

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)
HEADQUARTERS
SCIENCE MISSION DIRECTORATE

RESEARCH OPPORTUNITIES IN SPACE AND EARTH SCIENCES – 2020
(ROSES-2020)

NASA RESEARCH ANNOUNCEMENT (NRA)
SOLICITING BASIC AND APPLIED SCIENCE RESEARCH AND TECHNOLOGY DEVELOPMENT
ANNOUNCEMENT NUMBER: NNH20ZDA001N

CATALOG OF FEDERAL DOMESTIC ASSISTANCE (CFDA) NUMBER: 43.001
OMB APPROVAL NUMBER 2700-0092 (EXPIRES 9/30/2022)

ISSUED: FEBRUARY 14, 2020

NOTICE: July 6, 2020. In [Section V\(c\)iv](#) the points of contact for the International Space Station Program's Research Office have been updated.

Clarified June 23, 2020. The 2020 Guidebook for Proposers Responding to a NASA Notice of Funding Opportunity has been posted at <https://www.hq.nasa.gov/office/procurement/nraquidebook/> with an "effective date" of June 23, 2020. It is not anticipated that this version of the Guidebook will change the content of proposals to ROSES but, just to give everyone time to review it, the 2020 Guidebook will only apply to ROSES proposals with due dates after September 25, 2020.

Clarified May 22, 2020. If an acronym used in the page limited Scientific/Technical/Management (S/T/M) section needs to be defined, it must be defined within the S/T/M section the first time it is used. Proposers may not define acronyms solely in a list outside of the page-limited S/T/M section. If and only if acronyms are defined within the S/T/M section may an acronym list also be provided outside of the S/T/M section for the convenience of reviewers.

KEY DATES

FULL (STEP-2) PROPOSALS DUE
NO EARLIER THAN MAY 14, 2020
THROUGH NO LATER THAN MAY 13, 2021

RESEARCH OPPORTUNITIES IN SPACE AND EARTH SCIENCES (ROSES)–2020 EXECUTIVE SUMMARY

This National Aeronautics and Space Administration (NASA) Research Announcement (NRA), Research Opportunities in Space and Earth Sciences (ROSES) – 2020, solicits basic and applied research in support of NASA's Science Mission Directorate (SMD). ROSES is an omnibus NRA, with many individual program elements, each with its own due dates and topics. All together these cover the wide range of basic and applied research and technology in space and Earth sciences supported by SMD. Awards to non-governmental organizations will be made primarily as grants or cooperative agreements and only occasionally as contracts as the nature of the work and/or program requirements dictate, see [Section II\(a\)](#). Awards to government labs will be made as inter- or intra-agency transfers. The typical period of performance for an award is three years, but some programs may allow up to five years and others specify shorter periods. Organizations of every type, domestic and foreign, Government and private, for profit and not-for-profit, may submit proposals without restriction on teaming arrangements. Note that it is NASA policy that all research involving non-U.S. organizations will be conducted on the basis of no exchange of funds.

This ROSES-2020 omnibus NRA will be available electronically as PDF files, at <http://solicitation.nasaprs.com/ROSES2020>. Tables [2](#) and [3](#) of this NRA, which will be posted at <http://solicitation.nasaprs.com/ROSES2020table2> and <http://solicitation.nasaprs.com/ROSES2020table3>, respectively, provide proposal due dates and hypertext links to descriptions of the solicited program elements in the Appendices of this NRA. To learn of additional new program elements or amendments to this NRA through February 2021, at which time release of a subsequent ROSES NRA is planned, proposers are encouraged to subscribe to:

- (1) The SMD mailing lists (by logging in at <http://nspires.nasaprs.com/> and checking the appropriate boxes under "Account Management" and "Email Subscriptions"),
- (2) The ROSES-2020 Blog for amendments, clarifications, and corrections at <http://science.nasa.gov/researchers/sara/grant-solicitations/ROSES-2020/>, and
- (3) The ROSES-2020 due date Google calendars. Instructions are at <https://science.nasa.gov/researchers/sara/library-and-useful-links>.

Potential proposers may find Frequently Asked Questions (FAQ) that span multiple years of ROSES funding announcements at <http://science.nasa.gov/researchers/sara/faqs/> and should refer to the [Guidebook for Proposers Responding to a NASA Funding Announcement](#) (hereafter referred to as the *NASA Guidebook for Proposers* or simply the *Guidebook*).

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Any amendments to the program elements will be indicated as bold and red in [Table 2](#) and [Table 3](#) of this NRA. Potential proposers may receive notification of amendments to ROSES-2020 by signing up for the SMD NSPIRES mailing list and/or by signing up for the ROSES-2020 Blog at <https://science.nasa.gov/researchers/sara/grant-solicitations/roses-2020/>.

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RESEARCH OPPORTUNITIES IN SPACE AND EARTH SCIENCES (ROSES)–2020
SUMMARY OF SOLICITATION

I. FUNDING OPPORTUNITY DESCRIPTION

(a) Strategic Objectives of NASA and the Science Mission Directorate

The National Aeronautics and Space Administration (NASA) is chartered in the National Aeronautics and Space Act [51 U.S.C. § 20101 et seq.] with, among other objectives, the expansion of human knowledge of the Earth and of phenomena in the atmosphere and space. Working from this Congressional authorization, U.S. National Space Policy directs NASA to advance fundamental scientific knowledge of our Earth system, Solar System, and the Universe. This direction is manifest in the 2018 NASA Strategic Plan, which includes Strategic Objective 1.1 to understand the Sun, Earth, Solar System, and Universe. Further insight into the Strategic Goals and Objectives of the Science Mission Directorate, from the *2018 NASA Strategic Plan* and the current version of *Science 2019-2024: A Vision for Scientific Excellence* (formerly known as the Science Plan), are given in the documents at <http://science.nasa.gov/about-us/science-strategy/>. All program elements in this NASA Research Announcement (NRA) are relevant to NASA's Strategic Goals and Objectives. Each proposal to this NRA demonstrates the relevance of its proposed research to NASA by demonstrating relevance to the particular program element to which it was submitted. Further instructions concerning relevance and the other evaluation criteria are provided in Section VI(a) below.

(b) Research Programs of NASA's Science Mission Directorate

The NASA Science Mission Directorate (SMD) pursues NASA's strategic objectives using a wide variety of space flight programs that enable the execution of both remote sensing and *in situ* investigations. These investigations are carried out through the flight of space missions in Earth orbit, as well as to or even beyond objects in the Solar System, and also through ground-based research activities that directly support these space missions. This ROSES NASA Research Announcement (NRA) solicits proposals for both flight investigations, using suborbital-class platforms (including aircraft, balloons, sounding rockets, CubeSats, commercial suborbital reusable launch vehicles, and small International Space Station payloads), and all kinds of ground-based supporting research and technology (SR&T) investigations that seek to understand naturally occurring space and Earth phenomena, human-induced changes in the Earth system, and Earth and space science-related technologies and to support the national goals for further robotic and human exploration of space. These ground-based investigations include, but are not limited to: theory, modeling, and analysis of SMD science data, (together with data from SMD's international and/or interagency partners) development of concepts, techniques and advanced technologies suitable for future SMD space missions; development of methods for laboratory analysis of both extraterrestrial samples returned by spacecraft and terrestrial samples that support or otherwise help verify observations from missions; determination of atomic and composition parameters needed to analyze space data, as well as returned samples from the Earth or space; Earth surface observations and field campaigns that support SMD science missions; development of integrated Earth system models; development

of systems for applying Earth science research data to societal needs; and development of applied information systems applicable to SMD objectives and data.

Proposals in response to this NRA should be submitted to the most relevant science program elements described in Appendices A, B, C, D, and E. [Table 2](#) lists these program elements in the order of their calendar deadlines for the submission of proposals, while [Table 3](#) lists them in the order in which they appear in the appendices of this NRA. Direct questions about each specific program element to the Program Officer(s) identified in the Summary of Key Information section that concludes each program element description.

In order to pursue NASA's strategic objectives, SMD research and technology development activities are organized into four Programs:

- The Earth Science Research and Applied Sciences Program sponsors integrative research to advance knowledge of and to explore interactions among the major components of the Earth system — continents, oceans, atmosphere, ice, and life — to distinguish natural from human-induced causes of change and to understand and predict the consequences of change.
- The Heliophysics Research Program sponsors research to understand the Sun and its interactions with the Earth and the Solar System, including space weather.
- The Planetary Science Research Program sponsors research to explore the Solar System to study its origins and evolution, including the origins of life within it.
- The Astrophysics Research Program sponsors research to explore the Universe beyond, from the search for planets to the origin, evolution, structure, and destiny of the Universe itself.

Appendices A, B, C, and D describe program elements of these four science research programs, respectively. Additionally, Appendix E describes cross-division program elements relevant to two or more of these science research programs. Each of these appendices is prefaced with Division Overview (A.1, B.1, C.1...) that introduces the research program content of that division and lays out important rules that apply to all program elements within that Appendix if not superseded by individual program elements. See [Section I\(g\)](#) regarding order the precedence of these rules.

(c) Significant Changes from Recent ROSES

(i) Proposers should be aware of the following changes from last year:

- This year SMD will pilot a "dual-anonymous peer review" (DAPR) for the evaluation of proposals submitted to select program elements. Proposals to those program elements must be prepared consistent with guidelines for preparation of anonymous proposals, see [Section IV\(b\)i](#), and DAPR processes are described in [Section VI\(b\)](#).
- Starting in ROSES-2020, unless the program element states otherwise, the sufficiency of the data management plan will be evaluated and will have a bearing on whether or not the proposal is selected, see [Section II\(c\)](#).
- This year, SMD will initiate a multi-year stepwise transition to implement the National Academy's recommendations in their report "[Best Practices for a Future Open Code Policy for NASA](#)". This includes both:

- Two new cross division program elements to enable public access: E.7 Support for Open Source Software Tools, Frameworks, and Libraries and E.8 Supplemental Open Source Software Awards and
- SMD has made uniform across all of ROSES the expectations regarding data and software, both to emphasize its importance and to simplify life for proposers as unified data policies better enable cross-disciplinary proposals. Text describing the now uniform ROSES approach on data and software may be found in the Division Overviews (i.e., A.1, B.1, C.1...).
- This year SMD will collect information from proposers and reviewers to assess (intellectual) risk and impact of ROSES proposals and the Associate Administrator will assemble a special panel to take a second look at select high-risk high-impact proposals that were not selected for funding through the normal review process. For more information see [Section VI\(b\)](#).

There have been a number of changes to the program elements within ROSES (see the lists of Program Element Appendices above). A non-exhaustive list of examples include:

- In Appendix A (Earth Science) a new call for members of a science team for the Global Ecosystem Dynamics Investigation (GEDI) instrument on the International Space Station (ISS) will be solicited as program element A.8. Moreover, A.30 The Earth Science U.S. Participating Investigator program will evaluate proposals using "dual-anonymous peer review", see [Section VI\(b\)](#). The Ecological Forecasting call has returned (having not been solicited since 2016) as A.39. Please note that this element is unique in requiring cost sharing. Finally, more program elements than ever before in Appendix A are requiring that proposers use the Earth Science standard templates for the Table of Work Effort and Current and Pending Support, please see [Section IV\(b\)iii](#) and [the "SARA" web page where these templates maybe downloaded](#).
- In Appendix B (Heliophysics) new opportunities for GOLD/ICON Guest Investigators and Parker Solar Probe Guest Investigators will be solicited as program elements B.15 and B.16, respectively. In addition, H-FORT has been split into three separate program elements for improved clarity: Low Cost Access to Space (B.9), Flight Opportunities Studies (B.10), and the remaining SmallSats and Rideshare Opportunities (B.11) that retains the name H-FORT. Finally, program element B.4, Heliophysics Guest Investigators-Open will evaluate proposals using "dual-anonymous peer review", see [Section VI\(b\)](#).
- In Appendix C (Planetary Science) new participating scientist programs for the Double Asteroid Redirection Test (DART) Mission and the MOMA instrument on the ExoMars rover will be solicited as program elements C.21 and C.25, respectively. A program element for Radioisotope Power Systems Technology is planned for C.22, and what was Near-Earth Objects has been renamed Yearly Opportunities for Research in Planetary Defense (C.24).
- In Appendix D (Astrophysics) a new program element for Guest Scientists for the X-Ray Imaging and Spectroscopy Mission (XRISM) is planned for this year in D.12, Astrophysics Explorers U.S. Participating Investigators returns in D.13 and Theoretical and Computational Astrophysics Networks returns in D.14. Finally, all Astrophysics GO/GI programs and D.2 Astrophysics Data Analysis will evaluate proposals using "dual-anonymous peer review", see [Section VI\(b\)](#).

- To Appendix E (Cross Division) three new opportunities will be added this year: E.6, the Science Activation Program Integration, E.7 Support for Open Source Software Tools, Frameworks, and Libraries and E.8 Supplemental Open Source Software Awards. The graduate student research program Future Investigators in NASA Earth and Space Science and Technology (FINESST), that was added to ROSES last year continues as program element E.5. Finally, Habitable Worlds (E.4) will evaluate proposals using "dual-anonymous peer review", see [Section VI\(b\)](#).
- As always, small changes have been made throughout this document and to program elements, so please read carefully. Other changes will occur after this initial release, announced by Amendments, corrections, and clarifications. Subscribe to the NSPIRES mailing lists and the [ROSES-2020 Blog](#) for such updates.
- **The 2020 version of the [Guidebook for Proposers](#) has been posted at <https://www.hq.nasa.gov/office/procurement/nraguidebook/> with an "effective date" of June 23, 2020. To give proposers adequate time to review it, the 2020 Guidebook will only apply to ROSES proposals with due dates after September 25, 2020. Until then proposers should continue to refer to the prior (2018) version of the Guidebook. [Clarified June 23, 2020]**

(ii) Those who have not proposed to ROSES recently should note the following changes made in recent years:

- Awards deriving from ROSES now require that as-accepted manuscript versions of peer-reviewed publications be uploaded into NASA's part of the [PubMed Central \(PMC\)](#) repository called [NASA PubSpace](#), as described in [Section II.\(c\)](#). Manuscripts are to be deposited within one year, and failure to do so may delay or prevent awarding of funds.
- In [Section IV\(b\)iii](#) in the description of the summary table of work effort it is noted that, unless otherwise stated in an individual program element, person time listed in the table of work effort that is offered at no cost by the proposing organization is assumed to be an estimate of anticipated additional effort that may be provided to the project as needed and is considered voluntary uncommitted effort.
- [Section VI.\(b\)](#) defines the programmatic considerations that may be considered by the selection official.
- [Section VIII](#) now includes a link to information on filing a complaint through the NASA Office of Diversity and Equal Opportunity.
- Although, in general, Notices of Intent (NOIs) are optional, they are mandatory in a few cases (e.g., D.3 APRA and D.7 SAT). Grants.gov does not include an option to submit a Notice of Intent. For more information on NOIs see [Section IV\(b\)vi](#).

(d) NASA-Provided High-End Computing (HEC) Resources

SMD provides a specialized computational infrastructure to support its research community, managed on its behalf by NASA's High-End Computing (HEC) program (see the HEC website at <https://www.hec.nasa.gov/>). Two major computing facilities are offered: the NASA Center for Climate Simulation (NCCS) at the Goddard Space Flight Center (GSFC), and the NASA Advanced Supercomputing (NAS) facility at the Ames Research Center (ARC).

The HEC program facilities maintain a range of computing systems with significant data storage resources. These offerings are summarized at <https://www.hec.nasa.gov/about/overview.html>. Augmentation and refreshment of these central systems occur periodically but the resources continue to be highly constrained. The HEC program also provides assistance in code porting, performance tuning, scientific data visualization, and data transfer.

Any need for computing time and other HEC program resources for the proposed research responding to a ROSES solicitation must be explicitly justified by completing an allocation request form for inclusion with your ROSES proposal (see sections i and ii below). If your proposal is selected, it is eligible for an allocation of HEC resources.

(i) Request HEC Resources

The purpose of this step is to inform science review panels and program managers of your computational needs, and if your ROSES proposal is selected, establish eligibility to use HEC resources. Complete and submit a request in the HEC Request Management System (RMS) at <https://request.hec.nasa.gov>. The form includes a written justification of how the computational resources would support the investigation as well as a multi-year resource-phasing plan, in annual increments, identifying the computing time and data storage requirements covering the duration of the proposed award period. You should use the “planning date for start of investigation” from the Summary of Key Information for your program element as the start date for your computational project.

Computing time must be described in the request using Standard Billing Units (SBUs), a common unit of measurement employed by the HEC program for allocating and tracking computing usage across its various architectures. The RMS system has a built-in calculator to help convert processor (CPU) hours to SBUs. SBU Conversion Factors are also available at <https://www.hec.nasa.gov/user/policies/sbus.html>, or proposers may contact HEC support staff for further assistance calculating SBUs; contact information can be found at https://www.nas.nasa.gov/hecc/support/user_support.html for NAS User Support, and <https://www.nccs.nasa.gov> for NCCS User Services Group.

(ii) Upload Request for HEC Resources

Save a PDF copy of your request after submitting it using the button provided in RMS. During your proposal submission in the NSPIRES system:

- Upload the PDF version of your computing time request as a separate file from your proposal; select "Appendix" as the document type when uploading;
- On the NSPIRES Cover Page
 - Check the box indicating that a request for HEC resources is included in the proposal; and
 - Enter the HEC Request Number (specified on the PDF).

For proposals submitted via [Grants.gov](https://www.grants.gov), the resource request should be attached as an appendix to any appropriate location. This requirement for a separate document supersedes the general rule that proposals are made up of only two PDF files: the proposal and the Total Budget.

As they review the proposed investigation, science peer review panels will be asked to consider whether the computing time requested is an appropriate use of the highly constrained resources dedicated to each program element under this NRA.

Selection of your ROSES proposal does not guarantee that your HEC request will be fully allocated; it means that your HEC request is eligible to progress to the next step for evaluation by the HEC program (see section iii below). While you are guaranteed some HEC time, it may differ from your request given resource constraints.

(iii) Allocation of HEC Resources

If your proposal is selected for funding, your HEC request will be evaluated by the HEC Allocation Authority. The HEC program will then issue letters identifying yearly allocations of HEC resources for the duration of the project, which again, may differ from your request due to limited availability of resources. However, PIs may submit requests to increase or decrease allocations of HEC resources if there are unexpected changes to computational needs. Requests for modifications must be submitted via RMS. Allocation in full cannot be guaranteed, but SMD will make every attempt to satisfy the needs in the context of the overall set of requirements, resource constraints, and science priorities.

To expedite initiation of new projects where PIs and/or users are foreign nationals (whose accounts will require additional documentation and longer processing), the HEC program will consider providing a minimal allocation to such projects which have been notified of pending funding soon after the PI submits an allocation request in RMS.

For further information or questions about NASA provided High-End Computing resources please contact Tsengdar Lee at Tsengdar.J.Lee@nasa.gov or 202-358-0860.

(e) Availability of Funds for Awards

Prospective proposers to this NRA are advised that funds are not available for new awards for all of its solicited program elements at the time of its release. The Government's obligation to make awards is contingent upon the availability of sufficient appropriated funds from which payment can be made and the receipt of proposals that NASA determines are acceptable for award under this NRA.

(f) Successor, Renewal, Resubmitted, Multiple and Duplicate Proposals

PIs holding awards from any program element of any prior NRA are welcome to submit "successor" or "renewal" proposals that seek to continue a previously funded line of research if in scope of the current NRA. However, as described in the [NASA Guidebook for Proposers](#), such successor proposals will be considered with neither advantage nor disadvantage along with new proposals that are submitted for that same program.

Proposers are welcome to resubmit proposals (or tasks) that were not funded under a prior program element or solicitation. Such submissions will be peer reviewed and considered with neither advantage nor disadvantage along with new proposals that are received by NASA. However, some Appendices and/or program elements in ROSES limit submissions in several ways:

The first limitation on submission bars "multiple" proposals to a given program element. Some program elements in Appendix B (Heliophysics), e.g., B.2 H-SR, will not allow a

particular individual to be the PI on more than one proposal to those program elements. In such cases, the first proposal identifying a particular PI will be evaluated, but any subsequent proposal to the same program element that identifies the same PI will not be evaluated or considered.

The second limitation bars concurrent submission of what are called "duplicate" proposals, in B.1, the Heliophysics Research Program Overview, C.1, the Planetary Science Research Program Overview, and D.1 the Astrophysics Research Program Overview where they are described as "the same or essentially the same" proposals. See Section 1.4 of B.1, Section 3.2 of C.1 and Section 2 of D.1 for more information.

In either case, the order of receipt of the proposals will be determined by the time stamp generated automatically by the proposal submission system. The first proposal submitted will be evaluated but subsequent duplicate proposals will be returned without review.

(g) Order of Precedence: The *Guidebook* vs. *ROSES Summary of Solicitation* vs. program elements

ROSES is an omnibus solicitation, meaning that this *Summary of Solicitation* (SoS) presents required information that applies to all program elements within it (like the OMB Approval Number 2700-0092 and the CFDA Number 43.001) that is not repeated within each program element. Similarly, this *Summary of Solicitation* sets out the default rules that apply to every ROSES program element unless otherwise stated, but any program element may supersede the SoS.

Grants and cooperative agreements will be subject to the policies and provisions identified in the regulations at 2 CFR (Code of Federal Regulations) 200 and 1800, 14 CFR 1274 (for cooperative agreements awarded to commercial organizations), [the NASA Grants and Cooperative Agreements Manual \(GCAM\)](#), and the *NASA Guidebook for Proposers*. In the case of any conflict, the order of precedence is as follows:

1. Statutes and regulations
2. [The NASA GCAM](#)
3. Program elements
4. Division Research Program Overviews (e.g., A.1, B.1...)
5. The *Summary of Solicitation* of the ROSES NRA (i.e., this document)
6. [Guidebook for Proposers Responding to a NASA Funding Announcement](#)

An example where individual program element may supersede the *Guidebook* is "letters of affirmation" (sometimes called letters of endorsement). The *Guidebook* states that letters that endorse the value or merit of a proposal will not be considered in the evaluation of the proposal, but a few individual program elements in ROSES (e.g., C.17 PMEF, for facility instruments, and E.2 TWSC) do allow such letters of affirmation.

Moreover, this *Summary of Solicitation* may include instructions that are more specific or detailed than the *Guidebook*, and program elements often include instructions that are more specific or detailed than this *Summary of Solicitation* or the *Guidebook*.

An example of a case where individual program element differs from this *Summary of Solicitation* is in how Relevance is evaluated. [Section VI\(a\)](#) lays out a general approach to evaluating relevance, but a few individual program elements in Appendix C (e.g., C.3-

C.5) require explicit statements of relevance through mandatory text boxes on the NSPIRES cover pages.

Answers to questions may appear in a Frequently Asked Questions (FAQ). The FAQ for the ROSES NRA appears at <http://science.nasa.gov/researchers/sara/faqs/>. Any FAQs for individual program elements will appear under "other documents" on the NSPIRES web page for the program element. FAQs merely clarify, they do not contradict instructions in the *Guidebook*, *ROSES Summary of Solicitation* or program elements.

Questions about differences between *ROSES Summary of Solicitation* and the *Guidebook* should be directed to sara@nasa.gov. Questions about a difference between either of those and an individual program element, should be directed to the point of contact for the particular program element and cc sara@nasa.gov.

(h) Access to NASA Facilities/Systems

To access NASA facilities and/or systems, award recipients must work with NASA to ensure proper credentialing. For example, for access to High-End Computing (HEC) Resources (see Section I(d) above) and for physical access to a NASA facility one would work with the badging office at that NASA center. Authors of proposals that would involve Foreign National access to NASA facilities/systems should refer to [the Foreign National Access Management \(FNAM\) Operations Manual](#).

(i) Citizen science

Citizen science is a form of open collaboration in which individuals or organizations participate voluntarily in the scientific process. Proposers to any ROSES program element are invited to incorporate citizen science and crowdsourcing methodologies into their submissions, where such methodologies will advance the objectives of the proposed investigation. [The current SMD Policy on citizen science](#) describes standards for evaluating proposed and funded SMD citizen science projects. For more information see Section 3 [H.R.6414 - Crowdsourcing and Citizen Science Act of 2016](#), which authorizes federal agencies to utilize crowdsourcing and citizen science and the <https://science.nasa.gov/citizenscience> webpage, that provides information about existing SMD-funded projects, including how to sign up for [the NASA-SOLVE email listserve](#).

(j) Science Activation

NASA Science recognizes the importance our content and experts play in advancing human knowledge. SMD created a new program to activate learners of all ages to become more scientifically-literate and create a life-long love of learning. By leveraging community-based organizations across the U.S. and online, we can provide new opportunities. See the Science Activation program element in this ROSES solicitation under Section E.6. If you are a subject matter expert and would like to learn more - visit <https://science.nasa.gov/learners>. To volunteer as a subject matter expert in this program, submit an application at <https://science.nasa.gov/learners/sme-map>.

Questions about the program may be submitted to <https://science.nasa.gov/contact-science-activation>.

II. AWARD INFORMATION

(a) Funding and Award Policies

NASA may support an award as outlined in the proposal budget, or may offer to fund only selected parts, or all or part for a shorter duration (e.g., a one-year pilot study), or a combination. Awards may depend on acceptable revised budgets, statements of work, data management plans, or other elements of proposals described in ROSES or in the [NASA Guidebook for Proposers](#). Moreover, even after an award letter has been sent or an award has begun, NASA has the authority to suspend or terminate a grant in whole or in part in accordance with 2 CFR 200.338 through 200.340.

The amount of funds expected to be available for the first year of new awards for proposals submitted in response to this NRA is given in the Summary Table of Key Information at the end of each program element in the appendices. An estimate of the number of awards that might be made for each program element is also given in this Table, contingent on budget allocation to that program element and availability of funding and presuming the submission of sufficient highly rated proposals.

ROSES-2020 will receive ~5000 proposals across all program elements and will select/award ~1250 totaling ~\$600 million over the lifetime of the awards. Individual award sizes will vary based on scope from ~\$5,000 to multi-year awards in the millions of dollars.

NASA's goal is to initiate new awards as rapidly as possible after the selection of proposals is announced. However, the workload experienced by NASA, the availability of appropriated funds, and any necessary post-selection negotiations with the proposing organization(s) needed for the award(s) in question can all cause delays. Regarding this last item, every proposer is especially encouraged to submit full and detailed explanations of the requested budget to help expedite the processing of the award, should their proposal be selected.

The ROSES NRA is structured to allow NASA to make the full range of award types: grants, cooperative agreements, contracts, and intra- (within NASA) or interagency transfers. NASA has provided guidance to the award giving offices about how to decide what award type is appropriate in Sections 3.3 and 3.4 of [the GCAM](#). By default, ROSES proposals to non-governmental organizations will result in grants (or cooperative agreements) rather than contracts which would not be appropriate for the public purpose of what is solicited. Unless otherwise stated in a program element, contracts will not be awarded. If a prospective proposer to a program element that excludes contracts thinks that their work should be a contract, they should communicate with the point of contact for that program element and cc sara@nasa.gov.

In general, ROSES proposals submitted by non-governmental organizations result in grants. When ROSES proposals result in cooperative agreements (to non-governmental organizations) there is substantial involvement of NASA facilities or staff in the conduct of the proposed research (e.g., when the PI is at a NASA Center and a funded Co-I is at non-governmental organization).

The budget narrative need not state the type of award instrument that is anticipated. A NASA awards officer will determine the appropriate award instrument for the selections

resulting from this solicitation. Contract awards will be subject to the provisions of the Federal Acquisition Regulations (FAR) and [the NASA FAR Supplement](#).

(b) Award Period of Performance

The period of performance (duration) for new awards for proposals submitted in response to this NRA is given in the Summary of Key Information that concludes each program element description in the appendices. The period of performance ranges from one year for activities of limited scope to five years for extensive, comprehensive studies. Award durations may be longer in special cases, such as teams of long-duration space missions. Whatever the proposed period of performance it must be justified in the proposal. The appropriateness of the proposed period of performance will be evaluated by peer review. NASA may offer to support an award of shorter duration than was proposed. Award start and end dates will vary by program element, but award start dates are rarely less than 6 months from the proposal due date.

(c) Increasing Access to the Results of Federally Funded Research

In keeping with the [NASA approach for Increasing Access to Results of Federally Funded Research](#), most proposals to ROSES will be required to provide a data management plan (DMP) or an explanation of why one is not necessary given the nature of the work proposed. Starting in ROSES-2020, in a change from prior years, the default presumption is that when a DMP is required, the sufficiency of the data management plan will be evaluated as part of the proposal's intrinsic merit and will have a bearing on whether or not the proposal is selected. Unless otherwise stated, the data management plan will be placed in a 2-page section in the proposal PDF immediately following the references and citations for the Scientific/Technical/Management (S/T/M) portion of the proposal and does not count against the page limit for the S/T/M Section.

The exceptions that don't follow this default will say so explicitly and they are: First, for some proposals the nature of the work is inexorably linked to the handling of data so DMP is part of the page-limited S/T/M section of the proposal. Examples include (but are not necessarily limited to) proposals to program elements A.8 GEDI Science Team, B.7 Space Weather Science Applications, B.12 Heliophysics Data Environment Emphasis, C.4 Planetary Data Archiving, Restoration, and Tools, D.2 Astrophysics Data Analysis, D.13 Astrophysics USPI, D.14 Theoretical and Computational Astrophysics Networks, and E.3 The Exoplanets Research Program. Some elements, like A.9 Physical Oceanography and A.14 Ocean Surface Topography Science Team require a separate Software Development Plan. Second, instrument development and technology development programs are generally exempted from providing a DMP at all, under the presumption that no significant research data will be generated. However, even if a DMP is not required with the proposal, if peer-reviewed publications result from the award then any data behind figures or tables must be available electronically at the time of release, ideally in supplementary material with the article and code developed should be made publicly available when it is practical and feasible to do so, and when there is scientific utility in doing so.

Some program elements provide templates for the data management plan. The template for the program elements in Appendix B (Heliophysics) may be found [here](#) and

the template for the program elements in Appendix C (planetary Science) may be found [here](#). Please read the program elements carefully.

Whether in the separate 2-page section or in the page-limited S/T/M portion of the proposal, proposals that include a plan to archive data should allocate suitable time and resources for this activity. The appendices or individual program elements of ROSES may specify preferred archives and may require more than is outlined in this *Summary of Solicitation* for all proposers or just those that generate certain kinds of data. For more information on data management plans see the [SARA FAQs on this subject](#). For information about data rights, and other aspects of intellectual property such as invention rights resulting from awards see the file entitled "*Award and Intellectual Property Information*" under the section called "Grant and Cooperative Agreement Guidance" at https://prod.nais.nasa.gov/pub/pub_library/srba/.

In keeping with the [NASA Plan for Increasing Access to Results of Federally Funded Research](#), awards deriving from ROSES include terms and conditions requiring that as accepted manuscript versions of peer-reviewed publications (hereinafter "manuscripts") that result from ROSES awards be uploaded into NASA's part of the [PubMed Central \(PMC\)](#) repository called [NASA PubSpace](#). [The Federal Register notice on this subject](#) specifies that manuscripts are to be deposited within one year of completion of the (manuscript) peer review process. Please note that the [NASA research access FAQ](#) says that not doing so "may delay or prevent awarding of funds". This applies only to peer reviewed manuscripts. Patents, publications that contain material governed by personal privacy, export control, proprietary restrictions, or national security law or regulations will not be covered by this requirement. For more details on public access to scientific publications and digital scientific data resulting from NASA-funded research, please see: <https://www.nasa.gov/open/researchaccess>.

(d) Rephasing of Award Budgets, Family or Medical Leave and No-Cost Time Extensions

Occasionally the schedule for a research project changes, and this will change the phasing of the funding requirement. "Rephasing" funding may be initiated either at the request of the PI or NASA.

In keeping with NASA's policy (in [2 CFR 1800.903](#)), SMD will accommodate all reasonable requests from the PI or Authorized Organization Representative (AOR) to rephrase ROSES awards to accommodate a PI's need to care for family and health (e.g., for family or medical leave). In the case of contracts, rephasing will be performed as long as it does not compromise previously agreed upon project goals, timelines, or deliverables associated with a NASA requirement described in the contract.

NASA policy allows grantee-initiated, first time no-cost extensions (NCEs) of up to 12 months. Grantees can use the form at <https://www.nssc.nasa.gov/nocostextension> to request NCEs. PIs at Government labs should contact their program officer directly.

SMD program officers may engage in active grant management to diminish carrying forward unobligated funds from one fiscal year to the next fiscal year (carryover). Program Officers may invite PIs to rephrase their funding requirement where funds for a year or more are being carried forward. In this way, the awarding of future year funds

can more closely align with the timing of project activities. The total funds disbursed over the period of performance will not change, only the fiscal year (FY) in which they arrive.

SMD policy is that rephasing should not cause work on continuing awards to be deferred because of a delay in receipt of funds. PIs should communicate clearly to NASA if a rephase would interfere with the planned schedule for the grant. If an award is rephased, NASA will make every reasonable effort to provide the next fiscal year funding in a timely manner. Honoring commitments and ensuring the continuation of existing projects is a high priority of SMD.

III. ELIGIBILITY INFORMATION

(a) Eligibility of Applicants

Prospective investigators from any category of organizations or institutions, U.S or non-U.S., are welcome to respond to this solicitation. Specific categories of organizations and institutions that are welcome to respond include, but are not limited to, educational, industrial, and not-for-profit organizations, Federally Funded Research and Development Centers (FFRDCs), University Affiliated Research Centers (UARCs), NASA Centers, the Jet Propulsion Laboratory (JPL), and other Government agencies. Historically Black Colleges and Universities (HBCUs), Hispanic-Serving Institutions, Tribal Colleges, and Other Minority Universities (OMUs), small disadvantaged businesses (SDBs), veteran-owned small businesses, service-disabled veteran-owned small businesses, HUBZone small businesses, and women-owned small businesses (WOSBs) are encouraged to apply.

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.

(b) Number of Proposals and Teaming Arrangements

There is no general restriction on the number of proposals that an organization may submit to this solicitation, or on the teaming arrangements for any one proposal, including teaming with employees of NASA's Centers and the Jet Propulsion Laboratory. However, some Appendices or program elements limit the number of proposals that may be submitted on behalf of an individual PI to a program element or bar duplicate proposals, see [Section I\(f\)](#). Moreover, unless otherwise stated in the program element, each proposal must be a single separate, stand-alone, complete PDF document for evaluation purposes, other than the Total Budget, (optional) [HEC request](#), and, if relevant, documentation associated with the Dual-Anonymous Peer Review process.

(c) Foreign Participation Including Restrictions Involving China

(i) Foreign Participation in General

Participation in ROSES-funded research by non-U.S. organizations in this program is welcome on a "no exchange of funds" basis. It is NASA policy that each international partner, its sponsoring agency, or its funding/sponsoring institution, covers its own research contributions (further information on foreign participation is provided in [ROSES FAQ #14 on this topic](#) and the [NASA Guidebook for Proposers](#)).

Normally, NASA does not fund research efforts at foreign organizations, whether proposed directly by a foreign organization, or as part of proposals submitted by U.S. organizations. Unless otherwise stated in the program overview or program element, for any research efforts that derive from this NRA, NASA will provide the support for selected U.S. organizations and the sponsoring foreign agency or institution must do the same for their selected organizations.

If a proposal with a non-U.S. partner is selected, NASA will determine whether such participation should be covered by and implemented through an international agreement between NASA and the sponsoring foreign agency or funding/sponsoring institution under which the parties agree to each bear the cost of discharging their respective responsibilities.

NASA funding may not be used for subcontracted foreign research efforts, including travel. 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.

(ii) Restrictions Involving China

In accordance with restrictions in Appropriation Acts, NASA is prohibited from funding any work that involves the 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.

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

For more information please see the ROSES FAQ on the SARA web page at <http://science.nasa.gov/researchers/sara/faqs/prc-faq-roses/>

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.

An Assurance of Compliance with restrictions in Appropriation Acts herein after referred to as "the Acts" whereas:

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

(d) Cost Sharing or Matching

Unless otherwise specified (e.g., in A.39 Ecological Forecasting), cost sharing is not required for an institution of higher education or other not-for-profit organization to receive a grant or cooperative agreement, although NASA may accept cost sharing if it is voluntarily offered (see 2 CFR 200.306, 2 CFR 1800.306, [Grants and Cooperative Agreement Manual \(GCAM\)](#) 5.6 Funding).

For a commercial organization to receive a cooperative agreement, cost sharing (equal to 50% of the total) is required if the project has commercial applications and profit generating potential. Proposals from commercial organizations for cooperative agreements that do not include cost sharing must demonstrate that potential commercially marketable products are not expected to result from the project. (see references in parenthesis above and 14 CFR [§1274.102](#) (c) 4 and 14 CFR [§1274.204](#), "Costs and Payments" (b) Cost sharing).

Each proposal must include a Table of Personnel and Work Effort with names and planned work of all personnel necessary to perform the proposed effort, regardless of whether that work effort requires funding or not. As this is outside of the budget section, any work planned listed in this table that is not to be funded by NASA as a result of this proposal is not considered cost sharing as defined in 2 CFR § 200.29. Level of effort estimates for unfunded team members are not intended to represent voluntary committed cost sharing. Collaborators should be listed on the table, but their level of effort may be simply given as "de minimis." See [Section IV\(b\)iii](#) for an example.

IV. PROPOSAL AND SUBMISSION INFORMATION

(a) Proposal Instructions and Requirements

All information needed to apply to this solicitation is contained in this ROSES NRA and in the companion document, the *NASA Guidebook for Proposers*, located at <http://www.hq.nasa.gov/office/procurement/nraquidebook>. By reference, the latest edition of the *NASA Guidebook for Proposers* is incorporated into this NRA. We also include 48 CFR 1852.235-72 by reference and it appears in the *NASA Guidebook for*

Proposers. Proposers are responsible for understanding and complying with its procedures for the successful, timely preparation and submission of their proposals. Proposals that do not conform to its standards may be declared noncompliant and returned without review.

Questions regarding a program element should be directed to the program officer identified in the Summary Table of Key Information at the end of each program element or on the [list of program officers](#) on the SARA web page. Any clarifications or questions and answers that are published will be posted on the relevant program element's index page in NSPIRES.

The introductory material, as well as the appendices, of the [NASA Guidebook for Proposers](#) provides additional information about the entire NRA process, including NASA policies for the solicitation of proposals, guidelines for writing complete and effective proposals, and NASA's general policies and procedures for the review and selection of proposals and for issuing and managing the awards to the institutions that submitted selected proposals. A group of [Frequently Asked Questions \(FAQs\)](#) provides additional miscellaneous information about a variety of the NASA proposal and award processes, policies, and procedures.

NASA has implemented a process to collect demographic data from proposers via NSPIRES for the purpose of analyzing demographic differences associated with its award processes. Information collected will include name, gender, race, ethnicity, and disability status. Submission of this information is strictly voluntary, is not communicated to program officers, and is neither any part of the evaluation or selection process nor a precondition of award.

(b) Content and Form of the Proposal Submission

(i) Electronic Proposal Submission

All proposals submitted in response to this ROSES NRA must be submitted electronically by one of the officials at the PI's organization who is authorized to make such a submission; electronic submission by the authorized organization representative (AOR) serves as the required original signature of the proposing organization. No hard copy of the proposal is permitted.

Proposers may opt to submit proposals in response to this ROSES NRA via either of two different electronic proposal submission systems: the NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES) at <http://nspires.nasaprs.com>; see [Section IV\(b\)\(iv\)](#) below, or Grants.gov at <http://www.grants.gov>; see [Section IV\(b\)\(v\)](#) below. The only exceptions are occasional joint calls with other Agencies that use the other Agency submission system and the Astrophysics Guest Investigator (GI) and Guest Observer (GO) programs. See [Section IV\(b\)viii](#) on the two-phase process and those program elements for details.

Note carefully the following requirements for submission of an electronic proposal, regardless of the intent to submit via NSPIRES or Grants.gov:

- Every organization that intends to submit a proposal to NASA in response to this NRA, including educational institutions, industry, not-for-profit institutions, the Jet Propulsion Laboratory, NASA Centers, and other U.S. Government agencies, must

be registered in NSPIRES. This applies equally for proposals submitted via Grants.gov, as well as for proposals submitted via NSPIRES. Every organization that intends to submit a proposal through Grants.gov must also be registered in Grants.gov, as well as in NSPIRES. Registration for either proposal data system must be performed by an organization's electronic business point-of-contact (EBPOC) in the System for Award Management (<https://www.sam.gov/SAM/>). A Data Universal Number (DUNS) is required to obtain a SAM registration, and applicants are required to maintain an active SAM registration, with current information loaded, at all times while competing for a federal award, and, if applicable, during the period of performance of the award. A DUNS can be obtained [here](#).

- Any organization requesting NASA funds through the proposed investigation must be listed on the Proposal Cover Page. NASA will not fund organizations that do not appear on the Proposal Cover Page.
- Each individual team member (e.g., PI, Co-Investigators, etc.), including all personnel named on the proposal's electronic cover page, must be individually registered in NSPIRES. This applies equally for proposals submitted via Grants.gov, as well as for proposals submitted via NSPIRES.
- Unless specifically allowed by an individual program element, Co-PIs are not permitted. The use of other team member roles in NSPIRES (described in the [NASA Guidebook for Proposers](#)) including Co-I/Science PI, Co-I/Institutional PI, and Co-I/Co-PI (only from a non-U.S. organization under specific circumstances), are permitted. Any role with "PI" in the title is subject to the rules, requirements, page limits, etc. laid out for the PI. For more information on rules and expectations regarding the Co-I/Science PI please see [SARA FAQ #9](#).
- Each individual team member (e.g., PI, Co-investigators, etc.), including all personnel named on the proposal's electronic cover page, must confirm their participation on that proposal (indicating team member role) and specify an organizational affiliation. For proposals submitted via NSPIRES, this confirmation is via NSPIRES (see [Section IV\(b\)\(iv\)](#), below). For proposals submitted via Grants.gov, this confirmation is via "Letters of Commitment" included within the proposal. 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 investigation. 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.

Typically, an electronic proposal consists of electronic forms (i.e., the NSPIRES cover pages) and two or more attachments. The electronic forms contain data that will appear on a proposal's cover pages and will be stored with the proposal in the NSPIRES database. A proposal submitted in response to this NRA must have two attachments: the main proposal PDF and the Total Budget PDF. The main proposal PDF contains all ten sections of the proposal listed in Table 1, including the Table of Contents, main Science/Technical/Management section, References, Biographical sketches/CVs, Table of Personnel and Work Effort, Current and Pending Support, any Statements of

Commitment or Letters, Budget Justification, Facilities and Equipment, and Detailed Budget (excluding any salary, fringe or overhead). The separately uploaded Total Budget PDF contains the full and complete budget, including salary, fringe and overhead (see [Section IV\(b\)iii](#)). If there is an accompanying HEC request (see [Section I\(d\)](#) above) then a HEC Appendix is uploaded as a separate, third PDF.

The only exception to the general rule above is for the case of proposals submitted to those programs that use a dual-anonymous peer review (DAPR) process in which, not only are proposers unaware of the identity of the members on the review panel, but the reviewers are not told the identity of the proposers until after the review of the merit, relevance and cost reasonableness of the proposal. In ROSES this year the programs evaluating proposals using DAPR are:

- A.28 The Earth Science U.S. Participating Investigator program,
- B.4, Heliophysics Guest Investigators-Open,
- D.2 Astrophysics Data Analysis,
- Astrophysics Guest Investigator/Observer/Scientist Calls (D.5, D.6, D.9-D.12)
- E.4 Habitable Worlds.

Proposers to these programs must provide an anonymized version of the proposal for peer review, and a separate non-anonymized document that contains elements of the proposal that would reveal the identities and affiliations of participating researchers, such as expertise, facilities and resources. Any program element that is using DAPR (and thus has these special requirements) will 1) include a notification indicating that this is the case, 2) contain a special section with detailed instructions about how to prepare proposals, 3) [link to a special web FAQ on this subject](#), and 4) the NSPIRES page of any program using DAPR will host "Guidelines for Anonymous Proposals" under "Other documents". As always, a separate (not anonymized) Total Budget file will also be required. DAPR processes are described in [Section VI\(b\)](#).

Submission of proposals via either NSPIRES or Grants.gov is a two-part process. When the PI has completed entry of the data requested in the required electronic forms and attachment of the allowed PDF attachments, including the Science/Technical/Management section, an official at the PI's organization who is authorized to make such a submission, referred to as the Authorized Organizational Representative (AOR), must submit the electronic proposal (forms plus attachments). Coordination between the PI and his/her AOR on the final editing and submission of the proposal materials is facilitated through their respective accounts in NSPIRES and/or Grants.gov.

(ii) Proposal Format and Contents

All proposals submitted in response to this NRA must include responses to any questions and/or electronic forms required by NSPIRES or Grants.gov. For example, submission requires online input of a 4000-character Proposal Summary, Business Data (such as dates and fiscal years), Other Project Information (such as Environmental Impact), Budget information, Program Specific Data (such as government participation) and online confirmation of team members.

The Science/Technical/Management (S/T/M) section and other required sections of the proposal must be submitted as a single, searchable, unlocked PDF file that is attached

to the electronic submission using one of the proposal submission systems. Proposers must comply with all format requirements specified in this NRA (see below and [Table 1](#) for a summary) and in the [NASA Guidebook for Proposers](#). The S/T/M section is page limited and only the parts specified in Table 1 are permitted. Proposals that exceed page limits, violate formatting rules, or contain extra sections or appendices that are not specifically requested or allowed by this NRA or a program element may be declared noncompliant returned without review or rejected after review, no matter what their rating. The [NASA Guidebook for Proposers](#) provides default Agency-wide discussions of the content and organization of proposals, as well as the default page limits of a proposal's constituent parts. Those apply by default unless superseded by instructions detailed in ROSES, see Section I(g).

Note that some of the program element descriptions in Appendices A through E of this NRA may specify different page limits for the Science/Technical/Management section of the proposal; if so, these page limits will be prominently given in the Summary of Key Information subsection that concludes each program element description. In the event the information in this NRA is different from or contradictory to the information in the [NASA Guidebook for Proposers](#), the information in this NRA takes precedence.

Unless otherwise stated in the Appendix or program element, proposals submitted in response to ROSES must follow these rules for formatting: The body text and captions may not, on average across a solid block of text, exceed 15 characters per horizontal inch, including spaces, though text within figures and tables may be smaller if still judged by the reviewers to be readable. [Easily read sans serif fonts](#) (e.g., Arial, Helvetica, Verdana) are encouraged but not required. Proposals may not have more than 5.5 lines per vertical inch of text, must have at least one-inch margins, be set for US letter size (8.5x11) paper, and expository text necessary for the proposal may not be located solely in figures, tables, or their captions. Moving images are not allowed unless explicitly permitted by the program element. Pages must be numbered.

Important note on creating PDF files for upload: It is essential that all PDF files generated and submitted meet NASA requirements. This will ensure that the submitted files can be ingested by NSPIRES regardless of whether the proposal is submitted via NSPIRES or Grants.gov. 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. TeX and LaTeX users are strongly cautioned to ensure that their settings conform with the paper size, font size, margins etc., listed above. Do not include any digital signatures in the proposal document, NSPIRES cannot concatenate these PDF files with the cover page, total budget, etc. For more information on creating NSPIRES compliant PDF documents see http://nspires.nasaprs.com/tutorials/PDF_Guidelines.pdf. PDF files that do not meet NASA requirements cannot be ingested by the NSPIRES system; such files may be declared noncompliant and not submitted to peer review for evaluation.

There is a 20 MB size limit for proposals. **Added May 22, 2020: Proposers may not define acronyms in the S/T/M Section solely in a list outside of the page-limited S/T/M section. Acronyms must first be defined in the S/T/M Section.**

(iii) Table of Work Effort and Redaction of Salary, Fringe and Overhead Costs

Peer reviewers need to see the individual effort that will be spent on the project, whether at the proposing organization or not, whether NASA would be paying for it as a result of this proposal or not. Thus, every proposal must include a Table of Personnel and Work Effort that simply lists all of the planned work commitment, by person or role without any technical details. Note, this table is outside of and is distinct from the budget and the page-limited main part of the proposal and thus, unless otherwise stated in an individual program element, any person time listed in the table of work effort that is

Example Table of Personnel and Work Effort

Person and/or Role	Time charged to this proposal	Time not charged to this proposal	Total Time per person/year
PI, Rick Sanchez	3 months/year	N/A	3 months/year
Co-I, Morticia Smith	4 months/year	N/A	4 months/year
Co-I, Revolio Clockberg Jr.*	N/A	1.5 months/year	1.5 months/year
Collaborator, Daniella Harmon	N/A	<i>de minimis</i>	<i>de minimis</i>
Grad Student, Justin Roiland ^o	N/A	12 months/year	12 months/year

* A letter of support is provided from the foreign organization Herpson Polytechnic Universität for Prof. Revolio Clockberg Jr. participating at no cost to this proposal.

^o The Graduate student from the Citadel is funded by a FINESST award and thus participating at no cost to this proposal.

offered at no cost by the proposing organization is assumed to be an estimate of anticipated additional effort that may be provided to the project as needed and is considered voluntary uncommitted effort. Descriptions of the work that each team member would be performing must be included in the main part of the proposal, not in this table. The example table shown above presumes a simple case for which all investigators are working the same amount of time on the project each year. The reality is often more complicated, and your table should reflect the best estimate of the amount of time each participant will spend on the project. [Planetary Science Division Templates](#) have been provided for those proposing to Appendix C, and [Earth Science Division Templates for the Table of Work Effort \(and Current and Pending Support\)](#) are now required for an increasing number of program elements in Appendix A. For example, as of the time of release of ROSES: A.7, A.8, A.14, A.17 A.26, A.38, and A.39.

Peer reviewers do not need to know salaries or overhead rates to evaluate the cost reasonableness of ROSES proposals. Thus, proposals should not include costs of salary, fringe, or overhead anywhere in the uploaded proposal PDF, including the budget detail or justification sections in the main proposal, which will be seen by peer reviewers. Unless otherwise specified by the program element, all proposers must include all costs, including salary, fringe and overhead of NASA civil servants, all subawards, and any separate Co-I awards in two places outside of the uploaded proposal PDF: the NSPIRES web page budgets and the separately uploaded "Total Budget" PDF file, see below and the [walkthrough on this subject](#). Exceptions to this rule

include Phase-2 proposals for the astrophysics observing programs e.g., Neil Gehrels Swift Observatory Guest Investigator (D.5), Fermi Guest Investigator (D.6), NuSTAR Guest Observer (D.9), TESS Guest Investigator (D.10), and NICER Guest Observer (D.11) because those are cost-only proposals (essentially just budgets) that are not peer reviewed. See [Section IV\(b\)\(viii\)](#).

However, peer reviewers certainly do need to see the costs of everything other than salary, fringe, and overhead. Although quotes are not required, proposers are strongly encouraged to include both adequate budget detail and justification for the peer reviewers to evaluate whether costs of things (other than team members) are reasonable. For example, if a TDS3054C Tektronix Digital Oscilloscope that costs ~\$17K is needed then the proposal must give this price in the detailed budget and, in the budget justification, explain why such an expensive oscilloscope is needed, when a simple one like a TBS1000 series can be purchased for one tenth the price.

In the budget justification in the main proposal PDF, proposers may refer to the time, but not costs, for a subaward that involves salary, fringe or overhead, e.g., "4 months/year are allocated for Co-I Morticia Smith, as can be seen in the Table of Personnel and Work Effort. Dr. Smith will be funded via a subaward to the Citadel. The total cost for that subaward is given in the NSPIRES cover page budget in Section F line 5 and is included in the separately uploaded Total Budget PDF file but is not included here in the proposal."

Almost all ROSES program elements are set up to allow proposers to fill out the NSPIRES web page budgets. These NSPIRES web page budgets are not required for Step-1 proposals. Unless otherwise specified in the ROSES program element, these NSPIRES web page budgets should include all costs, including salary, fringe and overhead of all participants. The full NSPIRES web page budgets will not be seen by peer reviewers. Where more than one organization is involved, the total cost for the Co-I organization is simply given as a single number in row 5, 8, or 9 of Section F (of the NSPIRES cover page budget). When funds are going to Co-I organizations funded directly by NASA, such as NASA centers and other government labs, then lines 8 or 9 should be used and customized. Row 10 in Section F is reserved for reporting any subaward that does not have any salary component. Proposers are strongly encouraged to read the FAQs with a [walkthrough on this subject](#).

Almost all ROSES program elements are set up to allow Step-2 (full) proposers to separately upload a "Total Budget" PDF along with their proposal. Unless otherwise specified in the ROSES program element, all proposers are required to include this separate Total Budget PDF. The Total Budget should simply include the full and complete budget from your proposing organization and that of your Co-Is (in whatever is the standard form used by your organizations). This means that proposers need to get this information from their Co-Investigators whether or not they are Civil Servants. Budgets are generally laid out by project year but since NASA Civil Servant salaries must be charged to present fiscal year dollars, proposals that include NASA Civil Servant salaries may need to phase the funds for NASA Centers by fiscal year. The Total Budget PDF must lay out clearly how much is going to each organization, indicating whether the funds are passing through the proposing organization and which are not. Where the funds are passing through the proposing organization to a Co-I

organization, the Total Budget PDF must specify any overhead charged on funds passing through. Such charges never apply to funds sent directly to Co-I organizations such as NASA centers and other government labs. The Total Budget PDF is uploaded in exactly the same way that the proposal PDF is uploaded, but by choosing document type "Total Budget". This Total Budget file will not be seen by peer reviewers. These budget files are not required for Step-1 proposals.

NASA Civil Servant time must be included in the summary table of work effort and all costs for NASA civil servant investigators must be included in the budgets just as it would be for any other team member. In general, it is not anticipated that directed work to NASA Centers will overlap with work proposed via ROSES. However, any questions about whether NASA Civil Servant participation on a ROSES proposal is already covered by directed work and how to present this in a proposal budget should be directed to the appropriate Headquarters SMD division R&A Lead, a list of which may be found at <https://science.nasa.gov/researchers/sara/program-officers-list/>.

Proposers from JPL should not include the JPL award fee in the funds requested via ROSES, nor should the budgets of JPL Co-Investigators on proposals from other institutions include the JPL award fee in their budgets. JPL award fees are paid for and accounted for by a different mechanism than that used to fund awards from ROSES.

(iv) Submission of Proposals via NSPIRES, the NASA Proposal Data System

Proposals may be submitted electronically via NASA's Solicitation and Proposal Integrated Review and Evaluation System ([NSPIRES](#)). In order to submit a proposal via NSPIRES, this NRA requires that the proposer register key data concerning the intended submission with NSPIRES at <http://nspires.nasaprs.com>. Potential applicants are urged to access this site well in advance of the Notice of Intent (NOI) and proposal due dates of interest to familiarize themselves with its structure and enter the requested identifier information. Potential PIs should ensure that their organization is also registered in NSPIRES, as it is only an official from the PI's registered organization, not the PI, who can submit a proposal.

It is especially important to note that every individual named on the proposal's electronic Cover Page form (see below) as a proposing team member in any role, including Co-investigators and collaborators, must be individually registered in NSPIRES and that such individuals must perform this registration themselves; no one may register a second party, even the PI of a proposal in which that person is committed to participate. It is also important to note that every named individual must be identified with the organization through which they are participating in the proposal, regardless of their place of permanent employment or preferred mailing address. This data site is secure and all information entered is strictly for NASA's use only.

Every individual identified on the NSPIRES proposal cover page as a team member must indicate their commitment to the proposed investigation through NSPIRES prior to proposal cover page submission. Team members must additionally confirm the organization through which they are participating on this proposal. A team member will receive an email from NSPIRES indicating that he/she has been added to the proposal and should log in to NSPIRES.

- Once logged in, the team member should follow the link in the "Reminders and Notifications" section of his NSPIRES homepage, titled "Need <role> confirmation for proposal <title> for Solicitation <<solicitation number>>". On the "Team Member Participation Confirmation" page, the proposal team member should read language about the Organizational Relationship, then click the "Continue" button.
- If the contact information then displayed on the "Team Member Profile" screen is out of date, the proposal team member should update this information later using the "Account Mgmt" link in the NSPIRES navigation bar across the top. Prior to making that update, however, the team member should follow the on-screen prompts to identify the organization through which he/she is participating on this proposal. Click the "Link Relationship" button to the right side of the "Organizational Relationship" banner. Select the organization from the "Link Proposal to an Association" part of the page. If the correct organization is not displayed here, try using the "Add Association" button to add the organization to this list. Then click the "Save" button at the bottom of the page. If the team member cannot find the organization when searching in the "Add Association" area (i.e., the organization is not registered), type in the formal name in the space provided (or select "Self," if appropriate). Once the organization is selected and the "Save" button is clicked, there is a confirmation page that allows the team member to edit that relationship if it was chosen incorrectly. Click "Continue".
- Note that the organization through which the proposal team member is participating in the proposal might not be the proposal team member's primary employer or primary mailing address. If the address information is accurate (or once it has been edited to be accurate), the proposal team member may log out of NSPIRES.
- NSPIRES will send an email to both the team member and the PI confirming that the commitment was made and the organization was identified. The PI may additionally monitor the status of proposal team member commitments by examining the "Relationship Confirmed" column on the Team Member page of the NSPIRES proposal cover page record. Note that the proposal cannot be submitted until all identified team members have confirmed their participating organizations.

All proposals submitted via NSPIRES in response to this NRA must include a required electronic Cover Page form that is accessed at <http://nspires.nasaprs.com/>. This form is composed of several distinct sections: a Cover Page that contains the identifier information for the proposing institution and personnel; a Proposal Summary that provides an overview of the proposed investigation that is suitable for release through a publicly accessible archive should the proposal be selected; Business Data that provides the proposed start and end dates, as well as other proposal characteristics; a Budget form that contains a budget summary of the proposed research effort; Program Specific Data that includes required questions specific to ROSES and that particular program element; and Proposal Team that provides the Co-Investigators and other participants in the proposal. This Cover Page form is available for access and submission well in advance of the proposal due dates given in Tables [2](#) and [3](#) of this NRA and remains open until the proposal due date for each program element. Unless specified in the program element description itself, no other forms are required for proposal submission via NSPIRES.

The proposer is responsible for assembling the complete proposal document for peer review. The required elements of any proposal submitted in response to this NRA must be submitted as a single, searchable, unlocked PDF document that contains the complete proposal, including the Science/Technical/Management section and budget justification, assembled in the order provided in [Table 1](#) and uploaded as a single attachment. Unless otherwise specified in the program element the only permitted separate attachments are the HEC request, if any, see [Section I\(d\)](#), and the Total Budget file, see [Section IV\(b\)\(iii\)](#). Documents such as team member biographical sketches, letters of commitment, and current and pending support, as well as the proposal abstract (proposal summary) should not be uploaded to NSPIRES as separate files.

NSPIRES generates error and warning messages as part of the element check concerning possibly missing data. An error (designated by a red X) will preclude proposal submission to NASA by the AOR. A warning, indicated by an exclamation mark (!) on a yellow diamond, is an indication that data may be missing; a warning can be ignored after verifying that the material is included in the single attachment containing the complete proposal. Any actions taken because of warnings are at the PI's discretion.

Please do not download the Proposal Cover Page and incorporate it into the Proposal Document. NSPIRES automatically routes the parts of the proposal (Cover Page form, proposal document, and any HEC appendix, but not the Total Budget file) to the reviewers.

Proposers are encouraged to begin their submission process early. Tutorials and other NSPIRES help topics may be accessed through the NSPIRES online help site at <http://nspires.nasaprs.com/external/help.do>. For any questions that cannot be resolved with the available 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, , excluding Federal Holidays, 8:00 a.m. – 6:00 p.m. Eastern Time.

(v) Submission of Proposals via Grants.gov

Grants.gov may be used in place of NSPIRES to submit proposals in response to almost all program elements this ROSES NRA. Grants.gov is now using the [Workspace environment](#). Grants.gov requires that the PI use Workspace for either online completion of forms or downloading of forms for completion offline, in addition to downloading an instruction package from Grants.gov. Identifying the appropriate application package requires the funding opportunity number for that program element; the Grants.gov funding opportunity number may be found in the Summary of Key Information table at the end of each program element. That number will be of the form NNH20ZDA001N-XXXX where the "XXXX" will be an abbreviation for that program, e.g., NNH20ZDA001N-HSR for Heliophysics Supporting Research. Proposals submitted via Grants.gov must be submitted by the AOR.

Submitting a proposal via Grants.gov requires at least the following:

- a. Grant researchers (PIs) do not need to register with Grants.gov. However, every individual named in the proposal as a proposing team member in any role, including PI, Co-Investigators, and collaborators, as well as the PI's organization,

- must be registered in NSPIRES (<http://nspires.nasaprs.com>) and such individuals must perform this registration themselves; no one may register a second party, even the PI of a proposal in which that person is committed to participate. This NSPIRES site is secure and all information entered is strictly for NASA's use only.
- b. Follow Grants.gov instructions provided at the website to download any software tools or applications required to submit via Grants.gov.
 - c. Preview the application package from Grants.gov for either online completion or downloading for completion offline by selecting "Preview" under "Package" for the specific Funding Opportunity at <http://www.grants.gov>. Each program element described in an appendix of ROSES requires a different application package and has a different Funding Opportunity Number; the Funding Opportunity Number may be found in the Summary of Key Information at the end of the program element description in each appendix of ROSES. Enter the appropriate Funding Opportunity Number to retrieve the desired application package. All ROSES application packages may be found by searching on CFDA Number 43.001.
 - d. Note that Grants.gov proposers must additionally download the "Instructions" zip file, as this includes a proposal summary form and the Program Specific Data form that contains the mandatory data management plan as well as important questions about, for example, China and ITAR.
 - e. When ready to apply, click "Apply" to create, complete, and submit a Workspace. Completing a workspace allows proposers to complete all the required forms online or download PDF versions to be uploaded later.
 - f. Complete the required Grants.gov forms, including the Standard Form 424 Application for Federal Assistance, research and research-related (R&R) Other Project Information, R&R Senior/Key Person Profile, and R&R Budget. Every named individual must be identified with the organization through which they are participating in the proposal, regardless of their place of permanent employment or preferred mailing address.
 - g. Complete the required NASA specific forms including NASA Other Project Information, NASA PI and Authorized Representative Supplemental Data Sheet, and NASA Senior/Key Person Supplemental Data Sheet (this form is only required if there are Senior/Key Persons other than the PI).
 - h. Complete any NASA program-specific form that is required for the specific program element. This form, which is usually required for all ROSES program element submissions, is included as a PDF form within the proposal instruction package downloaded from Grants.gov. The form, once completed, is attached to the NASA Other Project Information form.
 - i. Create a proposal in PDF, including the Science/Technical/Management section and all other required proposal sections (see the [NASA Guidebook for Proposers](#)). Attach sections as separate PDF documents as prompted by Grants.gov. Do not duplicate materials; if a document must be provided as a separate attachment, do not also include it as part of the proposal narrative PDF file. Even though Grants.gov permits the attachment of non-PDF documents, NASA requires that all attached documents be PDF files, which conform to the specifications outlined in [Section IV \(b\)\(ii\)](#) above. Be sure to include a separate "Total Budget" PDF file and, if relevant, a separate "HEC Request" PDF file.

- j. Because Grants.gov does not support the electronic commitment of team members, statements of commitment from all team members must be provided as letters attached to the proposal application at the place(s) specified by Grants.gov. This statement must include confirmation of both the team member role in the proposed effort (e.g., Co-Investigator, collaborator) and the identification of the organization through which the team member will be participating.
- k. Here is an example of a statement of commitment: "I acknowledge that I am identified by name as <<role>> to the investigation, entitled <<name of proposal>>, that is submitted by <<name of Principal Investigator>> to the NASA Research Announcement <<alpha-numeric identifier>>, and that I intend to carry out all responsibilities identified for me in this proposal. I understand that the extent and justification of my participation as stated in this proposal will be considered during peer review in determining in part the merits of this proposal. I have read the entire proposal, including the management plan and budget, and I agree that the proposal correctly describes my commitment to the proposed investigation. For the purposes of conducting work for this investigation, my participating organization is <<insert name of organization>>."
- l. Submit the proposal via the Authorized Organization Representative (AOR); the PI may not submit the application to Grants.gov unless he/she is an AOR.
- m. Within a few days of submitting the proposal to Grants.gov, the PI and AOR should receive an email verifying submission of the proposal to the NSPIRES system, for review. Any proposer not receiving such a verification should contact the NSPIRES Help Desk.

Potential applicants are urged to access Grants.gov site well in advance of the proposal due date(s) of interest to familiarize themselves with its structure and download the appropriate application packages and tools.

Potential applicants considering employing Grants.gov should pay special attention to program elements that require a Notice of Intent, as Grants.gov does not provide the capability to submit an NOI. See Section IV(b)vi, below.

Additional instructions for formatting and submitting proposals via Grants.gov may be found in the [NASA Guidebook for Proposers](#). Instructions for the use of Grants.gov may be found at <https://www.grants.gov/web/grants/applicants/workspace-overview.html>. Instructions for NASA-specific forms and NASA program-specific forms may be found in the application instructions package. For any questions that cannot be resolved with the available online help menus and documentation, requests for assistance may be directed by email to support@grants.gov or by telephone to (800) 518-4726 twenty-four hours a day, seven days a week, except Federal holidays when the support center is closed.

(vi) Notice of Intent to Propose

The Notice of Intent (NOI) to propose is a brief summary of the planned work by the prospective PI. Such statements are of used to identify expertise needed for the review panel and to avoid inviting panelists who are planning to propose. Where NOIs are used - most of the program elements in Earth Science (Appendix A) and Astrophysics (Appendix D) - they are usually requested, but not required, for the submission of

proposals. However, for some program elements an NOI is not requested e.g., Neil Gehrels Swift, Fermi and TESS Guest Investigator programs and those with rolling submissions such as Rapid Response and Novel Research in Earth Science, and Topical Workshops, Symposia, and Conferences. For other programs, e.g., D.3 APRA, and D.7 SAT, an NOI is a required prerequisite for submission of a full proposal. For those program elements where the NOI is mandatory, this will be stated clearly in the program element and NOI due dates will be marked "mandatory" in the Tables of due dates. NOIs may be submitted via NSPIRES directly by the PI by 11:59 p.m. Eastern Time on the due date given in Tables [2](#) and [3](#) of this NRA; no action by an organization's AOR is required to submit an NOI.

Grants.gov does not provide NOI capability; therefore, when required (or requested) by a program element, NOIs must (or should) be submitted via NSPIRES, whether or not the proposal will be submitted via NSPIRES or Grants.gov. Interested proposers must register with NSPIRES before it can be accessed for use. NSPIRES is open for the submission of NOIs for typically 30 days, starting about 90 days in advance of the due date for the proposals themselves. When NOIs are requested but not required, late NOIs may be submitted by email to the main point of contact given in the Summary Table of Key Information at the end of the individual program element.

(vii) The Two-Step Proposal Process

Some ROSES program elements require that proposals be submitted using a two-step process in which the NOI is replaced by a required Step-1 proposal. This Step-1 proposal is an abbreviated presentation of the intended research and, as a proposal, it must be submitted by the Step-1 due date given in Tables [2](#) and [3](#) of this NRA by the organization Authorized Organizational Representative (AOR). The Step-1 proposal is a prerequisite for submission of a full Step-2 proposal, but it does not obligate the offerors to submit a Step-2 (full) proposal later.

For some program elements, the purpose of the Step-1 proposal is simply to avoid conflicts in the assembly of the review panel and no response will be provided to proposers. For other program elements, the Step-1 proposal may be evaluated to determine if the anticipated research project exhibits sufficient programmatic relevance and responsiveness to the program element to permit or encourage submission of a full Step-2 proposal. The two-step process can be structured in two ways: 1) Nonbinding two-step process in which a Step-2 proposal may be submitted even if the preceding Step-1 was discouraged or 2) A binding two-step process in which a Step-2 proposal cannot be submitted if it is not "invited" after the evaluation of the preceding Step-1. In any case those who submitted Step-1 proposals will be informed no later than four weeks prior to the Step-2 due date whether they are, or are not, "encouraged" or "invited" to submit a full Step-2 proposal.

The required Step-1 proposal is typically just the contents of the 4000-character limited Proposal Summary field in the cover pages but rarely may require a PDF document upload. In such cases the permitted page length and required contents for the Step-1 proposal will be specified in the program element description. In some cases (e.g., Appendix C, Planetary Science), the team may be adjusted between the Step-1 and Step-2 proposal, but in other cases (e.g., Appendix B, Heliophysics), changes to the

team are limited. When a Step-2 proposal is created, the team members and their confirmation are carried forward from the Step-1 automatically. However, if a Step-1 team member has changed organizations since confirmation on the Step-1 proposals, this could prevent the submission of the Step-2 proposal. When a confirmed Step-1 team member has changed organizations, the proposer must instruct the team member to update his or her participation confirmation in NSPIRES for the Step-2 proposal and inform the NASA POC immediately.

Please read the program element carefully. Budget data will not be requested as part of the Step-1 proposal. Unlike a Notice of Intent, which may be submitted by an individual, the Step-1 proposal must be submitted by an Authorized Organizational Representative of the proposing organization. Step-2 proposals are to be submitted in full compliance with the [NASA Guidebook for Proposers](#) discussed in [Section IV\(a\)](#) above. Proposers are encouraged to read the instructions document on Submitting Step-1 proposals that appears under "Other Documents" on the NSPIRES web page of any program element that requires a Step-1 proposal.

The tables of due dates clearly indicate which program elements require a Step-1 proposal. At the time of release of this ROSES-2020 NRA, the program elements that solicit proposals using a two-step process include: most of the Heliophysics program elements (Appendix B), most program elements in Planetary Science (Appendix C), and the cross-division program elements E.3 Exoplanets Research and E.4 Habitable Worlds.

(viii) The Two-Phase Proposal Process

On occasion, NASA will solicit proposals using a two-phase proposal process for which Phase-1 is a request for an observation to be performed by a NASA space observatory as part of a NASA guest investigator/guest observer program element. Phase-2 is a proposal only for funding from NASA that is not peer reviewed. As such the Phase-2 proposals are not subject to the requirements in [Section IV\(b\)iii](#) to omit salary, fringe and overhead. An NOI may or may not be requested, and the Phase-1 observing request must be submitted to the observatory web page by the proposal due date in Tables [2](#) and [3](#) of this NRA. Note the time and mode of proposal submission.

This ROSES NRA contains a number of guest investigator/guest observer program elements in Astrophysics that use the two-phase proposal process: Neil Gehrels Swift Observatory Guest Investigator (D.5), Fermi Guest Investigator (D.6), NuSTAR Guest Observer (D.9), the TESS Guest Investigator Program (D.10), and NICER Guest Observer (D.11).

Phase-1 observing requests for these programs cannot be submitted via either NSPIRES or Grants.gov. They must be submitted via the URL given in the Summary Table of Key Information given at the end of program element description. The Phase-2 proposal for funding must be submitted via NSPIRES by a proposal due date that will be announced when NASA announces the disposition of the Phase-1 observing requests. The process and requirements for the submission of Phase-1 observing requests and Phase-2 proposals may differ for each program element; proposers should read carefully the relevant program element Appendix to this ROSES NRA. The tables of due dates clearly indicate which program elements require a Phase-1 proposal.

(c) Proposal Submission Due Dates and Deadlines

For each program element, the electronic proposal must be submitted in its entirety by an Authorized Organizational Representative (AOR) no later than the proposal deadline (time) on the appropriate proposal due date given in Tables [2](#) and [3](#) of this NRA. Unless stated otherwise in the program element (e.g., Phase-1 proposals in Astrophysics), the proposal deadline is 11:59 p.m. Eastern Time and must be submitted electronically using either NSPIRES or Grants.gov (see Sections IV(b)(i–iii) above).

Proposals (including Step-1 proposals) submitted after the proposal due date and deadline will be labeled "late" by the NSPIRES system and they (and mandatory NOIs) will be handled in accordance with the [SMD Policy on Late Proposals](#). The vast majority of proposals received after the due date are rejected without review. If a late proposal is rejected, it is entirely at the discretion of the proposer whether or not to resubmit it in response to a subsequent appropriate solicitation.

(d) Proposal Funding Restrictions

In addition to the funding restrictions and requirements given in the [NASA Guidebook for Proposers](#) and [the GCAM](#), the following restrictions are applicable to this ROSES NRA:

- The estimated funding and number of proposals anticipated to be funded, as shown in the Summary of Key Information at the end of each program element, are subject to the availability of appropriated funds, as well as the submission of a sufficient number of proposals of adequate merit.
- Unless specifically noted otherwise in the specific ROSES Appendix and/or program element, the proposing PI organization are expected to subaward funding for all proposed Co-Is at non-Government organizations, even though this may result in a higher proposal cost because of subawarding fees. Rare exceptions will be considered on a case by case basis when requested in the proposal and found to be in the interest of the Government and consistent with appropriate law, regulation, policy, and practice.
- Unless otherwise noted in a program element, SMD will send funds directly to Co-Is at NASA Centers and other U.S. Government organizations, including JPL. Thus, if a proposal submitted by a university has a Government Co-I, the funds will not pass through the university, so the university (or other institution that receives a grant) may not include overhead or any other pass through charges on those funds. Funds for Co-Is who do not work for the Government would pass through the university and those charges may be applied. Regardless of whether a Co-I will be funded through a subaward via the proposing institution or funded directly by NASA, the cover page budget for the proposal must include all funding requested from NASA for the proposed investigation, including salaries for NASA civil servants, see [Section IV\(b\)iii](#). Time for Co-Is, costs of procurements (not labor or overhead), and other (non-salary) direct costs (e.g. technical support costs for on-site contractors) at NASA Centers and other U.S. Government organizations must be justified in the proposal's Budget Narrative. No indirect burden from non-governmental organizations should be applied to funds for Co-Is at NASA Centers and other U.S. Government organizations. (See the [NASA Guidebook for Proposers](#)).

- For most awards (e.g., non-contract awards), allowable costs are governed by [2 CFR Part 200](#). All proposed costs, including matching or 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 Part 200. In general, the construction of facilities is not an allowed activity for any of the program elements solicited in this NRA. As described in the GCAM Section 4 (Limitations), facilities are different and distinct from equipment, which may be an allowable expense.
- Computers are allowable under grants if they are essential for the project. It is no longer required that computers be used exclusively for the project. See [ROSES FAQ #27](#) for more information on this topic.
- 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. Proposers from NASA Centers should consult the latest NASA policy document regarding restrictions on travel funding. Note that selection of a proposal and approval of a proposed budget that includes travel for civil servants does not guarantee that a NASA Center has sufficient travel authority to approve the proposed travel under NASA's reduced travel budget.
- In general, proposals for sponsorship of topical conferences, workshops, consortia, or symposia meeting certain criteria are solicited through the ROSES program element E.2 Topical Workshops, Symposia, and Conferences.
- Regardless of whether a conference is sponsored by NASA, individual conference travel by grantees is permitted and proposers from universities, or other eligible non-governmental institutions, may include a budget for travel to conferences and workshops. Proposers from NASA Centers should consult their Center implementing policy on the latest NASA guidance on conference spending and reporting requirements. Note that selection of a proposal and approval of a proposed budget that includes travel for civil servant does not guarantee that a NASA Center has sufficient travel authority under NASA's reduced travel budget to approve the proposed travel.
- Profit for commercial organizations is not allowable under grant or cooperative agreement awards, but is allowable under contract awards. Costs for managing the project may be allowed under a grant. These costs, whether direct charges or part of the indirect cost agreement, must be consistent with [2 CFR 200 Subpart E](#).
- NASA funding may not be used for subcontracted foreign research efforts. U.S. research award recipients may directly purchase supplies and/or services from non-U.S. sources that do not constitute research, but award funds may not be used to fund research carried out by non-U.S. organizations. However, 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. Special restrictions apply to collaboration with China, see [Section III\(c\)](#).

- Travel by a participant in the research investigation, whether for the purpose of conducting the research, for collaboration, or for attending a conference, is considered to be a research expense. NASA conducts its collaborations with foreign institutions on a no exchange of funds basis. NASA funding may not be used for research efforts by foreign organizations at any level. Therefore, NASA funding may not be used for travel expenses by any team member who is not participating as a member of a U.S. organization.
- As noted in the [NASA Guidebook for Proposers](#), costs of preparing, publishing, and disseminating the results of NASA funded research (e.g., page charges, open access fees, etc.) may be included in research proposals and are allowable charges against the grant, as long as the charges are levied impartially on all research papers published by the journal.
- Non-NASA U.S. Government organizations should propose based on full-cost accounting, unless no such standards are in effect; in that case such proposers should follow the Managerial Cost Accounting Standards for the Federal Government as recommended by the Federal Accounting Standards Advisory Board. NSPIRES cover pages and uploaded "Total" budgets must include all costs that will be paid out of the resulting award.
- Regardless of whether functioning as a team lead or as a team member, personnel from NASA Centers must propose budgets consistent with the current NASA accounting implementation for the requested year of performance. All NSPIRES cover page budgets must include all costs that will be paid out of the resulting award, including costs of NASA civil servants. Costs that will not be paid out of the resulting award, but are paid from a separate NASA budget (e.g., center management and overhead; CM&O) and are not based on the success of this specific proposal, should not be included in the proposal budget. For example, CM&O should not be included in the proposal budget while other direct charges (including procurements and labor) to the proposed research task should be included. NASA civil servant Co-Is must provide to the proposing organization all costs requested of the ROSES program, so that the proposing organization may correctly complete the cover page budgets in NSPIRES.

V. SUBORBITAL-CLASS INVESTIGATIONS

(a) Overview of Suborbital-Class Platforms

In each SMD Research Program (Earth Science, Heliophysics, Planetary Science, Astrophysics), flight investigations are solicited. Flight investigations solicited through ROSES generally have modest costs and reduced mission assurance requirements appropriate for the specific research program, and these investigations are referred to as suborbital-class investigations. Platforms for flight investigations include aircraft, balloons, sounding rockets, suborbital reusable launch vehicles, SmallSats/CubeSats, and small International Space Station (ISS) payloads. General requirements for proposals to use any of these platforms (except aircraft, see below) are discussed in this section of ROSES.

Requirements for proposals using aircraft are discussed in the description of the Earth Science Research Program found in Appendix A. Moreover, the Aircraft Management Division (AMD <https://ad.hq.nasa.gov/>) provides capability leadership, oversight, and coordination of NASA's aviation assets, including Uncrewed Aircraft Systems (UAS). AMD coordinates functional reviews to ensure high standards of aviation safety and manages NASA's aircraft capability based on mission requirements. Proposals that include flight activities (not normal passenger travel) such as aircraft or helicopter flight services, including Uncrewed Aircraft Systems (UAS)/Drones operations or the acquisition or construction of such flight vehicles, must comply with [NASA Policy Directive 7900.4](#). Questions concerning flight compliance requirements may be addressed to Norman Schweizer at norman.s.schweizer@nasa.gov.

Generally, proposals for investigations that are carried out through development, launch, and operation of a short duration orbital experiment, such as one on a CubeSat or ISS-based project, are permitted in any ROSES program element that solicits investigations for use on suborbital-class platforms. In this sense, a CubeSat or an ISS-based investigation is a "suborbital class" investigation, even though it will be placed into orbit. CubeSat or ISS-based "suborbital class" investigations are subject to the same cost constraints to which traditional suborbital investigations are subject.

Proposals for life and microgravity science investigations are not solicited through ROSES. Life and microgravity science investigations are solicited by the Human Exploration and Operations Mission Directorate. For further information, refer to [the current "ROSBio" solicitation on NSPIRES](#).

(b) General Guidelines for Suborbital-Class Investigation Proposals

ROSES awards support science investigations and/or technology development utilizing payloads flown on suborbital-class platforms, or as flights of opportunity. Suborbital-class payloads may be recovered, refurbished, and reflown, in order to complete an investigation. A discussion of the plans for management and for reduction and analysis of the data must be given in the proposal. Although most awards are three or four years in duration, a five-year proposal may be accepted to develop a completely new, highly meritorious investigation through its first flight. Please read the individual ROSES program element for program specific requirements.

Budgets are expected to cover complete investigations, including payload development and construction, instrument calibration, launch, data analysis, and publication of results. The number of investigations that can be supported is limited and heavily dependent on the funds available to the relevant research program. Note that NASA does not carry reserves for Suborbital-Class Investigations and proposers should not expect NASA to accommodate any cost overrun incurred by a particular investigation, including the damage and/or loss of the payload owing to a suborbital-class platform system failure. Therefore, failure to achieve the proposed goals within the proposed time and budget could require descoping the initially proposed investigation, delaying it, canceling a particular launch date opportunity, or canceling the investigation altogether. Unlike most other ROSES investigations where the proposing PI organization must subcontract funding to non-Government investigators, funding for suborbital-class investigations will sometimes be split into multiple awards. Please read the individual

ROSES Appendix and consult with the POC.

(c) Points of Contact for Suborbital-Class Platforms

NASA provides some limited avenues for procurement of suborbital launch vehicle services, including: sounding rockets provided by the NASA Sounding Rockets Program Office (SRPO) at the NASA Goddard Space Flight Center/Wallops Flight Facility (NASA/GSFC/WFF), balloons provided by the NASA Balloon Program Office (BPO) at the NASA/GSFC/WFF, and suborbital reusable launch vehicle (sRLV) services provided by the NASA Space Technology Mission Directorate's (STMD) Flight Opportunities Program (FOP). SMD also solicits investigations as CubeSats and as small International Space Station payloads. Regardless of which launch vehicle service is anticipated, all prospective PIs are required to demonstrate the capacity, availability, and commitment of the suborbital-class platform to support their investigation. PIs are strongly urged to discuss prospective investigations with NASA program personnel (see below) prior to submitting their proposal to ensure that probable operational costs are properly anticipated.

(i) NASA-provided Sounding Rocket Services

Information on the capabilities of currently available sounding rocket vehicles is available at <http://sites.wff.nasa.gov/code810/vehicles.html>. Proposers are encouraged to consider these capabilities in designing their investigations, but the Sounding Rockets Program Office (SRPO) has the final authority in the choice of which vehicle is to be used.

The nominal U.S. launch sites for sounding rockets are White Sands Missile Range (WSMR) in New Mexico, Wallops Island in Virginia, Poker Flat Rocket Range (PFRR) in Alaska, and Reagan Test Site (RTS) in the Kwajalein Atoll. The SRPO also conducts launches from the established non-U.S. launch sites at Andoya, Norway; Kiruna, Sweden (Esrangle); or Australia; subject to science community requirements and the availability of SRPO operations funding to conduct the campaign.

Investigators proposing payloads to be flown on sounding rockets should answer the program-specific questions on the NSPIRES proposal cover pages. This information is needed by the SRPO to generate a rough order of magnitude cost estimate for the operational requirements associated with a proposed investigation and is used for planning purposes. The required information includes the envisioned vehicle type, payload mass, trajectory requirements, launch site, telemetry requirements, attitude control, or pointing requirements, and any plans for payload recovery and reuse. Investigators proposing sounding rocket payloads should contact the SRPO to obtain technical information related to SRPO launch vehicle capabilities, services, and the latest planned campaign schedules. Questions concerning sounding rockets may be addressed to:

Giovanni Rosanova
Sounding Rockets Program Office
Code 810
GSFC/Wallops Flight Facility
National Aeronautics and Space Administration

Wallops Island, VA 23337
Telephone: (757) 824-2202
Email: giovanni.rosanova@nasa.gov

(ii) NASA-provided Balloon Services

Information on the capabilities of current available balloon vehicles is available at <http://sites.wff.nasa.gov/code820/operations.html> and at <http://www.csbf.nasa.gov/balloons.html>. Proposers are encouraged to consider these capabilities in designing their investigations, but the Balloon Program Office (BPO) has the final authority in the choice of which vehicles to be used.

The nominal U.S. launch sites for Balloons are Fort Sumner, New Mexico, and at the Columbia Scientific Balloon Facility in Palestine, Texas. The BPO also conducts launches from established non-U.S. launch sites at McMurdo, Antarctica; Alice Springs, Australia; Kiruna, Sweden (Esrangle); or Wanaka, New Zealand, subject to science community requirements and the availability of BPO operations funding to conduct the campaign.

Proposers needing investigation unique engineering, flight support systems, and/or technical support services from NASA, such as the Wallops Arc-Second Pointing System (WASP), should contact the BPO directly for an estimate of the Government Furnished Equipment (GFE) cost of the desired support.

Investigators proposing balloon payloads should contact the BPO to obtain technical information related to BPO balloon capabilities, services, and the latest planned campaign schedules.

Questions concerning balloons may be addressed to:

Debora Fairbrother
Balloon Program Office
Code 820, GSFC/Wallops Flight Facility
National Aeronautics and Space Administration
Wallops Island, VA 23337
Telephone: (757) 824-1453
Email: debora.a.fairbrother@nasa.gov

(iii) Suborbital Reusable Launch Vehicles

Suborbital Reusable Launch Vehicles (sRLV) offer newly developed commercial capabilities for the conduct of NASA scientific research and technology advancement.

Proposals to ROSES program elements using sRLVs as platforms must be for complete investigations and must describe a complete suborbital science investigation, including payload construction, vehicle integration, launch and flight operations, data analysis, and publication of results. Proposers interested in using sRLVs as platforms to conduct an Earth or space science investigation must identify a vehicle that can provide the technical capabilities that are required to conduct the proposed investigation.

Proposals using sRLVs as platforms must specify the technical requirements that their investigation places on the vehicle. Proposals for investigations using sRLVs as platforms must provide a description of the instrument; its current status; a clear

assessment of what it will take to develop, modify, and integrate the instrument onto the sRLV; and include a plan to provide calibrated, research grade data.

SMD will conduct an sRLV continuing investigation review (CIR) for all sRLV-based projects. The CIR will take place following maturity of the sRLV-based project to the equivalent of a Phase A concept study report or a systems requirement review. A proposal for a sRLV-based project must describe the proposed schedule for CIR and the proposed funding required to reach CIR.

The CIR will include payload description, flight performance assessment, proposed payload configuration and interfaces, mission success criteria, requirements matrix, operational requirements, launch vehicle, and project schedule. Once the sRLV-based project reaches that level of design maturity, the CIR will be held at NASA Headquarters. The SMD Associate Administrator (or designee) is the decision authority for approval to proceed beyond the CIR. It is expected that sRLV-based projects will spend no more than approximately \$100K prior to CIR approval.

Proposals for sRLV-based investigations must be submitted to the appropriate ROSES program element, depending on the science to be addressed by the proposed investigation. The proposed sRLV-based investigation must meet the constraints of the program element to which it is being proposed. This explicitly includes any constraints on the areas of science that are solicited, on the available funding, and on the requirement for a complete science investigation.

In addition to the normal evaluation factors specified in [Section VI\(a\)](#) and the [NASA Guidebook for Proposers](#), evaluation of the intrinsic merit of sRLV-based proposals shall include the following additional factors:

- The extent that the proposed sRLV offers an advantage (e.g., scientific, technical, or cost) over other suborbital-class platforms (including sounding rockets, balloons, and aircraft);
- The likelihood that the proposed vehicle will be available at the proposed time for flight and that it will be capable of providing the required technical capabilities;
- The feasibility of the proposed technical investigation, including the concept for conduct of the experiment during the suborbital flight and the plans for calibrating and analyzing the data obtained to accomplish the proposed science objectives; and
- The quality of the plans for completing the preliminary design prior to the investigation confirmation review.

The cost to SMD for the flight and all other services provided by the sRLV vendor must be clearly stated in the proposal, included in the NSPIRES cover page budget (in Section F, line 10 labeled appropriately), and also in the separately uploaded "Total Budget" PDF. See [Section IV\(b\)iii](#) for information about the requirements for the separately uploaded "Total Budget" PDF.

In addition to the factors specified in the *Guidebook*, the evaluation of cost reasonableness of a proposal shall include:

- The affordability to SMD of the proposed vehicle vendor cost for the flight and other required services.

Proposers from Government Laboratories and NASA Centers (including JPL), but not others, may avail themselves of STMD's Flight Opportunities Program (FOP) contracts to sRLV flight service providers. Information on sRLV vehicles, including general vehicle capabilities and contact information for some vendors, is available at <https://www.nasa.gov/directorates/spacotech/flightopportunities/flightproviders>. The FOP will not sponsor participants to fly on suborbital reusable launch vehicles. The payloads to be flown on FOP-contracted sRLV flights must either be automated or remotely operated. The remote operation capability should be confirmed with the flight operator. For payloads to be flown on FOP contracted sRLV flights, the flight and all other services provided by the sRLV vendor will be procured directly by the FOP rather than through the award. FOP does not currently have a contract to provide parabolic flight.

Investigators proposing FOP-contracted sRLV flight service payloads are strongly urged to discuss prospective investigations with operations personnel in the Flight Opportunities Program and/or a potential vendor to ensure that probable integration, safety and mission assurance, and operational costs are properly anticipated.

All proposals from non-governmental organizations, and in addition any government proposers who choose not to use STMD's Flight Opportunities Program (FOP) contracts to sRLV flight service providers, must include a Letter of Endorsement from a commercial vendor that (i) describes how that vendor's vehicle will meet the investigation requirements and provides technical information on how the vehicle will meet the investigation requirements, (ii) states that the vehicle will be available for use at the time proposed for flight and provides information showing a plan for getting from the current vehicle status to flight status, and (iii) provides a quoted cost for the flight and all other services that are required from the vehicle vendor to enable and conduct the proposed investigation.

Questions concerning potential sRLV investigations may be addressed to:

Paul De León
Flight Opportunities Campaign Manager
Mail Stop 213-13
NASA Ames Research Center
Moffett Field, CA 94035
(650) 604-0275
paul.deleon@nasa.gov

(iv) Research Investigations utilizing the International Space Station

NASA has determined that there may be payload opportunities for small, suborbital-class space and Earth science research investigations, including both science and technology development, that utilize the International Space Station (ISS). Available external attach points include both zenith and nadir pointing locations and internal attach points include nadir pointing locations. NASA has available regular external launch opportunities and opportunities to launch pressurized (internal) cargo for use in the Window Observational Research Facility (WORF). Information on opportunities and

constraints for ISS attached payloads may be found at http://www.nasa.gov/mission_pages/station/research/research_information.html.

Proposals seeking use of the ISS must take advantage of the Station's unique capabilities. Proposals must include a clear and convincing scientific and/or technical argument that use of the ISS is required to produce the needed results in ways that could not be accomplished through the use of other platforms. Investigations that make use of the ISS may be proposed for periods of performance of up to five years.

Proposers interested in using the ISS to conduct an Earth or space science investigation must identify a specific accommodation location that can provide the technical capabilities required to conduct the proposed investigation. The proposal must include a letter of feasibility from the ISS Research Integration Office that must contain: (1) a preliminary assessment of the feasibility of the proposed concept and requirements for access to and accommodation on the Space Station, (2) identification of any significant challenges or conditional provisions for access and accommodation, and (3) a description of the level of technical interchange or negotiation required to mature the proposed concept for access and accommodation on ISS. Transportation and accommodation will be provided by NASA at no cost to the proposed research investigation, and costs for transportation to and accommodation on the ISS should not be included in the proposed budget. However, the PI's cost for all accommodation, safety, and other reviews that are conducted and supported by the PI must be included in the PI's proposed investigation budget. It can take the ISS Research Integration Office several weeks to prepare the letter of feasibility.

In addition to proposal requirements specified in the appropriate ROSES program element, proposals for investigations utilizing the ISS must provide a description of the instrument; its current status; a clear assessment of what it will take to develop, modify, and integrate the instrument onto the ISS; and include a plan to provide calibrated, research grade data in SI traceable units. Proposals must be for complete investigations that include payload development, construction, ISS integration, launch and flight operations, data analysis, and publication of results.

The ISS Research Integration Office will provide integration services, launch services, on-orbit operations and services, as well as safety and mission assurance reviews for all ISS investigations.

There is no one special due date for investigations for the ISS; rather, proposals must be submitted to the appropriate ROSES program element depending upon the science addressed by the proposed investigation. The proposed investigation must meet the constraints of the program element to which it is being proposed. This explicitly includes any constraints on the areas of science that are solicited, on the available funding, and on the requirement for a complete science investigation.

Investigations proposed for the ISS will be approved for the first year only. During the first year, in addition to beginning the proposed investigation, a detailed transportation and accommodation study will be undertaken with the ISS Research Integration Office. Approval for continued funding beyond the first year will be contingent on the ISS Program making a firm commitment for transportation and accommodation on the ISS that is compatible with the requirements of the proposed investigation.

All proposals will be evaluated with respect to the criteria specified in the [NASA Guidebook for Proposers](#). In addition to the factors specified in the *Guidebook*, the intrinsic merit of a proposal shall include the following additional factors:

- The extent that the advantages (e.g., scientific, technical, or cost) of the International Space Station’s capabilities and location will be utilized; and
- The feasibility of the proposed technical investigation, including the on-orbit operations concept and the plans for calibrating and analyzing the data obtained to accomplish the proposed science objectives.

External accommodations for payloads include Express Logistics Carriers (ELCs), the Japanese Experiment Module-Exposed Facility (JEM-EF), and the Columbus Orbiting Facility-Exposed Facility (COF-EF). Internal accommodations are also available in the pressurized environment via the Window Observational Research Facility (WORF). More detailed information can be found at www.nasa.gov/stationfacilities.

Attached payloads must be certified for transportation and use in a human tended vehicle. External payloads would be required to complete preliminary design review (PDR) approximately 36 months before launch, critical design review (CDR) approximately 24 months before launch, and be delivered for certification and integration approximately nine months before launch. Pressurized cargo for the WORF would be required to complete PDR approximately 12 months before launch, CDR approximately nine months before launch, and be delivered for certification and integration approximately four months before launch.

Investigators proposing ISS payloads are required to contact the ISS Research Integration Office to begin the technical discussion needed in order to start the ISS technical requirements interface and resource utilization feasibility and accommodation assessment. It is only after such feasibility assessment is performed by the ISS Research Integration Office that a signed feasibility letter will be issued to the investigator. The signed ISS feasibility letter must be submitted with any proposal requesting the use of ISS as a science platform to perform any experiment.

For ISS Program accommodation support please contact both of these points of contact from the ISS Program’s Research Office **[Updated, July 6, 2020]**

Name	email	Telephone
Steve Huning	steven.w.huning@nasa.gov	(281) 244-8043
Pete Hasbrook	Pete.Hasbrook@nasa.gov	(281) 483-0768

(v) Use of Short Duration Orbital Platforms, including CubeSats

Short duration (<2 years, in orbit) orbital platforms, including any ISS mounted payload that is retrievable and returned to Earth, ISS CubeSat deployments, and CubeSats generally have historically been used as teaching tools and technology demonstrations, and offer newly developed capabilities for the conduct of NASA scientific research and technology advancement. CubeSats may be built as a single unit (1U), weighing less than 1.33 kg, or combined in units of two, three, six (2x1x3 form factor) and, where allowed (e.g., D.3 APRA), twelve (2x2x3 form factor). Proposers contemplating six or twelve U are strongly encouraged to communicate with the point of contact for the

ROSES program element to which they plan to propose to verify that those are solicited and that the costs can be accommodated.

Proposals for science investigations utilizing short duration orbital platforms, such as CubeSats, must be for complete investigations, and must describe a complete science investigation, including CubeSat construction, payload integration and test, launch vehicle integration, communications, mission operations, data analysis, and publication of results.

The CubeSat Launch Initiative (CSLI) program regularly provides launch opportunities for small satellites to fly as secondary (auxiliary) payloads on launch vehicles planned for upcoming U.S. Government missions. Under the CSLI process, an Agency-wide selection recommendation committee considers candidate CubeSats for selection from among those proposed from organizations both internal and external to NASA. At an appropriate time after selection, SMD will provide direction for being considered for manifest on a launch vehicle going to an appropriate orbit.

CubeSats are typically launched as secondary payloads to low-Earth orbit or from the International Space Station. Further, additional commercial opportunities to leave Earth orbit as a secondary payload may arise on future mission launches. Information on the EM-1 stand-alone CubeSat opportunity, can be found by contacting the CubeSat points of contact listed below.

For more information about the CSLI, including previously-selected respondents, see http://www.nasa.gov/directorates/heo/home/CubeSats_initiative.html. For more resources specifically for CubeSat and SmallSats proposers, please see <https://www.nasa.gov/smallsat-institute>.

As a result of their secondary status, CubeSats are placed into orbits that are dictated by the primary. Therefore, in any given year a finite number of specific orbits (e.g., inclinations and altitudes) will be available for CubeSats, and the types of orbits available will vary from year to year. Thus, CubeSat-based missions requiring very specific orbital parameters may be at a disadvantage for securing a timely launch. Proposals should include the CubeSat Mission Parameters Table (below) and clearly

CubeSat Mission Parameters								
Mission Name	Mass	Cube Size	Desired Orbit		Acceptable Orbit Range	400 km @ 51.6 degree incl. Acceptable – Yes or No	Ready Date	Desired Mission Life
			Altitude					
			Inclination					

indicate both the required and the acceptable range of orbital parameters needed to meet mission objectives. NASA's CubeSats are deployed from the ISS via NanoRacks or from an expendable launch vehicle via a dispenser on contract at the time of manifesting. CubeSats must be compliant with Launch Services Program, Program Level Dispenser and CubeSat Requirements Document (LSP-Req-317.01) and the Compliance and Reference Documents referenced therein. That document may be found at: http://www.nasa.gov/pdf/627972main_LSP-REQ-317_01A.pdf

Investigators proposing CubeSats in response to this solicitation are expected to comply with the requirements of [NASA Procedural Requirement \(NPR\) 7120.8](#), NASA Research and Technology Program and Project Management Requirements, and should appropriately tailor these requirements, depending on the project size, complexity, and scope.

Proposals for CubeSat investigations should note the following:

- The cost of launch for a single, $\leq 3U$, spacecraft to Low Earth Orbit (LEO) will be covered under the NASA/HEOMD CubeSat Launch Initiative (CSLI) at no cost to the investigation. For this standard case proposers should mention (e.g., in the budget justification) that only the standard CSLI-provided launch services are needed and proposers should not include such launch service charges in the budgets of a ROSES proposal.
- Proposals to go beyond LEO, utilize more than one spacecraft, or involve a CubeSat $>3U$ must contact CSLI representatives (see below) to obtain a cost estimate. Proposals shall state explicitly in the budget justification that there are additional costs for launch within the proposed budget, and give those costs in the NSPIRES cover page budget and the separately uploaded Total Budget file. However, such CSLI quoted launch services costs are not in the hands of the proposing organization and overhead must not be charged on those costs.
- The proposed CubeSat investigation must meet the constraints of the program element to which it is being proposed. This explicitly includes any constraints on the areas of science that are solicited, on the available funding, and on the requirement for a complete science investigation.
- Proposals will be evaluated with respect to the criteria specified in the [NASA Guidebook for Proposers](#). In addition to the factors specified in the *Guidebook*, the proposal will be evaluated against any additional factors called out in the program element to which it is being proposed.
- Proposals for investigations using CubeSats must satisfy the constraints for a standard CubeSat and the NASA CubeSat deployer.
- Please note that there isn't a 12U deployer on ISS.
- Proposals must specify any constraints placed on the required orbit and orbital lifetime. The likely availability of NASA launches satisfying any constraints in the time period contemplated will be a consideration for the ROSES evaluation. The less stringent the orbital constraints, the more probable it will be that NASA can manifest the CubeSat investigation for launch.
- Proposals must demonstrate knowledge of the requirements for limiting orbital debris and must address how the mission will meet the requirements of [NPR 8715.6](#) for Limiting Orbital Debris.
- Proposals must address the approach to downlink and uplink communications licensing, frequency band selection, and frequency coordination for operations between space and ground within the RF spectrum.
- All costs for preparing, testing, and delivering the CubeSat for launch must be included in the proposal. Launch service charges should be included in the

proposal cost request only if they exceed the normal CSLI-provided launch services, as described above.

- Proposals for short duration orbital experiments other than CubeSats must include provisions for access to space as part of the proposal.

Investigators proposing CubeSats are strongly urged to discuss prospective investigations with personnel listed below regarding constraints, launch opportunities, and other technical matters.

For further information on SMD CubeSats, please contact:

Florence Tan

Phone: (202) 358-0058

Email: florence.w.tan@nasa.gov

For further information on CSLI, please contact:

Samantha Fonder,

Launch Services Program Executive,

Phone: 202-358-1521

Email: samantha.fonder@nasa.gov

VI. PROPOSAL REVIEW INFORMATION

(a) Evaluation Criteria

As stated in the [NASA Guidebook for Proposers](#), proposals are ordinarily evaluated on three criteria: intrinsic merit, relevance, and cost. A ROSES proposal that is not relevant is not selectable, no matter what the scores for Merit or Cost, or mean or median of all three criteria scores. Indeed, SMD may return without peer review a proposal deemed to be not relevant. The manner in which SMD evaluates ROSES proposals for relevance and cost varies from program to program. ROSES proposals may be scored by peer reviewers for all three criteria on a full scale, or the proposal may be scored on a full scale only for merit, with relevance and/or cost evaluated on an abridged scale, or with only comments provided for relevance and/or cost, or the peer review panel may not be asked to comment on relevance and cost at all.

Note the following specific points:

- Some of the program elements discussed in Appendices A through E will give specific factors, based on the solicited research objectives, which will be considered when evaluating a proposal's science and/or technical merits and/or its relevance to program objectives.
- Unless otherwise stated, relevance will be judged by whether the proposal addresses goals and objectives for the ROSES Appendix and/or specific program element to which it was submitted, rather than NASA's broader goals. Unless otherwise stated in the program element, relevance of the proposed work is judged based on whether the work proposed is deemed to be relevant, independent of whether or not it includes an overt, clear and direct statement of relevance. That is, unless otherwise stated in the program element, no proposal will be returned as noncompliant for lack of a relevance section or statement, and inclusion of a

relevance section or statement is no guarantee that the proposal will be judged relevant. Please read the program elements carefully. See also Section I(h).

- Cost data for U.S. proposals may be evaluated by peer review (for reasonableness) and by NASA program personnel (for consistency with the available budget). Proposers must follow the budget requirements in [Section IV\(b\)iii](#) and [Table 1](#) of this document. When evaluating the cost reasonableness of the proposals, reviewers will assess whether the proposed level of effort (i.e., labor FTEs) and the proposed other direct costs (i.e., supplies, equipment, travel) are commensurate with those required to accomplish the goals of the investigation. Salary levels, fringe benefit rates, and overhead rates are not part of that evaluation, and will be hidden from peer reviewers.
- Except in rare instances where it is explicitly acknowledged in the program element (e.g., A.39 Ecological Forecasting), neither the existence of proposed voluntary cost sharing nor the lack thereof or the magnitude of such cost sharing will be used as evaluation criteria or as a precondition for award. If voluntary cost sharing is proposed, the proposer should describe, in detail, any proposed cost sharing arrangements (see [Section III\(d\)](#) above). Please note that the Table of Personnel and Work Effort is no longer in the budget section and the *Guidebook* explicitly notes that any planned work commitment not funded by NASA is not considered cost sharing as defined in 2 CFR § 200.29.
- The [NASA Guidebook for Proposers](#) gives definitions for five adjectival ratings from Excellent down to Poor. NASA may provide decision letters and or evaluations with intermediate scores such as "Excellent/Very Good".
- A NASA awards 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, 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 the System for Award Management (SAM, <https://www.sam.gov/SAM/>) (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 and peer reviewers who may require access to the CBI to perform the assisting contract.

(b) Review and Selection Processes

Review and selection of proposals submitted to this NRA will be consistent with the policies and provisions given in the [NASA Guidebook for Proposers](#), the [SMD Peer Review Policy](#) and the SMD policy on avoidance of [Peer Review Conflicts of Interest](#).

Although not part of the peer review process, the selection official may take into account programmatic considerations such as impact on current or future missions, balance across subdisciplines, technologies, methodologies, career stage, risk, innovation, types of institutions, and project size (such as funding several small investigations instead of one large one).

Unless otherwise specified, the SMD Division Director responsible for a research program (or a delegate, such as the R&A Lead in the Earth Science and Planetary Science Divisions) is its Selection Official.

SMD is strongly committed to ensuring that the review of proposals is performed in an equitable and fair manner that reduces the impacts of any unconscious biases. To this end, selected program elements under ROSES will employ a dual-anonymous peer review (DAPR) process in which, not only are proposers not told the identity their reviewers, the reviewers are not told the identity of the proposers, until after they have evaluated all of the anonymized proposals.

DAPR will be applied to proposals submitted to: A.30 The Earth Science U.S. Participating Investigator program, B.4, Heliophysics Guest Investigators-Open, D.2 Astrophysics Data Analysis, all Astrophysics GO/GI programs (D.5, D.6, D.9-D.11) and E.4 Habitable Worlds. Proposers to these program elements must adhere to the instructions in those program elements on how to prepare anonymized proposals. Also, detailed instructions for the preparation of proposals will be posted on the NSPIRES page for these ROSES elements and at <https://science.nasa.gov/researchers/dual-anonymous-peer-review>.

In brief, proposers to these program elements will provide an anonymized version of the proposal for peer review, and a separate not anonymized "Expertise and Resources - Not Anonymized " document that contains the identifying expertise and resources. DAPR panels will be instructed to evaluate the anonymized proposals based on their scientific merit, without taking into account the proposing team qualifications. As a final check, and only after the scientific evaluation is finalized for all proposals, the panel will be provided with the separate non-anonymized Expertise and Resources document to assess the team capabilities required to execute the proposed science investigation.

Starting in ROSES-2020 another novel variant of the peer review process will be focused on high-(intellectual)-risk high-impact proposals. SMD will collect information from proposers and reviewers to assess (intellectual) risk and impact of ROSES proposals and the Associate Administrator will assemble a second panel of senior

researchers to examine a few high-risk high-impact proposals that were not selected for funding through the normal review process, but were nominated by selection officials for an independent evaluation of intellectual risk and impact.

(c) Selection Announcement and Award Dates

SMD's goal is to announce selections within 150 days of the proposal due date and within 60 days after the conclusion of the peer review. Selections are typically announced between 150 days and 220 days after the proposal due date. Although there are many reasons why selections are not announced earlier, the most common are the uncertainty in the NASA budget at the time selection decisions could be made and the time required to conduct an appropriate peer review and selection process. NASA does not usually announce new selections until the funds needed for those awards are approved through the Federal budget process. Therefore, a delay in the budget process for NASA usually results in a delay of the selection announcement date. After 150 days have passed since the proposal due date, proposers may contact the responsible Program Officer listed at the conclusion of that program element and on the [SARA web page](#) (see [Section VIII](#)). If the program officer does not respond proposers may send an inquiry to SARA@nasa.gov.

In order to announce selection decisions as soon as is practical, even in the presence of budget uncertainties, the Selection Official may make and announce selection decisions about some proposals and defer decisions on others. If a Selection Official uses this option, then proposers may be told that a proposal has been "selected," "declined," or that a decision has not yet been made. If a decision has not yet been made, then those proposals are termed "selectable" and will be considered for a supplemental selection if circumstances allow. Eventually proposers will be notified whether their proposal is selected or is no longer being considered for selection. All proposers will be notified via NSPIRES and provided with a written review (usually the panel evaluation) of the proposal. Proposers may contact the Program Officer for a "debriefing" to gain a better understanding of the evaluation process and the reasoning supporting the decision not to select the proposal, see the [SMD Reconsideration Policy](#) for more information.

(d) Processes for Appeals

(i) Reconsideration by SMD

SMD has a process for requesting a debrief and/or reconsideration of the declination of a proposal submitted in response to an SMD NASA Research Announcement and Cooperative Agreement Notices. Reconsideration may be requested if the PI believes that the proposal evaluation contained factual errors or was otherwise handled improperly. This process is described in the [SMD Reconsideration Policy](#) document available in the Library section of the [SARA website](http://sara.nasa.gov) at <http://sara.nasa.gov>.

(ii) Ombudsman Program

The NASA Procurement Ombudsman Program is available under this NRA as a procedure for addressing concerns and disagreements. The clause at NASA FAR Supplement (NFS) 1852.215-84 ("Ombudsman") is incorporated into this NRA.

The cognizant ombudsman is

Monica Manning

Deputy Assistant Administrator for Procurement

Telephone: 202-358-1050

Email: agency-procurementombudsman@nasa.gov

(iii) Protests

Only contract awards are subject to bid protest, either at the Government Accountability Office (GAO) or with the Agency, as defined in FAR 33.101. The provisions at FAR 52.233-2 (Service of Protest) and NFS 1852.233-70 (Protests to NASA) are incorporated into this NRA. Under both of these provisions, the designated official for receipt of protests to the Agency and copies of protests filed with the GAO is

Jeffrey Cullen

Director of Program Operations

NASA Headquarters

Washington, DC 20546-0001

Telephone: 202-358-1463

Email: jeffrey.m.cullen@nasa.gov

(e) Service as a Peer Reviewer

The success of NASA's research program rests on the quality of peer review. NASA will contact expert investigators and ask them to serve as peer reviewers. Since those whose proposals were selected in prior competitions are highly qualified and may not be submitting a proposal to the current competition, they are highly encouraged to serve on SMD peer review panels. Potential reviewers are encouraged to volunteer to be reviewers by filling out one of the review forms at <https://science.nasa.gov/researchers/volunteer-review-panels> or by sending an email to one of the [program officers](#) or to sara@nasa.gov. It is good experience for early-career scientists, and the influx of new reviewers is healthy for the process.

VII. AWARD ADMINISTRATION INFORMATION

(a) Notice of Award

All proposers will be notified via NSPIRES from which they will be able to retrieve their proposal evaluation and official decision letter (i.e., a decline or accept letter, what is sometimes called a "notice of intent to make a federal award"). If a proposal is selected, the business office of the offeror will be contacted by a NASA Grants Officer from the NASA Shared Services Center ([NSSC](#)), who is the only official authorized to obligate the Government. Any costs incurred by the proposer in anticipation of an award will be subject to 2 CFR Section 1800.209 Preaward costs. NASA waives the approval requirement for preaward costs of 90 days or fewer.

(b) Administrative and National Policy Requirements

This solicitation does not invoke any special administrative or national policy requirements: 2 CFR 200, 2 CFR 1800, 14 CFR 1274, and the Grants and Cooperative Agreement Manual will apply to any awards that derive from this NRA, as applicable.

Note that the research terms and conditions have been updated - see Section 5.10.1 of the [GCAM](#) for more information. Moreover, when a grant or cooperative agreement is issued for research, additional research terms and conditions apply – see section 5.10.2 of the GCAM for reference. All award requirements are posted at https://prod.nais.nasa.gov/pub/pub_library/srba/index.html.

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

(c) Award Reporting Requirements

The reporting requirements for awards made through this NRA will be consistent with 2 CFR 200.327-.329. Award recipients must also comply with reporting requirements found in 2 CFR 180.335 and 2 CFR 180.350.

Award recipients may also be subject to reporting requirements under the NASA Plan for Increasing Access to Results of Federally Funded Research. Such requirements include reporting of final peer-reviewed manuscripts in annual and final progress reports. In other words, award recipients should report on progress in archiving of data and manuscripts in their progress reports and especially in the final report. All requirements will be identified in the Notice of Award.

If the total value of your currently active grants, cooperative agreements, and procurement contracts from all Federal awarding agencies exceeds \$10,000,000 for any period of time during the period of performance of this Federal award, additional reporting requirements will apply. [See 2 CFR 200 Appendix XII—Award Term and Condition for Recipient Integrity and Performance Matters](#).

If the total Federal share of an award includes more than \$500,000 over the award's period of performance, NASA must include the term and condition available in Appendix XII—Award Term and Condition for Recipient Integrity and Performance Matters. See also §200.113 Mandatory disclosures. The non-Federal entity or applicant for a Federal award must disclose, in a timely manner, in writing to the Federal awarding agency or pass-through entity all violations of Federal criminal law involving fraud, bribery, or gratuity violations potentially affecting the Federal award. Non-Federal entities that have received a Federal award including the term and condition outlined in Appendix XII - Award Term and Condition for Recipient Integrity and Performance Matters - are required to report certain civil, criminal, or administrative proceedings to SAM. Failure to make required disclosures can result in any of the remedies described in §200.338 Remedies for noncompliance, including suspension or debarment (See also 2 CFR part 180, 31 U.S.C. 3321, and 41 U.S.C. 2313).

(d) Compliance with the National Environmental Policy Act

All awards made in response to proposals to this solicitation must comply with the [National Environmental Policy Act \(NEPA\)](#). Thus, proposers are encouraged to plan and budget for any anticipated environmental impacts. While most research awards will not

trigger action specific NEPA review, there are some activities, including international actions, that will. The majority of grant-related activities are categorically excluded (from specific NEPA review) as research and development (R&D) projects that do not pose any adverse environmental impact. A blanket NASA Grants Record of Environmental Consideration (REC) provides NEPA coverage for these anticipated activities. The NSPIRES cover pages include questions to determine whether a specific proposal falls within the Grants REC and must be completed as part of the proposal submission process. Activities outside of the bounding conditions of the Grants REC will require additional NEPA analysis. Examples of actions that will likely require NEPA analysis include, but are not limited to: suborbital-class flights not conducted by a NASA Program Office (see Section V); activities involving groundbreaking construction/fieldwork; and certain payload activities such as the use of expendable weather reconnaissance devices (dropsondes). Questions concerning environmental compliance may be addressed to Tina Norwood, NASA NEPA Manager, at tina.norwood-1@nasa.gov or (202) 358-7324.

(e) Acknowledgement of Support for Antarctic Access

For science projects that receive assistance from the U.S. Antarctic Program, this support must be acknowledged in publications. The acknowledgement should include: "Logistical support for this project in Antarctica was provided by the U.S. National Science Foundation through the U.S. Antarctic Program." Any additional requirements will be specified in the program element description.

VIII. POINTS OF CONTACT FOR FURTHER INFORMATION

General questions and comments about the policies of this NRA may be directed to:

Max Bernstein
SMD Lead for Research
Science Mission Directorate
National Aeronautics and Space Administration
Washington, DC 20546-0001
Email: sara@nasa.gov (preferred)
Telephone: (202) 358-0879

Note: Proposals must not be submitted to this address. Proposals must be submitted electronically, as described in [Section IV](#) above.

Specific questions about a given program element in this NRA should be directed to the Program Officer(s) listed in the Summary Table of Key Information at the end of each program element appendix. Up-to-date contact information for program officers can also be found online at the SARA web page's Program Officers List at <https://science.nasa.gov/researchers/sara/program-officers-list>.

Inquiries about accessing or using the NASA proposal submission web interface located at <http://nspires.nasaprs.com> should be directed by an email that includes a telephone number to nspires-help@nasaprs.com or by calling (202) 479-9376. This help center is staffed Monday through Friday, 8:00 a.m. – 6:00 p.m. Eastern Time.

Inquiries about accessing or using Grants.gov located at <http://www.grants.gov> should be directed by an email to support@grants.gov or by calling (800) 518-4726 twenty-four hours a day, seven days a week, except Federal holidays when the center is closed.

Students, faculty or staff in programs receiving NASA financial assistance, such as grant awards from this solicitation, may raise allegations of discrimination, including harassment, by contacting the NASA Office of Diversity and Equal Opportunity. Information on filing a complaint through ODEO at <https://missionstem.nasa.gov/filing-a-complaint.html>.

IX. ANCILLARY INFORMATION

(a) Announcement of Updates/Amendments

Because this NRA is released far in advance of many of the deadlines given in Tables 2 and 3, additional information for programs may develop before their proposal due dates. If so, such information will be added as a formal amendment to this NRA no later than 30 days before the proposal due date, or, if that is not possible, the proposal due date will be extended to allow 30 days for proposal submission from the date of the amendment. All amendments are posted on the main ROSES webpage at <http://solicitation.nasaprs.com/ROSES2020> (or by going to <http://solicitation.nasaprs.com/open> and selecting "NNH20ZDA001N"). Also, a blog for amendments, clarifications, and corrections to ROSES can be found in one place at <http://science.nasa.gov/researchers/sara/grant-solicitations/roses-2020/>. NASA SMD will also send an electronic notification of any such amendments to all subscribers of its electronic notification system (see Section IX(c) below). The prospective proposer is responsible to check this NRA's NSPIRES homepage for updates concerning the program(s) of interest. Any clarifications or questions and answers that are published will be posted on the relevant program element's NSPIRES web page.

(b) Electronic Submission of Proposal Information

On-time electronic submission over the Internet is required for every proposal and mandatory NOI. While every effort is made to ensure the reliability and accessibility of the electronic proposal submission systems (NSPIRES and Grants.gov) and to maintain help centers via email and telephone, difficulty may arise at any point, including with the user's own equipment. Therefore, prospective proposers are urged to familiarize themselves with the submission system(s) and to submit the required proposal materials well in advance of the deadline of the program of interest. Difficulty in registering with or using a proposal submission system is not, in and of itself, a sufficient reason for NASA to consider a proposal that is submitted after the proposal due date (see [Section IV\(c\)](#) above). After submission via NSPIRES, proposers can verify proposal delivery by logging into NSPIRES and selecting "proposals" and "Submitted Proposals/NOIs." Additionally, the proposal PI and the submitting organization's AOR(s) will receive an email from NSPIRES confirming that the submission has been completed.

(c) Electronic Notification of SMD Research Solicitations

SMD maintains an electronic notification system to alert interested researchers of its research program announcements. Subscription to this service is free to all registered users of the NASA proposal database system at <http://nspires.nasaprs.com>. To add or change a subscription to the electronic notification system, users should login to the database system and select "Account Management" then "email Subscriptions." Owing to the increasingly multidisciplinary nature of SMD programs, this email service will notify all subscribers of (i) all NASA SMD research program solicitations regardless of their type or science objectives; (ii) amendments to all SMD solicitations that have been released for which the proposal due dates have not passed; and (iii) special information that SMD wishes to communicate to those interested in proposing to its sponsored research programs. Altogether, a subscriber may receive 50 - 75 notifications per year. SMD maintains this subscription list in confidence and does not attempt to discern the identity of its subscribers. Regardless of whether or not this service is used, all SMD research announcements may be accessed at <http://solicitation.nasaprs.com/open> by selecting "NNH20ZDA001N" as soon as they are posted (typically by ~9:00 a.m. Eastern Time on their release date).

Note: Automated spam filtering software may identify SMD's electronic notifications as spam or junk mail. Subscribers are advised to ensure that email received from "NSPIRES-help@nasaprs.com" or "nspires@nasaprs.com" are not identified by any automated email filtering system as unwanted email. Note that the latter address is an outgoing (from NSPIRES) address only; all enquiries should be directed to the former address.

NRAs issued by SMD are synopsisized on Grants.gov (<http://www.grants.gov>) at the time they are released. This ROSES NRA was synopsisized upon its release.

(d) Further Information on SMD Research and Analysis Programs

SMD maintains a website for improving communication with the research community. This site is maintained by the SMD Research Lead, is referred to as the SARA website, and is located at <http://sara.nasa.gov>. The SARA website contains information related to NASA's Science Research Programs, including the solicitations, selections, a blog for changes to ROSES, and contact information for program officers.

(e) Archives of Past Selections

For more information about the types of research supported by the program elements solicited in previous editions of this NRA and other predecessor NRAs, the titles and abstracts of all investigations selected through previous solicitations (issued after January 1, 2005) are available by program element at <http://nspires.nasaprs.com>: click "Solicitations" and then "Closed/Past Selected", search on the particular ROSES program element of interest and information on the selected proposals will be in a downloadable PDF file. For example, for the selections from the last set of proposals submitted (in 2017) to The Science of TERRA, AQUA, and SUOMI NPP one would go to [the NSPIRES page for that program element](#), and download the PDF of "[The Science of TERRA, AQUA, and SUOMI NPP 2017 selections](#)" under the heading "Selections". One can also search the grants (only) that resulted from all NASA programs at

<http://www.research.gov/> by selecting "[Search awards](#)" and then using the "[Advanced Search](#)" to search for NASA awards only. One can also search the grants (only) that resulted from all NASA programs, but not abstracts at <https://www.nssc.nasa.gov/grantstatus>.

(f) Meeting Geospatial Standards

NASA pioneered the development of metadata and the accessibility and interoperability of space and Earth science data. When grants result in the development of data that NASA both identifies as geospatial and intends to distribute, then NASA awards will require that documentation (metadata) meet Federal Geographic Data Committee standards. NASA will assure that this documentation is electronically accessible to the Clearinghouse network (<http://www.fgdc.gov/dataandservices/>) and discoverable through <https://www.data.gov/geospatial/>.

X. CONCLUDING STATEMENT

Through this ROSES NRA, NASA encourages the participation of the space and Earth science communities in its Science Mission Directorate research and technology programs. These programs, while quite diverse in objectives and types, in fact form the foundation of both the basic and applied research that allows NASA's space and Earth science programs to be properly planned and carried through to the successful interpretation of data and its application to the needs of end users. Comments about this NRA are welcome and may be directed to the point of contact for general questions and comments identified in [Section VIII](#) above.

Table 1: Checklist for ROSES-2020 Proposals

<p>This list does not apply to Step-1 proposals. Many items on this checklist may be superseded by the program element and, if there is a difference, the text in the program element takes precedence. The instructions here supersede the NASA Guidebook for Proposers if there is a difference, see Section I(g).</p>		
<p>NSPIRES cover pages: This table lists the few aspects that most commonly cause difficulties to proposers. There are many required parts to the cover pages, see the NSPIRES tutorials for guidance.</p>		
	Team	All investigators must indicate participation via NSPIRES, except proposals submitted via grants.gov. If any team member doesn't confirm their participation the AOR will get an error that prevents submission.
	Team	Paid team members may not be collaborators, they should be given a role permitted to receive funds, such as Co-I.
	Team	A critical partner with a sustained, continuing role is a Co-I, not a collaborator, even if unpaid. See also FAQ #21 .
	Project Summary	Project Summary (abstract) must be in the 4000-character text box in the NSPIRES cover pages, not the Science/Technical/Management section of the proposal (except DAPR proposals).
	Budget	List all costs. Include all salary and indirect costs in the NSPIRES cover page budgets but not in the proposal PDF, see Section IV.(b)iii .
	Submission	The author must "release" the proposal and the AOR must "submit" prior to the due date.
	Other	There are questions that must be answered and there may be other required content, e.g., some program elements in Appendix C collect a relevance statement via the cover page, see VI(a).
<p>Proposal document</p>		
	Table of contents	First component of proposal. One page only and optional.
	Scientific/ Technical/ Management (S/T/M) Section	Second component and the main part of the proposal. The sequence for science content here is recommended proposers may order the elements as they prefer.
	Length restriction	Typically, 15 pages (except for a Step-1 proposal) and more may be permitted for some (e.g., suborbital) programs and less for others (e.g., C.17 PMEF, E.2 TWSC). Please read the program element and refer to the summary table of key information.
	Format	8.5" x 11.0" paper size
	Format	Single spaced, single column text (unless otherwise specified).
	Format	One-inch margins on all four sides. No reviewable content in margins.
	Format	No more than 5.5 lines per vertical inch

Table 1 Continued: Checklist for ROSES-2020 Proposals

	Text Format	No more than 15 characters per horizontal inch, including spaces. This is typically consistent with a font size of 12.
	Captions Format	As above (font size 12 etc.). Text necessary for the proposal may not be solely in figures, tables, or their captions.
	Figure Format	Text and content on/in figures must be easily legible without magnification.
	Table Format	Text and content on/in Tables must be easily legible without magnification.
	Content	Discuss objectives and their significance.
	Content	Discuss perceived impact of the work.
	Content	Discuss relevance of the work to the program element. See VI.(a)
	Content	Explain the technical approach and methodology.
	Content	Discuss potential sources of uncertainty
	Content	Present mitigation strategy or alternate approach given obstacles
	Content	Discuss roles of all team members so it's clear what they are doing
	Content	Present a work plan, with milestones, management structure
	Content	Present a data sharing and/or archiving plan in the S/T/M section only if it is required by program element, see Section II.(c) .
	Special Content	Provide other special requirements of program element, e.g., special statements for participating scientists, team leads, etc.
References: Third component of proposal		
	Length	No page limit
	Excluded	No references to documents unavailable to reviewers. See https://science.nasa.gov/researchers/sara/faqs#19 .
Data Management Plan (DMP) fourth component of proposal		
	Length	2 pages
	Required	Unless otherwise stated, a DMP or explanation of why it is not needed must be provided in this section.
	Content	See Section II(c) and the DMP FAQ for content and templates.
Biographical Sketches/Curriculum Vitae (CVs): fifth component of proposal		
	Required	For a PI and each Co-I.
	Length restriction	CV for a PI (or Science PI) - up to two pages, unless otherwise specified.
	Length restriction	CVs for anyone other than a PI are limited to one page
	Not required	CVs for collaborators are typically not needed, but may be included
Table of Personnel and Work Effort: This is the sixth component of the proposal. Note, location may differ from that given in <i>Guidebook</i> . See Section IV(b)iii		
	Required	Names and/or titles of all personnel to perform the proposed effort
	Required	Planned work commitment (e.g., in weeks, months etc.) to be funded by NASA see example in Section IV(b)iii .

Table 1 Continued: Checklist for ROSES-2020 Proposals

	Required	Planned work commitment (e.g., in weeks, months etc.) that will not be funded by NASA, if any. See example in Section IV(b)iii .
	Note	This table is outside of the budget Section. Time commitment included here that is not funded by NASA is not considered cost sharing, as defined in 2 CFR § 200.29.
	General	Where names are not known, include the position, such as postdoctoral fellow or technician.
Current and Pending Support: seventh component of the proposal, not page limited.		
	Required	Required for the PI and funded team members who are proposed to devote $\geq 10\%$ of their time to the proposed work.
	Required	For each current project or pending proposal list the level of effort for that team member (only) per year. Award values are not required.
	Excluded	Do not include Current and Pending for collaborators.
	Discouraged	Current and Pending for students is discouraged.
	Discouraged	Current and Pending for Foreign Co-Is is discouraged.
	Excluded	Do not self-reference this proposal in the current and pending
Statements of Commitment and Letters of Support, feasibility and Endorsement, the eighth component of the proposal.		
	General	Statements of Commitment by team members have been replaced by an indication of participation via the NSPIRES web interface.
	Statements of Commitment	Statements of Commitment must be included for Grants.gov proposals, since web confirmation of team member participation is not possible via Grants.gov.
	Letter of Endorsement – only permitted in special cases.	In general, not permitted. Special cases include 1) Foreign Co-Is must include letters of endorsement from their government agency or funding/sponsoring institution in their country and 2) Letters from commercial vendor are required for proposals for investigations using sRLVs not contracted by the Flight Opportunities Program. See Section V(b)iii .
	Letter of Support	A letter of support is required from the owner of any facility or resource that is not under the direct control of the PI or a Co-I, acknowledging that the facility or resource is available for the proposed use during the proposed period.
	Letter of feasibility	A letter of feasibility from the NASA Space Station Payload Office must be included with proposals to use ISS.
	Letter of affirmation	In general, letters of affirmation are not permitted for normal research proposals, but letters from the community may be included only where explicitly allowed, e.g., for C.17 PMEF, and E.2 TWSC.

Table 1 Continued: Checklist for ROSES-2020 Proposals

Budget Justification: The ninth component of the proposal, no page limit overall.		
General	Please explain in words what is being purchased and why it is reasonable. See the Guidebook for Proposers	
Required	Budget Narrative: justify each proposed component of cost, including subcontracts/subawards, consultants, other direct costs (including travel), and facilities and equipment. Give the "basis of estimate;" quotes need not be provided, but the proposal should indicate that the cost was based upon a quote, prior experience, etc.	
Excluded	Do not include any values for salary, fringe, or overhead.	
Optional	Proposers need not specify anticipated award type (i.e., grant vs. contract), see Section II(a)	
Facilities and Equipment: The tenth component of the proposal, no page limit.		
Length restriction	None, as needed	
Excluded content	Does not add scientific or technical information beyond a description of the facilities and equipment, i.e., don't add here what should be in the page-limited scientific/technical Section.	
Detailed Budget: The eleventh and final component of the main proposal document.		
Strongly Recommended	Detailed budget, itemizing expenses.	
Strongly Recommended	Separate detailed budget from each subaward organization.	
Excluded	Do not include any \$ or % values for salary, fringe, or overhead in this section which is peer reviewed. See the FAQ at https://science.nasa.gov/researchers/sara/faqs#8	
PDF Appendices Separate from the main proposal document		
"Total" Budget Document (separate PDF file attached as type "Total Budget").		
Required	Separately uploaded "Total" Budget PDF file see Section IV(b)(iii) .	
HEC Appendix Document (separate PDF file attached as "Appendix")		
If necessary	If the Program Specific Data Question on the use of NASA-provided HEC was answered in the affirmative, an appendix document must be provided. See Section I(d) for information.	
Expertise and Resources - Not Anonymized (separate PDF file attached as document type "Appendix")		
Selectively required	This document is required only for those program elements employing the Dual-Anonymous Peer Review process. See Section IV(b)i and relevant program elements for more information.	