NOTICE: Amended May 14, 2020. This amendment releases draft text for this program element for community comment. Comments on the draft text are due by June 15, 2020 via email to michael.r.garcia@nasa.gov (subject line = "May 2020 Pioneers Draft Comments"). It is anticipated that the final version of this program will be part of ROSES-2020 and that final text will be released no fewer than 90 days in advance of the proposal due date.

1. Scope of Program
This program element solicits proposals for "Pioneers", Astrophysics space and sub-orbital science investigations that are greater in cost, scope and capability than what is possible within the Astrophysics Research and Analysis (APRA) program (D.3 of ROSES-2020) but are smaller in cost than what is possible within the Astrophysics Explorers Mission of Opportunity (MO) program (e.g., PEA O of SALMON-3 for the 2019 opportunity). Investigations are solicited using platforms that include CubeSats (including constellations), SmallSats, Major Balloon Missions, and International Space Station (ISS)-attached payloads. Technology development and maturation within the proposed project is allowed, but the primary review criterion for selection is the merit of the proposed science investigation.

All proposed investigations must be responsive to the science goals of the Astrophysics Division, as described in the 2014 NASA Science Mission Directorate Science Plan and the 2018 NASA Strategic Plan.

2. Background
Small satellites (SmallSats) have been suggested as a means to execute scientific missions at far lower cost and complexity than typical space science missions; CubeSats are a type of SmallSats (link to National Academies study "Achieving Science Goals with CubeSats"). There are frequent launch opportunities for CubeSats in standard form factors as secondary payloads. NASA has previously developed Astrophysics 6U CubeSat missions for low-Earth orbit operations through the APRA program. Frequent launch opportunities are also available for SmallSats as secondary payloads using standard interfaces such as the Evolved Expendable Launch Vehicle Secondary Payload Adapter (ESPA) and the ESPA Grande.

NASA is developing capabilities for long(er) duration balloon flights including flights from mid-latitudes. Several test flights of zero-pressure balloons have recently been carried out, including shared-risk science payloads. These capabilities offer the opportunity for multi-month-long exposures including substantial night-time observing.

NASA has determined that there may be payload opportunities for small, suborbital-class astrophysics investigations that utilize the ISS. Proposals seeking use of the ISS must take advantage of the Station's unique capabilities. Available external attach points include both zenith and nadir pointing locations. Information on opportunities and constraints for ISS attached payloads may be found at http://www.nasa.gov/mission_pages/station/research/research_information.html.
3. Categories of Proposals

3.1 SmallSats and CubeSats, including CubeSat Constellations

Proposers to this program element may propose CubeSats in form factors from 1U to 27U, CubeSat constellations, as well as ESPA or ESPA Grande mounted SmallSats over a variety of form factors. It is expected that CubeSats larger than 12U will be dispensed from an ESPA ring.

NASA will cover all launch and launch vehicle integration costs for spaceflight launches via NASA's CubeSat Launch Initiative (CSLI) or SMD's rideshare program outside of the PI-managed cost. The rideshare program allows launch opportunities as secondary payloads on ESPA or ESPA Grande secondary adapters.

For information on small satellite platform technologies, visit the NASA Small Spacecraft Virtual Institute (S3VI) or the NASA Small Satellite Technology Program (SSTP) websites. Due to the rapidly emerging commercial SmallSat market, it is expected that a suitable spacecraft bus, or components for the bus, will be available from a variety of sources; please see some examples in the online version of the NASA State of the Art (SoA) Report.

Proposers requiring a secondary launch opportunity must include in the appendix a filled out version of the rideshare accommodation worksheet based on the template posted under "Other Documents" on the NSPIRES webpage for this program element. After the evaluation of proposals, but prior to the selection decision, NASA will perform an accommodation study of selectable rideshare investigation proposals to assess the extent to which the proposed investigation is compatible with expected future rideshare opportunities. A proposed investigation compatible with common launch opportunities is more likely to be selected than one with less flexible accommodation and orbit requirements.

Orbital missions must meet orbital debris requirements and the project team will assist NASA in verifying compliance. Detailed requirements and guidelines for limiting the generation of orbital debris and for implementing the U. S. Government Orbital Debris Mitigation Standard Practices are provided in NASA Standard (NASA-STD) 8719.14, Process for Limiting Orbital Debris,(which superseded NASA Safety Standard (NSS) 1740.14), and NASA-Handbook (NHBK) 8719.14, Handbook for Limiting Orbital Debris. This compliance will be evaluated as part of the Concept Study Report review (see Section 4.3 below).

Note that depending upon the nature of the proposed investigation, one or more appendices must be included (see Section 5.5). These appendices must be included at the end of the single PDF file that makes up the uploaded proposal document, but they do not count against the science-management-technical section page limit. Proposers are urged to be familiar with the rideshare documents available under "Other Documents" on the NSPIRES webpage for this program element.

For further information on CSLI, please contact:

Samantha Fonder
Launch Services Program Executive
Phone: 321-607-2286
Email: Samantha.fonder@nasa.gov
3.2 Major Balloon Payloads

Proposers to this program element may propose major balloon payloads. NASA will provide the appropriate balloon launch vehicle for major balloon missions via NASA’s scientific balloon program outside of the PI-managed cost.

Investigators proposing Pioneers balloon payloads are required to contact the Balloon Program Office (BPO) to obtain technical information related to BPO balloon capabilities, services, and the latest planned campaign schedules. A BPO Feasibility Letter must be included in the appendix of a Pioneers balloon proposal. All unique requirements that an investigation may have on the BPO must be listed in the BPO feasibility Letter. Payloads for remote balloon campaigns, e.g., McMurdo, Antarctica, or Wanaka, New Zealand, are required to have a CONUS test flight prior to deployment to the remote campaign. Alternatively, proposers can provide a test plan for a relevant thermal-vacuum test of the complete payload. The BPO concurrence on an environmental test must be included in the Feasibility Letter. The cost for environmental tests must be included in the proposal.

Information on the capabilities of current available balloon vehicles is available at [http://sites.wff.nasa.gov/code820/](http://sites.wff.nasa.gov/code820/) and at [http://www.csbf.nasa.gov/balloons.html](http://www.csbf.nasa.gov/balloons.html). Proposers are encouraged to consider these capabilities in designing their investigations, but the BPO has the final authority in the choice of which vehicles to be used. The current funded mission model of the BPO supports two U.S. balloon campaigns and two non-U.S. balloon campaigns per year.

The nominal U.S. launch sites for scientific 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; Wanaka, New Zealand; as well as Alice Springs, Australia; and Kiruna, Sweden (Esrange); subject to science community requirements and the availability of BPO operations funding to conduct the campaign. Launches from McMurdo, Antarctica, are typically conventional zero-pressure balloons with payload recovery on the continent. Flight durations vary, but the average flight duration is approximately 20 days and the longest flight is 55 days. In addition, the McMurdo site can support a super-pressure balloon launch extending the mission duration by allowing the balloon payload to leave the continent. Launches from Wanaka, New Zealand are exclusively on the super-pressure balloon platform, allowing for mid-latitude, southern-hemisphere observations, including nighttime flight operations. Flight durations on the super-pressure platform are expected to last between 30-60 days with a future goal of 100 days. Since the super-pressure payloads spend an appreciable duration over the water and a payload recovery cannot be guaranteed, proposers
must provide a plan to transmit all data during flight and are required to accept the risk of losing the payload at the end of the flight.

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.

Details on NASA's scientific balloon program may be found in the ROSES-2020 Summary of Solicitation, Section V(c)(ii).

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) 824-1717  
Email: debora.a.fairbrother@nasa.gov

3.3 International Space Station Attached Payloads

Proposers to this program element may propose payloads for the ISS. NASA will provide launch services to the ISS for ISS-attached payloads via NASA’s Commercial Resupply Services (CRS) program, outside of the PI-managed cost.

Details on ISS-attached experiments may be found in the ROSES-2020 Summary of Solicitation, Section V(c)(iv). Pay particular attention to the additional requirements for proposals for the ISS that are described in that section, including the requirement for a letter of feasibility from the ISS Research Integration Office. Note that the issuance of the ISS letter of feasibility can take several weeks; therefore, proposers are urged to contact the ISS Research Integration Office as early as possible for such a request.

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

4. Pioneers Management Process

Selected projects will be managed as research projects, not space flight projects. Management requirements for research projects are fully documented in NASA Procedural Requirements document NPR7120.8A, but key items are listed below.
4.1 Management Oversight

While selected projects will be managed as research projects, they will be subject to additional oversight beyond what is typical of APRA suborbital-class projects. That oversight will include monthly reporting. The NASA Special Projects and Small Satellite Project Office (S3PO) at Wallops Flight Facility will act as a program office and provide high-level oversight of Pioneers projects, including guidance at monthly reporting, and possible engineering support if requested by the project PI.

4.2 Program and Project Management

NASA considers Pioneers investigations to be research and technology projects just like all other ROSES investigations, not space flight projects. Programmatic oversight for Pioneers projects will be provided by the S3PO at WFF, while the PI provides project management. Issuance of an award is the beginning of formulation. At the end of each project year, the PI will submit an annual report, with the final report being serving to document project closeout, unless otherwise documented in the Project Plan.

4.3 Gate Reviews

Within 6 months following selection, Pioneers projects are required to deliver to NASA a Concept Study Report (CSR), which shall include a Project Plan, comprising an agreement between the PI and NASA on implementation approach, resources, cost, reviews, schedule, and other plans. Gate reviews (see below) will be conducted by the S3PO per the draft schedule contained in the CSR. Decision Authority for these gate reviews is the Director, Astrophysics Division, NASA HQ. The project will need to pass a Systems Requirements Review (SRR) in order to be approved to proceed; one of the deliverables required at SRR is the CSR with the Project Plan. Subsequent gate reviews will include a Preliminary Design Review (PDR) and/or Critical Design Review (CDR), and Flight Readiness Review (FRR) per the schedule agreed to in the Project Plan.

4.3 Cost and Continuation Assessment

Should a project be significantly over budget or behind schedule at any Gate Review, a Cost and Continuation Assessment will be performed to determine whether the project should continue and, if continuation is approved, how the project can increase its probability of success within its approved cost and schedule.

5. Proposal Requirements

5.1 Mandatory Notices of Intent (NOI)

To facilitate the early recruitment of a diverse and conflict-free review panel, an NOI is required for all submissions to this program element. Proposals that are not preceded by an NOI may be returned without review. Submission of an NOI does not obligate the proposer to submit a full proposal later.

After NOI submission, the initially listed PI may request to reassign the PI role only to listed Co-Is, and proposers may request to add funded investigators. To make additions to the proposal team from the NOI to the proposal, the PI must inform the NASA point of contact identified in the summary table of key information and cc sara@nasa.gov at least three weeks in advance of
the proposal due date. Addition of funded investigators within three weeks of the proposal deadline will require explicit permission from the NASA point of contact.

5.2 General Requirements

Proposals must be PI-led and responsive to the science goals of the Astrophysics Division, as described in the 2014 NASA Science Mission Directorate Science Plan and the NASA 2018 Strategic Plan. All proposed investigations must be more capable than the missions that are solicited within the Astrophysics Research and Analysis (APRA) program (D.3 of ROSES-2020).

PI-managed mission costs (from initiation to data archiving) allowed under this program are limited to $20M in real year dollars (not including launch). NASA will provide launch services outside of the PI-managed cost for all categories of missions. Awards are expected to cover all aspects of the proposed investigation, typically including payload development and construction, instrument integration and calibration, support for the team through launch, publication of results, and data analysis/dissemination/archiving. The PI institution is expected to fund participating Co-Investigators via subawards, except where the Co-I is at a Government laboratory, including the Jet Propulsion Laboratory.

Maximum duration of awards is five years. Proposers are encouraged to be flight ready within three to four years of the beginning of funding; all missions must be flight ready within five years of the beginning of funding. It is anticipated that spacecraft bus and launch availability will allow some SmallSat programs to be flight ready more rapidly.

5.3 Proposal Content Requirements

The Scientific/Technical/Management section of Pioneers proposals may be at most 30 pages long, and should otherwise follow the form outlined in the 2018 version of the NASA Guidebook for Proposers.

The proposal shall clearly define its science goals and objectives, shall demonstrate how the science objectives map into high-level science requirements, and shall show how the science requirements subsequently map into the measurement and instrument performance requirements and, as relevant, into the platform performance requirements. The proposal shall include a Science Traceability Matrix (STM) per the example found under "Other Documents" on the NSPIRES webpage for this program element. Each proposal shall clearly state the requirements for a successful science program, for the performance of the instrument, for the performance of the platform, the prime mission lifetime for operations, and the range of satellite orbits or balloon flights acceptable or required for deployment. Proposals shall clearly state the desired and acceptable orbits and operational constraints (e.g., duty cycle or observational cadence) and describe the relative scientific merits of each possible orbit (per the rideshare accommodation worksheet found under "Other Documents" on the NSPIRES webpage for this program element, for orbital payloads).

Proposals shall designate all Co-Investigators (Co-Is), describe the role of each Co-I in the development of the investigation, and justify the necessary nature of the role. Excessively large teams of Co-Investigators and Collaborators are discouraged.
The proposal shall outline what trades will be studied during the initial 6 months formulation phase leading to the CSR. In order to assist with these trades, the team may work with any of the NASA design offices identified below. Mission design will be a critical part of this formulation phase, during which the team will make trades, explore feasibility, and refine the mission concept. Proposals should include team members to conduct mission design and/or a statement that arrangements have been made to partner with an appropriate NASA mission design team.

Since some science teams may lack access to the necessary mission design capability, NASA field centers will provide study teams access to mission design assistance if needed. It is up to the proposing team to engage one of the field-center contacts below to determine the cost associated with the support required. The negotiated cost is to be included in the proposal as a separate line item. If you are at a NASA center and using your local design center, this cost should be included along with other costs in the main part of your budget. If you are not at a NASA Center, please include this cost in Section F ("Other Direct Costs") of the budget pages, line 8 or 9, labeled with the name of the center facility, e.g., Ames Research Center - Mission Design Center". These funds will be sent directly to the center and proposers may not charge overhead on this portion of the award. Note that participation by a design center does not necessarily mean that NASA center must continue support once the CSR has been delivered; it is up to the PI teams to work out what support is needed to successfully bring the mission to completion.

Ames Research Center - Mission Design Center
http://www.nasa.gov/centers/ames/engineering/divisions/missiondesign/
Sally Cahill, sally.a.cahill@nasa.gov, 650-604-6571.

Goddard Space Flight Center’s Wallops Flight Facility – Mission Planning Lab
https://sites.wff.nasa.gov/mpl/index.html
Benjamin Cervantes, benjamin.w.cervantes@nasa.gov, 757-824-1526.

Jet Propulsion Laboratory, Innovation Foundry and Team Xc
http://jplfoundry.jpl.nasa.gov/
Keith Grogan, keith.grogan@jpl.nasa.gov, 818-354-2617.

Marshall Space Flight Center - Advanced Concepts Office
https://www.nasa.gov/centers/marshal/capabilities/advanced_concepts.html
Rachel Mccauley rachel.j.mccauley@nasa.gov, 256-975-5400.

5.4 Data Management and Archiving Requirements

A discussion of the plans for project management and for reduction, analysis and archiving of the data (a Data Management Plan as described in the ROSES Summary of Solicitation), consistent with Pioneers data management and archiving requirements, must be included in the proposal.

The investigation team shall make mission data fully available to the public through a NASA-approved astrophysics data archive (High Energy Astrophysics Science Archive Research Center (HEASARC), Mikulski Archive for Space Telescopes (MAST), or Infrared Science Archive (IRSA)), in readily usable form, in the minimum time necessary, but, barring exceptional circumstances, within six months following the end of the prime mission. The PI shall be
responsible for collecting the scientific, engineering, and ancillary information necessary to validate and calibrate the data prior to delivery to the archive.

Archival data products shall include low-level (raw) data, high-level (processed) data, and derived data products such as maps, ancillary data, calibration data (ground and in-flight, and intercalibration as needed), documentation, related software, and/or other tools or parameters that are necessary to interpret the data. The PI shall be responsible for generating data products that are documented, validated, and calibrated in physical units that are usable by the scientific community at large.

5.5 Proposal Appendix Requirements

Proposals requiring a secondary launch opportunity for a Pioneers CubeSat or SmallSat project must fill out the rideshare accommodation worksheet posted under "Other Documents" on the NSPIRES webpage of this program element and include it in the proposal appendix.

Proposals for Pioneers balloon payloads must include a BPO Feasibility Letter in the proposal appendix.

Proposals for ISS-attached Pioneers payloads must include a letter of feasibility from the ISS Research Integration Office in the proposal appendix.

6. Concept Study Report Requirements

The planned duration of the awards of up to five years includes an initial formulation phase lasting 6 months during which science and performance trades shall be made in order to optimize the mission design. This phase shall conclude with the delivery of a Concept Study Report (CSR) to NASA, which will be reviewed by NASA in order to determine if continuation of the program into development is warranted.

The CSR shall include a Project Plan, comprising an agreement on implementation approach, resources, cost, reviews, schedule, and other plans, in order to be approved to proceed from the formulation phase to implementation phase. This should include sufficient information to allow a Systems Requirements Review (SRR) to be conducted. The CSR shall identify what changes in performance and implementation were made from the original proposal, i.e., what trades have been made. For Pioneers projects requiring a secondary launch, an updated launch accommodation worksheet must be included in the CSR. Please refer to "CSR-suggested-contents" found under "Other Documents" on the NSPIRES webpage for this program element for an outline of the suggested contents of the CSR.

The CSR must include sufficient information for NASA to perform a uniform cost analysis on all submissions; please see the required contents listed under "Other Documents" on the NSPIRES webpage for this program element.

Should review of the CSR reveal significant challenges (in, for example, cost, schedule or technology maturity) the project may be terminated or continued with a revised baseline.
7. Programmatic Information

7.1 Award Duration and Type

Awards will be for a maximum duration of 5 years. It is anticipated that extramural awards will be in the form of Cooperative Agreements but contracts will be awarded if deemed appropriate by NASA's office of procurement (i.e., if consistent with Section 3.3 of the *NASA Grant and Cooperative Agreement Manual*). Reports (such as the CSR) as outlined in this document will be specified in detail in the award documentation.

7.1.1 Description of NASA Contribution

It is anticipated that most awards to non-governmental organizations will be in the form of cooperative agreements (as opposed to grants) since SMD will be substantially involved after selection and intends to maintain an essential degree of oversight of the selected project(s) throughout the project lifecycle (e.g., see Section 4.1). Information on each suborbital-class platform provided as Government furnished equipment (GFE) and/or Government services by NASA is shown in sections 3.1-3.3 and 7.2. Proposers should contact the referenced suborbital-class platform point of contact when developing their proposals to best understand the capabilities and limitations of each platform, their associated technical and integration services, how to schedule a flight/launch, and to ensure their proposed investigations are feasible from a vehicle perspective.

Award conditions will provide for effective control of integrated spacecraft with payload to transfer to NASA upon delivery to the launch site for integration into the launch vehicle. This will allow use of the NASA National Telecommunications and Information Administration (NTIA) process to obtain RF usage authorization from the FCC.

The Pioneers program's planning budget can accommodate two or more selection(s) within this solicitation's cost cap with a typical (combined) funding profile over a nominal five-year development period including launch. Proposers should request a funding profile that is appropriate for their investigation. However, NASA cannot guarantee that every proposed funding profile can be accommodated within the Pioneers program budget. The inability of NASA to accommodate the requested funding profile may be a reason for non-selection of a proposal. Final funding profiles for all selected investigations will be negotiated between the Pioneers program and the selected investigation teams.

7.2 Launch for Secondary Payloads (CubeSats and SmallSats)

All launch costs and spacecraft integration costs will be covered by NASA and managed by NASA’s Launch Services Program. Proposers should plan that launch for CubeSats will be via the *CubeSat Launch Initiative* (CSLI) and launch for larger payloads via the SMD rideshare program. Through CSLI, NASA has begun regularly providing launch opportunities for CubeSats as secondary payloads on U.S. Government missions. The CubeSat Launch Initiative is managed by the NASA Human Exploration and Operations Mission Directorate.

Payloads are expected to adhere to ESPA or ESPA-grande standards, or containerized CubeSat standards for smaller spacecraft. Please see the information "ESPA RUG Pioneers" under "Other Documents" on the NSPIRES webpage for this program element for details.
Because of the availability of frequent launch opportunities, it is anticipated that the majority of the selections will be for investigations that would operate in moderately inclined low Earth orbit (LEO), geosynchronous transfer orbit (GTO), or Sun-synchronous orbit (SSO); other orbits (including low inclination LEO and cis-lunar) are allowed provided the case is made that launch opportunities as a secondary payload could reasonably be expected. More details on the NASA rideshare program can be found in the ESPA Rideshare Users Guide (RUG) available under "Other Documents" on the NSPIRES webpage for this program element. See also the SmallSat Virtual Institute (S3VI) Launch Portal for info on currently planned SMD launches which may have the capacity for rideshare payloads.

In case the requested launch configuration is not available immediately after the payload is completed, proposals should indicate a minimum ‘keep alive’ funding level that would allow the payload to be stored until the requested launch is available. Keep alive funding will be limited to at most 2 years and shall not be included in the PI-managed cost. Excessive keep alive costs or a low likelihood of achieving the required orbit via rideshare may be a reason for non-selection.

7.3 Cross-Waivers of Liability

Awards made in response to proposals to this program element will include the Cross-Waiver of Liability cited in Section 5.10.1 (and given in full in Appendix E) of the NASA Grant and Cooperative Agreement Manual: 5.a Cross-Waiver of Liability for International Space Station Activities and 5.b Cross-Waiver of Liability for Science or Space Exploration Activities Unrelated to the International Space Station. Cross-waivers will require the recipient to extend the correct cross-waiver terms and conditions to their subcontractors at any tier and related entities, ensuring those subcontractors and related entities also waive all claims against any entity or person defined in the provision for damages arising out of Protected Space Operations. This cross-waiver is intended to be broadly construed, and NASA extends it to its related entities as set forth in the provision. The language in the cross waiver is required by the international agreements NASA has with its international partners for the exploration of space.

8. Evaluation Considerations and Criteria

8.1 Evaluation Criteria

All proposals with be evaluated for Intrinsic Merit, Cost, and Relevance, as defined in Appendix D of the 2018 NASA Guidebook for Proposers and consistent with Section VI(a) of the ROSES Summary of Solicitation. While scientific merit is the primary factor in the Intrinsic Merit evaluation criterion, these programs also offer the opportunity for advancing the technology readiness levels of future space flight detectors and supporting technologies and preparing future leaders of NASA space flight missions, such as early-career researchers and students. For proposals submitted to this program element, specific factors that will be considered when evaluating a proposal’s intrinsic merit are primarily the scientific merit and secondarily the degree to which it advances the technology readiness level of a detector or supporting technology (see Section 8.3), and the degree to which it advances the readiness of early-career researchers or graduate students to assume leadership roles on future NASA space flight missions (see Section 8.2). Science merit will form 50% of the evaluation, technical feasibility and, if applicable, technology development feasibility 25%, and advancing early career researchers 25%.
8.2 Early-Career Team Members

Specific factors that will be considered when evaluating a proposal’s intrinsic merit include the degree to which it advances the readiness of early-career researchers or students to assume roles in advancing NASA's astrophysics strategic objectives. Brief details of the educational goals and training of the participants should be included in the main Science-Management-Technical section of proposal. The participation of graduate and undergraduate students, postdocs, and other early career team members is strongly encouraged, especially if the project can be concluded within the nominal tenure of student training or postdoctoral appointments.

8.3 Technology Development

While the emphasis in Pioneers is on astrophysics science investigations, Pioneers does support technology development. When proposing to carry out such development, the proposal should demonstrate that TRL 6 can be achieved by the end of the 6-month formulation phase and that all technologies will be flight ready by the time of delivery of the integrated mission for launch. A properly formulated technology development plan is consistent with the goals of Pioneers, and it could be a strength of a proposal.

9. Summary of Key Information

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<th>Maximum funding per investigation</th>
<th>$20M PI cost, over life cycle (real year dollars).</th>
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<tr>
<td>Expected annual program budget for new awards</td>
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<td>Number of new awards pending sufficient meritorious proposals</td>
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<td>Maximum duration of awards</td>
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<td>Due date for mandatory NOI to propose</td>
<td>See Tables 2 and 3 of this ROSES NRA</td>
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<tr>
<td>Due date for proposals</td>
<td>See Tables 2 and 3 of this ROSES NRA</td>
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<tr>
<td>Planning date for start of investigation</td>
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<tr>
<td>Launch readiness date</td>
<td>No later than five years from the project start (when initial funding starts).</td>
</tr>
<tr>
<td>Page limit for the central Science-Management-Technical section of proposal</td>
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</tr>
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<td>Relevance</td>
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</tr>
<tr>
<td>General information and overview of this solicitation</td>
<td>See the ROSES Summary of Solicitation.</td>
</tr>
<tr>
<td>Detailed instructions for the preparation and submission of proposals</td>
<td>Please see Section I(g) Order of Precedence and Table 1 of the ROSES Summary of Solicitation and the <em>NASA Guidebook for Proposers.</em></td>
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<td>Web site for submission of electronic proposals via Grants.gov</td>
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<tr>
<td>POC concerning Data Archive issues</td>
<td>Hashima Hasan (<a href="mailto:hashima.hasan@nasa.gov">hashima.hasan@nasa.gov</a> / 202-358-0692)</td>
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<tr>
<td>Funding opportunity number for downloading an application package from Grants.gov</td>
<td>NNH20ZDA001N-PIONEERS</td>
</tr>
</tbody>
</table>
| Point of contact | Michael Garcia  
Astrophysics Division  
NASA Headquarters  
Washington, DC 20546-0001  
Telephone: (202) 358-1053  
Email: michael.r.garcia@nasa.gov |