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HEADQUARTERS
SCIENCE MISSION DIRECTORATE

RESEARCH OPPORTUNITIES IN SPACE AND EARTH SCIENCES – 2018
(ROSES-2018)

NASA RESEARCH ANNOUNCEMENT (NRA)
SOLICITING BASIC AND APPLIED RESEARCH PROPOSALS

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STARTING NO EARLIER THAN MAY 3, 2018
THROUGH NO LATER THAN APRIL 25 2019

RESEARCH OPPORTUNITIES IN SPACE AND EARTH SCIENCES (ROSES)–2018 EXECUTIVE SUMMARY

This National Aeronautics and Space Administration (NASA) Research Announcement (NRA), Research Opportunities in Space and Earth Sciences (ROSES) – 2018, 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 supporting research and technology in space and Earth sciences supported by SMD. Awards will be made as grants, cooperative agreements, contracts, and inter- or intra-agency transfers, depending on the nature of the work proposed, the proposing organization, and/or program requirements. 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-2018 omnibus NRA will be available upon its release on February 14, 2018, at <http://solicitation.nasaprs.com/ROSES2018>. Tables [2](#) and [3](#) of this NRA, which will be posted at <http://solicitation.nasaprs.com/ROSES2018table2> and <http://solicitation.nasaprs.com/ROSES2018table3>, 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 2019, at which time release of a subsequent ROSES NRA is planned, proposers should 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-2018 RSS feed for amendments, clarifications, and corrections at <http://science.nasa.gov/researchers/sara/grant-solicitations/ROSES-2018/>, and
- (3) The ROSES-2018 due date Google calendar. Instructions are at <https://science.nasa.gov/researchers/sara/library-and-useful-links>.

Potential proposers should also be aware of the ROSES FAQ at <http://science.nasa.gov/researchers/sara/faqs/> and the [Guidebook for Proposers Responding to a NASA Funding Announcement](#) (hereafter referred to as the *NASA Guidebook for Proposers* or simply the *Guidebook*).

ROSES–2018 SUMMARY OF SOLICITATION
TABLE OF CONTENTS

	Page
I. Funding Opportunity Description	1
(a) Strategic Objectives of NASA and the Science Mission Directorate	1
(b) Research Programs of NASA’s Science Mission Directorate	1
(c) Significant Changes from Recent ROSES	2
(d) NASA-Provided High-End Computing (HEC) Resources	4
(e) Availability of Funds for Awards	6
(f) Successor, Resubmitted, Multiple and Duplicate Proposals	6
(g) Order of precedence: ROSES vs. Guidebook vs. Program Elements	6
(h) Access to NASA Facilities/Systems	7
(i) Citizen Science	7
II. Award Information	8
(a) Funding and Award Policies	8
(b) Award Period of Performance	9
(c) Increasing Access to the Results of Federally Funded Research	9
(d) Rephrasing of Award Budgets	10
III. Eligibility Information	10
(a) Eligibility of Applicants	10
(b) Number of Proposals and Teaming Arrangements	11
(c) Restrictions involving China	11
(d) Cost Sharing or Matching	12
IV. Proposal and Submission Information	13
(a) Proposal Instructions and Requirements	13
(b) Content and Form of the Proposal Submission	13
(i) Electronic Proposal Submission	13
(ii) Proposal Format and Contents	15
(iii) Budget Rules with Redaction of Salaries and Indirect Costs	16
(iv) Submission of Proposals via NSPIRES	18
(v) Submission of Proposals via Grants.gov	21
(vi) Notice of Intent to Propose	23
(vii) The Two-Step Proposal Process	23
(viii) The Two-Phase Proposal Process	24
(c) Proposal Submission Due Dates and Deadlines	25
(d) Proposal Funding Restrictions	25
V. Suborbital-Class Investigations	28
(a) Overview of Suborbital-Class Platforms	28
(b) Points of Contact for Suborbital-Class Platforms	28
(i) NASA-provided Sounding Rocket Services	28
(ii) NASA-provided Balloon Services	28
(iii) Suborbital Reusable Launch Vehicles	29
(iv) Research Investigations utilizing the International Space Station	32
(v) Use of Short Duration Orbital Platforms, including CubeSats	34
(c) General Guidelines for Suborbital Investigation Proposals	37

VI. Proposal Review Information	37
(a) Evaluation Criteria	37
(b) Review and Selection Processes	39
(c) Selection Announcement and Award Dates	39
(d) Processes for Appeals	40
(i) Reconsideration by SMD	40
(ii) Ombudsman Program	40
(iii) Protests	40
(e) Service as a Peer Reviewer	41
VII. Award Administration Information	41
(a) Notice of Award	41
(b) Administrative and National Policy Requirements	41
(c) Award Reporting Requirements	41
VIII. Points of Contact for Further Information	42
IX. Ancillary Information	43
(a) Announcement of Updates/Amendments to Solicitation	43
(b) Electronic Submission of Proposal Information	43
(c) Electronic Notification of SMD Research Solicitations	43
(d) Further Information on SMD Research and Analysis Programs	44
(e) Archives of Past Selections	44
(f) Meeting Geospacial Standards	44
X. Concluding Statement	45
TABLE 1. Checklist for Proposers	46
TABLE 2. Program Elements (ordered by due date)	follow link
TABLE 3: Program Elements (ordered by Division/Topic)	follow link

Note: [Table 2](#) and [Table 3](#) of this NRA are posted and updated as separate html documents on the web and can be reached either by following the hypertext links above embedded in the electronic version of this document, or at <http://solicitation.nasaprs.com/ROSES2018table2> and <http://solicitation.nasaprs.com/ROSES2018table3>, respectively, or by going to <http://solicitation.nasaprs.com/ROSES2018> and following the links there.

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-2018 by signing up for the SMD NSPIRES mailing list and/or by signing up for the ROSES-2018 RSS feed at <https://science.nasa.gov/researchers/sara/grant-solicitations/roses-2018/>.

RESEARCH OPPORTUNITIES IN SPACE AND EARTH SCIENCES (ROSES)–2018

LIST OF PROGRAM ELEMENT APPENDICES

APPENDIX A. EARTH SCIENCE RESEARCH PROGRAM

A.1	Earth Science Research Program Overview	A.1-1
A.2	Land Cover/Land Use Change	A.2-1
A.3	Ocean Biology and Biogeochemistry	A.3-1
A.4	Terrestrial Ecology	A.4-1
A.5	Carbon Cycle Science	A.5-1
A.6	Biodiversity	A.6-1
A.7	ECOSTRESS Science Team	A.7-1
A.8	Sustaining Living Systems in a Time of Climate Variability and Change	A.8-1
A.9	Physical Oceanography	A.9-1
A.10	Ocean Salinity Field Campaign SPURS II Processing and Synthesis	A.10-1
A.11	Ocean Salinity Science Team	A.11-1
A.12	Sea Level Change Science Team	A.12-1
A.13	Ocean Surface Topography Science Team	A.13-1
A.14	Ocean Vector Winds Science Team	A.14-1
A.15	Modeling, Analysis, and Prediction	A.15-1
A.16	Cryospheric Science	A.16-1
A.17	Atmospheric Composition: Upper Atmosphere Research Program	A.17-1
A.18	Atmospheric Composition: Radiation Sciences Program	A.18-1
A.19	Atmospheric Composition: Modeling and Analysis	A.19-1
A.20	Tropospheric Chemistry	A.20-1
A.21	Terrestrial Hydrology	A.21-1
A.22	NASA Energy and Water Cycle Study	A.22-1
A.23	Atmospheric Dynamics	A.23-1
A.24	Earth Surface and Interior	A.24-1
A.25	Rapid Response and Novel Research in Earth Science	A.25-1
A.26	Airborne Instrument Technology Transition	A.26-1
A.27	Earth Science U.S. Participating Investigator	A.27-1
A.28	Interdisciplinary Research in Earth Science	A.28-1
A.29	NISAR Science Team	A.29-1
A.30	CloudSat and CALIPSO Science Team	A.30-1
A.31	New (Early Career) Investigator Program in Earth Science	A.31-1
A.32	The Science of Terra, Aqua, and Suomi-NPP	A.32-1
A.33	Precipitation Science Team	A.33-1
A.34	ICESat-2 Research	A.34-1
A.35	SERVIR Applied Sciences Team	A.35-1

A.36	Earth Science Applications: Water Resources	A.36-1
A.37	Earth Science Applications: Disaster Risk and Response	A.37-1
A.38	Advancing Collaborative Connections for Earth Science	A.38-1
A.39	Making Earth System Data Records for Use in Research Environments	A.39-1
A.40	Citizen Science for Earth Systems Programs	A.40-1
A.41	Advanced Information Systems Technology	A.41-1
A.42	Instrument Incubator Program	A.42-1
A.43	Advanced Component Technologies	A.43-1
A.44	In-space Validation of Earth Science Technologies	A.44-1
A.45	Sustainable Land Imaging – Technology	A.45-1

APPENDIX B. HELIOPHYSICS RESEARCH PROGRAM

B.1	Heliophysics Research Program Overview	B.1-1
B.2	Heliophysics Supporting Research	B.2-1
B.3	Heliophysics Technology and Instrument Development for Science	B.3-1
B.4	Heliophysics Guest Investigators – Open	B.4-1
B.5	Heliophysics Grand Challenges Research - Theory, Modelling and Simulations	B.5-1
B.6	Heliophysics Living With a Star Science	B.6-1
B.7	Heliophysics Data Environment Enhancements	B.7-1
B.8	GOLD/ICON Guest Investigators	B.8-1
B.9	Heliophysics Grand Challenges Research – Science Centers	B.9-1
B.10	Heliophysics Early Career Investigator Program	B.10-1
B.11	Heliophysics U.S. Participating Investigators	B.11-1
B.12	Heliophysics Space Weather Operations to Research	B.12-1

APPENDIX C. PLANETARY SCIENCE RESEARCH PROGRAM

C.1	Planetary Science Research Program Overview	C.1-1
C.2	Emerging Worlds	C.2-1
C.3	Solar System Workings	C.3-1
C.4	Habitable Worlds (now in E.4)	C.4-1
C.5	Exobiology	C.5-1
C.6	Solar System Observations	C.6-1
C.7	Planetary Data Archiving, Restoration, and Tools	C.7-1
C.8	Lunar Data Analysis	C.8-1
C.9	Mars Data Analysis	C.9-1
C.10	Cassini Data Analysis	C.10-1
C.11	Discovery Data Analysis	C.11-1
C.12	Planetary Instrument Concepts for the Advancement of Solar System Observations	C.12-1
C.13	Maturation of Instruments for Solar System Exploration	C.13-1
C.14	Planetary Science and Technology Through Analog Research	C.14-1

C.15	Planetary Protection Research	C.15-1
C.16	Early Career Fellowship Start-up Program for Named Fellows	C.16-1
C.17	Planetary Major Equipment and Facilities	C.17-1
C.18	Laboratory Analysis of Returned Samples	C.18-1
C.19	New Frontiers Data Analysis	C.19-1
C.20	Rosetta Data Analysis Program	C.20-1
C.21	New Early Career Fellowship: Initial Applications	C.21-1
C.22	Development and Advancement of Lunar Instrumentation	C.22-1

APPENDIX D. ASTROPHYSICS RESEARCH PROGRAM

D.1	Astrophysics Research Program Overview	D.1-1
D.2	Astrophysics Data Analysis	D.2-1
D.3	Astrophysics Research and Analysis	D.3-1
D.4	Astrophysics Theory	D.4-1
D.5	Neil Gehrels Swift Observatory Guest Investigator – Cycle 15	D.5-1
D.6	Fermi Guest Investigator – Cycle 12	D.6-1
D.7	K2 Guest Investigator – Cycle 7	D.7-1
D.8	Strategic Astrophysics Technology	D.8-1
D.9	Nancy Grace Roman Technology Fellowships for Early Career Researchers	D.9-1
D.10	NuSTAR Guest Observer – Cycle 5	D.10-1
D.11	TESS Guest Investigator – Cycle 2	D.11-1
D.12	NICER Guest Observer – Cycle 1	D.12-1
D.13	LISA Preparatory Science	D.13-1
D.14	SOFIA Next Generation Instrumentation	D.14-1

APPENDIX E. CROSS-DIVISION RESEARCH

E.1	Cross Division Research Overview	E.1-1
E.2	Topical Workshops, Symposia, and Conferences	E.2-1
E.3	Exoplanets Research	E.3-1
E.4	Habitable Worlds	E.4-1

RESEARCH OPPORTUNITIES IN SPACE AND EARTH SCIENCES (ROSES)–2018

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 Questions and Goals in the 2014 Science Plan, (and in the 2018 Science Plan when it is published), 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 its relevance of the 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. Questions about each specific program element should be directed 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 activities are organized into four Research 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 as a magnetic variable star and its effects on the Earth and other planets and the dynamics of structures in the Solar System.
- 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 and life in other planetary systems 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, while Appendix E describes cross-division program elements relevant to two or more of these science research programs. Each of these appendices is prefaced with an Overview section that provides an introduction to the research program content that all interested applicants to this NRA are encouraged to read. The program elements described in these appendices also provide any clarifications or modifications to the general guidelines contained in this *Summary of Solicitation*.

(c) Significant Changes from Recent ROSES

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

- [Section IV\(b\)\(i\)](#) has new text on the Co-I/Science PI role.
- [Section III\(a\) "Eligibility of Applicants"](#) has been updated to more accurately reflect NASA policy on participation by non-U.S. organizations.
- NASA has increased the "Micro-purchase Threshold" for grantees from the prior \$3K value (from [2 CFR §200.67](#)) to \$10K. What this means is that competitive quotes are not required for items or services costing up to \$10K if management (at the organization receiving the grant) determines that the price is reasonable.
- Although, in general, Notices of Intent (NOIs) are optional, they are mandatory in a few cases (e.g., D.3 APRA, D.8 SAT and D.13 LISA). Grants.gov does not include

an option to submit a notice of intent. For more information on NOIs see [Section IV\(b\)vi](#).

- As always, small changes have been made throughout this document and to program elements. For example, in Appendix B (Heliophysics) B.10 Heliophysics - Early Career Investigator Program will be a new opportunity this year, [after having been released as draft last year](#). Program element B.12 Heliophysics Space Weather Operations to Research (H-SWO2R) was introduced late in ROSES-2017 as a pilot program and it is anticipated that it will also be solicited in ROSES-18. B.3 H-TIDeS has undergone major revision, and this year B.8 the Guest Investigator program is focused on Global Observations of Limb and Disk and Ionospheric Connection Explorer (GOLD/ICON). In Appendix C program element C.22, Development and Advancement of Lunar Instrumentation is a new opportunity this year and the Planetary Science Division early career program is undergoing major revision. In Appendix D, program elements D.12 NICER Cycle 1 and D.13 LISA Preparatory Science (LPS) are new opportunities this year. Other changes will occur throughout the year announced by Amendments, corrections, and clarifications. Subscribe to the NSPIRES mailing lists and the [ROSES-2018 RSS feed](#) for updates.
- All proposers are urged to carefully read the latest edition of the [NASA Guidebook for Proposers](#), which has been updated since last year. The 2018 version of the *Guidebook* should be out well in advance of the first ROSES-2018 due dates. If so, the 2018 version of the *Guidebook* is the one that applies to all proposals submitted in response to ROSES-2018.

(ii) Individuals who did not propose last year should be aware of the following changes made in recent years:

- Salaries for all participants and overhead from all types of organizations must be included in the NSPIRES web cover page budget and a separately uploaded Total Budget PDF file. This applies to all funded participants, including NASA civil servants. See [Section IV\(b\)iii](#).
- For all participants and all types of organizations, salaries and overhead may not be included anywhere in the body of the main proposal PDF, this information is relegated to the NSPIRES cover pages and the separately uploaded Total Budget PDF. See [Section IV\(b\)iii](#).
- Awards deriving from ROSES now require that as accepted manuscript versions of peer-reviewed publications that result from ROSES awards be uploaded into NASA's part of the [PubMed Central \(PMC\)](#) repository called [NASA PubSpace](#), see [Section II\(c\)](#).
- [Section I\(g\)](#) describes which instructions proposers should follow when there are discrepancies among the *ROSES Summary of Solicitation* vs. the *Guidebook* vs. program elements.
- [Table 1](#) indicates that Current and Pending Support is required only for funded Co-Is at or above 10% of that person's time (0.1 FTE).
- Data Management Plans (DMPs) are required along with almost all proposals, see [Section II\(c\)](#) and [the FAQ on this subject](#). For select instrument development programs DMPs are not required under the presumption that no significant research data will be generated. However, if those awards do result in peer reviewed publications, then those must still meet the requirement that the data behind figures

and tables be available electronically at the time of publication, ideally in supplementary material with the article. The default is for the data management plan to be put into a required text box on the NSPIRES cover pages, but some program elements (e.g., Appendix C) require the DMP to be part of the uploaded proposal PDF and have special instructions. Please read C.1 carefully if proposing to Planetary Science Division programs, including Habitable Worlds (E.4).

(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, namely, 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 on a periodic basis. 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 must be explicitly justified by completing a two-step request submission process: (1) generate a request form for inclusion with your ROSES proposal (see sections i and ii below); and (2) if selected for funding, submit detailed requirements for evaluation by the HEC Program (see section iii below).

(i) Generate Request for HEC Resources

The purpose of this step is to inform science review panels of your computational needs, and if your ROSES proposal is selected, establish eligibility to use HEC resources. First complete a request form in the HEC eBooks system (<https://hec.reisys.com/hec/computing/index.do>). 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.

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 eBooks system has a built-in calculation feature to assist with conversion from 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

The HEC eBooks system will generate a PDF version of your completed computing request for download, as well as send the PDF via email as an attachment. 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 in the email and on the PDF itself).

For proposals submitted via [Grants.gov](https://www.grants.gov), it should be attached as an appendix to any appropriate location. This requirement for a separate document supersedes the general rule that proposals are 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 utilization of the highly constrained resources dedicated for each program element under this NRA.

It is important to note that selection of your proposal only means that your request is eligible to progress to the next step for evaluation by the HEC Program (see section iii below). Also, while you are guaranteed a HEC award, it may differ from your request given resource constraints.

(iii) Submit Detailed Requirements for Allocation of HEC Resources

If your proposal is selected for funding, you will be prompted to log back in to the HEC eBooks system to complete the request process. Principal Investigators (PIs) will be required to submit detailed requirements (e.g., preferred facility/system for where the computational project will be conducted and data security, data transfer, application information, etc.) to be evaluated along with the proposed multi-year phasing plan. The HEC Program will then issue award 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 will have the opportunity to submit requests to increase or decrease allocations of HEC resources as demands change on a semi-annual basis. The HEC website at <https://www.hec.nasa.gov/request/science.html> provides the mechanism for PIs to formally request changes. Requests for modifications 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 e-Books (accessed through the HEC website). PIs should identify this foreign national status in their request abstract.

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, Resubmitted, Multiple and Duplicate Proposals

PIs holding awards under any program element of any prior NRA are welcome to submit "successor" proposals that seek to continue a previously funded line of research. 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 program elements in ROSES may limit submissions in a couple of ways.

The first limitation on submission prevents "multiple" proposals to a given program element. Some program elements in Appendix B (Heliophysics) will not allow a particular individual to be the PI on more than one proposal to those program elements. 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 submission of "duplicate" proposals. Planetary Science will not accept duplicate (the same or essentially the same) proposals submitted to any of its program elements (Appendix C, or its parts of cross-division programs in Appendix E). See C.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. Please carefully read the program elements and propose to Heliophysics and Planetary Science with this in mind.

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

Any inconsistency among authorities or agency instructions stated in or referenced in this solicitation shall be resolved by giving precedence in the following order:

Statutes and regulations

Program elements

The *Summary of Solicitation* of the ROSES NRA (i.e., this document)

Guidebook for Proposers Responding to a NASA Funding Announcement

There may be cases when the instructions in more than one of these documents are contradictory. In cases of contradictions between texts, individual program elements

take precedence over this *Summary of Solicitation*, and this *Summary of Solicitation* takes precedence over the [Guidebook for Proposers](#).

An example where individual program element may contradict and 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., A.36 Water Resources, 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 require explicit statements of relevance through mandatory text boxes on the NSPIRES cover pages.

Finally, answers to questions may appear in FAQs. 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 present clarification, 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 program staff to ensure proper credentialing. Special restrictions may apply to those who are neither U.S. citizens nor permanent residents, especially those from designated countries. Note, there is a presumption of denial for citizens of, or persons born in, State Sponsors of Terrorism (Column 2 of the NASA Designated Country List). For a current list of designated countries download the PDF at the NASA Export Control Website: <https://oiiir.hq.nasa.gov/nasaecp/>.

(i) Citizen science

"Citizen science" activities, in which the public contributes to the scientific process, can advance science investigations through activities that include formulating research questions, conducting scientific experiments, collecting and analyzing data, interpreting results, making new discoveries, developing technologies and applications, and solving complex problems. See for example Section 3 of <https://www.congress.gov/bill/114th-congress/house-bill/6414/text> and <https://science.nasa.gov/citizenscientists>, which provides information about existing SMD-funded projects and where one may sign up for the NASA-SOLVE email listserve.

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.

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 tasks, or all tasks for a shorter duration (e.g., a one-year pilot study), or a combination. Awards may depend on acceptable revised versions of 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 may cancel an award for various reasons including but not limited to: direction from the Office of Management and Budget, congressional action (legislation, budget cuts) and if conditions have changed enough to make the completion of the award impossible, for example, if a mission with which the award is associated fails.

The amount of funds expected to be available for 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.

In all cases, NASA's goal is to initiate new awards as rapidly as possible after the selection of proposals is announced for each program element. 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- or interagency transfers. However, most program elements in ROSES exclude contracts because it would not be appropriate for the nature of the work solicited. For example, the research program overviews in A.1, C.1, and E.1 set no contracts as the default so, unless otherwise stated in a program element, contracts are not awarded from proposals to calls in Appendices A, C and E. Where contracts are permitted, the program element will indicate that explicitly. Similarly, most (but not all) of the program elements in Appendices B and D do not award contracts. When new program elements are added by Amendment to this NRA, they may or may not allow contracts. Please read the Research Program Overviews (i.e., A.1, B.1 C.1 etc.) and program elements carefully if planning to propose a contract. 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.

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 (see https://prod.nais.nasa.gov/cgibin/nais/nasa_ref.cgi).

(b) Award Period of Performance

The maximum 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 maximum 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.

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

In keeping with the [NASA Plan 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. Unless otherwise stated, the data management plan will be collected on the NSPIRES web cover pages and limited to 8000 characters. Any program element that doesn't require a DMP via the cover pages will say so explicitly. Even where DMPs are not required with the proposal, if those awards do result in peer reviewed publications, grantees must still meet the mandatory minimum requirement that the data behind figures and tables be available electronically at the time of publication, ideally in supplementary material with the article. The kind of proposal that requires a data management plan is described in the [SARA FAQs on this subject](#). The appendices and individual program elements of ROSES may specify preferred archives and may require more than is outlined here for all proposers or just those that generate certain kinds of data. Please read the individual program elements carefully, especially Appendix C, which has its own instructions in Section 3.6 of C.1 and even [templates](#). Proposers that include a plan to archive data should allocate suitable time and funding for this task. 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/.

Awards deriving from ROSES-2018 will 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](#). 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 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 rephase 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 may 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 facilitate carrying forward unobligated funds from one fiscal year to the next fiscal year (carryover). Program Officers may invite the PI to rephase 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 would not change, only the fiscal year (FY) in which they arrive.

SMD policy is that work on continuing awards should not be deferred because of a delay in receipt of funds. 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), 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.

Moreover, 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.

Participation by non-U.S. organizations in this program is welcome, but subject to NASA's policy of no exchange of funds, in which each government supports its own national participants and associated costs (further information on foreign participation is provided in the [NASA Guidebook for Proposers](#)).

NASA does not normally 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.

(b) Number of Proposals and Teaming Arrangements

There is no 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, each proposal must be a single separate, stand-alone, complete PDF document for evaluation purposes, other than the Total Budget and [HEC request](#).

(c) Restrictions Involving China

Proposals must not include bilateral participation, collaboration, or coordination with China or any Chinese-owned company or entity, whether funded or performed under a no exchange of funds arrangement.

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, 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 can 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 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 that is not funded by NASA listed in this table 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 is implementing a process to collect demographic data from grant applicants 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 voluntary, only available to NASA in aggregate form, and is not a precondition of award.

Comments and suggestions of any nature about the [NASA Guidebook for Proposers](#) are encouraged and welcome and may be directed at any time to the point of contact identified in Section VIII below.

(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 for the proposal as the required original signature by an authorized official 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 the National Science Foundation (NSF) that use the NSF's FastLane system and the Astrophysics Guest Investigator and Guest Observer 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/portal/SAM/>).
- 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.

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 any specified required electronic forms available through either of two proposal submission systems, NSPIRES or Grants.gov. Submission via NSPIRES requires responding to questions on the NSPIRES submission page.

The Science/Technical/Management 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](#). Only appendices that are specifically requested in the [NASA Guidebook for Proposers](#) and allowed by this NRA or a program element will be permitted; proposals containing unsolicited appendices may be declared noncompliant. The [NASA Guidebook for Proposers](#) provides detailed discussions of the content and organization of proposals suitable for all program elements in this NRA, as well as the default page limits of a proposal's constituent parts.

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.

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. In addition, any proposer who creates files using TeX or LaTeX is required to first create a DVI file and then convert the DVI file to PDF (via an intermediate Postscript file if necessary). 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. Large file sizes can impact the time it takes for NASA and peer reviewers to download and access the proposal. In order to increase the ease in reviewing the proposal, the proposer should crop and compress any embedded photos and graphic files to an appropriate size and resolution.

(iii) Redaction of Salary, Fringe and Overhead Costs from the Proposal PDF

Peer reviewers do not need 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.10), TESS Guest Investigator (D.11), and NICER Guest Observer

(D.12). These are cost (only) proposals for NASA and 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. Thus, all proposals must include as much budget detail and justification as is required for the peer reviewers to evaluate whether costs of things (other than team members) are reasonable. For example, let's say your Co-I needs to purchase a Tektronix MDO4000C digital oscilloscope, which costs ~ \$6.5K. In the detailed budget, you must give this price and in the budget justification you would explain why she needs such an expensive oscilloscope, when simple ones can be purchased for only ~\$450.

Moreover, peer reviewers need to see the individual effort that will be spent on the project, whether at the proposing organization or not, whether or not NASA is paying for it. 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.

Example Table of Personnel and Work Effort

Person or Role	Time charged to this proposal	Time not charged to this proposal	Total Time per person/year
Bernstein, PI	3 months/year	N/A	3 months/year
Co-I Dr. West	1.5 months/year	N/A	1.5 months/year
Collaborator Bill Dyer	N/A	<i>de minimis</i>	<i>de minimis</i>
NESSF Grad Student fellow*	N/A	12 months/year	12 months/year

* The Graduate student has been awarded an NESSF fellowship, at no cost to this proposal.

Note, this table is outside of and is distinct from the budget and the page-limited main part of the proposal. Descriptions of the work that each team member would be performing must be included in the main part of the proposal. 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 typically more complicated, and your table should reflect the reality. [Templates](#) have been provided by the Planetary Science Division for those proposing to Appendix C, but all are welcome to use them.

In the budget justification in the main proposal PDF proposers should refer to the time but not costs for a subaward, e.g., "1.5 months/year are allocated for Co-I Dr. Herbert West, as can be seen in the Table of Personnel and Work Effort. Dr. West will be funded via a subaward to the Miskatonic foundation in Arkham, Mass. 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 then 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 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 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.

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, 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 a ! on a yellow field) 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.

In addition, it is unnecessary to download the Proposal Cover Page and incorporate it into the Proposal Document. NSPIRES will automatically route 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, 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 NNH18ZDA001N-XXXX where the "XXXX" will be an abbreviation for that program, e.g., NNH18ZDA001N-HSR for Heliophysics Supporting Research. Proposals submitted via Grants.gov must be submitted by the AOR.

Submitting a proposal via Grants.gov requires the following steps:

- 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 data site is secure and all information entered is strictly for NASA's use only.
- Follow Grants.gov instructions provided at the website to download any software tools or applications required to submit via Grants.gov.
- 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.
- Note that Grants.gov proposers must additionally download the "Instructions" document, as this includes the Program Specific Data form that contains the mandatory data management plan as well as important questions about, for example, China and ITAR.
- 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.
- 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.

- 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).
- 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.
- 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.
- 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.

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>>."

- 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.

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 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 merely encouraged, 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, D.8 SAT and D.13 LISA, an NOI is a required prerequisite for submission of a full proposal. For those program elements where the NOI is mandatory that 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 (requested) by a program element, NOIs must (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 merely invited and 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 (e.g., A.2 LCLUC, A.35 SERVIR Applied Sciences Team, B.10 H-ECIP) requires a PDF document upload. 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., A.2 LCLUC and Appendix C), the team may be adjusted between the Step-1 and Step-2 proposal, but in other cases (e.g., Appendix B, Heliophysics), the team cannot be changed.

All of Appendix B and some other program elements limit the number of Step-2 proposals on which an individual may be PI. 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.

At the time of release of this ROSES-2018 NRA, the program elements that solicit proposals using a two-step process include: A few program elements in Earth Science (Appendix A) including A.2 LCLUC, A.35 SERVIR Applied Sciences Team, A.36 Water Resources (all of which employ the binding two-step process), all 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 Guest Investigator (D.5), Fermi Guest Investigator (D.6), K2 Guest Observer (D.7),

NuSTAR Guest Observer (D.10), the TESS Guest Investigator Program (D.11), and NICER Guest Observer (D.12).

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.

(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 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. It is not possible to submit a late proposal electronically via NSPIRES unless the electronic *Cover Page* was initially created prior to the proposal due date.

(d) Proposal Funding Restrictions

In addition to the funding restrictions and requirements given in the [NASA Guidebook for Proposers](#) and the [NASA 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 must subaward the funding of all proposed Co-Is who reside at other non-Government organizations, even though this may result in a higher proposal cost because of subawarding fees. Potential exceptions to this rule include, but are not limited to, the awards that stem from the Suborbital-Class Platforms (see [Section V](#)). Other 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) should 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](#)).
- 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.
- 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 that require access to space or near-space are solicited. Flight investigations solicited through ROSES generally have modest costs and reduced mission assurance requirements appropriate for the research program, and these investigations are referred to as suborbital-class investigations. Platforms for suborbital-class investigations include aircraft, balloons, sounding rockets, suborbital reusable launch vehicles, 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 Unmanned 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 Unmanned 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, contact David Tomko, Human Research Program and Fundamental Space Biology at (202) 358-2211 or via email at: dtomko@nasa.gov.

(b) 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 current 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 (Esrange); 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) 824-1916 or (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 and included the NSPIRES cover page budget (in Section F, line 10 labeled appropriately) and also 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/spacetech/flightopportunities/flightproviders>. Until NASA establishes a policy to sponsor spaceflight participants onboard sRLVs, the FOP will not sponsor participants to fly on commercial balloon or 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.

Proposals from non-governmental organizations, and government proposers who are not planning 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:

Robert Yang
Flight Opportunities Program
Space Technology Mission Directorate
NASA Headquarters
Washington, DC 20546
Telephone: (202) 358-0143
Email: robert.l.yang@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 annual external launch opportunities after 2018 on the Japanese HTV launch vehicle and the SpaceX vehicle. NASA also has regular opportunities on a suite of vehicles to launch pressurized 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 NASA Space Station Payload Office. This letter of feasibility must contain: (1) a preliminary assessment of the feasibility for proposed provisions for access to and accommodation at 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 provisions for access and accommodation. 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.

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 construction, ISS integration, launch and flight operations, data analysis, and publication of results.

The ISS Customer 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.

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 Customer 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 concept for conduct of the experiment during the flight 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) mounted to the ISS truss structure, 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 strongly urged to discuss International Space Station payload constraints, launch opportunities, and other technical matters with the ISS Research Integration Office.

For further information, please contact:

George Nelson
ISS Research Integration Office/OZ
Johnson Space Center
National Aeronautics and Space Administration
Houston, TX 77058
Telephone: (281) 244-8514
Email: George.Nelson-1@nasa.gov

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

Short duration orbital platforms, such as CubeSats (built in increments of 10 centimeter cubes), have historically been used as teaching tools and technology demonstrations, and now may 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.

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 provided under the NASA/HEOMD CubeSat Launch Initiative (CSLI) at no cost to the investigation. For this standard case proposers should merely 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.
- 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:

Larry Kepko
Phone: 202-358-0362,
Email: larry.kepko@nasa.gov

For further information on CSLI, please contact:

Anne E Sweet,
Launch Services Program Executive,
Phone: 202-358-3784,
Email: anne.sweet-1@nasa.gov

or

Jason C Crusan,
Director, Advanced Exploration Systems,
Phone: 202-358-0635,
Email: jason.c.crusan@nasa.gov

(c) 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 for three or four years' 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 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 either 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, suborbital-class investigations will sometimes be split into multiple awards, depending on circumstances. Please read the individual ROSES Appendix and consult with the POC.

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 that ROSES Appendix and/or specific program element, 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 both by peer review (for reasonableness) and by NASA program personnel (vs. 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, 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" and/or may employ numerical scores.
- 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 awards officer will review the submitting organization's information available through the Federal Awardee Performance and Integrity Information System (FAPIIS) and the System for Award Management (SAM) to include checks on entity core data, registration expiration date, active exclusions, and delinquent federal debt.
- Prior to making a Federal award with a total amount of Federal share greater than the simplified acquisition threshold (currently \$150,000), NASA is required to review and consider any information about the applicant that is in the designated integrity and performance system (currently FAPIIS) accessible through the System for

Award Management (SAM, <https://www.sam.gov/portal/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](#). In deciding which proposals submitted to this NRA are selected, the desire to achieve a balance of efforts across the solicited program objectives may play a role in the selections.

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.

(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 remain "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 was not handled correctly. This process may be found at in the [SMD Reconsideration Policy](#) document available in the Library section of the [SARA website](#) 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

Assistant Administrator for Procurement

Office of Procurement

NASA Headquarters

Washington, DC 20546-0001

Telephone: 202-358-2090

(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 officially notified via NSPIRES from which they will be able to retrieve their official decision letter and evaluation. 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 offeror 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 less.

(b) Administrative and National Policy Requirements

This solicitation does not invoke any special administrative or national policy requirements: 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. All award requirements are posted at https://prod.nais.nasa.gov/pub/pub_library/srba/index.html.

(c) Award Reporting Requirements

The reporting requirements for awards made through this NRA will be consistent with 2 CFR 1800.902.

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 Federal share of any award issued under this NRA is more than \$10M over the period of performance, additional reporting requirements will apply. [See 2 CFR 200 Appendix XII—Award Term and Condition for Recipient Integrity and Performance Matters](#).

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 the subsection called "Other Project Information" in "View Proposal: Business Data" includes 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.

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.

IX. ANCILLARY INFORMATION

(a) Announcement of Updates/Amendments to Solicitation

Because this NRA is released far in advance of many of the deadlines given in Tables 2 and 3, additional programmatic information for any of its 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/ROSES2018> (or by going to <http://solicitation.nasaprs.com/open> and selecting "NNH18ZDA001N"). Also, an RSS feed for amendments, clarifications, and corrections to ROSES can be found in one place (and there is an RSS feed) at <http://science.nasa.gov/researchers/sara/grant-solicitations/roses-2018/>. 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), it is the responsibility of the prospective proposer to check this NRA's 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 web page, which can be found as described above.

(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 "NNH18ZDA001N" 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 synopsized on Grants.gov (<http://www.grants.gov>) at the time they are released. This ROSES NRA will be synopsized 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, an RSS feed 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 solicitation by year at <http://nspires.nasaprs.com>: click "Solicitations" and then "Closed/Past Solicitations and Selections," choose the year from the pop-down menu, and click the find button to see the abstracts in a PDF file. One can 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-2018 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 <i>NASA Guidebook for Proposers</i> if there is a difference, see Section I(g).</p>		
<p>NSPIRES cover pages: Table 1 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.
	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.
	DMP	For most programs, the Data Management Plan (DMP) or explanation of why it is not needed must be provided in the 4000-character text boxes in the cover pages, unless otherwise stated in the program element. See Section II(c) and the ROSES FAQ for important information.
	Budget	List all costs. Include all salary and indirect costs in the NSPIRES cover page budgets.
	Submission	Both the author must "release" the proposal and the AOR must "submit" prior to the due date.
	Other	There are cover page questions that must be answered and there may be other required content, e.g., some program elements in Appendix C collect a relevance statement here, see VI (a).
<p>Proposal document</p>		
	Table of contents	First component of proposal. One page only and optional.
	Scientific/ Technical/ Management Section	Second component and the main part of the proposal. The sequence for science content here is recommended, but 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

Table 1 Continued: Checklist for ROSES-2018 Proposals

	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
	Format	No more than 15 characters per horizontal inch, including spaces
	Format	Font size 12 consistent with rules above, sans serif font recommended
	Figure Format	Text and content on/in figures must be easily legible without magnification.
	Captions Format	As above. Text necessary for the proposal may not be solely in figures, tables, or their captions.
	Table Format	Text and content on/in Tables must be easily legible without magnification. See also directly above
	Content	Discuss objectives and their significance.
	Content	Discuss perceived impact of the work.
	Content	Discuss relevance of the work to the solicitation. 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	Present 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 text only if it is required by program element.
	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 (e.g., unpublished manuscripts). No links to personal websites.
Biographical sketches/Curriculum Vitae (CVs): fourth component of proposal		
	Required	One for a PI and each Co-I
	Length restriction	CV for a 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 fifth component of the proposal. Note, location may differ from that given in <i>Guidebook</i> . See Section IV(b)iii		
	General	Note this table has been moved from the budget Section. Where names are not known, include the position, such as postdoctoral fellow or technician.

Table 1 Continued: Checklist for ROSES-2018 Proposals

	Required	Names and/or titles of all personnel to perform the proposed effort
	Required	Planned work commitment (e.g., in fractions of a work year) to be funded by NASA
	Required	Planned work commitment (e.g., in fractions of a work year) that will not be funded by NASA, if any. Note: time commitment included here that is not funded by NASA is not considered cost sharing, as defined in 2 CFR § 200.29.
Current and Pending Support: Sixth 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 one 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 Seventh 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 A.36 Water Resources, C.17 PMEF, and E.2 TWSC.

Table 1 Continued: Checklist for ROSES-2018 Proposals

Budget Justification: The eighth 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 ninth 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 tenth 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 document type "Total Budget").	
	Required	Separately uploaded "Total" Budget PDF file see Section IV(b)(iii) .
	HEC Appendix Document (separate PDF file attached as document type "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.

[TABLE 2: PROGRAM ELEMENTS \(ORDERED BY PROPOSAL DUE DATE\)](#) and [TABLE 3: PROGRAM ELEMENTS \(ORDERED BY DIVISION/TOPIC\)](#) are posted as separate documents on the web at <http://solicitation.nasaprs.com/ROSES2018table2> and <http://solicitation.nasaprs.com/ROSES2018table3>, respectively.