



ISS NATIONAL LABORATORY®

**SUBMISSION INSTRUCTIONS AND EVALUATION OVERVIEW
FOR PROPOSALS IN TECHNOLOGY DEVELOPMENT/DEMONSTRATION**

Center for the Advancement of Science in Space, Inc.

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1 PREFACE

Since 2000, the International Space Station (ISS) has enabled humans to live and work in space, supporting research and technology development that is not possible anywhere on Earth. Since its designation in 2005, the ISS National Laboratory has expanded access to this orbiting laboratory to research communities from U.S. academic institutions, government agencies, and the private sector. ISS National Lab-sponsored research seeks scientific discovery and technology advancement on the ISS that directly benefits humanity by increasing fundamental knowledge, scientific application, education outreach, workforce development, and demand creation for sustainable, scalable innovation and production in low Earth orbit (LEO).

As managers of this national laboratory in partnership with NASA, the Center for the Advancement of Science in Space, Inc. (CASIS) awards access to funding and resources on the ISS via competitive grant solicitations to support nonexploration science and technology development as well as science, technology, engineering, and mathematics (STEM) education initiatives from U.S.-based institutions.

As a U.S. taxpayer-funded organization, CASIS only contracts with U.S. Persons, as defined by the Code of Federal Regulations at 22 CFR §120.15. Submitted proposals must be compliant with all U.S. Export Administration Regulations (EAR) and International Traffic in Arms Regulations (ITAR). This document will assist offerors in the development of concepts and proposals to leverage the ISS for applied research and technology development and demonstration.

2 PROPOSAL PREPARATION AND CONTENT

The objective of the CASIS proposal submission and evaluation process is to solicit and identify, in a clear and transparent manner, proposals that demonstrate an appropriate and effective application and use of the ISS National Lab, a publicly funded asset with unique capabilities, resources, and limited capacity. To make this determination on the many and diverse types of proposals received, these instructions are provided to each proposing entity to assist in their development of a proposal that clearly defines a technology development goal, experimental design, execution plan, and support requirements.

Proposals are evaluated along four “lines of business,” key programmatic focus areas of the ISS National Lab: 1) fundamental science, 2) in-space production applications, 3) STEM engagement and educational outreach, and 4) technology development/demonstration. These instructions are for the technology development/demonstration line of business for applied research and development (R&D), technology demonstration, and technology readiness level (TRL) maturation, to improve products and/or processes that will produce positive economic impact. All projects with an expressed commercial purpose or intent are included.

Full proposals shall contain five sections: cover page, abstract, technical section, budget (cost) section, and appendices. Each section is described in detail in this instruction guide. The proposal shall be submitted as one document unless noted “as attached file” (see Appendix A).

Proposals shall be prepared in accordance with the following:

- Proposals must be single-spaced, with no less than 0.75" margins and 11-point Arial or Calibri

typeface (black type only).

- Number all pages of the proposal consecutively. The cover page should not be numbered. The budget section should begin at the top of its own page following the technical section.
- The technical section should address the response elements in Section 2.3 of these instructions. The budget section of the proposal should follow the guidance in Section 2.4 of these instructions. If any sections are not included, the proposal may be deemed non-responsive and ineligible for consideration.
- Avoid using columns in text. Proposals may include graphics, which must fit within the designated page limits except as noted.
- A table of contents, introduction, executive summary, or any other elements not prescribed by this guidance are neither required nor desired.
- Spreadsheets containing calculations, such as the project budget, must be submitted in the same file format as the template, (i.e., Microsoft Excel).
 - Paste a copy of the “Budget Summary” tab from the completed excel budget file into section 2.4 of the proposal
- Except where noted, submit the proposal and all text attachments in a single Portable Document Format (PDF). The only documents that should be submitted as separate documents are as follows:
 - The completed budget in the excel file should be submitted as a separate document along with the proposal in a single zipped file
 - PI Profile and Certifications Compliance Form should be submitted as a separate document along with the proposal in a single zipped file
 - If applicable, the Co-PI Profile and Certifications Compliance Form(s) should be submitted as separate document(s) along with the proposal in a single zipped file
- Combine (zip) all files and upload the single zipped file where indicated on the NLRA webpage.

Proposals should be submitted by a principal investigator (PI) or an authorized official of the proposing organization. Any individual business entity or institution capable of executing the proposed research may submit a proposal. However, CASIS will **ONLY** consider proposals from U.S. persons (business and individual), as defined by the Code of Federal Regulations ([22 CFR §120.15](#)).

2.1 Cover Page (1 page)

The proposal must have a cover page that adheres to the content guidance found in Appendix B. The form is to be completed, in its entirety, by the offeror. Mark any items as NA if they are not applicable or TBD if they are to be determined. The cover page is excluded from the page count.

Please limit the use of corporate or institutional logos and other identifying marks of the offeror’s organization on the cover page.

2.2 Proposal Abstract (1 page)

On one page, provide a summary of the proposed activity. The abstract is not included in the page limitation. The abstract must include:

- A brief description of the need for, and objective of, the proposed research, emphasizing its relevancy to the ISS National Lab mission and why the proposed work requires microgravity, the space environment, or the specific vantage point of the ISS.

- A concise summary of the technical approach and a brief description of the tasks and methods (e.g., modeling, ground experiments, or ISS flight experiments).
- A brief description of the expected benefits. Summarize anticipated outcomes and how the results will contribute to potential future applications and/or public benefits if the project is successful.

The abstract shall contain no proprietary information.

2.3 Technical Section (No more than 15 pages)

A detailed description of the technology development/demonstration project to be undertaken shall be submitted as part of the proposal's technical section and contain information addressing four technical subsections outlined below: Scientific and Technical Merit, Implementation Feasibility, Operations/ISS Utilization, and Business and Economic Impact. The technical section of the proposal should be *no more than 15 pages total in length*. Exceeding the page limit may result in evaluators not seeing information on additional pages. It is recommended that proposals be concise and readable, describing the entire technical approach. Proposal evaluators will not research specific details, so please be clear and identify any abbreviated terms. In the appendices (not included in the page count), provide literature citations for any material cited in the technical section of the supporting technical data and related financial/operations and business plans.

The paragraph numbering for the response elements in the following sections align with the proposal evaluation criteria and scoring rubric in the CASIS Proposal Evaluator Instructions and Evaluator Workbook. These documents are available for reference on our website at [ISSNationalLab.org](https://issnationallab.org) or by contacting us via email at PM@issnationallab.org. The response elements can be addressed in any order in the final proposal.

2.3.1 Technical Section I: Scientific and Technical Merit

Scientific and technical merit will be assessed based on the degree to which the project would promote, enable, and facilitate applied research and development, technology demonstration, and technology readiness level maturation to improve products or processes that will generate positive economic impact.

Response Elements:

A-1 Clearly defined science/technology question addressing expected advancement(s): For technology development/demonstration projects, what technology development goals will be addressed? Goals should be specific, addressing measurability and achievability. Summarize the expected relevance of the expected technology development outcomes, including when outcomes may be achieved and how the project will advance the starting technology readiness level (TRL). Identify steps needed to affect the envisioned ending TRL. (weight = 0.2)

A-2 Compelling nature and priority of the science or technology objectives: Why is the project of a compelling nature? How are the high-priority technology maturation objectives addressed in a strategy (e.g., external industry objectives or internal corporate strategy)? (weight = 0.1)

A-3 Innovation, multidisciplinary integration, and novelty of approach: Explain how the project challenges and seeks to shift current technology paradigms. How innovative is the technology being demonstrated, and does it involve new concepts, approaches, or implementations to be developed or used or advantages over existing methods and implementations? Does the approach integrate multiple disciplines in novel ways? What “inherent value” does the project have compared with the existing state of the art? Alternatively, the offeror may focus the response to this criterion on how the project relates to internal corporate strategy. (weight = 0.15)

A-4 Programmatic value of proposed project: Describe how the project advances a new or unique technology in the context of ongoing or planned space station research. Referencing related work, does the proposed project leverage prior ISS National Lab research? Or, does the project extend Earth-based technology to the space station in ways that will be leverageable by future efforts? Describe how these activities interface with the proposed project and discuss any planned coordination with outside sources. (weight = 0.1)

A-5 Likelihood of science or technology advancement success: How likely is the proposed project to meet the technology maturation goals and objectives? Are the proposed mission requirements appropriate for guiding development and ensuring success? Is the technology maturation itself likely to lead to success? (weight = 0.25)

A-6 Merit of data results/analysis plan: Describe the proposed project’s data collection, analysis, and interpretation plan. Identify how data collected will be fully adequate to assess the project’s success. Does in-process data analysis allow for monitoring during project execution to allow for in-flight adjustments? Does the offeror anticipate publishing and/or presenting project results? Discuss whether project outcomes will be public domain or proprietary. (weight = 0.1)

A-7 Basis and justification for exploitation of microgravity, the extreme environments of space, or the unique vantage point of the ISS: Describe the role and necessity of space-based research in general and ISS-based research specifically. Describe how the project will benefit from the space environment, such as:

- a. Persistent exposure to the LEO environment (e.g., vacuum, atomic oxygen, radiation, debris, or hot/cold cycling)
- b. Persistent microgravity
- c. A specific influence on an organism or material’s behavior
- d. Unique ISS vantage point—remote sensing and aerospace test bed/TRL raising applications

Identify why the proposed project could not achieve substantively the same scientific or technical objectives on the ground, via sounding rocket, high-altitude balloon, reduced gravity aircraft testing, computer simulation, or other mechanisms. (weight = 0.1)

2.3.2 Technical Section II: Implementation Feasibility

Implementation feasibility will be assessed based on the quality and feasibility of the implementation approach, including design and plan for operations, suitability for addressing objectives, management approach, schedule, cost, proposer expertise and prior performance, risk, and whether the

implementation would overcome strategic and operational barriers to increase the offeror's access to space-based facilities.

Response Elements:

- B-1 Adequacy and robustness of the investigation design and plan for operations:* Describe how the proposed implementation design of the project addresses the experiment goals and science objectives. How does the project's success criteria for experimental conduct and operation demonstrate the necessary and sufficient evidence to complete the project? (weight = 0.2)
- B-2 Suitability of proposed hardware, software, and facilities to address objectives:* Describe the selected flight hardware, software, and facilities, clearly stating the design requirements, critical components, requisites, and verification approach for each. Outline product development steps, including manufacturing timelines. List hardware and software alternatives, where applicable, and relate selection criteria to impact on experiment or technology maturation success. (weight = 0.15)
- B-3 Adequacy and robustness of the management approach and schedule:* Identify the proposed project's key personnel, such as a principal investigator (PI) or a project manager (PM). Describe the project's organizational structure. If multiple co-performers are proposed, describe their responsibilities within the project and provide the management plan for coordinating all performers. Provide a timeline of activities (Gantt chart, flow chart, diagrams, etc.) required to successfully execute the preflight, flight, and postflight phases of the project. (weight = 0.15)
- B-4 Well-defined and credible cost of the investigation:* Discuss the basis of estimate for the proposed project's costs (Note: The budget itself is to be placed in Section 2.4). Identify management reserves, and the philosophy for releasing them. Describe sources of funds to cover those costs. If applicable, include sponsorship or commitment letter(s) supporting the project as an appendix to the proposal. (weight = 0.15)
- B-5 Offeror and Implementation Partner's experience, expertise, and record of performance:* Describe the proposed project team's experience, expertise, and history, including the Implementation Partner. How is the offeror's past performance relevant to the project's proposed science investigation or technology maturation? Does the Implementation Partner (if applicable) have experience with similar ISS flight projects, and does that experience suggest a high likelihood of successful implementation? Define roles and responsibilities of key performers and/or collaborators. In an appendix to the proposal, provide a biographical sketch for each PI or co-investigator (Co-I) and other key personnel, along with their citizenship status. (weight = 0.1)
- B-6 Uniqueness of implementation relative to ISS R&D tools available to offeror:* Identify how the selected research tools are uniquely capable of achieving the science investigation or technology maturation goals. For example, explain the limitations of currently available ISS solutions and how the proposed implementation hardware uniquely addresses the investigation goals. Note that tool selection (this criterion) is different from justification for use of the ISS (criterion A-7). (weight = 0.15)

B-7 *Implementation risk assessment and mitigation:* Discuss approach to risk management. Identify anticipated implementation risks associated with any project milestones. Based on the offeror's knowledge and experience, describe possible mitigations relative to the project's planned procedures, situations, new/untested hardware and materials. (weight = 0.1)

2.3.3 Technical Section III: Operations and ISS Utilization

Operations and ISS utilization will be assessed based on the project's detailed description of the facility, flight hardware, and other resources required to execute the defined concept of operations to meet defined science requirements for the payload. The details required to assess readiness for operations and appropriate utilization of scarce ISS resources include power, mass, volume, and interface requirements; installation and operations impact on ISS crew time; hazards; regulatory compliance; data collection and downlink needs; and whether the project offramp or completion criteria are defined and consistent with ISS operations sustainability.

PIs are strongly encouraged to discuss any aspects of the experiment with their Implementation Partner that they deem significant beyond the standard description of the experiment. Consider the resources and support requirements for proper execution, the time required to operate the experiment, and the overall duration of the experiment in space in order to meet each of the defined science requirements. Provide details unique to the experimental design that someone unfamiliar with the science or the experimental design will need to know to be able to operate or troubleshoot it should the PI not be immediately able to help. Offerors are encouraged to utilize the Preliminary Experiment Requirements Document (P-ERD) appendix to provide additional details related to this section. *Failure to adequately address the operations and utilization response elements below may result in a non-selectable proposal.*

Response Elements:

- C-1 *Potential ISS hazards are identified and control techniques are provided:*** Clearly identify potential ISS hazards along with a relevant basis for identification. This criterion includes contribution by the Implementation Partner. Provide potential hazard control activities with known schedule and cost impacts. (weight = 0.1)
- C-2 *Installation and operations impacts on ISS crew time are defined and sustainable:*** Working with the Implementation Partner (where applicable), estimate the crew time required for installation and operation. Provide estimates of these times, substantiated by a basis of estimate where possible. Crew time estimates can be addressed in a Preliminary Experiment Requirements Document (P-ERD) appendix (see Appendix C). (weight = 0.25)
- C-3 *Operational status and suitability of support equipment, logistics, and consumables:*** Identify needed support equipment, logistics, and consumables (if relevant). Identify why each item is necessary, particularly if return samples require ground analysis. (weight = 0.15)
- C-4 *Mass, volume, power, and interface requirements are defined and sustainable:*** Identify and substantiate ISS mass, volume, power, and interface requirements. Requirements should be supported by specific basis of estimates where possible. Identify downmass requirements (if needed). These implementation requirements can be documented in the Preliminary

Experiment Requirements Document (P-ERD) (see Appendix C). (weight = 0.2)

C-5 External regulatory policies are identified and addressed: Identify necessary regulatory policies (e.g., biomedical, human tissue, Earth observation, etc.) exclusive of NASA policies and provide plans for regulatory approval. (weight = 0.1)

C-6 Data collection/downlink plan is defined and sustainable: Identify data collection and data downlink plans, including data volumes and frequency of collection. Describe how they support the science investigation objectives. (weight = 0.1)

C-7 Completion criteria are defined and consistent with ISS operations: Identify criteria for project completion and contingency scenarios. What are the minimum success criteria? Define the minimum required duration in microgravity or the space environment. If applicable, what is the minimum sample size for scientifically significant results to be achieved. Are there continuation and/or early disposal alternatives for project disposition? Minimum success criteria can be documented in the Preliminary Experiment Requirements Document (P-ERD) (see Appendix C). (weight = 0.1)

2.3.4 Technical Section IV: Business and Economic Impact

Business and economic impact will be assessed based on the market potential and application leverage of the proposed project, including market scalability and leveragability, market disruption, incremental revenue, financial commitments, and whether the project has a feasible commercialization plan and customer engagement.

In addition to describing the market and the potential for the product, service, or product improvement, also identify the customer in general—or better, specific customers. Describe how the product will get to the customers and how it will impact them. Describe why the customer needs the product or service and how they will use the product or service. Elaborate on any follow-on testing and product development plan beyond the initial study. Provide estimates on resource requirements and possible funding sources and strategies to conduct the follow-on testing and reach product commercialization. If required resources and/or funding for follow-on endeavors have been committed, identify specific organizations committing them. If commercialization of the project is subject to regulatory approvals, provide the current state of the regulatory dialogue and expected time to gaining such approvals.

Response Elements:

D-1 Project outcomes can be deployed to serve sizable addressable markets (scalability): Discuss the impact of the solution/product resulting (directly or indirectly) from this project in terms of its Total Addressable Market (TAM)—the overall revenue opportunity that is or is expected to be available to a product or service if 100% market share is achieved. Identify the method of estimation used (e.g., top-down, bottom-up, etc.), the expected value, and any third-party sources used to develop these estimates. (weight = 0.1)

D-2 Ability to leverage project outcomes across multiple applications, customers, or needs: Describe whether (and if so, how) this product/solution development and/or technology maturation is designed with regard to a capability to address **each or some of the following:**

multiple applications, needs, customers, and markets. The highest-scoring proposals will be leverageable in several of these dimensions. (weight = 0.1)

D-3 *Project results in technology/products/solution innovation and/or market disruption*: Describe how the project represents or materially supports a unique innovation that will likely disrupt the targeted markets discussed in D-1. Provide supporting evidence that products or solutions developed as a result of this project will likely gain significant competitive advantage and have high potential to win significant market share. (weight = 0.2)

D-4 *Project leads to incremental revenue after completion*: Quantify the expectations and provide supporting information for estimated incremental revenues resulting from solutions/products developed as a result of this project, as discussed in criteria D-1 through D-3. Revenue expectations should be stated by expected incremental annual revenues and the time to achieve such revenues (e.g., incremental revenues of \$X/year, achieved in Y years). (weight = 0.2)

D-5 *Sufficient internal/partner resource commitment is available*: Identify funding available for this project. Provide applicable commitment letter(s) as attachments. CASIS will separately assess cost realism in criterion B-4. Discuss funding needed to complete and commercialize the results of this project and identify additional quantifiable and committed capital sources (whether internal or partner-provided) to meet this funding need. (weight = 0.2)

D-6 *Project has feasible commercialization and customer engagement*: Summarize the offeror organization's customer engagement progress and capabilities, as well as the commercialization strategy. This discussion may be supported by including a summary of the financial/operational plan and/or a business plan in the proposal appendices. (weight = 0.2)

2.4 Budget Section (Not included in page count)

The budget template consists of an Excel file with worksheets labeled Instructions, Glossary, Summary, Year 1, Year 2, and Year 3. Offerors may modify this file, as needed and with appropriate notation, to include additional cost elements, years, worksheets, etc. The Excel file **must be completed and submitted with the final proposal**. In addition, offerors must provide a copy (or link) of the budget summary table from the template in the Budget section of the proposal. For competitive ISS National Lab Research Announcements, the budget template will be available on the solicitation webpage.

The budget is an estimate of the total resources necessary to achieve the desired goals and objectives, applications, or impacts for the funded life of the project. CASIS requires sufficient detail in the budget and schedule to determine adequacy of preflight development and testing resources, time to flight, and time to complete the project. CASIS requires details regarding the project's development costs and the sources of funds to cover those costs to verify that the proposal has adequate resources committed to the project. **If the budget includes funding from sources other than the offeror's organization or CASIS (i.e., third-party funding), the offeror MUST include letters of commitment from the third party or parties for those funds with the proposal, including the funded amount and timing for release of funds.**

Travel Cost Reimbursement: The offeror may include the cost of travel in the CASIS portion of the budget request; however, this cost will not be included in the value of the grant. If the budget request is approved, a not-to-exceed value for travel will be referenced in the grant or user agreement in Paragraph 4(b), and the actual cost of funded travel must be approved in writing in advance, on a case-by-case basis. Instructions for obtaining travel approval will be included in the agreement as well as in the Principal Investigator Guide provided by the CASIS Operations project manager after award.

For any questions about template use, please email PM@ISSNationalLab.org.

Indirect Rates Justification

CASIS shall recognize and apply to all grant agreements any approved federally recognized indirect cost rate that has been negotiated between the offeror and a U.S. government agency. If no such rate has been negotiated with a U.S. government agency, CASIS shall apply a de minimis rate of ten percent (10%) for those seeking indirect costs in a grant award. Also, CASIS will allow a grantee to voluntarily waive indirect costs or charge less than the full de minimis indirect cost rate should they choose to do so.

All proposal submissions seeking funding from CASIS are subject to this policy. All grantees are required to provide satisfactory written evidence in or accompanying their proposal submission of a previously approved federal indirect rate. Such evidence shall demonstrate the existence of an approved federally recognized indirect cost rate negotiated between the grantee and a U.S. government agency. In the absence of this evidence, CASIS will apply the de minimis indirect cost rate stated above.

2.5 Alternative Sections (Optional, not included in page count)

Follow-on Activities: For planning purposes, it is helpful to know as soon as practical if follow-on activities or additional project iterations are anticipated. Assuming the project outcomes are successful, the offeror is welcomed to describe the types of anticipated follow-on activities that are not already included in the proposed project by providing an overview of next steps, anticipated costs, and any dependencies or efficiencies that exist between the main project and the follow-on effort. Please use the *Iterative Research Multiple Flight Questionnaire* (Appendix D) to provide this information.

Alternative Cost Estimates: The cost for the alternatives or follow-on activities should be reflected in this section and not in the narrative or summary in the main budget section of the proposal.

2.6 Proposal Attachments (Not included in page-count)

Templates for requisite attachments will be provided on the research announcement webpage.

Required Proposal Attachments

- A. *Biographical Sketch (two pages or less per PI/Co-I):* Supply a biographical sketch (including citizenship status) for each PI or Co-I and background on key collaborators. Include information on past success in the field of study. Specifically, note expertise relevant to addressing the scope and scale of the project from inception through completion. Address

the investigator's record of success in the field of study and provide relevant publications, commercial examples, patents, or technology implementation experience. If the project is collaborative (e.g., multiple institutions or Co-Is), describe the roles and responsibilities of each partner and the experience each has for that role. Please include educational history, professional experience, publications, and current grant funding.

- B. *Literature Cited*: Provide literature citations for any material cited in the technical section or any other references supporting the proposal.
- C. *Data Management Plan (DMP)*: Include in the proposal appendices a supplementary document of no more than two pages labeled "Data Management Plan." Proposals that do not include a DMP will not be evaluated. The requirements for DMPs are documented in existing U.S. Government directives and NASA policies for research data and publication access, including the following:
- [“NASA Plan for Increasing Access to the Results of Scientific Research”](#)
 - [NPD 2230.1, Research Data and Publication Access](#)

This supplementary document should describe how the project will conform to NASA policy and directives on the dissemination and sharing of data and may include:

1. The types of data, samples, physical collections, software, curriculum materials, and other materials to be produced in the course of the project
2. The standards to be used for data and metadata format and content (where existing standards are absent or deemed inadequate, this should be documented along with any proposed solutions or remedies)
3. Policies for access and sharing, including provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements (CASIS encourages publication of data and inclusion in publicly accessible databases such as Physical Sciences Informatics or GeneLab, when possible.)
4. Policies and provisions for re-use, re-distribution, and the production of derivatives
5. Plans for archiving data, samples, and other research products, and for preservation of access to them

Simultaneously submitted collaborative proposals and proposals that include subawards are a single unified project and should include only one supplemental combined DMP, regardless of the number of non-lead collaborative proposals or subawards included. In such collaborative proposals, the data management plan should discuss the relevant data issues in the context of the collaboration.

Proposers who feel that the plan cannot fit within the limit of two pages may use part of the 15-page Technical Section of the proposal for additional data management information. Offerors are advised that the DMP must not be used to circumvent the 15-page Technical Section limitation. The DMP will be reviewed as an integral part of the proposal for the scientific community of relevance.

- D. *Completed Budget (Excel spreadsheet)*

- E. *Approved Indirect Rate Agreement (as applicable)*: Attach written evidence demonstrating the existence of an approved federally recognized indirect cost rate negotiated between the grantee and a U.S. government agency. See Section 2.4 above for detailed instructions.
- F. *Copy of Institutional Animal Care and Use Committee (IACUC) Approval (as applicable)*: Proposals involving animals or humans require an assurance of compliance with appropriate oversight boards and their required provisions. All proposals must include a statement from the offeror's institution certifying that the proposed work will meet all federal and local human subject requirements and animal care and use requirements. If Institutional Review Board or Institutional Animal Care and Use Committee (IACUC) certification is already approved at proposal submission, attach a copy of the certification. If this certification is pending, the offeror must submit a copy to CASIS within 90 days after notice of award.
- G. *Vertebrate Animal and Higher Order Cephalopod Section (VACS) (as applicable)*: If live vertebrate animals or higher-order cephalopods (hereinafter, animals) are to be used, the following criteria must be addressed completely in a VACS of the proposal. The criteria must be addressed for work proposed at every performance site—this is the site (institution) where procedures with animals will be performed. If the offeror's institution is not the site where animal work will be performed or if the work will be performed at several sites, these performance sites must be identified.
1. Description of Procedures (Vertebrate Animals Section)
Provide a concise description of the proposed procedures to be used that involve live vertebrate animals. Identify the species, strains, ages, sex, and total number of animals by species to be used.
 2. Justifications (Vertebrate Animals Section)
Provide justification that the species are appropriate for the proposed research. Explain why the research goals cannot be accomplished using an alternative model (e.g., computational, human, invertebrate, in vitro).
 3. Minimization of Pain and Distress (Vertebrate Animals Section)
Describe the interventions to minimize discomfort, distress, pain, and injury. These include analgesia, anesthesia, sedation, palliative care, and humane endpoints.
 4. Method of Euthanasia (Cover Page Supplement/PHS Fellowship Supplemental Form)
Provide a justification for methods of euthanasia that are not consistent with the American Veterinary Medical Association (AVMA) Guidelines for the Euthanasia of Animals. If the answer is "No" to the question "Is method consistent with AVMA guidelines?", describe the method and provide scientific justification in the text field provided.
- H. *PI Profile and Certifications form*: Provide information about the Principal Investigator using the PI Profile and Certifications form and attach it to the submission.
- I. *Implementation Partner Proposal*: Attach to proposal appendices.
- J. *SAM.gov Registration*: If the Proposing Organization is registered with System for Award

Management (SAM.gov), attach a downloaded copy of the SAM registration to the proposal appendices.

Optional Proposal Attachments

- A. *Letters of Support*: If the offeror has received letters of commercial support or letters of commitment from collaborators, the offeror **MUST** attach them to the proposal. Identify the contribution the collaborator intends to make along with a commitment to perform the work. Up to three professional references may also be included.
- B. *Co-Principal Investigator Profile and Certifications form*: If the project has a Co-PI, complete the Co-PI Profile and Certifications form and attach it to the submission.
- C. *Preliminary Experiment Requirements Document (P-ERD)*: Include any known investigation and/or project operations concepts that would be helpful to CASIS during the operational feasibility review. Include as many science, engineering, and/or technology requirements that may be known at this stage.
- D. *Iterative Research Multiple Flight Questionnaire*: If the offeror is anticipating the requirement for iterative microgravity studies, which would include multiple flights, please complete the questionnaire provided in Appendix D and include it with the proposal submission.
- E. *Supporting Plans and Technical Data (limited to 5 pages)*: Include data sheets, charts, and excerpts from referenced research.

3 PROPOSAL EVALUATION AND SELECTION

3.1 Evaluation Factors and Process

A peer review evaluation process will be used to evaluate the proposal. This type of evaluation relates directly to the CASIS mission to identify projects that maximize the return on investment for the ISS platform. Benefits are captured through each of the evaluation categories in Section 2 by using a rubric-based sheet to form a provisional score for that category. Criteria within those categories are weighted based on the expected strength of that criteria for the specific line of business (i.e., technology development/demonstration). In addition, overall strengths and weaknesses, as well as any notable features, are documented by evaluators. This information is used by evaluators to synthesize an “adjectival rating,” as shown in Table 1.

The adjectival ratings and strengths and weaknesses identified by the proposal evaluators are used by the CASIS final determination committee and chief executive officer to determine which proposals will be selected for award.

Evaluation Factors: Proposals will be evaluated based on four factors: scientific & technical merit, business & economic impact, implementation feasibility, and operations & ISS utilization. Each factor is comprised of multiple subfactors, all of which are numerically weighted and scored. All proposals submitted must include an expressed commercial purpose or intent.

Table 1: Adjectival rating descriptions

Score	Adjectival Rating	Strengths and Weaknesses
>85-100	Excellent	A truly outstanding proposal. Few, if any, weaknesses are noted, and there are many strengths. A proposal with this rating should be compelling and a top-tier effort.
>75-85	Very Good	A better-than-average proposal. Strengths outweigh weaknesses, and there are no meaningful non-compliant criteria responses. A proposal of this rating would have attractive features noted in strengths that would easily justify selection.
>65-75	Good	An acceptable proposal. Weaknesses and strengths are essentially balanced. Any non-compliant criteria responses are easily correctable. A proposal rated as “Good” in all categories would be “on the cusp” for selection.
>50-65	Fair	A marginal proposal. Weaknesses outweigh strengths (perhaps significantly). The evaluation may identify non-compliant criteria responses, but these should be correctable with additional effort by the proposer or Implementation Partner.
0-50	Poor	A non-selectable proposal. Few if any strengths and many weaknesses, some of which may include uncorrectable non-compliant criteria responses.

Relative Order of Importance of Evaluation Factors Business & economic impact is more important than scientific & technical merit, which is more important than implementation feasibility and operations & ISS utilization combined. Implementation feasibility and operations & ISS utilization are of equal weight. Cost is not scored in proposal evaluation but is considered in final selection.

Prior to evaluation, the CASIS Portfolio Management team will review the proposal to ensure that major elements have been completed satisfactorily based on the provided guidelines. An attempt will be made to resolve any findings with the PI teams before beginning a formal review.

Subject matter experts will evaluate the proposal using the following steps:

1. **Technical Evaluations:** Peer reviews by external subject matter experts to determine the adjectival rating of each technical category.
2. **Compliance and Budget Review:** The CASIS Contracts and Compliance department will review the offeror’s completed forms and budget estimate for risks, limitations, and contracting concerns for consideration during final determination.
3. **Evaluation Integration:** The team of evaluators representing operations, science, and economics will integrate individual category adjectival ratings, collate notable features, assess resource requirements, synthesize an overall risk assessment, and prepare a recommendation for the CASIS final determination committee and chief executive officer. This team will also convey feedback to proposers on request.
4. **Final Determination:** The CASIS chief executive officer and chief scientist will perform the

final prioritization and award determination (project selection), initiating discussions with members of the operations, science, and economic review teams and CASIS senior staff, as necessary.

All information contained in a proposal and any presentation material will be treated as confidential and reviewed only by CASIS personnel or third-party subject matter experts providing technical reviews. Please ensure the proposal includes an appropriate confidentiality disclaimer (and appropriate regulatory disclaimers, e.g., ITAR or EAR) on all pages.

CASIS has overall responsibility for conducting proposal evaluations but will rely on external constituents under contract with CASIS and with relevant expertise to determine category adjectival rating. All non-U.S. Government subject matter experts are required to sign a confidentiality agreement and a conflict of interest form with the ISS National Lab prior to receipt of proposals for review.

CASIS may share proposals with select NASA personnel for the purpose of completing an operational feasibility review of the experiment design, the availability of flight hardware and facilities required for the execution of the experiment on the ISS, or funding mechanisms.

3.2 Final Determination

In the final determination meeting, the CASIS chief executive officer, chief scientist, chief operating officer, director of business development, director of operations, and director of portfolio management review eligible projects for selection. If unable to attend, these directors may designate a representative from their department to serve as their delegate in the meeting. The chief executive officer considers all input and makes the final determination of project funding and priority. In addition to the proposal evaluation results, ISS resource allocation priorities, current strategic priorities, budget availability, and overall programmatic risk are major considerations in determining which projects are either sponsored for flight, set aside for future consideration, or not selected.

Projects identified to be sponsored are issued a non-binding notice of intent to award and subsequently moved to agreement drafting, negotiation, and award. Selected projects must meet minimum eligibility requirements, such as readiness for an increment, secured funding, and an agreement with an Implementation Partner, if appropriate. Projects that pass the review process but are not selected for sponsorship are set aside for up to six months to be targeted for external funding when possible. Offerors whose proposals are not selected will be notified and given feedback on proposal weaknesses. After the final determination meeting, CASIS will coordinate with the NASA liaison regarding the specific allocation of ISS research resources for selected projects.

3.3 Revision/Resubmission Limit

Proposals not selected can be revised based on feedback and resubmitted to a subsequent research announcement of similar scope.

3.4 Appeals

CASIS will notify the PI or authorized official submitting the application of project selection or non-selection by email. This notification will include reviewers' comments from the technical, economic, and feasibility evaluations. Anyone who is adversely affected by the decision made by CASIS and

would like to appeal shall submit a written appeal to the CASIS chief executive officer within 10 calendar days from the date of notification. This appeal consists of a written statement of up to 10 pages stating the basis for the appeal. The appeal will be considered by a member of CASIS senior management who was not involved in the final determination. Failure to file an appeal within the prescribed time constitutes waiver of right to appeal.

3.5 Proposals Submitted as Part of an Agreement with an External Organization

Proposals originating as part of an agreement by CASIS with a U.S. government agency or an outside organization are reviewed in the same manner as all other proposals. However, the final selection and prioritization of these proposals, including award determination, may rely on review criteria defined by the U.S. government agency or external organization co-sponsoring the solicitation. CASIS may also choose by written agreement with a U.S. government agency or an outside organization to supplant the CASIS scientific or economic review process for proposals with the review process that is applied by the U.S. government agency or external organization. All other aspects of the CASIS review process remain the same.

4 CONTRACTS

To be considered, proposals must be received from U.S. persons and U.S. entities, as defined in the Code of Federal Regulations ([CFR](#)), and must be compliant with ISS National Lab export control programs and policies.

Award recipients will be required to enter into a User Agreement or Grant Agreement with the Center for the Advancement of Science in Space, Inc. (CASIS). As a nonprofit corporation doing business with the federal government via a Cooperative Agreement with NASA, CASIS is contractually bound by U.S. federal procurement law and regulations to flow down to CASIS agreements with award recipients various contractual obligations that are in the Cooperative Agreement between CASIS and NASA. The obligations are regulated in part by the Federal Acquisition Regulations (FAR), 48 C.F.R., as well as NASA-specific procurement regulations. Mandatory clauses are non-negotiable and cannot be removed from CASIS user agreements or grant agreements. If an award recipient does not desire to, or cannot, comply with mandatory flow down clauses, the awardee should not accept the award opportunity. These terms and conditions from the NASA Cooperative Agreement will apply to all Grant Agreements (funded) and User Agreements (unfunded). These documents listing the mandatory flow down provisions contained in a User Agreement and Grant Agreement are provided as part of the Step 1 and Step 2 zipped documents made available to offerors via the web page for the solicitation.

Appendix A Summary of Required and Optional Documentation for Proposal Submissions

Name of Section or Form	Format	Limitation	Inclusion Location	Instruction Page
Cover Page	PDF form	1 page	As first page of proposal	2, 17
Abstract	PDF	1 page	Proposal Page 1	2
Technical Section	PDF	15 pages	Proposal Body	3
Budget Section	PDF	No limit	Proposal Body	8
Budget	CASIS template (spreadsheet)	No limit	Attach to submission	8
Approved Indirect Rate Agreement (if applicable)	PDF	No limit	Attach to submission (or provide electronic access)	9
Biographical Sketch	PDF	2 pages per PI/ Co-I	Proposal Appendix	9
Literature Citations	PDF	No limit	Proposal Appendix	10
Data Management Plan	PDF	2 pages	Proposal Appendix	10
Copy of IACUC Approval (if applicable)	PDF	No limit	Proposal Appendix	11
Vertebrate Animal and Higher Order Cephalopod Section (VACS) (if applicable)	PDF	No limit	Proposal Appendix	11
PI Profile and Certifications	PDF form	No limit	Attach form to submission	11
Implementation Partner Proposal	PDF	No limit	Proposal Appendix	11
SAM.gov Registration (if applicable)	PDF	No limit	Proposal Appendix	11
Co-PI Profile and Certifications (if applicable)	PDF form	No limit	Attach form to submission	12
Preliminary Experiment Requirements Document	PDF	No limit	Proposal Appendix	12, 18
Letters of Support, Letters of Reference (optional)	PDF	No limit	Proposal Appendix	12
Iterative Research Multiple Flight Questionnaire (optional)	PDF	3 pages	Proposal Appendix	12, 19
Supporting Technical Data (optional)	PDF	5 pages	Proposal Appendix	12

Note: All documentation is required unless otherwise noted as “optional” or “if applicable.”

Appendix B Proposal Cover Page**Project Proposal Submission**

**Technology Advancement and Applied Research Leveraging the ISS National Lab
ISS National Lab Research Announcement (NLRA) 2023-7**

Project Name:		
Proposal #:	Revision #:	Submission Date:
Principal Investigator (PI):		Email:
Contract Manager:		Email:
Organization Name:		
Implementation Partner:		
Total Project & Implementation Cost (\$):		
ISS National Laboratory Funding Requested (\$):		
Is the offeror's organization registered with SAM.gov? YES <input type="checkbox"/> NO <input type="checkbox"/> If yes, present a downloaded copy of the registration as part of the proposal submission.		

Trade Compliance

The Proposing Organization agrees to comply with all applicable U.S. export control laws and regulations, specifically including, but not limited to, the requirements of the Arms Export Control Act, 22 U.S.C. 2751- 2799, including the International Traffic in Arms Regulation (ITAR), 22 C.F.R. 120-130; and the Export Administration Act, 50 U.S.C. app. 2401-2420, including the Export Administration Regulations, 15 C.F.R. 730-774; including the requirement for obtaining any export license or other approval.

To the extent permitted by applicable state law, the Proposing Organization shall indemnify and hold CASIS harmless for all damages, costs, fines, penalties, attorney fees, and all other expenses arising from any claim or demand that the Proposing Organization failed to comply with export laws in connection with this proposed project. A representative from the Proposing Organization must address the following questions, and if applicable, ensure all pages of this proposal are properly annotated:

Does this proposal contain information and/or data that is subject to *Export Administration Regulations (EAR)*? YES ☐ NO ☐

If yes, provide the ECCN Reference Number: _____

Does this proposal contain information and/or data that is subject to *International Traffic in Arms Regulations (ITAR)*? YES ☐ NO ☐

If yes, provide the USML/CML Reference Number: _____

Appendix C Preliminary Experiment Requirements Document



ISS National Laboratory Preliminary Experiment Requirements Document (P-ERD)

Operations Concept

Include any known investigation and/or project operations concepts that would be helpful to CASIS during the Operational Feasibility Review. Please include as many science, engineering, and/or technology requirements that may be known at this stage of the proposal development phase. Offerors are encouraged to work closely with their Implementation Partner to address these requirements where applicable.

Factors to consider may include:

- Crew time estimates
 - Ascent and descent requirements
 - Proposed hardware to be used/built/modified
 - Materials list
 - Proposed model organisms
 - Any known design requirements
 - Any known volume, mass, or other size specifications
 - Any known specific stowage requirements (e.g., conditioned, passive, temperature ranges, etc.)
 - Any investigation timing requirements (e.g., timing of addition of new media, fixation agents, etc.)
 - Any specific late load or early return requirements
 - Any ground control requirements
-

Appendix D Iterative Research Multiple Flight Questionnaire



Iterative Research Multiple Flight Questionnaire

Technology Development/Demonstration Research Leveraging the ISS National Lab

Proposed Project Name:
Principal Investigator (PI):

Offerors that anticipate a requirement for iterative studies that would include multiple flights to the ISS for successful completion are encouraged to provide additional information.

Please provide an answer to each of the following questions and delete italicized text before submission. Please use no less than 12-point font and one-inch margins. Please limit this response to a maximum of 3 pages. Headings, bullets, and charts or graphics may be used as desired.

- 1. If the initial flight is successful or if results warrant an additional step or steps in the science/technology maturation, describe the number and nature of corresponding successive flight experiments. How is the research question posed or technology maturation goal different from that of preceding flight experiment(s)?*
- 2. What would be the objectives and technical approach for the follow-on effort(s)? (This can be for a ground-based or flight effort.)*
- 3. What resources are going to be needed to execute the follow-on effort(s)?*
- 4. What does the offeror anticipate learning from that effort?*

