical and physical processes; (2) to develop scientific and technological foundations for a safe, productive human presence in space for extended periods and in preparation for exploration; and (3) to apply this knowledge and technology to improve our nation's competitiveness, education and the quality of life on Earth. NASA Life and Physical Science experiments will be designed to discover how space flight affects a diverse group of microorganisms, plants and animals and study the effects of microgravity on both chemical and physical processes and specifically in the areas of combustion, fluid physics, complex fluids, and material science. **Concept papers must address the specific research emphases for this solicitation described in Section 1.B.**

NASA's selection of research projects is guided by recommendations of the National Research Council's 2011 Decadal Survey Report, "Recapturing a Future for Space Exploration: Life and Physical Sciences Research for a New Era" (<http://www.nap.edu/catalog/13048.html>) (hereafter "Decadal Survey"). Each research emphasis described in section I.B is focused on specific recommendations and flight opportunities described in the Decadal Survey. **Proposers should read and understand this document. NASA will select a limited number of innovative, competitive, hypothesis-driven, scientifically meritorious studies submitted to this solicitation that address one or more of the highest priority recommendations of the decadal survey. Each proposer must identify how the proposed experiments address at least one of the highest priority recommendations of the Decadal Survey.**

NASA intends to sponsor studies that will result in new basic knowledge that will provide a foundation on which other NASA researchers and engineers can build approaches and countermeasures to the problems confronting human exploration of space, or that translate into new biological, chemical or physical science tools or applications on Earth.

All concept papers meeting the solicitation criteria will be evaluated for scientific and technical (implementation) merit by independent peer review panels. Proposed research judged to be of high scientific merit and feasible to implement will be evaluated for their relevance to programmatic needs and goals. The government's obligation to make awards is contingent upon the availability of appropriated funds from which payment for award purposes can be made, and

the receipt of concept papers that the government determines are acceptable for award under this NRA.

NASA anticipates that up to 10 awards will be given for concept papers that outline innovative research that is aligned with the priorities of the ISS program. The monetary value of each award will total up to \$4,000 but the total award will not exceed \$40,000. The selected awardees will be invited to submit full ISS proposals on their research which may result in one flight opportunity for student researchers. See Section II for details.

## **B. Research Emphases Specific to this Solicitation**

This NRA solicits the development of concept papers on ground-based Life and Physical sciences research designed to lead to Space Flight. The scope for each of the research emphases is different. Concept papers must be responsive to one of these emphases. Additionally, the proposed research approach must adhere to any specific constraints or guidelines outlined within the research emphasis area described below.

### **B.1 – Microbiology**

The field of microbiology is one that is critical to human space exploration. As humans explore space, microorganisms will accompany them. While most microorganisms do not appear to have a substantial impact on the mission, several species can present a risk to crew health or the integrity of the vehicle and its systems. Conversely, many species are beneficial for crew health, necessary for plant growth and development, and hold the potential for bioprocessing and bioremediation that could advance our space exploration capabilities. Understanding the roles that microorganisms have played and will play in the human exploration of space is complicated by the unique microbiological responses that have been observed when microorganisms are cultured during spaceflight. The mechanism behind these alterations is unclear; however, when compared to identically growth cultures on Earth, multiple spaceflight experiments have documented altered growth rates, differentially expressed genes, increased virulence, and changes in antibiotic susceptibility. To fully prepare for future spaceflight, a thorough understanding of the benefits and potential risks associated with microorganisms must be accomplished, and the ISS provides an exceptional platform to achieve that goal.

Proposed concept papers can cover a broad range of topics, including but not limited to:

- the protection of crew health;
- microbial ecology;
- microbiome studies;
- the response of microorganisms to spaceflight culture;
- planetary protection;
- the use of microorganisms for beneficial purposes, such as probiotics, energy generation,

and waste remediation.

## B.2 - Physical Sciences

From the very early days of human spaceflight, NASA has been conducting experiments in space to understand the effect of weightlessness on physical and chemically reacting systems. In the Physical Sciences research looking at both fundamental studies in microgravity as well as experiments targeted at reducing the risks to long duration human missions to the moon, Mars, and beyond is conducted.

### a. Combustion science

Microgravity offers potential for major gains in combustion science understanding in that it offers a unique capability to establish the flow environment rather than having it dominated by uncontrollable (under normal gravity) buoyancy effects, and through this control extend the range of test conditions that can be studied.

The proposed concept papers should include the following research areas:

- Gaseous flames premixed and non-premixed;
- low-temperature-cool flames;
- supercritical water oxidation;
- droplets and sprays;
- solid combustion;
- fire detection, prevention and suppression; and, fire safety.

Potential future areas of research include: auto-ignition and explosion of in-situ propellants; advanced propulsion systems for interplanetary travel; development of chemical processing units for reduced and microgravity conditions; use of in-situ materials for production of propellants; carbon sequestration and pollution reduction; self-assembling propellants and catalysts; high pressure systems; transport measurements at flame conditions; and innovative combustor design approaches for a reduced gravity or microgravity environment.

### b. Fluid Physics

The Fluid Physics discipline studies the effects of gravity on fluids and how they respond in the absence of gravity with a particular focus in two major sub-disciplines. The first sub-discipline is multiphase flows (with and without heat transfer). Under this area, disciplines included are two-phase flow, phase separation, boiling and condensation, flow through porous media, system stability, bio-fluids, and storage and handling of fluids (propellants). The second sub-discipline is interfacial phenomena. Within this area,

disciplines include capillary flow, dynamics, and instabilities. Even though these studies are categorized into two major sub-disciplines, it should be noted that in most cases there is significant overlap. For example, interfacial forces play a significant role when studying storage and handling or two-phase flow through porous media.

c. Complex Fluids

Complex fluids include non-Newtonian fluids, colloids, polymers, foams, microemulsions, gels, granular materials and a number of biological materials such as proteins, biomembranes and cells. They can be used as models for a wide variety of the more complex physical phenomena that occur in everyday life.

The proposed concept papers should address the following key areas

- Fundamental studies of order and frustration in colloidal systems, including the role of colloidal particle shape on structure and complex processes, such as self-assembly, motility and non-biological self-replication;
- Understanding of the dynamics, morphology and structures of; liquid crystals;
- Investigation of the behavior of wet foams beyond the limits imposed by the different instabilities that occur under normal gravity conditions, such as the convective instability; exploration of the of the statics (jammed) and dynamics (flowing) of granular materials;
- Particulate management including investigating the fibrous capturing mechanisms, impaction, interception and diffusion; measurement and prediction of the complete rheological properties of the polymeric fluids subjected to both shearing and extensional flows.

d. Materials Science

The International Space Station provides a laboratory environment in which materials processes can be studied in conditions with minimal to negligible buoyancy driven convection, sedimentation, and pressure head effects. Typically, microgravity materials experiments involve one of the following purposes. One is to obtain thermo-physical property measurements such as diffusion coefficients which is difficult or impossible to obtain on the ground due to convection or sedimentation. Another is to obtain uniform pressure conditions in the sample, i.e. no pressure head effects, as is desired when studying the dynamics of granular materials. A third is to produce benchmark materials created in ideal conditions where sedimentation and buoyancy driven mass transport are minimized. An example would be a composite material made of dispersed phases having very different densities. Finally and perhaps most commonly, is to form materials in conditions where heat and mass transport are dominated by normally obscured transport such as diffusion or surface tension driven convection. This allows for tests of theories relating materials processing conditions with resultant material properties. Existing ISS

materials research facilities provide for isothermal, thermal gradient, and container-less (levitation) processing conditions. This solicitation is open to microgravity research concept papers in all areas of materials science including but not limited to glasses, ceramics, organics, polymers, metals, alloys, composites, granular materials, semiconductors, biomaterials, etc.

### B.3 - Space Physiology

The International Space Station (ISS) provides prolonged experimental access to space that allows investigators to study and answer fundamental questions about animal physiology, such as the role of gravity in developmental biology, by examining how animals grow, develop, mature, and age. NASA is interested in Space Physiology studies that propose fundamental research on the effects of microgravity on systems such as the immune, endocrine, reproductive, and nervous system, while expanding our knowledge of the mechanisms responsible for cellular and molecular changes in skeletal, muscular and connective tissue systems. “With the availability of “knock out” and “disease” animal models, new insights on how microgravity affects physiological mechanisms can be secured from space experiments. In addition, there is the potential to gain new data on tissue healing (especially fractures) and on growth and development of animals over multiple generations.” (National Research Council’s 2011 Decadal Survey Report, page 11-3)

At this time, NASA Space Life Sciences is particularly interested in research studies that will enable a better understanding of how physiological mechanisms governing homeostasis at the genetic, molecular and cellular levels are integrated to regulate adaptation to space flight at the physiological system or whole animal level.

Some representative research areas in which concept papers can propose experiments are:

- Specific mechanisms of bone mass regulation;
- Basic mechanisms regulating skeletal muscle protein balance during changes in gravity;
- Fracture repair and wound healing;
- Long-term studies addressing the preservation and reversibility of bone loss, including the evaluation of new osteoporosis drugs under clinical development;
- Sensorimotor and neural mechanisms;
- Long-term studies of the combined environmental factors of space flight on mammalian physiology (*i.e.* microgravity, radiation, closed systems);
- Recovery after long-term exposure to unloading, or other factors of the space environment;
- Effects of long-term exposure to unloading, or other factors of the space environment on processes of development, reproduction or aging ;and

- Effects of microgravity on the cardiovascular system and fluid balance within an animal

NASA's selection of research projects is guided by recommendations of the National Research Council's 2011 Decadal Survey Report, "Recapturing a Future for Space Exploration: Life and Physical Sciences Research for a New Era" (<http://www.nap.edu/catalog/13048.html>) as further elaborated in the NASA-developed "Fundamental Space Biology Science Plan" that provides an implementation strategy and roadmap based on NRC recommendations and available flight and fiscal resources ([http://www.nasa.gov/exploration/library/esmd\\_documents.html](http://www.nasa.gov/exploration/library/esmd_documents.html)). Proposers are urged to look in these documents for additional ideas about proposal areas.

### **C. New User Workshops and Technical Societies**

This solicitation is targeted at graduate Ph.D. students and Post-Doctoral Fellows in EPSCoR and other states who have never conducted any variation of space research and have no experience designing ISS flight investigations. As a result, these potential new researchers would benefit from guidance and information provided by current and past ISS Principal Investigators at a New Users workshop planned at three (3) major Technical Societies' Annual Meetings and the annual ISS Research and Development Conference. The information for the New User Workshop is as follows:

#### **1. Space Physical Science - American Physical Science:**

The New User workshop for the Physical Sciences discipline will be held at the following:

Sponsor: American Physical Society (APS) Annual Meeting.

Date and Time: Sunday, March 2, 2014, 1:30-6:00 PM

Location: Colorado Convention Center, Denver CO

Website: <http://www.aps.org/meetings/march/events/iss.cfm>

The purpose of this Workshop is to allow members of the APS, and in particular, students and post-docs, to gain some familiarity with the interesting gravity-dependent phenomena that have been discovered from physical sciences research carried out on the International Space Station (ISS). The speakers will cover recent results from experiments in fluid physics, complex fluids and combustion science. The Workshop will provide a better understanding of existing and planned ISS research capabilities and current funding opportunities. Attendees will have an opportunity to interact with NASA flight experiment Principal Investigators and ISS Program Office staff in a panel discussion at the conclusion of the session. A noteworthy participant will be an ISS astronaut with

experience in operating Physical Sciences experiments on the ISS.

2. Space Physiology – American Physiological Society

The New User workshop for Space Physiology discipline will be held at the following:

Sponsor: American Physiological Society (APS) Annual Meeting

Event: Experimental Biology (EB) Symposium

Date and Time: April 30, 2014 12:00 pm – 4:00 pm

Location: San Diego Convention Center, CA

Website: [www.the-aps.org](http://www.the-aps.org)

The purpose of this EB Symposium is to allow members of American Physiological Society and other EB societies, and in particular, physiology students and post-docs, to gain some familiarity with the interesting physiological changes that have been discovered about how we adapt to spaceflight, and to get a better understanding of planned ISS research capabilities and funding opportunities. Attendees will have an opportunity to interact with the NASA flight Principal Investigators and ISS Program staff on the Program in a panel discussion at the conclusion of the session.

3. Space Microbiology – American Society of Microbiology

The New User workshop for the Microbiology discipline will be held at the following:

Sponsor: American Society of Microbiology

Event: Learning Labs

Date and Time: Sunday, May 18th, 2014 at 12:15 pm

Location: Boston Convention & Exhibition Center, Boston, MA

Website: [www.asm.org](http://www.asm.org)

The International Space Station (ISS) provides a unique environment that stimulates novel responses during microbial culture, such as alterations in gene expression, phenotypic characteristics, and microbial virulence. The purpose of this Learning Lab is to allow attendees of the American Society of Microbiology Annual General Meeting, and in particular, graduate students and post-doctoral fellows, to gain some familiarity with microbiology concepts in the microgravity environment. This session will specifically promote active engagement of the audience around the concept of microbiology research conducted on the ISS.

4. ISS Research - American Astronautical Society ISS Research and Development Conference

The New User workshop for all ISS research disciplines including Life and Physical Sciences will be held at the following:

Sponsor: American Astronautical Society

Event: ISS Research and Development Conference

Date and Time: Tuesday, June 17<sup>th</sup>, 2014, 8:00 am to Thursday, June 19<sup>th</sup> 2014, 5:00pm

Location: Hyatt Regency McCormick Place, Chicago IL

Website: <http://astronautical.org/issrdc>

The conference focuses on ISS Research and Development and offers perspectives on the full breadth of research and technology development on the ISS – one stop for understanding the full suite of opportunities available. The new user workshop held at this conference equips potential researchers with information that would allow them to develop their own ideas for experiments using this unique laboratory. Potential ISS users who attend will learn: “What can I do on the ISS? How can I do it?”

#### **D. NASA Safety Policy**

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

#### **E. Availability of Funds for Award**

NASA anticipates that up to 10 awards will be given for concept papers that outline innovative research which is aligned with the priorities of the ISS program. The monetary value of each pre-proposal awarded will be up to \$4,000 but the total award will not exceed \$40,000. The selected awardees will be invited to submit full ISS proposals on their research which may result in one flight opportunity for student researchers. One of these 10 full proposals will then receive additional funding to conduct research on the ISS, subject to the type of award that is offered.

There will be a period of performance of 4 months. The Government’s ability to make award(s) is contingent upon the availability of appropriated funds from which payment can be made and the receipt of concept papers that NASA determines acceptable for award under this NRA.

#### **F. Funding Restrictions**

A contract, grant, cooperative agreement, or other agreement may be used to accomplish an effort funded in response to an NRA. NASA will determine the appropriate award instrument. Contracts resulting from NRAs are subject to the FAR and the NASA FAR Supplement. However, it is anticipated that a grant or cooperative agreement will be awarded as a result of this solicitation. Any resultant grants or cooperative agreements will be awarded and administered in accordance with the 14 CFR 1260 “NASA Grant and Cooperative Agreement Handbook”

([http://prod.nais.nasa.gov/pub/pub\\_library/grcover.htm](http://prod.nais.nasa.gov/pub/pub_library/grcover.htm)),

For information on allowable costs, refer to the cost principles cited in the *NASA Federal Acquisition Regulations (FAR) Supplement Provision* and the *Guidebook for Proposers*. (References in Section VIII.)

Travel is allowed, as may be necessary, for the meaningful completion of the proposed investigation, as well as for publicizing its results at an appropriate professional meeting. International travel is not allowed.

## **G. Guidebook for Proposers Responding to a NASA Research Announcement (NRA) or Cooperative Agreements Notice (CAN)**

All policies and procedures for the preparation and submission of concept papers, as well as NASA's review and selection of concept papers for funding, are presented in a separate document entitled *Guidebook for Proposers Responding to a NASA Research Announcement (NRA) or Cooperative Agreements Notice (CAN)* (Guidebook) that is located at <http://www.hq.nasa.gov/office/procurement/nraguidebook/proposer2013.pdf>.

By reference, the newest edition of this Guidebook (January 2013) is hereby incorporated into this NRA, and proposers to this NRA are responsible for understanding and complying with its procedures before preparing and submitting their concept papers. Concept papers that do not conform to its standards may be declared noncompliant and returned without review.

The other chapters and appendices of this Guidebook provide supplemental information about the entire NRA process, including NASA policies for the solicitation of concept papers; guidelines for writing complete and effective concept papers; the NASA policies and procedures for the review and selection of concept papers; as well as for issuing and managing the awards to the institutions that submitted selected concept papers; and Frequently Asked Questions about a variety of the NASA proposal and award processes and procedures. Note that the NASA policy for concept papers involving non-U.S. participants is given in section (1) of Appendix B of this Guidebook.

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

## **II. Award Information**

## **A. Funding Availability**

Selections made through this NRA will be dependent upon available funding, the results of peer review for scientific merit, the technical feasibility of the proposal, and its programmatic relevance. The type of award offered to selected proposers will generally follow the policies in Section D.1 of the *NASA Guidebook for Proposers*. A NASA awards officer will determine the appropriate award instrument for the selections resulting from this solicitation.

Grants and cooperative agreements will be subject to the provisions of the *NASA Grants and Cooperative Agreement Handbook*, hereafter referred to as the *Grants Handbook 14 CFR 1260* and Appendix D of the *NASA Guidebook for Proposers*. In the case of any conflict, the *Grants Handbook* takes precedence.

NASA intends that the mechanism for funding each successful proposal will be a single grant/cooperative agreement, with funding allocations to participating investigators based on the submitted budget, available funds and overall project review. The winning concept papers will be awarded with a one-time award. These award recipients will then be invited to develop a full proposal. These full proposals may also be eligible for additional funding, subject to the type of award that is offered. Full proposals will be evaluated as described in Section V. Proposals to continue or supplement existing grants or cooperative agreements, if selected, will result in a new grant or cooperative agreements.

Depending on available funding, the results of peer review for scientific and technical merit, and programmatic relevance/balance, approximately 10 concept papers will be selected. It is anticipated that awards will average \$4,000 for up to a 4 month period of performance. NASA does not provide separate funding for direct and indirect costs; thus, the amount of the award requested is the total of all costs submitted in the proposed budget. Selections of awardees are expected to be announced by August 30, 2014

## **B. Period of Performance**

NASA SLPS and ISS Program Office awards will support a 4-month period. It is anticipated that this period of performance will enable graduate students and post-doctoral fellow researchers to achieve the objectives of developing a concept paper for innovative life and physical science research that can be eventually performed in the microgravity environment on the International Space Station.

## **III. Eligibility Information**

### **A. Eligibility of Applicants**

Participation in this program is open to Graduate students and Post-Doctoral Fellows from all categories of U.S. institutions. Student researchers/scientists from EPSCoR jurisdiction institutions are specifically encouraged to participate. Please go to

[http://www.nasa.gov/offices/education/programs/national/epscor/home/EPSCoR\\_Directors.html](http://www.nasa.gov/offices/education/programs/national/epscor/home/EPSCoR_Directors.html) to view the map of the EPSCoR Jurisdictions.

In all such arrangements, the proposing entity is expected to be responsible for administering the project according to the management approach presented in the proposal. The proposing entity must have in place a documented base of ongoing high quality research in science and technology, or in those areas of science and engineering clearly relevant to the specific programmatic objectives and research emphases indicated in this NRA. No present or prior NASA support of research or training in any institution or for any investigator is a prerequisite to submission of a proposal or a competing factor in the selection process.

### **B. Guidelines for International Participation**

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. institution. For additional guidance on foreign participation, see Section 1.6 of the *NASA Guidebook for Proposers* and NASA FAR Supplement (NFS) Part 1835.016-70. Foreign institutions are not eligible for funding from NASA. Therefore, concept papers from foreign entities, or those including foreign entity participation, will not be eligible for award.

### **C. Cost Sharing or Matching**

For an institution of higher education seeking to receive a grant or cooperative agreement, cost sharing is not required; however, NASA can accept cost sharing if it is voluntarily offered. For this situation, 14 CFR 1260, Section B, Provision & Section 1260.123 of the *NASA Grant and Cooperative Agreement Handbook*, entitled “Cost sharing or matching,” located at [http://prod.nais.nasa.gov/pub/pub\\_library/grantb.html#1260.123](http://prod.nais.nasa.gov/pub/pub_library/grantb.html#1260.123), describes the acceptable forms of cost sharing.

## **IV. Concept Paper and Submission Information**

### **A. Address for Concept Paper Information**

All information needed to respond to this solicitation is contained in this NRA and in the companion document entitled *Guidebook for Proposers Responding to a NASA Research Announcement (NRA) or Cooperative Agreement Notice (CAN)* (hereafter referred to as the *Guidebook for Proposers*) that is located at:

<http://www.hq.nasa.gov/office/procurement/nraguidebook/>.

Additionally, applicants shall prepare concept papers in accordance with NFS 1852.235-72 (NOV 2004), Instructions for Responding to NASA Research Announcements, hereafter referred to as the NASA FAR Supplement Provision, which is located at:

[http://www.hq.nasa.gov/office/procurement/regs/5228-41.htm#52\\_235-72](http://www.hq.nasa.gov/office/procurement/regs/5228-41.htm#52_235-72).

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

Concept paper submission questions received will be answered and published in a Frequently Asked Questions (FAQ) document. This FAQ will be posted on the NSPIRES solicitation download site alongside this NRA, and will be updated periodically between submission release and the full proposal due date.

## **B. Content and Form of Concept Paper Submission**

### **1. NASA Proposal Data System**

#### **a) NSPIRES Registration**

This NRA requires that the proposer register key data concerning their intended submission with the NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES) located at <http://nspires.nasaprs.com>. Potential applicants are urged to access this site well in advance of the due dates of interest to familiarize themselves with its structure and enter the requested identifier information. **It is especially important to note that every individual named on the concept paper's *Cover Page* (see below) must be registered in NSPIRES and that such individuals must perform this registration themselves; that is, no one may register a second party, even the PI of a concept paper.** This data site is secure and all information entered is strictly for NASA use only.

#### **b) Electronic Proposal Submission**

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

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

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

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

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

Generically, an electronic concept paper consists of one or more electronic forms, including an electronic cover page as well as all required and allowed appendices; see Sections IV(b)(2) and (3) below for further requirements.

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

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

## **2. Concept Paper Submission Information**

Concept papers must not exceed 5 pages and briefly describe the subject of the required concept paper, to include the student(s) qualifications, approach to writing the concept paper, commitment of the institution and involvement of the academic advisor/sponsor. Specify any

planned travel to workshops/conferences and show the budget for writing and submitting the white paper.

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

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

Awarded proposers may be invited to submit full proposals.

The typical concept paper should express a consolidated effort in support of one or more related technical concepts or ideas. Disjointed efforts should not be combined into a single proposal.

### **3. Concept Paper Format and Contents**

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

The required sections of the proposal must be submitted as searchable, unlocked PDF files that are attached to the electronic submission using one of the proposal submission systems. Proposers must comply with any format requirements specified in this NRA and in the *NASA Guidebook for Proposers* (e.g. Section 2.3 of the *NASA Guidebook for Proposers*). Only appendices/attachments that are specifically requested in either this NRA or in the *NASA Guidebook for Proposers* will be permitted; concept papers containing unsolicited appendices/attachments may be declared noncompliant. Section 2 of the *NASA Guidebook for Proposers* provides detailed discussions of the content and organization of concept papers suitable for all program elements in this NRA, as well as the default page limits of a proposal's constituent parts.

#### ***a. Concept Paper Format***

Concept paper submissions are required in advance of full proposals in order to provide potential proposers with a rapid response to minimize unnecessary effort. Concept papers should follow the format below. The cover sheet should be clearly marked "CONCEPT PAPER" and the total length shall not exceed 5 pages, excluding cover page and official transmittal letter. A page is defined as being no larger than electronically formatted page of 8.5" by 11.0" with type not smaller than 12 point. Smaller font may be used for figures, tables and

charts. All concept papers must be written in English.

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

A. Cover sheet to include:

- 1) NRA number NNJ14ZBG001N
- 2) Discipline Area (Microbiology, Physical Sciences (Combustion, Fluid Physics, Complex Fluids, Material Science), Space Physiology)
- 3) Proposal title
- 4) Lead investigator and Institution submitting concept paper
- 5) Other team members (if applicable)
- 6) Technical point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available)
- 7) Administrative point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available),
- 8) Date concept paper was submitted.

B. Official transmittal letter.

Section II. Summary of Proposal {6}

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

**C. Submission Dates and Times**

Solicitation Announcement Identifier: NRA NNJ14ZBG001N

Release date: March 10th, 2014

Concept papers due July 10th, 2014, 5:00 PM Eastern Daylight Time.

Notification of Concept Paper Status (selected/non-selected): August 15th, 2014

Selections of concept papers are expected to be announced by August 30th, 2014

Full proposals are due by November 30, 2014. The NASA Selecting Official is the Director of Space Life and Physical Sciences Research and Applications Division at NASA Headquarters (Washington, D.C.).

Final Proposal selection by January 31st, 2015

#### **D. Funding Restrictions**

Allowable costs for grant and cooperative agreement awards with universities, hospitals, and other nonprofit organization and awards with commercial organizations that do not involve cost sharing are covered in Provision & Section 1260.127 of the *NASA Grant and Cooperative Agreement Handbook*, located at

[http://prod.nais.nasa.gov/pub/pub\\_library/grantb.html#1260.127](http://prod.nais.nasa.gov/pub/pub_library/grantb.html#1260.127). Pre-award costs are covered in Provision & Section 1260.125, located at [http://prod.nais.nasa.gov/pub/pub\\_library/grantb.html#1260.125](http://prod.nais.nasa.gov/pub/pub_library/grantb.html#1260.125).

#### **V. Concept Paper Review Information**

Successful research concept papers are likely to be those that provide sound contributions to both immediate and long-term scientific and technical needs of NASA as explicitly expressed in current NASA documents and communications.

##### **A. Evaluation Criteria**

**Each Step-1 concept paper submitted must contain the required components as identified in Section IV.B.2. Step-1 concept paper lacking any of the required components may not be invited for full Step-2 proposal submission.**

##### EPSCoR Project Office:

All concept papers will be reviewed by the NASA Office of Education staff and ISS flight research experts following procedures similar to those used for other NASA EPSCoR concept papers.

##### ISS Program:

Concept papers recommended by the EPSCoR Project Office for acceptance will then be evaluated by the ISS Program and the NASA HQs Space and Life Sciences Office based on Feasibility and Budget.

Concept papers and subsequent full proposals will undergo a merit peer review by a panel of scientific and/or technical subject matter experts. This panel of experts may include non-NASA and or non-Government personnel. The number and diversity of experts required will be determined by the response to this NRA and by the variety of disciplines represented in the concept paper relevant to the research emphases described in this NRA. The merit review

panel will assign *a score from 0-100* based upon the intrinsic scientific or technical merit of the proposal. This score will reflect the consensus of the panel. **A bonus of 5 points will be given for concept papers submitted by student researchers/scientists who belong to the EPSCoR jurisdiction.**

The score assigned by this panel will not be affected by the cost of the proposed work, nor will it reflect the programmatic relevance of the proposed work to NASA. However, the panel will be asked to include in their critique of each proposal any comments they may have concerning the proposed research budget.

**To be responsive to this research solicitation, proposed studies should be hypothesis-driven and lead to new knowledge within accepted scientific standards. Purely phenomenological approaches with no significant mechanistic basis or likely gain in scientific knowledge are not acceptable.** In addition, concept papers must address the research emphases defined in Section I.B. of this NRA and flight proposals are expected to have a firm justification for space flight implementation derived from ground-based research results.

All of the following criteria will be used in determining the merit score (significance and approach are the most important and weigh more than innovation, investigator, and environment):

- **Significance:** Does this study address an important problem? If the aims of the application are achieved, how will scientific knowledge or technology be advanced? What will be the effect of these studies on the concepts, methods, or products that drive this field? Is there a significant societal or economic impact?
- **Approach:** Are the conceptual framework, design, methods, and analyses adequately developed, well integrated, and appropriate to the aims of the project? Is the proposed approach likely to yield the desired results? Does the applicant acknowledge potential problem areas and consider alternative tactics?
- **Innovation:** Does the project employ appropriate novel concepts, approaches, or methods? Are the aims original and innovative? Does the project challenge existing paradigms or develop new methodologies or technologies?
- **Investigators:** Are the proposers appropriately trained and well suited to carry out this work? Is the work proposed appropriate to the experience level of the principal investigator and any co-investigators? Is the evidence of the proposers' productivity satisfactory?
- **Environment:** Does the scientific environment in which the work will be performed contribute to the probability of success? Do the proposed experiments take advantage of unique features of the scientific environment or employ useful collaborative arrangements? Is there evidence of institutional support?

## **B. Review and Selection Process**

Award(s) will be made to proposers whose research is determined to be innovative and the most advantageous to the Government, all factors considered, including the potential contributions of

the proposed work to the overall research program and the availability of funding for the effort.

NASA's policy is to ensure impartial, equitable, and comprehensive evaluation of all proposals and to select the source(s) whose offer(s) best meet(s) the Government's technical, policy, and programmatic goals in accordance with the evaluation criteria contained in this NRA. Pursuant to NASA FAR 1835.016 and FAR 35.016, the primary basis for selecting proposals for acceptance shall be technical, importance to agency programs, and fund availability. In order to provide this evaluation, cognizant personnel will review each submission and will convene panels of experts in the appropriate areas when necessary. The results of these reviews will be documented in the form of recommendations and will be provided to the manager of the NASA ISS Research Integration Office. These recommendations will indicate those proposers with whom negotiations or discussions will be conducted. They will also include questions arising from the reviews and, when appropriate, issues that need to be resolved prior to making awards.

Concept papers will not be evaluated against each other since they are not submitted in accordance with a common work statement. NASA's intent is to review concept papers as soon as possible after they arrive; however, concept papers may be reviewed periodically for administrative reasons. For evaluation purposes, a proposal is the document described in "Concept Paper Format and Content", Section IV.B.3 of this announcement. Other supporting or background materials submitted with the proposal will be considered for the reviewer's convenience only and are not considered part of the proposal. All concept papers must first be deemed relevant to ISS and likely to contribute to the mission as described in paragraphs I.B. "Research Emphases Specific to this Solicitation".

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

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

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

## **VI. Award Administration Information**

### **A. Award Notices**

At the end of the selection process, each proposing organization will be notified of its selection or non-selection status. NASA will provide debriefings to those investigators who request one. Selection notification will be made by a letter signed by the designated NASA selecting

official.

The selection letters are not an authorization to begin performance. The selected organization's business office will be contacted by a NASA Grants Officer to negotiate an award. Any costs incurred by the investigator in anticipation of an award are at their own risk until contacted by NASA. The NASA Grants Officer will determine the type of award instrument, request further business data, and negotiate the resultant action. NASA Grants Officers are the only personnel with the authority to make award and obligate Government funds. NASA reserves the right to offer selection of only a portion of a proposal. In these instances, the investigator will be given the opportunity to accept or decline the offer. Additional information can be referenced in paragraph (d) of NFS 1835.016-71, located at [http://www.hq.nasa.gov/office/procurement/regs/1835.htm#35\\_016-71](http://www.hq.nasa.gov/office/procurement/regs/1835.htm#35_016-71), and in Appendix D of the *Guidebook*.

## **B. Administrative and National Policy Requirements**

Grant and cooperative agreement awards are subject to the NASA Grant and Cooperative Agreement Handbook. This handbook consists of four sections that prescribe the policies and procedures relating to the award and administration of NASA grants. Section A provides the text of provisions and special conditions and addresses NASA's authority, definitions, applicability, amendments, publications, deviations, pre-award requirements and post-award requirements currently covered by 14 CFR Part 1260. Section B relates to grants with institutions of higher education, hospitals, and other nonprofit organizations. Sections A and B, with the special considerations in subpart 1260.4(b), apply to awards with commercial firms that do not involve cost sharing. Section C adopts the administrative requirements of OMB Circular No. A-102 and relates to administrative requirements for grants to state and local governments. Section D relates to awards with commercial firms. The Handbook is located at [http://prod.nais.nasa.gov/cgi-bin/nais/nasa\\_ref.cgi](http://prod.nais.nasa.gov/cgi-bin/nais/nasa_ref.cgi).

## **C. Program Reporting/Individual Researcher Reporting**

Required reports for grants and cooperative agreements are covered in Exhibit G, "Required Reports and Publications" of the NASA Grant and Cooperative Agreement Handbook. However, no annual/final report is necessary for this award as the required white paper will serve as the final report.

## VII. Contacts

Additional technical information for this NRA is available from:

Dr. Camille W. Alleyne  
Assistant Program Scientist for Education and Communications  
International Space Station Program  
NASA, Lyndon B. Johnson Space Center  
Code OZ  
2101 NASA Parkway  
Houston, TX 77058  
Telephone: (281) 483-1239  
E-mail: [camille.alleyne@nasa.gov](mailto:camille.alleyne@nasa.gov)

For technical information on Microbiology:

Dr. Mark Ott  
Biomedical Research and Environmental Sciences Division  
NASA, Lyndon B. Johnson Space Center  
Code SK  
2101 NASA Parkway  
Houston, TX 77058  
Telephone: (281) 483-7155  
E-mail: [c.m.ott@nasa.gov](mailto:c.m.ott@nasa.gov)

For technical information on Physical Sciences:

Dr. Fran Chiaramonte  
Program Executive for Physical Sciences  
Life and Physical Sciences Division  
NASA Headquarters  
Code HQ:CR000  
300 E Street, SW  
Washington, DC 20546  
Telephone: (202) 358-0693  
E-mail: [francis.p.chiaramonte@nasa.gov](mailto:francis.p.chiaramonte@nasa.gov)

For technical information on Space Physiology:

Dr. David Tomko  
Program Executive for Space Biology  
Life and Physical Sciences Division  
NASA Headquarters  
Code HQ:CR000  
300 E Street, SW  
Washington, DC 20546

Telephone: (202) 358-2211  
E-mail: [dtomko@nasa.gov](mailto:dtomko@nasa.gov)

Additional contracting information for this NRA is available from:

Miyoshi Thompson  
Contracting Officer  
2101 NASA Parkway  
Houston, TX 77058  
Code BG  
Email: [miyoshi.thompson-1@nasa.gov](mailto:miyoshi.thompson-1@nasa.gov)  
Phone: (281) 244-1683

EPSCoR Related:

Jeppie R. Compton  
Project Manager, NASA EPSCoR  
Office of Education  
NASA Kennedy Space Center, HQ EX-E  
Kennedy Space Center, FL 32899-0001  
E-mail: [jeppie.r.compton@nasa.gov](mailto:jeppie.r.compton@nasa.gov)  
Telephone: (321) 867-6988

## **VIII. Other Information**

### **A. Proprietary Information**

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

### **B. General References**

**Guidebook for Proposers Responding to a NASA Research Announcement (NRA)** is available online at the following address:

<http://www.hq.nasa.gov/office/procurement/nraguidebook/>

**NASA Federal Acquisition Regulations Supplement Instructions for Responding to NASA Research Announcements (Provision NFS 1852.235-72 November 2004)** is available online at the following address: [http://www.hq.nasa.gov/office/procurement/regs/5228-41.htm#52\\_235](http://www.hq.nasa.gov/office/procurement/regs/5228-41.htm#52_235)

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

[http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPR&c=5810&s=1earch\\_term=5810](http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPR&c=5810&s=1earch_term=5810)

**NASA Grant and Cooperative Agreement Handbook.** This document is available online at the following address:

[http://prod.nais.nasa.gov/cgi-bin/nais/nasa\\_ref.cgi](http://prod.nais.nasa.gov/cgi-bin/nais/nasa_ref.cgi)

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

[http://www.nasa.gov/pdf/558162main\\_ISS%20Overview\\_HSTI.pdf](http://www.nasa.gov/pdf/558162main_ISS%20Overview_HSTI.pdf)

**Overview of Attached Payload Accommodations and Environments on the International Space Station.** This document is available online at the following address:

[http://www.nasa.gov/pdf/190373main\\_TP-2007-214768.pdf](http://www.nasa.gov/pdf/190373main_TP-2007-214768.pdf)

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

[http://www.nasa.gov/pdf/508318main\\_ISS\\_ref\\_guide\\_nov2010.pdf](http://www.nasa.gov/pdf/508318main_ISS_ref_guide_nov2010.pdf)

## **G. Certification of Compliance**

By submitting the enclosed proposal cover sheet certification form in response to this NASA research announcement, the authorizing official provides assurance that the institution is in compliance with the certifications listed. The summaries for the existing certifications state:

- **Debarment, Suspension, and Other Responsibility Matters Primary Covered Transactions**

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 34 CFR Part 85, Section 85.510, Participant's responsibilities. The regulations were published as Part VII of the May 26, 1988 Federal Register (pages 19160 - 19211).

Copies of the regulation may be obtained by contacting the U.S. Department of Education, Grants and Contracts Service, 400 Maryland Avenue, S.W. (Room 3633 GSA Regional Office Building No. 3), Washington, DC. 20202-4725, telephone (202) 732-2505.

- The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:
  - Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
  - Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or Local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

- Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or Local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and
    - Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or Local) terminated for cause or default.
  - Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.
- **Certification Regarding Lobbying for Contracts, Grants, Loans, and Cooperative Agreements**  
The undersigned certifies, to the best of his or her knowledge and belief, that:
    - No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
    - If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form - LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
    - The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certificate shall be subject to a civil penalty of not less than \$10,000, and not more than \$100,000 for each such failure.

- **Assurance of Compliance with the National Aeronautics and Space Administration Regulations Pursuant to Nondiscrimination in Federally Assisted Programs**

As a condition of receipt of Federal financial assistance, the Applicant Institution, acknowledges and agrees that it must comply (and require any subgrantees, contractors, successors, transferees, and assignees to comply) with applicable provisions of national laws and policies prohibiting discrimination, including but not limited to:

- Title VI of the Civil Rights Act of 1964, as amended, which prohibits recipients of federal financial assistance from discriminating on the basis of race, color, or national

- origin (42 U.S.C. 2000d et seq.), as implemented by NASA Title VI regulations, 14 C.F.R. Part 1250.
- As clarified by Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination on the basis of limited English proficiency (LEP). To ensure compliance with Title VI, the Applicant must take reasonable steps to ensure that LEP persons have meaningful access to its programs in accordance with NASA Title VI LEP Guidance to Grant Recipients (68 Fed. Reg. 70039). Meaningful access may entail providing language assistance services, including oral and written translation, where necessary. The Applicant is encouraged to consider the need for language services for LEP persons served or encountered both in developing budgets and in conducting programs and activities. Assistance and information regarding LEP obligations may be found at <http://www.lep.gov>.
  - Title IX of the Education Amendments of 1972, as amended, which prohibits discrimination on the basis of sex in education programs or activities (20 U.S.C. 1681 et seq.) as implemented by NASA Title IX regulations, 14 C.F.R. Part 1253. If the Applicant is an educational institution:
    - The Applicant is required to designate at least one employee to serve as its Title IX coordinator (14 C.F.R. §1253.135(a)).
    - The Applicant is required to notify all of its program beneficiaries of the name, office, address, and telephone number of the employee(s) designated to serve as the Title IX coordinators. (14 C.F.R. §1253.135(a)).
    - The Applicant is required to publish internal grievance procedures to promptly and equitably resolve complaints alleging illegal discrimination in its programs or activities (14 C.F.R. §1253.135(b)).
    - The Applicant is required to take specific steps to regularly and consistently notify program beneficiaries that the Applicant does not discriminate in the operation of its programs and activities. (14 C.F.R. §1253.140).
  - Section 504 of the Rehabilitation Act of 1973, as amended, which prohibits The Applicant from discriminating on the basis of disability (29 U.S.C. 794) as implemented by NASA Section 504 regulations, 14 C.F.R. Part 1251.
    - The Applicant is required to designate at least one employee to serve as its Section 504 coordinator (14 C.F.R. §1251.106(a)).
    - The Applicant is required to notify all its program beneficiaries of the name, office, address, and telephone number of the employee(s) designated to serve as the Section 504 coordinator (14 C.F.R. §1251.106(a)).
    - The Applicant is required to publish internal grievance procedures to promptly and equitably resolve complaints alleging illegal discrimination in its programs or activities (14 C.F.R. §1251.106(b)).
    - The Applicant is required to take specific steps to regularly and consistently notify program beneficiaries that the Applicant do not discriminate in the operation of its programs and activities. (14 C.F.R. §1251.107).
  - The Age Discrimination Act of 1975, as amended, which prohibits the Applicant from discriminating on the basis of age (42 U.S.C. 6101 et seq.) as implemented by NASA Age Discrimination Act regulations, 14 C.F.R. Part 1252.

The Applicant also acknowledges and agrees that it must cooperate with any compliance review or complaint investigation conducted by NASA and comply (and require any subgrantees, contractors, successors, transferees, and assignees to comply) with applicable provisions governing NASA access to records, accounts, documents, information, facilities, and staff. The Applicant must keep such records and submit to the responsible NASA official or designee timely, complete, and accurate compliance reports at such times, and in such form and containing such information, as the responsible NASA official or his designee may determine to be necessary to ascertain whether the Applicant has complied or is complying with relevant obligations and must immediately take any measure determined necessary to effectuate this agreement. The Applicant must comply with all other reporting, data collection, and evaluation requirements, as prescribed by law or detailed in program guidance.

The below certification form must be completed and returned as part of the jurisdiction's proposal.

**Proposal Cover Sheet**

Title: \_\_\_\_\_

Principal Investigator: \_\_\_\_\_

Institution \_\_\_\_\_

Street/PO Box: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ Country: \_\_\_\_\_

Email: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Co-Investigator	Institution & Address	Phone & E-mail
_____	_____	_____
_____	_____	_____
_____	_____	_____

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Certification of Compliance with Applicable Executive Orders and U.S. Code

By submitting the proposal identified in the Cover Sheet/Proposal Summary either in response to a NASA Research Announcement or as an Unsolicited Proposal, the Authorizing Official of the proposing institution (or the individual proposer if there is no proposing institution) as identified below:

- Certifies that the statements made in this proposal are true and complete to the best of his/her knowledge;
- Agrees to accept the obligations to comply with NASA award terms and conditions if an award is made as a result of this proposal; and
- Confirms compliance with all provisions, rules and stipulations set forth by these two Certifications [namely, (i) *Certification of Compliance with the NASA Regulations Pursuant to Nondiscrimination in Federally Assisted Programs*, and (ii) *Certifications, Disclosures, And Assurances Regarding Lobbying and Debarment & Suspension*].

Willful provision of false information in this proposal and/or its supporting documents, or in reports required under an ensuing award, is a criminal offense (U.S. Code, Title 18, Section 1001).

Title of Authorizing Official: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Name of Proposing Institution: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ E-mail: \_\_\_\_\_

Cage Code: \_\_\_\_\_ DUNS Number: \_\_\_\_\_ TIN Number: \_\_\_\_\_

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

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

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

Title of Authorizing Official: \_\_\_\_\_

Printed Name: \_\_\_\_\_ Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Name of Proposing Institution: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

E-mail: \_\_\_\_\_

- **Representation by prospective recipient that they are not the Association of Community Organizations for Reform now (ACORN) or a subsidiary of ACORN**

In accordance with section 534 of the Consolidated and Further Continuing Appropriations Act of 2012 (Pub. L.112-55), none of the funds made available by the Act may be distributed to the Association of Community Organizations for Reform Now (ACORN) or its subsidiaries.

The prospective recipient represents, by submission of its offer, that it is not the Association of Community Organizations for Reform Now (ACORN) or a subsidiary thereof, and that no funds made available under this award will be distributed to ACORN or its subsidiaries.

Recipient \_\_\_\_\_

Signature \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

Date of execution \_\_\_\_\_

- **Representation by corporations regarding an unpaid delinquent tax liability or a felony conviction under any federal law**

In accordance with sections 544 and 543 of the Consolidated and Further Continuing Appropriations Act of 2012 (Pub. L.112-55), none of the funds made available by that Act may be used to enter into a grant or cooperative agreement with any corporation that -

- Has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability, where the awarding agency is aware of the unpaid tax liability, unless an agency has considered suspension or debarment of the corporation and made a determination that this action is not necessary to protect the interests of the Government; or
- Was convicted (or had an officer or agent of such corporation acting on behalf of the corporation convicted) of a felony criminal violation under any Federal law within the preceding 24 months, where the awarding agency is aware of the conviction, unless an agency has considered suspension or debarment of the corporation and made a determination that this action is not necessary to protect the interests of the Government.

The prospective recipient represents that -

- It is  is not  a corporation that has had any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability; and
- It is  is not  a corporation that was convicted, or had an officer or agent acting on behalf of the corporation convicted, of a felony criminal violation under a Federal law within the preceding 24 months.

- **Certification by prospective recipients regarding federal income tax filing and federal income tax violations**

In accordance with section 527 of the Consolidated and Further Continuing Appropriations Act of 2012 (Pub. L.112-55), none of the funds made available by the Act may be used to enter into a grant or cooperative agreement in an amount greater than \$5 Million unless the prospective recipient certifies in writing to NASA that, to the best of its knowledge and belief, the prospective recipient has filed all Federal tax returns required during the three years preceding the certification, has not been convicted of a criminal offense under the Internal revenue Code of 1986, and has not, more than 90 days prior to certification, been notified of any unpaid Federal tax assessment for which the liability remains unsatisfied, unless the assessment is the subject of an installment agreement or offer in compromise that has been approved by the Internal Revenue Service and is not in default, or the assessment is the subject of a non-frivolous administrative or judicial proceeding.

The prospective recipient's proposal shall include a signed written certification as follows -

To the best of my knowledge and belief, \_\_\_\_\_(name of offeror) has filed the Federal tax returns required during the three years preceding this certification, has not been convicted of a criminal offense under the Internal revenue Code of 1986, and has not, more than 90 days prior to certification, been notified of any unpaid Federal tax assessment for which the liability remains unsatisfied, unless the assessment is the subject of an installment agreement or offer in compromise that has been approved by the Internal Revenue Service and is not in default, or the assessment is the subject of a non-frivolous administrative or judicial proceeding.