F.12 ARTEMIS III DEPLOYED INSTRUMENTS PROGRAM

NOTICE: Amended May 30, 2023. This amendment releases the final text and due dates for this program element, which was previously released as draft for community comment. Proposals to this program will be submitted by a two-step process in which the Notice of Intent is replaced by a mandatory Step-1 proposal that must be submitted by an organization Authorized Organizational Representative. See Section 5 of this program element. Step-1 proposals are due June 30, 2023, and Step-2 proposals are due August 31, 2023.

A Pre-proposal Conference is scheduled for June 14, 2023, and a Biological and Physical Sciences (BPS) Virtual Workshop is scheduled for June 9, 2023; see Section 3.5.

Changes from the previous draft version of this program element include but are not limited to:

- **Section 1 includes a clarification that the <500 g allowance of non-geological returned samples can include regolith-derived products, and that the 500 g limit is total for the entire mission, not per investigation.**
- **The Technology Readiness Level (TRL) entry requirement has been modified. An entry TRL of 6 is now preferred, but not required. Section 3.2 outlines the requirements for demonstrating that payloads will be matured to TRL 6 by the time of Preliminary Design Review (PDR). Section 10 discusses the adjusted gate review requirements for payloads that are not TRL 6 at the beginning of the award period.**
- **Externally mounted payloads are not within the scope of this call and all descriptions of external mounting points on Starship have been removed.**
- **Section 3.2.6.1 has been modified to indicate that payloads must provide their own power for operation during the surface phase of the mission.**
- **Section 3.2.6.2 has been modified to indicate that the expected range of Starship WiFi is 300m. Payloads that desire to operate on the surface after departure of Starship, or that desire to be located outside of this WiFi range, must rely on payload-provided communications and data transfer capabilities/hardware.**
- **The payload copy delivery dates have been specified in the Schedule table at the end of Section 3.4.**

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1. Introduction and Funding Opportunity Description

Through this Artemis III Deployed Instruments program element, NASA's Science Mission Directorate solicits proposals for instruments to be deployed on the surface of the Moon during Artemis III, the first crewed landing of the Artemis program. Payloads selected through this program element will be part of the Artemis III payload manifest; proposers interested in flying payloads on the second crewed landing should refer to F.21 Artemis IV Deployed Instruments Program. Artemis III will be a landed mission in the south polar region of the Moon, within 6º of latitude from the south pole, providing potential access to surface-accessible volatile deposits. Several of the proposed landing regions are located among some of the oldest parts of the Moon, and together with the permanently shadowed regions, provide the opportunity to learn about the history of the Moon through previously unstudied lunar materials.

Deployed instruments consist of autonomous instrument packages installed on the lunar surface by astronauts during extravehicular activities (EVAs). These science packages will enable a variety of geophysical and environmental investigations. In addition to their intrinsic science value, some measurements from deployed instruments may also reduce risks to astronauts (e.g., goals 7a-m in Section 5.7 of the *Artemis III Science Definition Team Report*).

Proposed deployed instruments must address one or more of the scientific objectives outlined in the *Artemis III Science Definition Team (SDT) Report*. These objectives are:

- Understanding planetary processes
- Understanding the character and origin of lunar polar volatiles
- Interpreting the impact history of the Earth-Moon system
- Revealing the record of the ancient sun and our astronomical environment
- Observing the universe and the local space environment from a unique location
- Conducting experimental science in the lunar environment
- Investigating and mitigating exploration risks

In addition to these objectives, the SDT report also described a candidate science program that includes measurements to be made by deployed instruments. Specific investigations identified include geophysical monitoring and characterization, environmental monitoring and characterization, and understanding the human impact on the Moon. Preference will be given to instruments that address one or more of these measurements. Instruments addressing other high priority SDT objectives are also welcome and may be selected based on availability of mass, funding, and programmatic considerations.

Given that a laser retroreflector is already pre-manifested for the first crewed Artemis landing, laser retroreflectors are not being solicited for this Artemis III Deployed Instruments (A3DI) call.

Other investigations that are in scope for this call include, but are not limited to, studies of plant biology, concrete microstructure using lunar regolith, flammability of solid materials, soft media flow, quantum physics, and theory of relativity and the equivalence principle.

Deployed instruments must have clear scientific goals; instruments that are purely technology demonstrations or solely for *in-situ* resource utilization (ISRU) are outside of the scope of this call. Sample return for deployed instruments is limited to <500 g in total across all investigations and must be either non-geological samples or consist of derived regolith, and crew time for retrieving samples must be estimated and justified. Purely geological samples that must be returned to Earth are outside the scope of this call. Proposals requiring lower (or zero) return mass and minimal crew time are preferred.

2. Scope and Background Information

This program element solicits both standalone instruments and instrument suites to conduct the science investigations identified in Section 1 that can be uniquely accomplished by human deployment of payloads at the landing site for Artemis III (see Section 2.1). NASA encourages instruments that can address more than one measurement need and/or science investigation, including those that have the ancillary benefit of increasing crew safety and/or reducing risk for future missions (e.g., goals 7a-m in the Artemis III SDT).

Proposals must include:

- Expected science results from the investigation;
- Instrument concept of operations, including why crew are needed for deployment, how the instrument is to be deployed, any special requirements for deployment (i.e., positioning, surface slope, etc.), an estimate of the crew time needed for deployment, and an overview of the real-time Earth-based science support needed to deploy the instrument during EVA;
- Resource requirements for the proposed investigation including cost, mass, volume, power, telemetry, data transfer need, astronaut interaction, etc.;
- Demonstration of adherence to basic safety requirements and human factors design; see Proposal Information Package (PIP).

2.1 Landing Site

Scientific investigations with instruments solicited in this call must either be responsive to a polar landing region or be site-agnostic. For Artemis III, NASA has identified 13 candidate landing regions near the lunar South Pole. Each of these regions is located within six degrees of latitude of the lunar South Pole and, collectively, contain diverse geologic features. Specific landing sites are tightly coupled to the timing of the launch window, so having multiple regions ensures flexibility to accommodate different launch windows. Therefore, the specific landing site may not be known until close to launch.

2.2 Information for Biological and Physical Sciences Payloads

The NASA Biological and Physical Sciences Division (BPS) is interested in investigating the properties of physical systems, including their functions and behavior, in the radiation environment and one-sixth gravity of the Moon. In addition to the objectives in the Artemis III SDT Report, proposers in the biological and physical sciences must also demonstrate relevance to priorities in the National Academy of Sciences 2010-2020 Decadal Report "*Recapturing a Future for Space Exploration: Life and Physical Sciences Research for a New Era*." Such proposals must provide a clear rationale and

justification for why the studies require being conducted on the surface of the Moon. Proposals that address BPS topics must comply with all the requirements, specifications, and constraints defined in this solicitation.

BPS space biology topic awardee(s) may be contacted by a representative of the Ames Life Sciences Data Archive (ALSDA) with instructions for archiving returned specimens that may be used by other investigators. The ALSDA is the official repository for non-human biological specimens generated by NASA's Space Biology Program. Its associated NASA Biological Institutional Scientific Collection (NBISC) is a biorepository of non-human samples from NASA-funded spaceflight investigations and correlative ground studies. The primary purpose of the NBISC is to identify, document, preserve, and make the collection available to the public community.

All proposers in the biological and physical sciences must review and understand all of the solicitation information, including the required proposal content, because this opportunity is different from the standard Biological and Physical Sciences Division ROSES elements (see Sections 3.0, 4.0, and 5.0). This program element requires the inclusion of additional details concerning identification of the specific hardware/instrument and its development; operations; planning and management; and budgetary information in addition to the science and science budget of the proposal. Additionally, the review process includes separate science and technical peer reviews. If one or more of the proposal content elements are missing, the proposal may be considered non-compliant and declined without review or following review.

A BPS-focused virtual workshop will be held prior to the primary pre-proposal conference to go over the differences between this A3DI opportunity and BPS ROSES program elements to familiarize the BPS science community who are new to this proposal format of ROSES. This virtual workshop will be open to all perspective proposers but will primarily focus on information relevant to BPS proposers. See Section 3.5 for information on the pre-proposal conference and virtual workshop.

3. Proposal Information

To be compliant, all investigations must meet the following requirements that are further described in the subsections below:

- Preferred entry Technology Readiness Level (TRL) of at least 6 (Section 3.2)
- Must not exceed a total mass of 60 kg, including appropriate mass reserve (3.2.3)
- Must maintain a 20% or more mass margin (3.2.1)
- Must be below the cost cap, including a minimum of 20% cost reserve (3.2.2)
- Must fall within anticipated communication, power, and thermal limits (3.2.5-3.2.6)
- Must minimize crew time required to deploy the payload(s) and, if required, collect specimens for return (3.2.1)
- Must adhere to crew safety and human factors design requirements (3.2.8)

3.1 Artemis III Mission Architecture

NASA’s Human Landing System (HLS) will take astronauts to the lunar surface as part of the Artemis exploration program. HLS will serve as a habitat on the lunar surface for

the early Artemis missions and a research platform both on the surface and in lunar orbit, enabling critical scientific investigations, such as carrying instruments for deployment on the lunar surface. For the Artemis III mission, the HLS Program is working with SpaceX throughout the development process to design and build an innovative and technically advanced lunar lander, the Starship.

3.1.1 HLS Concept of Operations

The Starship HLS and mission equipment (including the payloads selected from this call) will launch from Earth to a near-rectilinear halo orbit (NRHO) around the Moon, where it will await the arrival of crew, who launch separately in the Orion spacecraft onboard the Space Launch System (SLS). HLS launch is tied to Orion launch readiness, occurring between 60 and 90 days prior. After Orion inserts into NRHO, it will dock with the loitering Starship in preparation for the surface mission.

Once the crew are ready for the landed mission, Starship (with 2 crew onboard) will undock from Orion and descend to the lunar surface. While on the surface, the crew will perform multiple EVAs, during which they will collect lunar samples, perform field science, and deploy payloads. Once the surface mission has been completed, Starship will ascend from the surface to return the crew (and samples) to Orion in NRHO.

Once the vehicles have safely re-docked, lunar samples and crew will be transferred to Orion for return to Earth. Starship will be disposed of in a location that neither poses harm to nor interferes with NASA lunar orbit missions, vehicles, or assets of historical value and will comply with applicable planetary protection regulations to ensure a safe disposal of the vehicle.

3.1.2 Artemis III Capabilities (Crew and Vehicle)

Lunar surface activities for the Artemis III mission will last approximately 6.5 Earth days, over which there will be up to four planned Extravehicular Activities (EVAs), each lasting a maximum of eight hours, during which instruments selected from this call may be deployed. Crew time for instrument deployment will be limited; payload designs should take this into account and proposals shall provide supporting evidence for how designs and concept of operations (ConOps; see Section 3.2.7) minimize required crew time.

Up to 450kg of Starship's mass allocation will be available for utilization, i.e., to conduct science, research, development, test and evaluation, public outreach, education, and commercialization using a human exploration platform and/or mission. For Artemis III, the utilization mass allocation includes sample collection tools and sample return containers as well as payloads. Between 80-90kg are estimated for the former, leaving 360-370kg available for other utilization activities, including the payloads solicited in this call. The total available volume for payload stowage may be split between the pressurized and unpressurized volumes of Starship; stowage lockers and small payload interfaces are located in the crew cabin, while the unpressurized garage will provide the bulk of the remaining capacity for stowage (see Section 3.2.4).

3.2 Payload Technical and Safety Requirements

Proposed investigations must be accommodatable by SpaceX's Starship. Payloads that exceed mass, volume, and/or cost thresholds after award may be subject to a

termination review or be required to undergo descoping options. Proposals must include a plan for mass and volume control, including justification that there are sufficient mass and volume margins given the maturity/TRL of the proposed investigation. A mass, volume, and cost control strategy could include proposing potential technical descopes that can be used to preserve mass, cost, power, schedule, or other resources. Proposals that use descopes as a resource control strategy must describe associated impacts on proposed science objectives. Such a descope plan should meaningfully mitigate mass/resource-growth risks and include timeframes for when the execution of descope options expire.

A minimum entry TRL of 6 is preferred for payloads proposed to this program element. For technologies and subsystems that do not have flight heritage, the proposal must include a reference to the details and the results of testing and/or analysis that demonstrate performance in a relevant environment under conditions that simulate all known significant failure modes of the hardware to demonstrate technical maturity of TRL 6. If a combination of this testing and analysis is proposed to be accomplished at the beginning of the award period, then a reference must be included describing what testing/analysis is planned or has been completed at the time of proposal submission to demonstrate a plan for maturing these payloads to TRL 6 by the time of Preliminary Design Review (PDR; see Section 10.3). A summary of the test/analysis should be included in the body of the proposal.

3.2.1 General Tenets for Proposed Investigations

- Reduce operational complexity (e.g., number of modes and/or number of mode transitions. Astronauts can turn on payloads, but instruments must operate without crew intervention after being powered on).
- Maintain a 20% or more mass margin.
- Reduce demand on resources (including crew time), especially at critical times.
- Avoid the need for any non-essential operation/monitoring/access by crew on the lunar surface.
- State what data rate is required for acquisition and transmission. Describe whether the data rate needs to be continuous and/or real time and, if required, how long continuous data is needed. Describe any data latency requirements as well as any maximum delay to receive data, if there are Loss of Signal (LOS) periods.
- Document clear contamination requirements for each instrument, as needed.
- Design to meet GSFC-STD-7000 General Environments Verification Standard
- For the purposes of this call, use SLS-SPEC-159 Rev I, Cross Program Design Specification for Natural Environments (DSNE) as source data for characteristics of the expected lunar environment.
- If needed resources are mode-dependent, be very clear about usage peaks, phasing, averages, durations, etc.
- Include handling and deployment requirements for proposed instruments (e.g., distance from lander requirements, sun-facing requirements, ground preparation, etc.). Also include a description of the impact to the science objectives if these deployment requirements are not met.
- SpaceX will be compliant with all safety requirements imposed by the Range, the FAA, and others. SpaceX will require the support of payload providers to identify and

mitigate hazards and to provide supporting documentation. See Air Force Space Command Manual (AFSPCMAN) 91-710.

3.2.2 Cost

NASA plans to provide funding for instrument assembly and flight through Principal Investigator (PI)-led lunar surface science investigations under a Not-To-Exceed (NTE) cost cap. Proposed investigations, including all mission phases A-F (as defined by the NASA Systems Engineering Handbook), must not exceed $25M in real-year dollars, inclusive of a minimum of 20% reserves to be held at NASA's Planetary Mission Program Office (PMPO). Proposals shall include a general assessment of cost risks and risk mitigation strategies, including those associated with supply chain and inflation issues. Multiple instruments or suites of instruments may be selected if the total cost remains below the overall A3DI cost cap for this solicitation ($25M total). Thus, lower-cost investigations and cost-efficient operations are encouraged. Proposers planning for surface operations (Phase E) longer than 3 months may apply for extended mission funding at the end of the nominal mission. NASA will provide details for this process in FY24. Proposed investigations must demonstrate how primary science objectives can be achieved within a Phase E timeline of 3 months or less and may discuss additional science that could be achieved with longer investigation times.

3.2.3 Mass

Proposals shall provide notional mass numbers coupled to a Not-To-Exceed mass threshold. Proposed instruments or suites of instruments are limited to a total mass of 60 kg (proposers should take note of mass and volume handling limitations for crew as outlined in EVA-EXP-0070), including appropriate mass reserves, due to crew lifting requirements. The two-handed mass carry limit for a single suited crewmember in 1/6 g is 31.3 kg, (for more details on crew carry assumptions and requirements, see EVA-EXP-0070), therefore no individual component of the proposed suite shall exceed 31.3 kg. The allocation of mass reserves shall be justified in the proposal.

3.2.4 Volume/Stowage

The total available volume for payload stowage may be split between the pressurized (crew cabin lockers) and unpressurized (garage) volumes of Starship. Proposals must state whether pressurized vs. unpressurized stowage is preferred, with justification required for the use of the pressurized volume. Starship will provide safe restraint for payloads during all mission stages leading up to deployment. Prior to deployment, payloads will descend to the surface with EVA crew on the elevator.

3.2.5 Temperature/Humidity

Payloads designed to be stowed and/or charged inside the pressurized volume shall be designed to operate safely in pressures down to 8.2 +/- 0.2 psi and oxygen concentrations up to 37%. Environmental conditions within Starship's pressurized volume are required to be sustained within the following bounds for temperature and humidity: 64.4° to 80.6° (dry bulb temperature, degrees F) and 25% to 75% (humidity ratio, pounds of moisture per pound of dry air). See PIP Figure 3: Environmental Comfort Zone.

3.2.6 Power and Data Interface Guidelines

All instruments proposed must fall within anticipated communication and power limits for Starship noted below. Proposers should note that these are guidelines and proposers shall propose what they need, with justification, to achieve their science. However, if proposed requirements exceed these guidelines, proposals will be evaluated accordingly on accommodability. Applicable guidelines or requirements are provided in each subsection below.

3.2.6.1 Power

At the time of writing of this solicitation, NASA anticipates that vehicle power from Starship is expected to be available for payload use during the transit and loiter mission phases. Starship will provide a minimum of 100W (continuous) and 150W (peak) total power across all payload interfaces (in both the pressurized volume and the garage). In the pressurized volume, there will be a minimum of four powered interfaces, each capable of providing up to the full 100W (continuous) and 150W (peak) at either 28V or 120V DC. In the garage, there will be a minimum of two powered interfaces with the same power and voltage characteristics. These interfaces could be used for e.g., charging and conditioning of payloads during the transit and loiter mission phases. Starship will be capable of rejecting a cabin air thermal load up to the power provided to payloads.

While on the surface, payloads must provide their own power. Note that batteries levy significant safety requirements (Section 3.2.8). See also the "Artemis Vehicle Battery Requirements and Processes" resource posted under "Other Documents" on NSPIRES for additional battery requirements.

3.2.6.2 Command and Data Handling

Starship will provide both ethernet and WiFi for payload use inside the pressurized volume, and WiFi will extend up to 300m exterior to the vehicle. Starship will exchange commands, command response, telemetry, and data with payloads in accordance with CCSDS 133.0-B-2 Space Packet Protocol (data rate TBD; see FAQ #67 in the Frequently Asked Questions document on the NSPIRES page element for F.12 A3DI). Payloads that desire to operate on the surface after departure of Starship, or that desire to be located outside WiFi range, must rely on direct-to-Earth payload-provided communications and data transfer capabilities/hardware (see FAQs #13 and 14).

Proposers may choose to develop a software emulator to provide signals and data to demonstrate and verify interfaces.

3.2.7 Payload Concept of Operations Details

Proposals must document expected instrument/suite mass and dimensions and as many interface/concept of operations (ConOps) requirements as possible with special consideration given to the following, if applicable:

- Payload structural load limits
- Payload uplink and downlink communication requirements (data volume, bandwidth, latency, etc.)

- Payload data storage requirements (data stored on payload, data storage requirement on Starship, etc.)
- Payload communication interfaces and formats (wireless, interface port(s), etc.)
- Payload deployment requirements including siting, pointing, field-of-view, or orientation requirements
- Payload mechanical interface(s) and launch lock requirements, if any
- Payload optical sensitivities (dust, chemicals, line-of-sight to the Sun, etc.) and keep out zones for sensor operation, if applicable
- Payload cleanliness requirements (e.g., organic contamination, particulates, magnetic cleanliness, electromagnetic shielding, etc.)
- Payload-unique time synchronization requirements
- Payload operational timeline and conops considerations
- Special handling and storage requirements

3.2.8 Human Factors and Safety

The HLS Program is still developing requirements and the detailed safety and mission assurance (SMA) process for deployed payloads. Section 3 in the PIP contains some basic principles associated with these areas:

- Environmental compatibility
- Fault and failure tolerance
- Control of hazardous functions
- Contingency return and rapid safing
- Failure propagation
- Hazardous and flammable materials (with special considerations for the HLS oxygen-rich environment)
- Material offgassing
- Radiation
- Electrical system design
- Battery design
- Human factors design

Proposers should be prepared to address the above items and give a plan for verifying safety requirements according to the Artemis Campaign Development (ACD) Cross Program Utilization Payload Common Safety Requirements (ACD-50043; see PIP). It is the responsibility of each payload team to establish and control the traceability between each of the Safety Requirements defined in ACD-50043 and the corresponding design implementation data. Proposers should additionally anticipate a feasibility study that will evaluate payload accommodability and do-no-harm safety considerations as part of the proposal review process.

3.3 A3DI Deliverables to HLS

Selected A3DI team(s) will be expected to provide specific deliverables to HLS. These deliverables should be included in the proposed work scope and may include (but are not limited to):

- Concept of Operations (conops)

- 3D CAD Model
- Hazard Report (including conditions and controls)
- Payload Operations Manual (includes integration, functional checkouts, and flight operations)
- Structural FEM
- Structural Analysis
- Vibration Analysis and Test Report (Modal Characterization, Random Vibe, Acoustics, Shock and Sine Vibe required)
- Thermal Math Model and Analysis
- Material Outgassing Report showing materials meet < 1% Total Mass Loss (TML) and < 0.1% Collected Volatile Condensable Materials (CVCM); Data submitted from MAPTIS can substitute for test
- Any unique instrumentation or ground support equipment needed to measure the lander environment during integration
- Electromagnetic Interference (EMI) Test Report; MIL STD 461 Revision G (RE102 and CE102 only required testing)
- Thermal-Vacuum (TVAC) Test Report (4 Thermal Cycles at payload level)
- If dictated by conops requiring vehicle interfaces:
  - Interface Control Document (ICD) inputs/updates
  - Command and Telemetry Dictionary/Database inputs; Command scripts
  - Attachment/Integration interface bolt pattern drawing; Pinout, connector, and grounding diagram
  - Payload Software Emulator

3.4 Payload Copies Required

Four versions of the payload must be delivered according to the schedule in Section 3.5 below: an engineering model, two training models, and a flight model. An engineering model is a high-fidelity unit that demonstrates critical aspects of the engineering processes involved in the development of the operational unit. Engineering test units are intended to closely resemble the final product (hardware/software) to the maximum extent possible and are built and tested so as to establish confidence that the design will function in the expected environments. A training model will have the same dimensions of the flight unit, with all crew-interaction points mimicking the flight article so as to properly train the crew on the deployment of the payload.

3.5 Schedule

The time frame for the solicitation of Artemis III Deployed Instruments is listed in Table F.12-1.

Table F.12-1. Timeline for A3DI Program Element

BPS Virtual Workshop*	June 9, 2023, at 3 pm Eastern
Pre-proposal conference**	June 14, 2023, at 2 pm Eastern
Step-1 proposals due	June 30, 2023
Step-1 decisions	~ 2 weeks after Step-1 deadline
Step-2 proposals due	August 31, 2023
Selection	~ 6 months after Step-2 deadline

Training unit (2) delivery	December 2024
Engineering unit delivery	April 2025
Target flight instrument delivery (Artemis III)	July 2025
Target landing (Artemis III)	December 2025

The connection information for the BPS Virtual Workshop is:
https://nasaenterprise.webex.com/nasaenterprise/j.php?MTID=mfde75e76c8d6b01f459b556edde354a2
Join by phone:
+1-929-251-9612 USA Toll 2
+1-415-527-5035 US Toll

The connection information for the Pre-proposal conference is:
https://nasaenterprise.webex.com/nasaenterprise/j.php?MTID=me82c6e44ddfacc97c571b74735a5cb87
Join by phone:
+1-929-251-9612 USA Toll 2
+1-415-527-5035 US Toll

4. Programmatic Information

The science team members of the selected proposal(s) will join the Artemis III Science Team, which is comprised of the NASA Artemis Internal Science Team, the competed Artemis III Geology Team, and Participating Scientists. The Artemis III Project Scientist will facilitate the inclusion of the selected instrument team(s) into the Artemis III Science Team.

4.1 Eligibility (Including Foreign Participation)

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 basis, shall be ineligible for award.

4.1.1 U.S.-led proposals

Costs associated with internationally provided participation to U.S.-led efforts (inclusive of hardware and personnel) may be up to one third of the total cost of the investigation. Proposals shall include a discussion of the scale of the internationally contributed instruments, how the proposed contribution is consistent with the Exploration Science Strategy and Integration Office's policy that the contribution does not exceed approximately one-third of the investigation cost, and how the programmatic risks (e.g., schedule delays that impact integration dates onto lander, etc.) associated with the contribution will be handled. Foreign Co-Is on proposals from U.S. organizations must include a letter of certification from their government agency or funding/sponsoring institution indicating that, should NASA select the proposal, the support needed by the foreign Co-I for their portion of the research will be provided.

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 does not fund research efforts at foreign organizations, including travel, whether proposed directly by a foreign organization or as part of proposals submitted by U.S. organizations. However, the direct purchase of goods, supplies and/or services, which do not constitute research, from non-U.S. sources by U.S. award recipients is permitted.

Further information on foreign participation is provided in ROSES FAQ #14 on this topic and the *NASA Proposer's Guide*.

4.1.2 Foreign-led proposals

Participation in ROSES-funded research by non-U.S. organizations is welcome on a "no exchange of funds" basis (see NFS 1835.016). That is, unless otherwise stated, NASA will fund research at selected U.S. organizations and the sponsoring foreign agency or institution must do the same for theirs. Per NASA Federal Acquisition Regulation Supplement 1852.235-72, "proposals from foreign entities should not include a cost plan unless the proposal involves collaboration with a U.S. institution, in which case a cost plan for only the participation of the U.S. entity must be included." While a cost plan is not required for proposals from foreign organizations, such proposals should adequately demonstrate that the appropriate work effort and resources are available to complete the work.

4.2 Roles of Proposal Team Members

Proposals shall designate and name all key management team members, including a Deputy PI and Project Manager (PM) (both of whom are required) and all Co-Investigators (Co-Is). Teams must identify team members responsible for supporting data archiving (see Section 7.5). Proposals shall describe the role of each Co-I in the development of the investigation and justify the necessary nature of each role. These roles shall be mapped to a Work Breakdown Structure (WBS) as outlined in Appendix I of NPR 7120.8A. Excessively large teams of Co-Investigators and Collaborators are discouraged.

5. Proposal Preparation and Submission

5.1 Step-1 of the Two Step Review Process

This program element uses a non-binding two-step proposal submission process, as described in Section 2 of C.1, the Planetary Science Research Program Overview. Proposers are reminded that Step-1 proposals are mandatory and must be submitted by the proposing organization by the due date specified above and in Tables 2 and 3 of ROSES-2023. Step-1 proposals shall include, at a minimum, the key science objectives to be addressed and the instrument or suite of instruments proposed to address those objectives.

Step-1 proposals will be either encouraged or discouraged, but detailed feedback will not be provided. Proposers who wish to add funded investigators between the Step-1 and Step-2 deadlines must inform NASA in writing at least two weeks in advance of the Step-2 due date. See C.1, the Planetary Science Research Program Overview, for more information on restrictions on changes between Step-1 and Step-2 proposals.

Proposers are strongly encouraged to provide names and contact information of up to five experts qualified to review their proposal in response to the appropriate NSPIRES cover page question when submitting your Step-1 proposal. These experts must not be from the institutions of the PI or Co-Is or stand to benefit from the selection financially or otherwise of the proposal. NASA does not commit to using these individuals as proposal reviewers but will consider all suggestions.

6. Step-2 Proposal Content

6.1 Main Content

A notional breakdown of content that shall be included in the submitted proposal document is as follows:

- Executive Summary (1-page limit) – must include all sections in the template provided in "Other Documents" on the NSPIRES page for this program element; not included in overall page count and to precede the proposal table of contents.
    - Do not include the total project cost in the executive summary, as it must not be viewable by the reviewers. The total cost must be included in the submitted full (non-redacted) budget.
- Proposal Table of Contents (as needed)
- S/T/M (30-page limit)
    - Science Plan
    - Payload Technical Plan
    - Science Traceability Matrix (see Section 6.1.1)
    - Management Plan, including key personnel and their responsibilities
    - Crew Training plan
- References – as needed and not included in overall page count.

The Scientific/Technical/Management (S/T/M) section of proposals submitted to this call shall be at most 30 pages long, including figures and tables, but not including the additional sections outside of the S/T/M page limit, listed below. Proposals must follow content guidelines for each required proposal element as listed in the *ROSES-2023 Summary of Solicitation* and the *2023 NASA Proposer's Guide*, but please note that the required order of elements differs from the ***Proposer's Guide***. File size is limited to no larger than 25 MB, which is an exception to the typical ROSES standard limit. Violation of these formatting rules is grounds for a proposal to be returned without review.

Crew training will be required to ensure successful payload deployment. Details of this crew training are TBD, but a preliminary training plan should be provided, with a discussion on what crew training would be required to enable the crew to successfully deploy the proposed instrument (including any ground preparation and post-deployment calibration as necessary).

6.1.1 Science Traceability Matrix

Each proposal shall clearly define its science goals and objectives and explicitly identify the relevant Artemis III SDT report or BPS-specific objectives the investigation will address (see Section 1). The proposals 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.

The proposals shall include a Science Traceability Matrix within the S/T/M section based on the example found below.

Table F.12-2. Example Science Traceability Matrix

A. Science Objectives	B. Science Questions	C. Investigation Objective Requirements			Mission Top Level Requirements
		Measurement	Requirement	Projected Performance	
Objective #	Question #	Examples:			Examples:
Objective #	Question #	Temporal Resolution	XX Sec.	XXX Sec.	Observing strategies: requires yaw and elevation maneuvers.
Etc.	Etc.	Etc.			Launch window: to meet nadir and limb overlap requirements. Window applies day to day.
		Precision	YY%	YYY%	
		Accuracy	ZZ %	ZZZ%	

6.2 Additional Required Content

The following Additional Required Content must directly follow the references in the order in which they appear here, which supersedes that listed in the *Proposer's Guide*. As these are outside of the page-limited S/T/M section, they do not count against the S/T/M Section 30-page limit.

Additional Required Content in the order in which it is to appear – not included in 30-page S/T/M limit, includes:

- Open Science and Data Management Plan (OSDMP; 2-page limit)
- Table of Personnel and Work Effort (no page limit; see Section 3.8 of C.1, the Planetary Science Research Program Overview)
- Biographical Sketches (2 pages for PI, 1 for DPI, PM, and each Co-I)
- Current and Pending Support (no page limit)
- Letters of Support and Certification (no page limit)
- Schedule, including visual and description of the critical path (no page limit)
- Technical, schedule, and cost risks and associated mitigation strategy for each risk identified (no page limit)
- Safety and Mission Assurance Plan (no page limit)
- Redacted Budget Justification (no page limit)

6.3 Open Science and Data Management Plan

Proposals submitted to this program element must include an Open Science and Data Management Plan (OSDMP; formerly called a Data Management Plan). As described in

Section 3.7 of C.1, the Planetary Science Research Program Overview, the OSDMP must be placed in a special section, no longer than two pages in length, that immediately follows the References and Citations section for the Scientific/Technical/Management portion of the proposal. The OSDMP should have subsections on data, software, publications, physical samples, and roles and responsibilities of personnel for archiving these products, as outlined in Section 3.7 of C.1, the Planetary Science Research Program Overview. The sufficiency of the OSDMP will be evaluated as part of Merit; see Section 8.

The investigation team shall make all data fully available to the public through the Planetary Data System or an equivalent, NASA-approved archive (e.g., GeneLab and Physical Sciences Informatics for biological and physical sciences data, respectively) in readily usable form in the minimum time necessary, but, barring exceptional circumstances, within six months following the end of the investigation's data acquisition.

SMD policy currently requires that repositories used for SMD information have the following properties:

- Make information findable and accessible to the public without fee or restriction of use;
- Compliant with standards for accessibility for all electronic and information technology to people with disabilities;
- Compliant with a principle of non-discriminatory data access so that all users will be treated equally (any variation in accessibility will result solely from the capability, equipment, and connectivity of the user).

Additionally, repositories should be capable of maintaining the information for an extended period (e.g., C.1 suggests 25 years) and follow FAIR Guiding Principles.

Proposers intending to archive data in the PDS must obtain a letter of support from the appropriate PDS Discipline Node confirming that the PDS is willing to accept their submission. This letter must be included in the proposal and placed in a section for Statements of Commitment and Letters of Support, Feasibility, and Endorsement (see Table 1 of ROSES-2023). See the Information for Data Proposers and Guidelines for Archiving sections of the PDS website for more information.

In addition, space biology topic awardee(s) may be contacted by a representative of the Ames Life Sciences Data Archive (ALSDA) with instructions for archiving returned specimens that may be used by other investigators. The ALSDA is the official repository for non-human biological specimens generated by NASA's Space Biology Program.

6.4 Export Control

Projects must comply with NASA export control requirements per NPR 2190.1 Export Control Program (note that this document expires June 30, 2023. Proposers should check the NODIS library for updates to this NPR after June 30th). If the proposal contains export-controlled material, proposers must answer affirmatively to the ITAR questions in the Program Specific Data section of the NSPIRES cover page. Moreover, the ITAR material shall be presented in a red font or enclosed in a red-bordered box,

and the following statement shall be prominently displayed as the first page of the uploaded PDF proposal document and will not count toward the proposal's page limits:

> "The information (data) contained in [insert page numbers or other identification] of this proposal is (are) subject to U.S. export laws and regulations. It is furnished to the Government with the understanding that it will not be exported without the prior approval of the proposer under the terms of an applicable export license or technical assistance agreement. The identified information (data) is (are) printed in a red font and figure(s) and table(s) containing the identified information (data) is (are) placed in a red-bordered box."

7. Cost Information

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. However, all costs, including salary, fringe and overhead, all subawards, and any separate Co-I awards must appear in two places outside of the uploaded proposal PDF: 1) the NSPIRES web page budgets and 2) the separately uploaded "Total Budget" PDF file. See Section IV(b)iii of the ROSES Summary of Solicitation and the walkthrough on this subject.

Proposals must clearly describe the cost of all the investigation phases from project initiation through the archiving of data acquired during the mission and must be aligned to project years. Some examples of the costs include: design, test, and evaluation of the payload; supporting interactions between the payload and Integration Manager(s); integration support costs, which can include providing supporting documentation (e.g., thermal model, finite element model, master equipment list, etc.) to SpaceX; support for A3DI payload/HLS meetings and integration (e.g., payload integration kickoff meeting, support for a payload workshop, preparation of integration support documents, travel to the HLS provider's site to support payload delivery); storage costs from delivery in place (i.e., when the payload build is complete) to lander need date (~6 months prior to launch); and science team activities. Storage costs shall be estimated at a cost per month rate. These storage costs will be held within the reserves at the PMPO level.

Proposers shall also include the following travel in their proposed work scope and budget:

- 1 Kickoff Meeting with NASA for two days for two people in Huntsville, AL (may be virtual).
- 1 trip for 2 days for up to 3 people for Critical Design Review (CDR), to be held either at the PI's institution or the location where hardware is being built. See Section 10.3 for gate review descriptions; the Key Decision Point (KDP) may be virtual.
- 1 trip for 2 days for up to 3 people for System Integration Review/Acceptance Review (SIR/AR), to be held at the location where hardware is being built.
- 2 trips per year to Johnson Space Center (JSC) for 5 days for up to 2 people, for crew training activities.
    - Depending on the complexity of the crew interactions with the proposed payload(s), proposers may propose, with appropriate justification, deviations on the guidelines for travel to JSC.

- 3 trips to JSC (for team members supporting operations only) for Flight Operations Directorate (FOD) training and simulation support.
  - L-24 to 12 months pre-launch: 1 1-week trip for any team members supporting operations;
  - L-12 to 0 months before launch: 2 1-week trips for any team members supporting operations.
  - Proposals must justify the team members needed and clearly define their roles for supporting FOD training ops.
- 1 trip for 3-4 days for up to two people for payload delivery to lander and pre-integration checkouts of payloads at Kennedy Space Center (KSC).
- 1 8-day trip to JSC (for team members supporting ops only) to support actual EVA operations.
  - Proposals must justify the team members needed and clearly define their roles for supporting EVA ops.

Any additional travel needed to complete the development and testing of the payloads and to conduct other team activities must be described and justified in the proposal.

Proposers shall provide a basis of estimate for their proposed budget, including planned workforce totals, subaward costs, and other relevant details. NASA's notional budget profile for funding is 50% in project year 1 of the investigation, 40% in year 2, and 10% in year 3. Proposal budgets shall roughly reflect this phasing. This program's planning budget can accommodate one or more selections within this solicitation's cost cap with a typical (combined) funding profile. Proposers shall request a funding profile that is appropriate for their investigation. However, NASA cannot guarantee that every proposed funding profile can be accommodated within the 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 NASA and the selected investigation team(s).

The proposed cost reserves will be held at the PMPO level and shall be included in the overall budget. For example, a suite that costs ~$22M would require $4.4M in reserves; that would exceed the $25M cost cap for this call and, thus, would not be compliant. Proposals must be capped at a budget level that allows for at least 20% cost reserves (e.g., a $25M proposal would have a known 20% held at the PMPO level and shall include a clear statement in the budget summary acknowledging that up to $5M reserves will be held at the PMPO level). The proposal shall justify the level of reserves proposed by the project. The separately uploaded Total Budget file required by the *ROSES-2023 Summary of Solicitation* must include a clear budget line for reserves.

8. Evaluation Criteria and Programmatic Factors

All compliant Step-2 proposals for this ROSES element will be evaluated in two separate panels, one evaluating science merit, relevance, and cost reasonableness (e.g., scope of work; includes OSMDP; items 1-3 below), and one evaluating technical, management, and cost (TMC) feasibility considerations (item 4 below). Proposals will be evaluated based on the following criteria in addition to and that expand upon those defined in the *Proposer's Guide* for intrinsic merit, cost, and relevance:

1. Intrinsic science merit (and supporting exploration merit, if applicable) of the proposed investigation, where science/exploration merit refers to the compelling nature of the science/exploration investigation:
   - Compelling nature and priority of the proposed investigation's science/exploration goals and objectives, including a description of how science return is enhanced by deployment by crew; and
   - Likelihood of science success, including how well anticipated measurements support the goals and objectives, e.g., whether the resolution, precision, etc. of the proposed instruments meet the requirements for achieving the stated science objectives.
2. Experiment science merit (and supporting exploration merit, if applicable) and the feasibility of the proposed implementation of the identified investigation:
   - Probability of technical success;
   - Likelihood that the proposed plan will attain the proposed measurements;
   - Science or exploration resiliency (as opposed to the robustness of the technology in item 4 below). This factor includes both developmental and operational resiliency, including the ability to withstand adverse circumstances and the potential to recover from anomalies in flight and during operations:
     - Developmental resiliency includes the approach to descoping the full investigation objectives to the minimum investigation objectives in the event that development problems force reductions in scope;
     - Operational resiliency includes the instrument's ability to withstand adverse circumstances, the capability to degrade gracefully, and the potential to recover from anomalies in flight and during operations.
   - Probability of investigation team success. This factor will be evaluated by assessing the expertise and organizational structure of the investigation team and the experiment design in light of the proposed instrument(s); and
   - Facilities, instruments, equipment, and other resources or support systems presented in the proposal that would affect the likelihood of achieving the proposed objectives.
3. Merit of the Open Science and Data Management Plan (see Section 6.4):
   - Justification that the data management plan is appropriate to meet the goals and objectives of the investigation;
   - Clear description of proposed data products (types, volumes, formats, and standards) and software for delivery to the PDS or other adequate repository;
   - Adequate plan, schedule, and resources for interpretation of data and for reporting science, exploration, or technology results in the professional literature (e.g., refereed journals);
   - Adequate data archiving plan to ensure the preservation of data of value to the research and development community; and
   - Demonstration that the plan provides for the timely release of the data to the public domain, for enlarging its impact.
4. Technical, management, and cost (TMC) feasibility of the proposed investigation,

including cost risk and accommodability:

- Ease of accommodation of the proposed payload interfaces with Starship. This involves following mass, volume, and other guidelines as called out in Section 3.2. Factors of most critical concern include, but are not limited to, mass, power, data rate, and required crew time for deployment. Lower mass of the proposed payload suite, for example, will be seen as a cost benefit to NASA, as it may reduce its delivery costs:
  - The more requests levied on the HLS or complexity of deployment/crew time required, the more likely it is that the accommodability score will be affected; and
  - NASA will evaluate the payload(s) against the requirements in EVA-EXP-0070 (see PIP) to assess feasibility of integrating into HLS/Starship.
- Adequacy of mass reserves and/or planned mass descopes to meaningfully mitigate mass growth risks;
- Adequacy and robustness of the instrument implementation plan;
- Adequacy and robustness of the investigation design and plan for operation;
- Adequacy and robustness of the flight hardware (including TRL) and software designs, heritage, and margins;
- Adequacy and robustness of the management approach, including the capability of the management team; and
- Adequacy and robustness of the cost plan, including identification of cost risks and risk mitigation strategies.
- Extent to which the proposal convincingly demonstrates that the payload will be available in time to support the HLS delivery schedules as described in Section 3.5; and
- Safety. This A3DI call represents the first time NASA has solicited lunar surface payloads for crewed missions since Apollo. Payload providers should anticipate rigorous SMA processes consistent with a Class A mission. Science payloads must be designed to “do no harm” to the HLS spacecraft or flight crew. HLS and Exploration EVA will impose a TBD Safety Review Process (see FAQ #31) that will follow each payload through its development lifecycle. More information on safety considerations is available in the PIP. Factors likely to be considered include:
  - Environmental compatibility,
  - Fault and failure tolerance,
  - Control of hazardous functions,
  - Contingency return and rapid safing,
  - Failure propagation,
  - Hazardous and flammable materials (with special considerations for the HLS oxygen-rich environment),
  - Material offgassing,
  - Radiation,
  - Electrical system design,
  - Battery design, and
  - Human factors design (refer to the PIP).

Key factors of accommodability that will be assessed include, but are not limited to, mass growth risk and risk management strategy, power and data transfer rate demands of the lander, integration complexity, required crew time, safety, and cost and cost risk mitigation strategy.

Selectable proposals will be relevant to A3DI, will have high scientific merit, with instrumentation that appropriately addresses identified science objectives, and with no significant barriers to accommodation by HLS or crew interaction.

Although not part of the peer review process, the selection official may take into account programmatic considerations such as impact on current or future missions, balance across: subdisciplines, technologies, methodologies, career stage, risk, innovation, types of institutions (e.g., MSI, PUI, vs. R1), and project size (such as funding several small investigations instead of one large one), as per Section V(b) of the *ROSES-2023 Summary of Solicitation*. NASA will try to maximize overall programmatic balance as it seeks to control total mass, cost, and payload complexity.

9. Award Information and NASA Contribution

It is anticipated that awards to non-governmental organizations will be in the form of cooperative agreements, not contracts. As described in the *NASA Grant and Cooperative Agreement Manual*, the award type is determined by the nature of the work proposed, without regard to type of organization. NASA's contribution to the investigation is primarily through delivery of the payload(s) to the surface via HLS and deployment by NASA astronauts. NASA will also contribute an Integration Manager(s) responsible for working between the payload provider and the HLS and EHP Program providers, supporting integration of the investigation onto the HLS, and provision of a Project Scientist to develop conops and payload placement determinations among all NASA payload stakeholders and the HLS provider.

All selected investigations must comply with the technical requirements, integration support obligations, and delivery schedules provided by NASA and/or the HLS provider, to include on-site storage of the payload from delivery-in-place through shipment to the HLS provider and subsequent integration and check-out at the HLS provider facility.

The selecting official for this program element will be the SMD Deputy Associate Administrator for Exploration, Dr. Joel Kearns.

10. Payload Management Process

After selection, NASA intends to maintain an appropriate degree of oversight of the selected project(s), and to that end, has designated the Planetary Missions Program Office (PMPO) at Marshall Space Flight Center (MSFC) to serve as the principal project management interface with the selected teams throughout the project lifecycle. Management oversight and reviews will be as set forth in Sections 5.1 and 5.2 of this program element. A3DI investigations are research projects just like all other ROSES investigations, not space flight projects. Management requirements for research projects are fully documented in NASA Procedural Requirements document NPR 7120.8A. For the purposes of this solicitation, PMPO is firewalled off from the rest of MSFC; thus, no conflict of interest exists for proposers from MSFC.

The selected proposal(s) will be shared with the Artemis Internal Science Team as well as the HLS Program to facilitate coordination efforts between the selected instrument suite(s) and SpaceX. In addition, the proposal(s) recommended for selection to the selection official will be shared with Artemis Campaign Development/Exploration Systems Development Mission Directorate (ESDMD) to verify that the payload would meet safety requirements across the relevant programs and directorates.

10.1 Management Oversight and Reporting

Organizations selected for awards in response to proposals to this program element shall report to PMPO on a monthly basis. Monthly reporting and reviews will cover the project accomplishments, technical status, risk, cost and schedule status, and other topics relevant to the accomplishment of the project. The projects will perform risk management that complies with NPR 8000.4.

Proposals shall include a Safety and Mission Assurance (SMA) Plan describing the approach and requirements being implemented for SMA. Institutional SMA requirements may be used for the A3DI projects. Selected investigations shall submit a hazard analysis to the PMPO that will include personnel safety during ground activities, and hardware safety during flight operations. If selected investigations have a Quality Management System that meets the intent of SAE AS9100 or ISO 9001, no additional quality requirements will be imposed. Otherwise, an equivalency assessment of the institutional system will be required. NASA is not imposing reliability requirements.

If an award is to a BPS topic proposal, the organization selected shall submit a yearly report to the NASA Task Book (https://taskbook.nasaprs.com). The Principal Investigator shall provide an annual written report to NASA's Task Book management on or before the anniversary of the start of funding. This information will consist primarily of:

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

The Task Book includes descriptions of all peer-reviewed Space Biology and Physical Sciences activities funded by NASA. The Task Book is an invaluable source of information for NASA biological, biomedical, and physical sciences researchers, as well as the external scientific and technical communities.

10.2 Planetary Protection

Proposals shall identify an approach to planetary protection implementation based on the latest relevant NASA Procedural Requirements document NPR 8715.24 and NASA standard NASA-STD-8719.27, that requires flight systems to produce an organic inventory. Because NASA is targeting a polar landing site, all selected proposals are to be compatible with compliance to Planetary Protection Category IIb (see Table 4-2 in NASA-STD-8719.27).

10.3 Documentation and Gate Reviews

Within ~one month following selection, the selected A3DI project(s) are required to submit investigation accommodation information and interface/conops requirements to PMPO. Within 3 months following selection, the A3DI project(s) are required to deliver to PMPO a Project Plan, comprising an agreement between the PI and NASA on science objectives, implementation approach, resources, cost, reviews (including safety review/verification), schedule, and other plans. A project plan template may be found in Appendix G of NPR 7120.8A. PMPO will work with the PI of the selected investigation on the content of the project plan after selection, which will include a Project Protection Plan.

Gate reviews will be conducted by the Independent Assessment Team (IAT), in accordance with the Terms of Reference document. The draft schedule shall be contained in the Project Plan. Decision Authority for these gate reviews is the Deputy Associate Administrator for Exploration at NASA HQ SMD. If the payload begins at a Technology Readiness Level below 6, a Preliminary Design Review will be the first gate review. The IAT may be requested to support a PDR if the project is not at TRL 6 or higher when selected. This will be determined on a case by case basis based on the maturity of the proposed project. Regardless of TRL, all projects will conduct a Critical Design Review (CDR). Following the CDR, the project will participate in a Key Decision Point (KDP) review where the project will be approved to proceed. Additionally, a System Integration Review combined with an Acceptance Review will be a required gate review with the IAT. The Project Plan will document the review plan based on the hardware maturity and must be approved prior to the first gate review. Selected A3DI projects will support these independent reviews and outbriefs to NASA HQ.

Within 90 days of the completion of Phase E (the investigation's surface operations), projects will submit a report to the PMPO Manager that documents the accomplishments, operations, and technical performance of the hardware including any failures and lessons learned. Prior to the end of the cooperative agreement (see Section 9), data archiving will be complete and a memo documenting the accomplishment of mission success criteria will be submitted to the PMPO Manger and subsequently signed by the NASA HQ Program Scientist. A closeout review (Key Decision Point) may be conducted at the discretion of the Decision Authority.

Specific deliverables to PMPO that should be included in proposed work scope include:

- Project Plan
- Mission Assurance Plan (can be included in Project Plan)
- Monthly Financial Report
- Quarterly Financial Report
- Monthly Status Reports
- Mishaps & Safety Statistics Reporting
- Technology Reports
- Final Scientific and Technical Report
- Science Data collected during mission (PDS Archiving)
- Flight Hardware and Acceptance Data Package

10.4 Cost and Continuation Assessment

Should a project be significantly over budget and/or behind schedule at any time such that it represents an appreciable risk to project success, or if the project is unable to accomplish one or more of its proposed science objectives, 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. Such a review would involve updating the plans for mass control described above, including the impact to science objectives of any descopes. If the cost and continuation assessment indicates that the project cannot succeed on the planned budget and schedule, then NASA may terminate the cooperative agreement in whole or in part consistent with 2 CFR § 200.339.

11. Summary of Key Information

Maximum funding	$25M per instrument/suite
Maximum investigation mass	60 kg
Number of awards pending adequate proposals of merit	1-2. More may be selected based on available funding/mass.
Maximum duration of awards	3 years
Due date for Step-1 proposals	See Tables 2 and 3 of this ROSES NRA
Due date for Step-2 proposals	See Tables 2 and 3 of this ROSES NRA
Planning date for start of investigation	~6 months after the Step-2 proposal submission date
Payload delivery	July 2025
Target launch date	December 2025
Page limit for the central Science-Technical-Management section of proposal	30, plus additional required materials (see Section 6.3)
Relevance	This program element is relevant to all goals/objectives of any SMD division as outlined within the NASA Science Plan. Investigations addressing the outlined objectives are relevant to this program and are, by definition, relevant to NASA.
General information and overview of this solicitation	See the *ROSES-2023 Summary of Solicitation*.
General requirements for content of proposals	See C.1 the Planetary Science Research Program Overview, Section IV of the *ROSES-2023 Summary of Solicitation*, and Table 1 of *ROSES-2023*.
Detailed instructions for the submission of proposals	See NSPIRES Online Help, Sections 3.22-4.4 of the *NASA Proposer's Guide* and Section IV(b) of the *ROSES-2023 Summary of Solicitation*.
Submission medium	Electronic proposal submission is required; no hard copy is required or permitted.

Web site for submission of NOI and proposals via NSPIRES	http://nspires.nasaprs.com/ (help desk available at nspires-help@nasaprs.com or (202) 479-9376)
Web site for submission of proposals via Grants.gov	https://www.grants.gov/ (help desk available at support@grants.gov or (800) 518-4726)
Funding opportunity number for downloading an application package from Grants.gov	NNH23ZDA001N-A3DI
NASA Headquarters Science Mission Directorate Programmatic Points of contact concerning this program, all of whom share the following address: HQ-ArtemisInstruments@mail.nasa.gov	Ryan Watkins Exploration Science Strategy Integration Office (ESSIO) Amanda Nahm ESSIO/Planetary Science Division Brad Bailey Exploration Science Strategy Integration Office (ESSIO)