

**National Aeronautics and Space Administration
NASA Headquarters
Biological and Physical Sciences Division
300 E Street, SW
Washington, D.C. 20546-0001**

Use of the NASA Physical Sciences Informatics System

NASA Research Announcement

**Soliciting Proposals for Use of the NASA Physical Sciences Informatics System for
Biophysics, Combustion Science, Complex Fluids, Fluid Physics, Fundamental Physics, and
Materials Science**

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Executive Summary

This National Aeronautics and Space Administration (NASA) Research Announcement (NRA) solicits ground-based research proposals using an open science approach to develop new analyses and generate new scientific insights by utilizing experimental data residing in NASA's Physical Sciences Informatics (PSI) system (<https://psi.nasa.gov>), an online database of completed physical science reduced-gravity flight experiments conducted on the International Space Station (ISS), Space Shuttle flights, Free Flyers, or commercial cargo flights to and from the ISS, and from related ground-based studies. The goals of this NRA are to: a) promote investigations making use of currently available experimental data resulting in more scientists participating in reduced-gravity research; b) allow new areas of research and discovery to occur more quickly through open access; and c) accelerate the "research to product or publication" timeline through the rapid sharing of data.

The PSI system allows researchers to data mine information generated by experiments conducted as part of NASA's Physical Sciences Research Program in support of NASA's Biological and Physical Sciences (BPS) Division. In this manner PSI meets the requirements of the nation's Open Data Policy, which states that "Government information shall be managed as an asset throughout its life cycle to promote interoperability and openness, and, wherever possible and legally permissible, to ensure that data are released to the public in ways that make the data easy to find, accessible, and usable." (Executive Order May 9, 2013, "Making Open and Machine Readable the New Default for Government Information"). In accordance with this policy, all awardees from this NRA must upload data, new analytical or numerical models, tools, and software produced from the funded research into the PSI system.

This solicitation is open to researchers from all categories of U.S. and non-U.S. organizations, including educational institutions, industry, nonprofit organizations, NASA Centers, and other U.S. Government agencies. This NRA is soliciting proposals from two types of investigators: 1) established researchers from all categories of U.S. and non-U.S. organizations; 2) graduate students (with advisors) from accredited U.S. postsecondary institutions and programs. The proposals from graduate students must be submitted by their advisor.

Proposals will be solicited through appendices under this omnibus solicitation. The appendices will provide key information including: specific scope of the work solicited, such as concentrations on specific research areas, anticipated budget for new awards, number of awards anticipated, and proposal due dates. The provisions in any appendix will apply to that specific opportunity and will supersede any conflicting provisions in this omnibus solicitation or in the *NASA Guidebook for Proposers*. During the five years that this NRA will be open, NASA plans to release appendices annually, depending on available funding and other programmatic constraints.

In general, this NRA solicits research in the following six research areas: 1) Biophysics, 2) Combustion Science, 3) Complex Fluids, 4) Fluid Physics, 5) Fundamental Physics, and 6) Materials Science. Not all research areas will be solicited in each appendix. The PSI experiments

eligible for use in the proposals will be specified in each appendix.

Additional information or programmatic changes that may affect this omnibus solicitation or any of its appendices will be added as a formal amendment to this omnibus solicitation and posted on the solicitation's webpage in the NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES) (<https://nspires.nasaprs.com>). It is each prospective offeror's responsibility to check the webpage for updates concerning the solicitation and the programs of interest. In addition, proposers should monitor the Frequently Asked Questions (FAQ) document posted on the solicitation's webpage in NSPIRES. This document will be updated periodically with questions and answers posed by potential investigators.

I. Funding Opportunity Description

A. Introduction

NASA's Physical Sciences Research Program conducts fundamental and applied physical sciences research, with the objective of enabling exploration and pioneering scientific discovery. NASA's experiments in the various disciplines of physical science reveal how physical systems respond to the near absence of gravity. They also reveal how other phenomena, which have a small influence on physical systems in Earth's gravity, can dominate system behavior in space. This NRA solicits ground-based research proposals that utilize experimental data archived in NASA's PSI system (<https://psi.nasa.gov>) to develop new analyses and scientific insights. Refer to Section I.C for an overview of the PSI system.

The goal of the PSI system is to contain nearly all completed reduced-gravity physical science experiments conducted on the ISS, and some select experiments from the Space Shuttle, Free Flyer, and ISS commercial cargo flight programs, as well as data from related ground-based studies. Conducted in a nearly weightless environment, these experiments reveal how physical systems respond to the near absence of the effects of gravity, such as buoyancy-driven convection, sedimentation, or sagging. NASA anticipates that new investigations utilizing data from the previously conducted experiments contained in the PSI database will inspire new areas of research, educate students, enhance discovery, and multiply innovation. Physical sciences experiments conducted in the reduced-gravity environment have yielded rich and unique results that have provided valuable insights into fundamental physical behavior that can apply to both terrestrial and space environments. Collecting this data in a single location – the PSI system – provides scientists around the world easy access to scientific data from multiple NASA experiments.

NASA's Physical Sciences Research Program benefits from collaborations with several international partners—Europe, Russia, Japan, and Canada—foreign governments with space programs such as France, Germany and Italy, other U.S. Government agencies such as National Institute of Standards and Technology (NIST), and non-Government organizations such as the Center for the Advancement of Science In Space (CASIS). The scale of this research enterprise promises new possibilities in the physical sciences; some of these possibilities are already being realized both in the form of innovations for space exploration and in advances in scientific

knowledge that may lead to new ways to improve the quality of life on Earth.

B. Research Emphases Specific to This Solicitation

This NRA solicits ground-based research proposals that present a compelling case on how the experimental data from the PSI system (<https://psi.nasa.gov>) will be used to promote the advancement of further research. Proposers must show a clear path from the scientific data obtained from the PSI system to the proposed investigation. In addition, the project must address an important problem in the proposed area of research and advance scientific knowledge or technology. Examples of proposed investigations that utilize the PSI data include:

- Enhancement and verification of numerical and analytical models;
- Development or enhancement of data analysis or other informatics tools to increase science readiness;
- A new ground-based experiment or data analysis to verify phenomena observed in the original investigation;
- A new ground-based experiment or data analysis that expands upon the results from the original investigation;
- A new ground-based experiment or data analysis that is not directly linked with the science objectives from the original investigation.

Proposers must review the data in the PSI system before preparing their proposal. The proposal must clearly demonstrate how the PSI data will be used in the project. Furthermore, prior to the submission of the proposal, it is highly recommended that the proposers take at least one representative sample set of the PSI data to perform numerical modeling or sample experiments and present the findings as part of the proposal.

In general, research is solicited in the following six **research areas**. Keep in mind that not all of these areas are currently represented in the PSI system, because in some cases experiments have not been flown, analyzed, or loaded into the database.

Biophysics:

biological macromolecules, biofluids, biomaterials/biofilms, and biological physics

Combustion Science:

spacecraft fire safety, droplets, gaseous – premixed and non-premixed, solid fuels, and high pressure/supercritical reacting fluids

Complex Fluids:

colloids, liquid crystals, foams, gels, and granular flows

Fluid Physics:

adiabatic two-phase flow, boiling and condensation, capillary flow, interfacial phenomena, and cryogenic propellant storage and transfer

Fundamental Physics:

quantum coherence and entanglement, quantum interferometry & precision measurements, properties of quantum matter, microscopic properties of complex plasmas, and properties of many-body system.

Materials Science:

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glasses and ceramics, granular materials, metals, polymers and organics, and semiconductors

Proposals will be solicited through appendices under this omnibus solicitation. Not all research areas listed above will be solicited in each appendix. The PSI experiments eligible for use in the proposals will be specified in each appendix. An appendix will only be open for a defined period of time. Please refer to the appendices for additional information regarding the specific research areas being solicited. Proposals in research areas not requested in the appendix will be deemed non-compliant and returned without review.

This NRA is soliciting proposals from established researchers and graduate students.

- 1) For established researchers, NASA is soliciting proposals that advance fundamental research in one of the physical sciences disciplines identified above that leads to future publications or may lead to patents or commercial applications. Postdoctoral scholars are also eligible to submit proposals under this category.
- 2) For graduate students (students working toward an advanced degree), this NRA is soliciting proposals that advance fundamental research in one of the physical sciences disciplines identified above and also assist in the awarding of an advanced degree to the graduate student. This NRA is open to students who meet all of the following eligibility requirements:
 - The student is pursuing an advanced degree directly related to a physical sciences discipline—only technical degrees are permitted (not degrees in policy or management);
 - The student is a U.S. citizen, a permanent resident alien of the U.S., or on a student visa at an accredited U.S. university at the time of application submission;
 - The student is enrolled in a master's or doctoral degree program at an accredited U.S. university at the time of application submission, or, if the student is an undergraduate starting their graduate studies, he or she has been accepted to a master's or doctoral degree program at an accredited U.S. university at the time of application submission and will start during the next academic year;
 - The student has an academic graduate advisor who will submit the application for the graduate student. The student must perform the proposed research under the guidance of the assigned graduate advisor.

Research results from proposals selected under this NRA will be entered into the PSI system for use by future investigators. See Section VI.C.3 for additional information.

C. Overview of the Physical Sciences Informatics System and Open Science Method

The PSI system is designed as a tool for investigators to further science in accordance with the open science method, while also meeting the requirements of the nation's Open Data Policy. The open science method that is being adopted by NASA's Physical Sciences Research Program brings together the community of researchers to define an envelope of broadly scoped experiments that will be conducted and analyzed, with the resulting data placed into the open-access PSI system. In this manner, the Physical Sciences open science vision (see Figure 1)

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leverages raw and analyzed data from completed experiments, numerical models, and related publications to create experimental informatics libraries that will support many more investigators and funded microgravity-derived research, converting what traditionally would be a single Principal Investigator (PI) research opportunity into multiple PI research opportunities.

At this point, the PSI system contains information on a number of investigations conducted on the ISS, Space Shuttle flights, Free Flyers, or commercial cargo flights to and from the ISS, and from related ground-based studies, with data for new investigations added as they become available. Visit the PSI website, <https://psi.nasa.gov>, to find out more about the system. Prior to gaining access to the data in the PSI, users must request access to the system at <https://psi.nasa.gov/register>. Please contact the PSI support team at MSFC-DL-HelpdeskMSFC@mail.nasa.gov or 866-419-6297 for any questions or issues with the system.

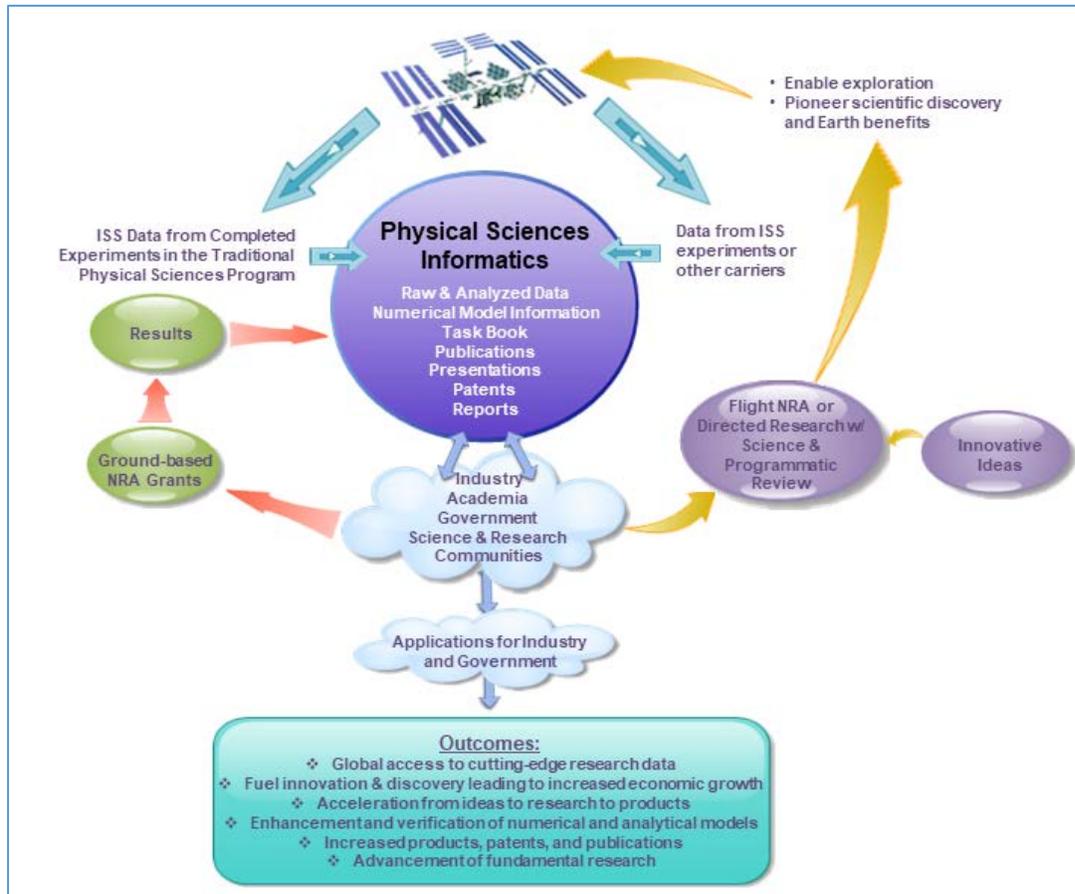


Figure 1: The Physical Sciences Research Flow - describes the two paths through which an investigator can submit proposals to become part of the NASA Physical Sciences Research program and the expected outcomes for that research. The two paths are a flight NRA and a ground-based NRA.

D. Data Management Plan

As a Federal Agency, NASA requires prompt public disclosure of the results of its sponsored research to generate knowledge that benefits the nation. Thus, it is NASA's intent that all knowledge developed under awards resulting from this solicitation be shared broadly.

Furthermore, promoting the full and open sharing of data with the research communities, private industry, academia, and the general public is a longstanding core value of NASA. Therefore, in keeping with the "NASA Plan for Increasing Access to the Results of Scientific Research," which can be found at:

[https://www.nasa.gov/sites/default/files/atoms/files/206985_2015_nasa_plan-for-web.pdf](https://www.nasa.gov/sites/default/files/atoms/files/2069852015nasa_plan-for-web.pdf)

all proposals submitted to this NRA are required to include a Data Management Plan (DMP) that describes how data generated through the course of the proposed research will be shared and preserved (including timeframe), or explains why data sharing and/or preservation are not possible or scientifically appropriate, or why the data need not be made publicly available. The DMP shall define in adequate detail how the data created by the award will be shared/preserved including:

- What data types, volumes, formats, and (where relevant) standards are expected to be generated?
- Where these data will be made available?
- When will these data be made available?
- Who on the proposal team will do this archiving?

Award recipients are required to upload all data, new analytical or numerical models, the source code from numerical models, tools, and software produced under the funded research, related documentation, and published papers into the NASA PSI system (<https://psi.nasa.gov>). At a minimum, the DMP must describe how data sharing and preservation will enable validation of published results, or how such results could be validated if data are not shared or preserved. The DMP must provide a plan for making research data that underlie the results and findings in peer-reviewed publications digitally accessible at the time of publication or within a reasonable time period after publication. This includes data (or how to access data) that are displayed in charts and figures. This requirement does not include preliminary data, laboratory notebooks, drafts of scientific papers, plans for research, peer review reports, communications with colleagues, or physical objects, such as laboratory specimens. For this NRA, the data sharing and preservation requirement will be met by stating in the DMP that data will be entered into the NASA PSI system and explaining how this task will be achieved. See Section VI.C.3 for more information on the requirement of uploading data from the research funded under this solicitation into the PSI system.

In addition, award recipients will be expected to publish their work in peer-reviewed, open literature publications to the greatest extent practical. NASA recognizes that there are cases when data cannot be disclosed to the public (e.g., export-controlled data). Even in these cases, offerors are expected to publish data to the greatest extent possible (e.g., use normalized data or at least discuss new methodologies used with clean "test cases"). NASA also understands that offerors may have legitimate proprietary interests in the technology or data they have produced at their own expense. If results must include proprietary or restricted information, that information

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should be appropriately marked and segregated into a separate appendix that will not be publicly disseminated. A publicly releasable version of the final report and other deliverables shall be otherwise complete and comprehensive. Furthermore, as-accepted manuscript versions of papers published in peer-reviewed scholarly journals and in juried conference proceedings must be made publicly accessible via NASA's PubSpace website (<https://www.nasa.gov/open/researchaccess/pubspace>). See Section VI.C.4 for more information on this requirement.

The DMP must be included as part of the proposal attachment. Please refer to Section IV.B.3 for required proposal format and content information. A template for a suitable DMP for this NRA is available as Attachment B of this NRA.

The DMP will be reviewed as part of the overall NASA research proposal/project plan review process. The DMP will be refined with NASA discipline experts shortly after award. NASA program managers will provide guidance to awardees, as well as monitor compliance with the refined DMP.

E. 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: (1) the public, (2) astronauts and pilots, (3) the NASA workforce (including employees working under NASA instruments), and (4) high-value equipment and property. All research conducted under NASA auspices shall conform to this policy.

F. Diversity

NASA recognizes and supports the benefits of having diverse and inclusive scientific, engineering, and technology communities and fully expects that such values will be reflected in the composition of all panels and teams including peer review panels (science, engineering, and technology), proposal teams, science definition teams, and mission and instrument teams.

G. Availability of Funds for Award

There is no funding associated with this omnibus solicitation. All funding will be associated with each particular appendix. The Government's ability to make awards is contingent upon the availability of appropriated funds and the receipt of proposals that NASA determines are acceptable for award under this solicitation. Prospective proposers to this NRA are advised that funds are not currently available for awards under this NRA.

H. Additional Funding Restrictions

In addition to the funding restrictions and requirements given in the *NASA Guidebook for Proposers*, 2 CFR (Code of Federal Regulations) 200, 2 CFR 1800, 14 CFR 1274 and the NASA Grants and Cooperative Agreements Manual (GCAM), the following restrictions are applicable to this solicitation:

- The estimated funding and number of proposals anticipated to be funded are subject to the availability of appropriated funds, as well as the submission of a sufficient number of proposals of adequate merit.
- It is not anticipated that this solicitation will require the construction of facilities (i.e., buildings, structures, or other real property). However, if new or modified facilities are required to further the technology, the offerors shall clearly state the rationale. For further information on allowable costs, refer to the cost principles cited at 2 CFR 200 Subpart E – Cost Principles or Federal Acquisition Regulation (FAR) Part 31 and NASA FAR Supplement (NFS) Part 1831 depending on whether a grant/cooperative agreement or contract will be the resulting award instrument.
- U.S. award recipients may directly purchase supplies and/or services that do not constitute research from non-U.S. sources, but award funds may not be used to fund research carried out by non-U.S. organizations. 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. See the *NASA Guidebook for Proposers*.
- Typically travel, including foreign travel, is allowed as may be necessary for the meaningful completion of the proposed investigation, as well as for publicizing its results at appropriate professional meetings.
- Profit is not allowable under grant or cooperative agreement awards but is allowable under contract awards. Recovery of costs only (no profit) for commercial organizations is allowed under grant awards.
- All proposed costs, including any cost sharing, must be allowable, allocable, and reasonable. Funds may only be used for the project. Unless otherwise directed in 2 CFR 200, for changes to the negotiated indirect cost rate that occur throughout the project period, you must apply the rate negotiated for that year, whether higher or lower than at the time of the initial award. All activities charged under indirect costs must be allowed under the cost principles in 2 CFR 200.

Regardless of whether functioning as a PI or as a team member, personnel from NASA Centers shall propose budgets based on Full Cost Accounting (FCA). Non-NASA U.S. Government organizations shall propose based on FCA unless no such standards are in effect; in that case such proposers shall 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/>.

II. Award Information

Refer to the appendices for the anticipated total amount of funds available, any funding limitations, potential number of proposal awards, and period of performance (duration) for

awards. While the appendices will provide estimates for funding and the number of awards, these amounts may vary depending on the merit of proposals submitted and the funding available at the time of selections.

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 policies and provisions identified in the regulations at 2 CFR 200 and 1800, 14 CFR 1274, NASA GCAM, and the *NASA Guidebook for Proposers*. In the case of any conflict, the order of precedence is as follows: regulations, NASA GCAM, program appendices, this omnibus NRA, then the *NASA Guidebook for Proposers*. Contract awards will be subject to the provisions of the FAR (<http://www.acquisition.gov/far/>) and the NFS (<https://www.hq.nasa.gov/office/procurement/regs/NFS.pdf>).

III. Eligibility Information

A. Eligibility of Applicants

Participation in this program is open to all categories of U.S. and non-U.S. organizations, including educational institutions, industry, nonprofit organizations, NASA Centers and other Government agencies. PIs may collaborate with investigators from universities, Federal Government laboratories, the private sector, state and local government laboratories, and other countries. It is NASA policy that research with foreign organizations will be accomplished on a no-exchange-of-funds basis. For further information, see Section III.B – Guidelines for International Participation. For grants and cooperative agreements, NASA policy on research with foreign organizations is covered in 2 CFR 1800.3.

In all arrangements, the applying entity is expected to be responsible for administering the project according to the management approach presented in the proposal. Present or prior NASA support of research or training in any institution or for any investigator is not a prerequisite for submission of a proposal.

B. Guidelines for International Participation

1. Guidelines for International Team Members on U.S. Proposals

International team members may be included on U.S. proposals. International collaborations that demonstrate clear scientific benefits or cost savings are particularly encouraged. While Co-Investigators (Co-Is) or collaborators employed by non-U.S. organizations may be identified as part of a proposal submitted by a U.S. organization, NASA funding through this NRA may not be used to support research efforts by non-U.S. organizations at any level; however, the direct purchase of supplies and/or services that do not constitute research from non-U.S. sources by U.S. award recipients is permitted. Furthermore, PIs and other team members, including graduate students, who are not U.S. citizens but are employed by or studying at a U.S. organization may receive funding to support their research activities through this NRA. Additional information on international participation can be found at:

http://farsite.hill.af.mil/archive/NFS/97.61/1835.htm#P49_2601.

2. Guidelines for International Proposals

NASA will consider, consistent with U.S. Government laws, policies, and regulations, proposals from non-U.S. organizations. However, foreign entities are not eligible for funding from NASA. Therefore, unless otherwise noted in this NRA or in the relevant appendix, proposals from foreign entities should not include a cost plan unless the proposal involves collaboration with a U.S. institution, in which case a cost plan for only the participation of the U.S. entity must be included. Proposals from foreign entities and proposals from U.S. entities that include foreign participation must be endorsed by the respective government agency or funding/sponsoring institution in the country of the organization with which the foreign participant is affiliated. Such endorsement should indicate that the proposal merits careful consideration by NASA, and if the proposal is selected, sufficient funds will be made available to the foreign entity by his/her country's government agency or funding/sponsoring institution to undertake the activity as proposed.

All foreign proposals must be typewritten in English and comply with all other submission requirements stated in the NRA. All foreign proposals will undergo the same NASA evaluation and selection process as those originating in the U.S. All proposals must be received before the established closing date. Those proposals received after the closing date will be treated in accordance with Attachment A, paragraph (g). Foreign entities may, in exceptional situations, submit a proposal without an endorsement by the sponsoring foreign government agency or funding institution, if endorsement is not possible before the announced closing date. In such cases, the NASA sponsoring office should be advised when a decision on endorsement can be expected. Foreign entities that have submitted proposals, whether they have been selected or not, will be contacted directly by the NASA sponsoring office. Copies of these letters will be sent to the foreign sponsor. Should a foreign proposal or a U.S. proposal with foreign participation be selected, NASA's Office of External Relations (OER) will work with the foreign sponsor, and coordinate within the U.S. Government interagency community, as necessary, to develop a binding legal instrument to enable the collaborative activity on a no-exchange-of-funds basis, in which NASA and the non-U.S. sponsoring agency or funding institution will each bear the appropriate cost of discharging their respective responsibilities.

Depending on the nature and extent of the proposed cooperation, these arrangements may entail:

- (i) An exchange of letters between NASA and the foreign sponsor; or
- (ii) A formal Agency-to-Agency Memorandum of Understanding (MOU).

NASA's policy is to conduct research with non-U.S. organizations on a cooperative, no-exchange-of-funds basis. For additional information on international participation, see NASA FAR Supplement Part 1835.016-70, which can be referenced at:

http://farsite.hill.af.mil/archive/NFS/97.61/1835.htm#P49_2601.

Also, see NASA Policy Directive 1360.2B Initiation and Development of International Cooperation in Space and Aeronautics Programs, which is located at:

<https://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPD&c=1360&s=2B>.

3. Export Control Guidelines Applicable to Proposals Including Foreign Participation

Proposals including foreign participation must include a section discussing compliance with U.S. export laws and regulations, e.g., 22 CFR Parts 120-130 and 15 CFR Parts 730-774, as applicable to the circumstances surrounding the particular foreign participation. The discussion must describe in detail the proposed foreign participation and is to include, but not be limited to, whether or not the foreign participation may require the prospective investigator to obtain the prior approval of the Department of State or the Department of Commerce via a technical assistance agreement or an export license, or whether a license exemption/exception may apply. If prior approvals via licenses are necessary, discuss whether the license has been applied for or, if not, the projected timing of the application and any implications for the schedule. Information regarding U.S. export regulations is available at the U.S. Department of State website https://www.pmddtc.state.gov/ddtc_public and through the U.S. Department of Commerce's Bureau of Industry and Security website at <https://www.bis.doc.gov/>.

4. Export-Controlled Material in Proposals

While explicit inclusion of export-controlled material in proposals is not prohibited, NASA advises proposers that, under U.S. law and regulations, spacecraft and their specifically designed, modified, or configured systems, components, and parts may be 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. Other items or information may be subject to the Export Administration Regulations (EAR), 15 CFR Parts 730-774. This 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 NRA.

Proposers to this NRA are strongly encouraged not to include export-controlled material in their proposals, although the effort being proposed may itself be export controlled (ref. websites noted above in III.B.3). If it is essential to include any export-controlled information in a proposal, a notice to that effect must be prominently displayed on the first pages of the proposal and shall state:

"The information (data) contained in [insert page numbers or other identification] of this proposal is (are) subject to U.S. export control 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."

Reference the following website for guidance on NASA's Export Control Program and NASA Center Points of Contact: <http://www.hq.nasa.gov/office/oer/nasaecp/contacts.html>

These first pages listing export-controlled information should precede the table of contents, do not count against the page limits, and may also be used to provide the proprietary notification, if applicable. It is the responsibility of the proposer to determine whether any proposal information is subject to export-control regulations.

5. Assurance of Compliance – China Funding Restriction

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.

As stated in 2 CFR 1800 Appendix A, NASA requires Certifications, Assurances, and Representations, including Certifications and Assurances to implement restrictions in Appropriation Acts that are applicable to all awards. By submission of a proposal, proposers are certifying that the proposing organization has read and is in compliance with all the Certifications, Assurances, and Representations, including that they are not China or a Chinese-owned company, and that they 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.

NASA anticipates this restriction will be contained in future appropriation acts. Active Procurement Information Circular (PIC) 12-01A instructs Contracting Officers to add certification NFS 1852.225-72 entitled “Restriction on Funding Activity with China – Representation” as well as NFS clause 1852.225-71 entitled “Restriction on Funding Activity with China” in all contract awards.

C. Cost Sharing or Matching

For an institution of higher education, hospital, or other non-profit organization seeking to receive a grant or cooperative agreement, cost sharing is not required; however, NASA can accept cost sharing if it is voluntarily offered. See CFR 200.306, 2 CFR 1800.306 and 2 CFR 1800.922 for more information on cost sharing.

For a commercial firm seeking to receive a grant or cooperative agreement, cost sharing is required as defined in 14 CFR 1274, unless the commercial firm can demonstrate that they will not receive substantial compensating benefits for performance of the work. If no substantial compensating benefits will be received, cost sharing is not required but can be accepted. Acceptable forms of cost sharing for commercial firms are discussed in the Regulations at 14 CFR 1274.204 – Costs and Payments, which is located at: https://prod.nais.nasa.gov/pub/pub_library/grantd.html#1274204

IV. Proposal Submission Information

A. Source of Application Materials

All information needed to respond to appendices issued in accordance with this solicitation is contained in this solicitation, in the relevant appendices, and in the *NASA Guidebook for*

Proposers, which is located at

https://prod.nais.nasa.gov/pub/pub_library/srba/proposers_guidebooks.html.

Additionally, applicants shall prepare proposals in accordance with 48 CFR 1852.235-72 – Instructions for Responding to NASA Research Announcements, which is located at:

http://www.ecfr.gov/cgi-bin/text-idx?SID=406e676673b2f2ddf3520d74f5f4192d&node=pt48.6.1852&rgn=div5%23se48.6.1852_1235_672#se48.6.1852_1235_672 and is also included as Attachment A of this NRA.

The information in this NRA supersedes and provides additional direction to that found in the *NASA Guidebook for Proposers* and provides additional direction consistent with the NASA FAR Supplement Provision. Proposals that do not conform to the standards outlined in this solicitation will be declared noncompliant and will be handled in accordance with Attachment A.

Offerors are responsible for understanding and complying with the procedures in the *Guidebook* before preparing and submitting proposals. Proposals that do not conform to the standards outlined may be declared noncompliant and rejected without review. Where this solicitation and the *NASA Guidebook for Proposers* are in conflict, this solicitation takes precedence. In addition, the provisions in any appendix will apply to that specific opportunity and will supersede any conflicting provisions in this omnibus solicitation or in the *NASA Guidebook for Proposers*.

Proposal submission questions will be answered and published in a Frequently Asked Questions (FAQ) document. Individual responses will not be provided. This FAQ will be posted on the NSPIRES solicitation webpage alongside this NRA and will be updated periodically between solicitation release and the proposal due date.

B. Content and Form of Proposal Submission

1. NASA Proposal Data System

a) NSPIRES Registration

This NRA requires that the proposers register key data concerning their intended submission with NSPIRES located at <https://nspires.nasaprs.com>. Potential applicants are urged to access this site well in advance of the Notice of Intent (NOI) and proposal due dates to familiarize themselves with its structure and enter the requested identifier information. It is especially important to note that every individual named on the proposal's Cover Page (see further below) must be registered in NSPIRES and that such individuals must perform the registration themselves; that is, no one may register a second party, not even the PI of a proposal. This website is secure and all information entered is strictly for NASA use only.

Every organization that intends to submit a proposal in response to this NRA, including educational institutions, industry, nonprofit institutions, NASA Centers, the Jet Propulsion Laboratory, and other U.S. Government agencies, must be registered in NSPIRES, regardless of the electronic system used to submit proposals. Such registration must be performed by an organization's electronic business point-of-contact (EBPOC) in the System for Award

Management (SAM) at <https://sam.gov/>. A prerequisite for registering an organization in NSPIRES is registration in SAM. Note that if the submitting organization is not registered in SAM, it may take 15 business days to complete the registration, so proposers are advised to start the SAM and NSPIRES registration process well in advance of the proposal deadline in order to complete organization registration in SAM and then complete organization registration and proposer affiliation in NSPIRES before the proposal due date. Note that difficulty in registering in SAM or NSPIRES is not a sufficient reason for NASA to consider a proposal submitted after the deadline.

b) Electronic Submission

NOIs must be submitted through NSPIRES (<https://nspires.nasaprs.com>) and may be submitted by the PI.

For the submission of a full proposal, proposers may use either NSPIRES (<https://nspires.nasaprs.com>) or Grants.gov (<https://www.grants.gov/>). Regardless of the electronic submission system used, all proposers, team members, and agency officials must be registered with NSPIRES before proposal submission. The proposal must be submitted electronically by an official at the PI's organization who is authorized to make such a submission, the Authorized Organizational Representative (AOR). No emailed or hard copy of the proposal will be accepted. 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. It is strongly recommended that the PI work closely with his/her team members and organization official to ensure the proposal is submitted by the due date and time listed in the specific appendix of this solicitation. Proposals will not be accepted after the listed due dates and times.

NSPIRES accepts fully electronic proposals through a combination of data-based information (e.g., the electronic Cover Page and its associated forms) and uploaded PDF file(s) that contain the body of the proposal. The system will conduct an element check to identify any item(s) that may be missing or incomplete. Proposers are strongly encouraged to begin their submission process early.

Tutorials, registration assistance, and other NSPIRES help topics may be accessed through the NSPIRES online help website at <http://nspires.nasaprs.com/external/help.do>. Tutorials of NSPIRES are available at <https://nspires.nasaprs.com/tutorials/>. For any questions that cannot be resolved with the available online help menus, requests for assistance may be directed by email to nspires-help@nasaprs.com or by telephone to 202-479-9376, Monday through Friday, 8:00 a.m.– 6:00 p.m. (Eastern).

Instructions for the use of Grants.gov may be found at <http://www.grants.gov/>. Instructions for NASA-specific forms and NASA program-specific forms may be found in the “Application Instructions” that accompany the application package. For any questions that cannot be resolved with the available online help, requests for assistance may be directed by email to support@grants.gov or by telephone to 800-518-4726. The Contact Center is available 24 hours a day, 7 days a week, except for Federal holidays.

2. Notice of Intent Submission

To facilitate planning of the review process, applicants are strongly encouraged to submit an NOI by following the online instructions. The NOI must include the following information:

- The name and organization of the PI, and, if the full proposal will be a graduate student proposal, the name of the graduate student.
- The title of the planned investigation.
- One-paragraph abstract of the planned project submitted as the NSPIRES Proposal Summary. The abstract needs to include the following information:
 - A brief description of the planned project;
 - A list of PSI investigations to be used; and
 - The names and organizations of any Co-Is and other personnel to be involved in the proposed work.

The information above must be entered through NSPIRES cover pages; no PDF document upload will be accepted for the NOIs.

Notices of Intent must be submitted electronically by the NOI due date through the NSPIRES website (<https://nspires.nasaprs.com>). To initiate an NOI:

- Log in using your NSPIRES user name and password.
- Access Proposals/NOIs in the NSPIRES Options page.
- Click on the “Create NOI” button on the right-hand side of the screen.
- Select the open appendix for the “Use of the NASA Physical Sciences Informatics System” solicitation.
- Follow the step-by-step instructions provided in NSPIRES to complete your NOI.

All information entered will remain private until the electronic submission is completed. Please note that NOIs are strongly encouraged, but are not required for submission of a proposal. Failure to submit an NOI will not impact the selection process.

3. Proposal Format and Contents

This NRA is soliciting proposals from two types of investigators: 1) established researchers, and 2) graduate students with advisors from accredited postsecondary institutions and programs.

The proposal format and content requirements as outlined in this section are the same for both types of proposals, except that graduate students must include: 1) an endorsement from their academic graduate advisor or another formal contact at the graduate institution or program, and 2) their graduate school transcripts (or undergraduate transcripts if just starting graduate school).

For graduate student proposals, the proposal must be submitted by the student’s advisor as the “Principal Investigator,” and the student must be assigned as the “Graduate/Undergraduate Student” as part of the proposal team. **Although the proposal must be submitted by the graduate student’s advisor, the graduate student applicant must be the principal author of the Scientific/Technical/Management Project Description, receiving minimal assistance**

from other researchers such as current/prospective faculty advisors, mentors or collaborators. The remainder of the proposal can be developed by either the graduate student or the advisor. The advisor must certify in the letter of endorsement (see Section IV.B.3.b.vi below) that the graduate student is the principal author of the Scientific/Technical/Management Project Description.

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

In general, each proposal shall include a Proposal Cover Page and a Proposal Attachment consisting of the Scientific/Technical/Management Project Description section and all other required elements. Instructions for completing the Proposal Cover Page are specific to the electronic proposal submission system used by the offeror (NSPIRES or Grants.gov). Only attachments that are specifically requested either in this omnibus NRA or in appendices to this omnibus NRA should be submitted.

The required sections of the Proposal Attachment must be submitted as one searchable, unlocked PDF file that is attached to the electronic submission using one of the proposal submission systems. Offerors must comply with the format and page limit requirements described in this NRA.

Important note on creating PDF files for upload: It is essential that all PDF files generated and submitted by the offeror meet NASA requirements. This will ensure that the submitted files can be ingested by NSPIRES regardless of whether the proposal is submitted via NSPIRES. At a minimum, it is the responsibility of the proposer to: (1) ensure that all PDF files are unlocked and that edit permission is enabled – this is necessary to allow NSPIRES to concatenate submitted files into a single PDF document; 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, then convert the DVI file to Postscript and then to PDF. See https://nspires.nasaprs.com/tutorials/PDF_Guidelines.pdf for more information on creating PDF documents that are compliant with NSPIRES. Proposals containing PDF files that do not meet NASA requirements may be declared noncompliant and may not be evaluated.

It is each offeror's responsibility to verify the accuracy and completeness of his/her proposal, including all text, figures, tables, and required forms. NSPIRES allows applicants to verify before submission that all information contained in proposal PDF file(s) being provided to NSPIRES is complete and accurate.

There is a 20 MB file size limit for proposals. In order to meet the 20 MB file size limit, proposers should crop and compress any embedded photos and graphic files to an appropriate size and resolution.

Requirements in the appendices supersede any requirements in the NASA Guidebook for Proposers or in this omnibus solicitation.

a) Proposal Cover Page

Additional information for completing the Proposal Cover Page:

Proposal Summary (Abstract):

Both electronic systems require a Proposal Summary suitable for release through a publicly accessible archive should the proposal be selected (per Section 3.10 of the *NASA Guidebook for Proposers*). The Proposal Summary should be concise, should not exceed 4,000 characters in length, and should not contain any special characters, graphics or formatting; use text only. Grants.gov users must use a writeable pdf form (downloadable from Grants.gov) named ProposalSummary.pdf, which restricts the Proposal Summary text to the character limit. If Grants.gov were not to impose a limit on the length of the Proposal Summary, the Summary will be truncated to 4,000 characters when the proposal is transmitted from Grants.gov to NSPIRES.

Budget:

Both electronic systems require budget figures on the Proposal Cover Page. Offerors need to include budget figures for all years of the proposed project on the Proposal Cover Page, including subawards and NASA team member costs. Offerors should refer to section 3.18 of the *NASA Guidebook for Proposers* and additional budget instructions provided in the relevant appendix.

Program Specific Data:

This section consists of questions specific to the relevant appendix. Responses to the Program Specific Data (PSD) questions are required regardless of whether the proposal is submitted through NSPIRES or Grants.gov. NSPIRES will automatically prompt the offeror to answer the PSD questions prior to submission. Grants.gov submissions are required to include the NASA Program Specific Data (PSD) form. Proposal submissions that do not include the NASA PSD form may be deemed non-compliant and declined without review.

Proposal Team:

Each team member (PI, Co-I, collaborator, graduate, undergraduate student, consultant, postdoctoral associate, support staff, etc.) must register him/herself in NSPIRES and complete all the required information. Each individual team member must also be included on the Proposal Cover Page. The organizational affiliation specified on the cover page must be the organization through which the team member would work and receive funding while participating in the proposed effort. If the individual has multiple affiliations, then this organization may be different from the individual's primary employer or preferred mailing address. Team members are asked to ensure that their contact information in NSPIRES is up to date. Changes can be made using the "Account Management" link on the "NSPIRES Options" page.

For Graduate Student proposals, the academic graduate advisor is the PI and the student must be assigned as a "Graduate/Undergraduate Student." Graduate student proposals must have a graduate student assigned as part of the proposal team to be considered for selection as a Graduate Student proposal. Submitted Graduate Student proposals that do not have a graduate student as part of the proposal team will be considered non-compliant with this solicitation and

may be declined without review.

Required Certifications:

In order to submit a proposal, the AOR of the proposing organization must read the “Certification of Compliance with Applicable Executive Orders and U.S. Code” and click the checkbox to accept the certifications. The AOR’s signature on the Proposal Cover Page automatically certifies that the proposing organization has read and is in compliance with all the certifications, assurances, and representations identified in NSPIRES.

b) Proposal Attachment

In addition to the Cover Page elements discussed above, proposers must include a Proposal Attachment consisting of the Scientific/Technical/Management Project Description section and all other required elements. The Attachment must include the sections listed in Table 1, in the order listed, as one searchable, unlocked PDF file. If any required sections are missing from the proposal, it may be declared non-compliant and declined without review. No additional sections/appendices beyond what is listed in Table 1 are allowed, with the following exception: a Title Page that states the name of the proposal and the proposing organization maybe be included in the proposal. The Title Page may include project or organization logos but shall not include additional proposal information such as abstracts. The page may be used to provide statements regarding proprietary information (see Section IV.B.3.c) and/or export control (see Section III.B.4). Reviewers will not consider any proposal material in excess of the page limits and sections specified in the Table below. Any excess material may be removed from the proposal prior to forwarding for evaluation.

Table 1: Required Elements for Proposal Attachment

Section Number	Section	Page Limit
1	Table of Contents	1 page maximum
2	Response to Prior Review, if applicable (see Section IV.B.3.b.i below)	2 pages maximum
3	Scientific/Technical/Management Project Description (see Section IV.B.3.b.ii below)	10 pages maximum
4	References and Citations	no page limit
5	Data Management Plan (See Section I.D and Section IV.B.3.b.iii below)	2 pages maximum
6	Personnel Curriculum Vitae (see Section IV.B.3.b.iv below)	1-2 pages per person, no overall page limit
7	For Graduate Student proposals: Student Transcripts (see Section IV.B.3.b.v below)	no page limit
8	Current and Pending Support (see <i>NASA Guidebook for Proposers</i> and Attachment A)	no page limit
9	Facilities and Equipment (see <i>NASA Guidebook for Proposers</i> and Attachment A)	no page limit
10	Budget Narrative of Proposed Costs (see <i>NASA Guidebook for Proposers</i> and Attachment A)	no page limit
11	For Graduate Student proposals: Letter of Endorsement from the student’s academic graduate advisor or another	no page limit

	formal contact at the graduate institution or program if the advisor is not available (see Section IV.B.3.b.vi below)	
12	Letters of Support (as applicable; see Section IV.B.3.b.vii below)	no page limit

The *NASA Guidebook for Proposers* is located at:

https://prod.nais.nasa.gov/pub/pub_library/srba/proposers_guidebooks.html

The following supersedes the information provided in the *NASA Guidebook for Proposers* and is required in addition to the NASA FAR Supplement Provision:

i) Response to Prior Review (if applicable)

Investigators who are submitting a proposal in response to this solicitation and whose most recent submission that included similar objectives to any NASA-sponsored research announcement was not accepted are required to submit an explanation of how the current proposal addresses criticisms from previous review cycles. This explanation shall be presented preceding the Project Description as part of the Proposal Attachment and is limited to two pages. The explanation should include a description of changes to the current proposal as a result of review comments, or an explanation as to why the prior review comments are not applicable to the current proposal. These two pages are not considered part of the 10-page Project Description. If a proposal that is deemed a revised proposal does not include this section, it may be declared non-compliant and declined without review. Proposal reviewers will be provided with the evaluations of prior submissions.

ii) Scientific/Technical/Management Project Description

The length of the project description of the proposal shall not exceed 10 pages. The format (margins, etc.) of this section must follow the guidelines described in Section 3.6 of the *NASA Guidebook for Proposers*. In addition to the requirements specified in the Guidebook, the following requirements apply to the font size: the body text and captions may not, on average across a solid block of text, exceed 15 characters per horizontal inch, including spaces and no more than 5.5 lines per vertical inch of text. Referenced figures must be included in the page limit of the project description; however, the figure captions may use a 10-point font. The proposal shall contain sufficient detail to enable reviewers 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 current resources and the resources requested. The hypotheses and specific aims of the proposed research shall be clearly stated. The proposed research plan and science objectives from all participants, including any international team members, must be included in the submitted proposal. The project description also must include a general implementation plan that includes the management structure for the proposal personnel. Reviewers will not consider any material that exceeds the page limit for the project description. Cited literature and all other proposal sections are not considered part of the page limit for the project description. Reviewers are not required to view and/or consider referenced websites in their evaluation of the proposal. Additional information can be referenced in Attachment A, Section (c)(4) and *NASA Guidebook for Proposers*.

iii) Data Management Plan

A Data Management Plan (DMP) must be included in the Proposal Attachment. Requirements of the DMP are described in Section I.D. A template of a suitable DMP for this NRA is available in Attachment B of this NRA. The DMP shall not exceed two pages.

iv) Personnel Curriculum Vitae

The PI (and any Co-Principal Investigators, Co-PIs) must include a biographical sketch (not to exceed two pages) that includes his/her professional experiences, positions, and a bibliography of recent publications. A one-page sketch for each Co-I, or any other team member that will play a critical management or technical role in the proposed investigation, must also be included. The sketches should highlight publications relevant to the proposed investigation. See *NASA Guidebook for Proposers* and Attachment A for additional information.

v) Student Transcripts (for Graduate Student proposals only)

Copies of the official transcripts must be included in the Proposal Attachment. Only transcripts from the graduate school are required unless the graduate student has not completed one year of graduate school. If this is the case, transcripts from the student's undergraduate school must be provided.

vi) Letter of Endorsement (for Graduate Student proposals only)

Graduate student applicants must include a letter of endorsement from the student's academic graduate advisor. If the graduate advisor is not available, a letter from another formal contact at the graduate student's institution or program may be substituted. At a minimum, the letter must include a brief assessment of: the student's qualifications, the appropriateness of the student to perform the proposed research, and how this research will lead to an advanced degree for the student. Furthermore, the letter must certify that the graduate student is the principal author of the Scientific/Technical/Management Project Description.

vii) Letters of Support (if applicable)

Letters of support must be included in the Proposal Attachment in the following cases:

- From the owner of any facility or resource that is to be used for the project but that is not under the PI's direct control, a letter acknowledging that the facility or resource is available for the proposed use during the proposed period – see *NASA Guidebook for Proposers*;
- From government agencies or funding/sponsoring institutions of any proposal team members located in non-U.S. institutions, a letter endorsing the proposal and certifying that if the proposal is selected, sufficient funds will be made available by the government agency or funding/sponsoring institution for the team member to undertake the activity as proposed. Letters must be signed by an official at the organization or agency authorized to make such a commitment – see Section III.B.2 and *NASA Guidebook for Proposers*.

Other letters, including Letters of Affirmation (i.e., letters that endorse the value or merit of a proposal) are not allowed unless they are included as part of the Scientific/Technical/Management Project Description section, in which case they count against the page limit for that section. See *NASA Guidebook for Proposers* for more information.

c) Proprietary Information

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

C. Proposal Submission Dates, Time, and Location

For each opportunity described in the appendices to this solicitation, the electronic proposal must be submitted in its entirety by an AOR of the submitting organization no later than on the proposal due date and time given in the respective appendix. During the final hours before the submission deadline, offerors may experience server/connection congestion. Therefore, offerors are urged to familiarize themselves with the submission system(s), ensure they are registered in NSPIRES (which is required even if offerors are submitting through Grants.gov), and begin the submission process early. Offerors are strongly encouraged to submit proposals at least 48 hours in advance of submission deadline.

Proposals submitted after the proposal deadline on the proposal due date will be considered late and may be rejected without review. Late proposals will be handled in accordance with NASA's policy given in Attachment A, paragraph (g). Offerors should also keep in mind that the NSPIRES Help Desk is not staffed after 6:00 p.m. Eastern Time and that the Grants.gov customer support contact center is not staffed on federal holidays.

Refer to the appendices for specific due dates.

D. Collection of Demographic Information

NASA is implementing a process to collect demographic data from proposers for the purpose of analyzing demographic differences associated with its award processes. Information collected will include name, gender, race, ethnicity, disability status, and citizenship status. Submission of the information is voluntary and is not a precondition of award.

V. Proposal Review Information

A. Compliance Review

NASA will prescreen all proposals for compliance with the requirements of this solicitation and its subsequent appendices. This includes:

- Submission of a complete proposal with all required elements.
- Submission of a proposal that is consistent with the research areas identified in the relevant appendix.
- Submission of a proposal from an eligible offeror as specified in the Eligibility Information in this omnibus NRA and the relevant appendix.

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- Submission of a budget that includes all required details and that is for a funding period consistent with this omnibus NRA and the relevant appendix.
- Submission of a proposal that is consistent with the page limitations and formatting guidelines specified in this omnibus NRA and the relevant appendix.

Non-compliant proposals may be withdrawn from the review process and declined without further review. Compliant proposals submitted in response to this NRA will undergo a comprehensive review described in Section V.B.

B. Proposal Evaluation and Evaluation Criteria

Compliant proposals will undergo a comprehensive review, which includes the evaluation of factors such as the intrinsic scientific/technical merit of the proposal, relevance to NASA's Science Mission Directorate (SMD), programmatic balance, and the cost of the proposed work. Proposals will be evaluated in accordance with these criteria regardless of the award instrument NASA chooses to utilize.

A panel of scientific and/or technical subject matter experts will evaluate the intrinsic scientific/technical merit of the proposals. This panel of experts may include non-NASA and other 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 proposals relevant to the research emphases described in this omnibus NRA and the relevant appendix. The evaluation of this factor will result in a score of 0-100 based upon the intrinsic scientific or technical merit of the proposal. This score will reflect the panel's view of the proposal's strengths and weaknesses. Numerical scores will serve as a guide but will not be the only determining factor in the Agency's decision. The merit evaluation panel may include in its critique of a proposal any comments concerning the proposal's budget and programmatic relevance to NASA; however, the results of the scientific/technical merit evaluation and its associated score will not be impacted by the evaluation of cost or the programmatic relevance of the proposed work to NASA.

All of the factors shown below will be used in determining the above-described intrinsic scientific/technical merit of the proposal. *Effective Use of the PSI System* is the most important factor and carries the most weight. However, for Graduate Student proposals, *Academic Benefit* and *Effective Use of the PSI System* are the most important factors and carry the same weight. *Significance* and *Approach* are the second most important and weigh more than *Investigators* and *Environment*.

- *Effective Use of the PSI System*: How well do the investigators utilize the experimental data contained in the PSI system to meet the research goals stated in the proposal? How well does the use of this data advance research in the chosen research area?
- *Significance*: Does this study address an important problem? If the aims of the application are achieved, how well will scientific knowledge or technology be advanced?

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- *Approach*: Are the conceptual framework, proposed methods, and analysis techniques adequately developed, well integrated, and appropriate to the aims of the project? Is the proposed approach likely to yield the desired results within the specified timeframe? Does the project employ contemporary methods, concepts or approaches?
- *Investigators*: Are the investigators appropriately trained and well suited to carry out this work? Is the work proposed appropriate to the experience level of the investigators?
- *Environment*: Does the scientific environment in which the work will be performed contribute to the probability of success? Is there evidence of institutional support?
- **For Graduate Student proposals only: Academic Benefit**: How well does the proposed research benefit the advancement of the student's education and achieving the advanced degree?

In addition to the factors established for evaluating intrinsic scientific/technical merit of the proposal, other factors evaluated include: relevance to the goals and/or objectives of the appendix to which the proposal is submitted, programmatic alignment and balance, data management plan, and cost. Evaluation of the cost of the proposed effort includes consideration of the reasonableness of the proposed cost and the relationship of the proposed cost to available funds.

Proposals that enable exploration or pioneer scientific discovery will have strong program alignment.

While the most important factor in this evaluation process is the intrinsic scientific/technical merit, programmatic relevance/balance/alignment, data management plan, and available funds are all taken into consideration when making final selections. Deficiencies in any one of these factors may prevent selection of a proposal.

Additional information can be found in Attachment A, Sections (i)-(k). None of the provisions set forth in Attachment A, Sections (i)-(k) are intended to contravene or contradict the evaluation criteria set forth above.

The appendices may provide additional information regarding the evaluation criteria and may contain additional or tailored evaluation criteria. If any criteria in the appendices conflict with any part of this omnibus solicitation, the criteria identified in the appendices will take precedence.

C. Review and Selection Processes

The review of proposals submitted in response to this solicitation will be consistent with the general policies and provisions described in the *NASA Guidebook for Proposers*. Selection procedures will also be consistent with the procedures identified in the *NASA Guidebook for Proposers*. The information resulting from the reviews will be used to prepare selection recommendations. Selection for funding will be made by the designated NASA Selection Official. Unless otherwise specified in the relevant appendix, the Selection Official will be the Director of the Biological and Physical Science Division, Science Mission Directorate, or designee, at NASA Headquarters, Washington, D.C.

A NASA grant officer will conduct a pre-award review of risk associated with the proposer as required by 2 CFR 200.205. For all proposals selected for award, the grant officer will review the submitting organization's information available through the Federal Awardee Performance and Integrity Information System (FAPIIS) and the System for Award Management (SAM) to include checks on entity core data, registration expiration date, active exclusions, and delinquent federal debt.

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 FAPIIS) accessible through 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.

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

D. Reconsideration and Selection of Proposals Not Originally Selected

In accordance with Attachment A, Section (j) and codified in 48 CFR 1852.235-72 (July 2016), proposals that are evaluated as scientifically and programmatically meritorious, but which are not selected for award under a particular Appendix due to unavailability of funds or for any other reason, may be subsequently evaluated and reconsidered for selection. In the event a proposal is reconsidered, NASA will notify the proposing organization of its reconsideration and selection. Proposing organizations are required to respond to NASA's offer immediately to confirm their continued interest in an award.

E. Ombudsman

(1) An ombudsman has been appointed to hear and facilitate the resolution of concerns from offerors, potential offerors, and contractors during the pre-award and post-award phases of this acquisition. When requested, the ombudsman will maintain strict confidentiality as to the source of the concern. The existence of the ombudsman is not to diminish the authority of the contracting officer and/or grant officer, the proposal evaluation panel, or the Selection Official.

Further, the ombudsman does not participate in the evaluation of proposals, the source selection process, or the adjudication of formal contract disputes. Therefore, before consulting with an ombudsman, interested parties must first address their concerns, issues, disagreements, and/or recommendations to the contracting officer and/or grant officer for resolution.

(2) If resolution cannot be made by the grants officer or contracting officer, interested parties may contact the NASA ombudsman. Concerns, issues, disagreements, and recommendations which cannot be resolved at the installation may be referred to the NASA ombudsman:

Monica Manning
Deputy Assistant Administrator for Procurement
NASA HQ
300 E Street, SW, Room 5L14
Washington, D.C. 20546-0001
Phone: 202-358-1050
Email: agency-procurementombudsman@nasa.gov

Please do not contact the ombudsman to request copies of the solicitation, verify due date, or clarify technical requirements. Such inquiries shall be directed to the contacts specified in Section VII of this document.

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 proposers who request one. Selection notification will be made electronically through NSPIRES by a letter signed by the Selection Official. The selection letters are not an authorization to begin performance. The selected organization's business office will be contacted by a NASA grant or contract officer to negotiate an award. Any costs incurred by the proposer in anticipation of an award are at their own risk until **receiving an award** by a NASA grant officer. The NASA Procurement Office will request further business data, and negotiate the resultant action. NASA grant officers are the only personnel with the authority to award NASA grants and obligate government funds. NASA reserves the right to offer selection of only a portion of a proposal. In these instances, the proposer will be given the opportunity to accept or decline the offer. Additional information can be referenced in Attachment A, Section (k)(2).

B. Administrative and National Policy Requirements

Administrative and national policy requirements including general terms and conditions for grant and cooperative agreement awards may be found in 2 CFR 1800 Appendix B (see https://prod.nais.nasa.gov/pub/pub_library/srba/). Provisions for contract awards may be found in

the FAR and NASA FAR Supplement. Please note that it is expected that offerors will comply with Homeland Security Presidential Directive HSPD-12. The applicability of HSPD-12 will be determined during the negotiation for award for selected proposals. NASA also has additional specific access management requirements. All grant recipients must work with NASA project/program staff to ensure proper credentialing for any individuals who need access to NASA facilities and/or systems. Such individuals include U.S. citizens, lawful permanent residents (“green card” holders), and foreign nationals (those who are neither U.S. citizens nor permanent residents).

C. Post-Award Program Reporting/Individual Researcher Reporting

1. Annual Reporting and Task Book Reporting

The PI shall provide an annual written report to NASA on or before the anniversary of the start of funding. This information will be used to assess the degree of progress of the project. This information will consist primarily of:

- An abstract;
- A bibliographic list of publications;
- Copies of publications;
- A statement of progress, including a comparison with the originally proposed work schedule.

A component of the annual report will be used for the NASA Task Book (<https://taskbook.nasaprs.com>). The Task Book includes descriptions of all peer-reviewed Life and Physical Sciences activities funded by the BPS. The Task Book is an invaluable source of information for NASA biological, biomedical, and physical sciences researchers, as well as the external scientific and technical communities.

2. Final Report

A final report must be provided to NASA at the end of the award funding period, including a detailed listing of all peer-reviewed publications. This information will consist primarily of:

- Statement of the specific objectives;
- Significance of the work;
- Background;
- Overall progress during the performance period;
- Narrative discussion of technical approaches including problems encountered;
- Accomplishments related to approach;
- An appendix with bibliography and copies of all publications and reports;
- **For Graduate Student proposals only:** Description of the status of achieving an advanced degree.

Any publications or other public materials containing data are particularly important to include in the report.

3. NASA Physical Sciences Informatics System

All awardees must upload data produced from this research into the PSI system (<https://psi.nasa.gov>) at the end of the award period. Data input must conform to the PSI data submission requirements document that resides in the PSI system; NASA will provide specific data input procedures at a later date. The required data include: the raw experimental data in a machine-readable textual or numerical form, digital images and video; analyzed or reduced data prepared by the experiment's PI (including Graduate Student investigations); and supporting data including NASA reports, science requirements, experiment design and engineering data (including applicable drawings), any new analytical or numerical models, tools, or software developed as part of the research, references to publications and patents, and description of any commercial applications developed as a result of the research.

4. NASA-Funded Research Results Portal PubSpace

All awardees must make as-accepted manuscript versions of papers published in peer-reviewed scholarly journals and in juried conference proceedings publicly accessible via NASA's PubSpace website; see <http://www.nasa.gov/open/researchaccess/pubspace> for more information. PubSpace is an archive of original science journal articles produced by NASA-funded research made available online to the public. The as-accepted manuscript versions of papers must be made available on PubSpace within one year of publication. NASA will provide specific submission procedures at a later date. The Notice of Award document will include all reporting requirements related to accessing research results.

5. Reporting Related to FAPIIS

If the Federal share of any award issued under this NRA 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.

D. Special Considerations for Graduate Student Awards

NASA assumes that awards to selected Graduate Student proposals are for the funding of the specific graduate student identified in the proposal to conduct the research at the institution submitting the proposal. If the student decides to end his/her graduate studies prior to the end of the grant, the award may not be transferred to another student; instead, the grant will be terminated. If the student completes his/her degree before the start of the later year(s) of a multi-year award, but the student will continue to study for another advanced degree at the same institution, the award may be continued. Otherwise, the remaining year(s) of the award will be terminated. If the student changes graduate institutions, it is at NASA's discretion whether to negotiate transfer of the award to the new institution or to terminate the award.

VII. Contacts

Additional programmatic information for this NRA is available from:

Name: Dr. Francis Chiaramonte
Title: Program Scientist for Physical Sciences
NASA Headquarters
Email: francis.p.chiaramonte@nasa.gov
Phone: 202-358-0693

Additional technical information about the PSI for this NRA is available from:

Name: Teresa Miller
Title: Physical Sciences Informatics System – Technical Point of Contact
NASA Marshall Space Flight Center
Email: teresa.y.miller@nasa.gov
Phone: 256-544-7815

Additional award information for this NRA is available from:

Name: Libby Romaguera
Title: Grants Team Lead
Email: libby.a.romaguera@nasa.gov
Phone: 228-813-6160

For help on NSPIRES, please contact:

NSPIRES Help Desk
Email: nspires-help@nasaprs.com
Phone: 202-479-9376

VIII. References

1. Guidebook for Proposers Responding to a NASA Funding Announcement (*NASA Guidebook for Proposers*)
https://prod.nais.nasa.gov/pub/pub_library/srba/proposers_guidebooks.html
2. Federal Acquisition Regulation (FAR) is available online at the following addresses:
<https://www.acquisition.gov/far/> or
<http://farsite.hill.af.mil/>
3. NASA Federal Acquisition Regulations Supplement (NFS)
<https://www.hq.nasa.gov/office/procurement/regs/NFS.pdf>
4. 48 CFR 1852.235-72 – Instructions for Responding to NASA Research Announcements
<http://www.ecfr.gov/cgi-bin/text-idx?SID=406e676673b2f2ddf3520d74f5f4192d&node=>

[pt48.6.1852&rgn=div5#se48.6.1852_1235_672](#)

5. NASA Grant and Cooperative Agreement Manual
https://prod.nais.nasa.gov/pub/pub_library/srba/documents/Grant_and_CooperativeAgreementManual.doc
6. NASA Task Book
<https://taskbook.nasaprs.com/>
7. Assessment of Directions in Microgravity and Physical Sciences Research at NASA, National Research Council, 2003
http://books.nap.edu/catalog.php?record_id=10624
8. Recapturing a Future for Space Exploration: Life and Physical Sciences Research for a New Era, National Research Council, 2011
http://www.nap.edu/catalog.php?record_id=13048
9. A Midterm Assessment of Implementation of the Decadal Survey on Life and Physical Sciences Research at NASA, 2018
<https://www.nap.edu/catalog/24966/a-midterm-assessment-of-implementation-of-the-decadal-survey-on-life-and-physical-sciences-research-at-nasa>
10. A Researcher's Guide to: International Space Station – Physical Science Informatics (NP-2018-08-018-JSC)
https://www.nasa.gov/sites/default/files/atoms/files/psi_researchers_guide-tagged.pdf
11. NASA Physical Sciences Informatics System
<https://psi.nasa.gov/>
12. NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES)
<https://nspires.nasaprs.com/>
13. Grants.gov electronic proposal submission system
<https://grants.gov/>

Attachment A: Instructions for Responding to NASA Research Announcements

Instructions for Responding to NASA Research Announcements 48 CFR 1852.235-72 (JUL 2016)

(a) **General.**

- (1) Proposals received in response to a NASA Research Announcement (NRA) will be used only for evaluation purposes. NASA does not allow a proposal, the contents of which are not available without restriction from another source, or any unique ideas submitted in response to an NRA to be used as the basis of a solicitation or in negotiation with other organizations, nor is a pre-award synopsis published for individual proposals.
 - (2) A solicited proposal that results in a NASA award becomes part of the record of that transaction and may be available to the public on specific request; however, information or material that NASA and the awardee mutually agree to be of a privileged nature will be held in confidence to the extent permitted by law, including the Freedom of Information Act.
 - (3) NRAs contain programmatic information and certain requirements which apply only to proposals prepared in response to that particular announcement. These instructions contain the general proposal preparation information which applies to responses to all NRAs.
 - (4) 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 Federal Acquisition Regulation and the NASA FAR Supplement. A grant, cooperative agreement, or other agreement resulting from NRAs are subject to policies and procedures outlined in the Guidebook for Proposers Responding to a NASA Funding Announcement, 2 CFR part 1800, 14 CFR part 1274, or other agreement policy. Any proposal from a large business concern that may result in the award of a contract, which exceeds \$5,000,000 and has subcontracting possibilities should include a small business subcontracting plan in accordance with the clause at FAR 52.219-9, Small Business Subcontracting Plan. (Subcontract plans for contract awards below \$5,000,000, will be negotiated after selection.)
 - (5) NASA does not have mandatory forms or formats for responses to NRAs; however, it is requested that proposals conform to the guidelines in these instructions. NASA may accept proposals without discussion; hence, proposals should initially be as complete as possible and be submitted on the proposers' most favorable terms.
 - (6) To be considered for award, a submission must, at a minimum, present a specific project within the areas delineated by the NRA; contain sufficient technical and cost information to permit a meaningful evaluation; be signed by an official authorized to legally bind the submitting organization; not merely offer to perform standard services or to just provide computer facilities or services; and not significantly duplicate a more specific current or pending NASA solicitation.
- (b) **NRA-Specific Items.** Several proposal submission items appear in the NRA itself: the unique NRA identifier; when to submit proposals; where to send proposals; number of copies required; and sources for more information. Items included in these instructions may be supplemented by the NRA.

- (c) The following information is needed to permit consideration in an objective manner. NRAs will generally specify topics for which additional information or greater detail is desirable. Each proposal copy shall contain all submitted material, including a copy of the transmittal letter if it contains substantive information.

(1) Transmittal letter or prefatory material.

- (i) The legal name and address of the organization and specific division or campus identification if part of a larger organization;
- (ii) A brief, scientifically valid project title intelligible to a scientifically literate reader and suitable for use in the public press;
- (iii) Type of organization: e.g., profit, nonprofit, educational, small business, minority, women-owned, etc.;
- (iv) Name and telephone number of the principal investigator and business personnel who may be contacted during evaluation or negotiation;
- (v) Identification of other organizations that are currently evaluating a proposal for the same efforts;
- (vi) Identification of the NRA, by number and title, to which the proposal is responding;
- (vii) Dollar amount requested, desired starting date, and duration of project;
- (viii) Date of submission; and
- (ix) Signature of a responsible official or authorized representative of the organization, or any other person authorized to legally bind the organization (unless the signature appears on the proposal itself).

(2) Restriction on use and disclosure of proposal information.

Information contained in proposals is used for evaluation purposes only. Offerors or quoters should, in order to maximize protection of trade secrets or other information that is confidential or privileged, place the following notice on the title page of the proposal and specify the information subject to the notice by inserting an appropriate identification in the notice. In any event, information 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.

Notice—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 contract (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.

- (3) **Abstract.** Include a concise (200-300 word if not otherwise specified in the NRA) abstract describing the objective and the method of approach.

(4) Project description.

- (i) The main body of the proposal shall be a detailed statement of the work to be undertaken and should include objectives and expected significance; relation to the present state of knowledge; and relation to previous work done on the project and to related work in progress elsewhere. The statement should outline the plan of work,

including the broad design of experiments to be undertaken and a description of experimental methods and procedures. The project description should address the evaluation factors in these instructions and any specific factors in the NRA. Any substantial collaboration with individuals not referred to in the budget or use of consultants should be described. Subcontracting significant portions of a research project is discouraged.

- (ii) When it is expected that the effort will require more than one year, the proposal should cover the complete project to the extent that it can be reasonably anticipated. Principal emphasis should be on the first year of work, and the description should distinguish clearly between the first year's work and work planned for subsequent years.
- (5) **Management approach.** For large or complex efforts involving interactions among numerous individuals or other organizations, plans for distribution of responsibilities and arrangements for ensuring a coordinated effort should be described.
- (6) **Personnel.** The principal investigator is responsible for supervision of the work and participates in the conduct of the research regardless of whether or not compensated under the award. A short biographical sketch of the principal investigator, a list of principal publications and any exceptional qualifications should be included. Omit social security number and other personal items which do not merit consideration in evaluation of the proposal. Give similar biographical information on other senior professional personnel who will be directly associated with the project. Give the names and titles of any other scientists and technical personnel associated substantially with the project in an advisory capacity. Universities should list the approximate number of students or other assistants, together with information as to their level of academic attainment. Any special industry-university cooperative arrangements should be described.
- (7) **Facilities and equipment.**
- (i) Describe available facilities and major items of equipment especially adapted or suited to the proposed project, and any additional major equipment that will be required. Identify any Government-owned facilities, industrial plant equipment, or special tooling that are proposed for use. Include evidence of its availability and the cognizant Government points of contact.
 - (ii) Before requesting a major item of capital equipment, the proposer should determine if sharing or loan of equipment already within the organization is a feasible alternative. Where such arrangements cannot be made, the proposal should so state. The need for items that typically can be used for research and non-research purposes should be explained.
- (8) **Proposed costs (U.S. proposals only).**
- (i) Proposals should contain cost and technical parts in one volume: do not use separate "confidential" salary pages. As applicable, include separate cost estimates for salaries and wages; fringe benefits; equipment; expendable materials and supplies; services; domestic and foreign travel; ADP expenses; publication or page charges; consultants; subcontracts; other miscellaneous identifiable direct costs; and indirect costs. List salaries and wages in appropriate organizational categories (e.g., principal investigator, other scientific and engineering professionals, graduate students, research assistants, and technicians and other non-professional personnel). Estimate all staffing data in terms of staff-months or fractions of full-time.

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- (ii) Explanatory notes should accompany the cost proposal to provide identification and estimated cost of major capital equipment items to be acquired; purpose and estimated number and lengths of trips planned; basis for indirect cost computation (including date of most recent negotiation and cognizant agency); and clarification of other items in the cost proposal that are not self-evident. List estimated expenses as yearly requirements by major work phases.
 - (iii) Allowable costs are governed by FAR part 31 and the NASA FAR Supplement part 1831.
 - (iv) Use of NASA funds—NASA funding may not be used for foreign research efforts at any level, whether as a collaborator or a subcontract. The direct purchase of supplies and/or services, which do not constitute research, from non-U.S. sources by U.S. award recipients is permitted. Additionally, in accordance with the National Space Transportation Policy, use of a non-U.S. manufactured launch vehicle is permitted only on a no-exchange-of-funds basis.
- (9) **Security.** Proposals should not contain security classified material. If the research requires access to or may generate security classified information, the submitter will be required to comply with Government security regulations.
- (10) **Current support.** For other current projects being conducted by the principal investigator, provide title of project, sponsoring agency, and ending date.
- (11) **Special matters.**
- (i) Include any required statements of environmental impact of the research, human subject or animal care provisions, conflict of interest, or on such other topics as may be required by the nature of the effort and current statutes, executive orders, or other current Government-wide guidelines.
 - (ii) Identify and discuss risk factors and issues throughout the proposal where they are relevant, and your approach to managing these risks.
 - (iii) Proposers should include a brief description of the organization, its facilities, and previous work experience in the field of the proposal. Identify the cognizant Government audit agency, inspection agency, and administrative contracting officer, when applicable.
- (d) **Renewal proposals.**
- (1) Renewal proposals for existing awards will be considered in the same manner as proposals for new endeavors. A renewal proposal should not repeat all of the information that was in the original proposal. The renewal proposal should refer to its predecessor, update the parts that are no longer current, and indicate what elements of the research are expected to be covered during the period for which support is desired. A description of any significant findings since the most recent progress report should be included. The renewal proposal should treat, in reasonable detail, the plans for the next period, contain a cost estimate, and otherwise adhere to these instructions.
 - (2) NASA may renew an effort either through amendment of an existing contract or by a new award.
- (e) **Length.** Unless otherwise specified in the NRA, effort should be made to keep proposals as brief as possible, concentrating on substantive material. Few proposals need exceed 15-20 pages. Necessary detailed information, such as reprints, should be included as attachments. A complete set of attachments is necessary for each copy of the proposal. As proposals are not returned, avoid use of “one-of-a-kind” attachments.

(f) **Joint proposals.**

(1) Where multiple organizations are involved, the proposal may be submitted by only one of them. It should clearly describe the role to be played by the other organizations and indicate the legal and managerial arrangements contemplated. In other instances, simultaneous submission of related proposals from each organization might be appropriate, in which case parallel awards would be made.

(2) Where a project of a cooperative nature with NASA is contemplated, describe the contributions expected from any participating NASA investigator and agency facilities or equipment which may be required. The proposal must be confined only to that which the proposing organization can commit itself. "Joint" proposals which specify the internal arrangements NASA will actually make are not acceptable as a means of establishing an agency commitment.

(g) **Late proposals.** Proposals or proposal modifications received after the latest date specified for receipt may be considered if a significant reduction in cost to the Government is probable or if there are significant technical advantages, as compared with proposals previously received.

(h) **Withdrawal.** Proposals may be withdrawn by the proposer at any time before award. Offerors are requested to notify NASA if the proposal is funded by another organization or of other changed circumstances which dictate termination of evaluation.

(i) **Evaluation factors.**

(1) Unless otherwise specified in the NRA, the principal elements (of approximately equal weight) considered in evaluating a proposal are its relevance to NASA's objectives, intrinsic merit, and cost.

(2) Evaluation of a proposal's relevance to NASA's objectives includes the consideration of the potential contribution of the effort to NASA's mission.

(3) Evaluation of its intrinsic merit includes the consideration of the following factors of equal importance:

(i) Overall scientific or technical merit of the proposal or unique and innovative methods, approaches, or concepts demonstrated by the proposal.

(ii) Offeror's capabilities, related experience, facilities, techniques, or unique combinations of these which are integral factors for achieving the proposal objectives.

(iii) The qualifications, capabilities, and experience of the proposed principal investigator, team leader, or key personnel critical in achieving the proposal objectives.

(iv) Overall standing among similar proposals and/or evaluation against the state-of-the-art.

(4) Evaluation of the cost of a proposed effort may include the realism and reasonableness of the proposed cost and available funds.

(j) **Evaluation techniques.** Selection decisions will be made following peer and/or scientific review of the proposals. Several evaluation techniques are regularly used within NASA. In all cases proposals are subject to scientific review by discipline specialists in the area of the proposal. Some proposals are reviewed entirely in-house, others are evaluated by a combination of in-house and selected external reviewers, while yet others are subject to the full external peer review technique (with due regard for conflict-of-interest and protection of proposal information), such as by mail or through assembled panels. The final decisions are made by a NASA selecting official. A proposal which is scientifically and programmatically

meritorious, but not selected for award during its initial review, may be included in subsequent reviews unless the proposer requests otherwise.

(k) Selection for award.

- (1) When a proposal is not selected for award, the proposer will be notified. NASA will explain generally why the proposal was not selected. Proposers desiring additional information may contact the selecting official who will arrange a debriefing.
- (2) When a proposal is selected for award, negotiation and award will be handled by the procurement office in the funding installation. The proposal is used as the basis for negotiation. The contracting officer may request certain business data and may forward a model award instrument and other information pertinent to negotiation.

(l) Additional guidelines applicable to foreign proposals and proposals including foreign participation.

- (1) NASA welcomes proposals from outside the U.S. However, foreign entities are generally not eligible for funding from NASA. Therefore, unless otherwise noted in the NRA, proposals from foreign entities should not include a cost plan unless the proposal involves collaboration with a U.S. institution, in which case a cost plan for only the participation of the U.S. entity must be included. Proposals from foreign entities and proposals from U.S. entities that include foreign participation must be endorsed by the respective government agency or funding/sponsoring institution in the country from which the foreign entity is proposing. Such endorsement should indicate that the proposal merits careful consideration by NASA, and if the proposal is selected, sufficient funds will be made available to undertake the activity as proposed.
- (2) All foreign proposals must be typewritten in English and comply with all other submission requirements stated in the NRA. All foreign proposals will undergo the same evaluation and selection process as those originating in the U.S. All proposals must be received before the established closing date. Those received after the closing date will be treated in accordance with paragraph (g) of this provision. Sponsoring foreign government agencies or funding institutions may, in exceptional situations, forward a proposal without endorsement if endorsement is not possible before the announced closing date. In such cases, the NASA sponsoring office should be advised when a decision on endorsement can be expected.
- (3) Successful and unsuccessful foreign entities will be contacted directly by the NASA sponsoring office. Copies of these letters will be sent to the foreign sponsor. Should a foreign proposal or a U.S. proposal with foreign participation be selected, NASA's Office of External Relations will arrange with the foreign sponsor for the proposed participation on a no-exchange-of-funds basis, in which NASA and the non-U.S. sponsoring agency or funding institution will each bear the cost of discharging their respective responsibilities.
- (4) Depending on the nature and extent of the proposed cooperation, these arrangements may entail:
 - (i) An exchange of letters between NASA and the foreign sponsor; or
 - (ii) A formal Agency-to-Agency Memorandum of Understanding (MOU).

(m) Cancellation of NRA. NASA reserves the right to make no awards under this NRA and to cancel this NRA. NASA assumes no liability for canceling the NRA or for anyone's failure to receive actual notice of cancellation.

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[62 FR 4475, Jan. 30, 1997, as amended at 64 FR 48561, Sept. 7, 1999; 65 FR 3153, Jan. 20, 2000; 67 FR 30604, May 7, 2002; 67 FR 61520, Oct. 1, 2002; 69 FR 63460, Nov. 2, 2004; 70 FR 74207, Dec. 15, 2005; 81 FR 41238, June 24, 2016]

Attachment B: Data Management Plan Template

a. Introduction

All proposals submitted in response to this NRA must include a Data Management Plan (DMP) that describes how data generated through the course of the proposed research will be shared and preserved (including timeframe). Since all award recipients from the NRA are required to upload the data produced from the funded research into the PSI system at the end of the award period (see Section VI.C.3) and make as-accepted manuscript versions of papers published in peer-reviewed scholarly journals and in juried conference proceedings publicly accessible via NASA’s PubSpace website (see Section VI.C.4), only DMPs that incorporate these requirements are acceptable for proposals submitted in response to this NRA. The template below can be used to prepare an acceptable DMP for this NRA. Proposers are not required to use this template and may use a DMP of their own design, but all required information must be included in the plan. See Section I.D for details on the DMP requirements for this NRA.

b. DMP Template for the “Use of the NASA Physical Sciences Informatics System” NRA

Preface

[Provide the title of the proposed research.]

[Provide names and institutions of the members of the research team.]

[Provide a brief high-level description or the objectives of the proposed research.]

[Provide a list of facilities planned to be used.]

Research Data Summary

The data generated as part of the proposed project is expected to include [describe generated data here: types, volumes, formats, and (where relevant) standards].

Overall Data Storage Plan

Data gathered during the investigation is stored in two places: during data analysis at the investigators’ host institution [or institutions, if more than one institution involved], and, once analyzed, raw and analyzed data will be stored in the PSI.

Data Storage During Analysis

During data analysis, the generated data will be stored [explain where, how, and by whom data is stored during analysis].

Data Upload to and Storage in the PSI

The data will be provided to the PSI by [person assigned this role on the proposal team]. [Name person here] will abide by the PSI data submission requirements document available in the PSI system and follow the specific data input procedures as provided by the PSI.

The timeline for providing the data into the PSI is: [include a schedule for providing the data; e.g., quarterly, annually, at the time of publication of results, at the end of the award period.] The proposal features a timeline and a budget with adequate effort to achieve this task.

Providing Publications to PubSpace

As-accepted manuscript versions of papers published in peer-reviewed scholarly journals and in juried conference proceedings will be provided to PubSpace by [person assigned this role on the proposal team]. [Name person here] will abide by the PubSpace submission requirements and follow the specific data input procedures as provided by NASA.

The timeline for providing the data into the PubSpace is: [include a schedule for providing the data; e.g., quarterly, annually, one year after publication.] The proposal features a timeline and a budget with adequate effort to achieve this task.

Additional Methods for Providing the Data to the Public

In addition to providing the data to the PSI and the as-accepted manuscript versions of papers to PubSpace, the data and publications will be made available to the public through [explain any additional data sharing plans, such as: inclusion of data in supplementary materials contained in publications; data sharing planned to be done through the proposers' own efforts, such as project websites. Also explain what kind of data will be shared through the different methods and present a timeline for making the data available. If no additional methods are planned, just state "No additional methods planned at this time."]

Attachment C: Acronym List

a.m.	ante meridiem
ADP	Automatic Data Processing
AOR	Authorized Organizational Representative
BPS	Biological and Physical Sciences
CASIS	Center for the Advancement of Science In Space
CBI	Confidential Business Information
CFDA	Catalog of Federal Domestic Assistance
CFR	Code of Federal Regulations
Co-I	Co-Investigator
Co-PI	Co-Principal Investigator
D.C.	District of Columbia
DMP	Data Management Plan
DVI	Device Independent file format
EAR	Export Administration Regulations
EBPOC	Electronic Business Point-of-Contact
FAQ	Frequently Asked Questions
FAPIIS	Federal Awardee Performance and Integrity Information System
FAR	Federal Acquisition Regulation
FCA	Full Cost Accounting
FR	Federal Regulation
GCAM	Grants and Cooperative Agreements Manual
HQ	Headquarters
HSPD	Homeland Security Presidential Directive
ISS	International Space Station
ITAR	International Traffic in Arms Regulations
LaTeX	Lamport TeX
MB	megabyte
MOU	Memorandum of Understanding
NASA	National Aeronautics and Space Administration
NFS	NASA FAR Supplement
NIST	National Institute of Standards and Technology
No.	Number
NOI	Notice of Intent
NRA	NASA Research Announcement
NSPIRES	NASA Solicitation and Proposal Integrated Review and Evaluation System
OER	Office of External Relations
OMB	Office of Management and Budget
p.m.	post meridiem
PDF	Portable Document Format
PI	Principal Investigator
PIC	Procurement Information Circular
PSD	Program Specific Data
PSI	Physical Sciences Informatics
SAM	System for Award Management

SMD	Science Mission Directorate
SW	Southwest
TeX	τέχνη
U.S.	United States
U.S.C.	United States Code