

ANNOUNCEMENT OF PARTNERSHIP OPPORTUNITY CUBESAT LAUNCH INITIATIVE

General Information

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Description

1.0 INTRODUCTION AND BACKGROUND

The National Aeronautics and Space Administration (NASA) Human Exploration and Operations Mission Directorate (HEOMD) anticipates making launch opportunities available for a limited number of CubeSats to a variety of U.S. CubeSat developers. The CubeSat Launch Initiative (CSLI) will provide or facilitate flight opportunities to low-Earth orbit (LEO) as auxiliary payloads on launches, as well as deployments from the International Space Station (ISS), currently planned for 2023-2026.

NASA's CubeSat Launch Initiative is intended to expand U.S. interest in Science, Technology, Engineering, and Mathematics (STEM), thereby developing future scientists, engineers, and technologists. As such, CSLI is placing a renewed emphasis on education, and is moving in a direction to refocus the program on providing access to space for educational institutions, non-profits with an education/outreach component, and NASA Centers for early career workforce development.

This solicitation includes three types of opportunities and is organized to provide general information and requirements applicable to any proposal, and three appendices to provide additional information and requirements unique to those opportunities. After reading the rest of the main body, continue with the appendix appropriate to your organization and project disposition as indicated in the following table:

If your organization is a U.S.:	And...	See this Appendix for further eligibility details and instructions
Educational organization*	The entire project is/will be led, built, and managed by students with educators/faculty members serving as advisors	Appendix A
	Work is underway on a NASA sponsored and/or selected mission not necessarily led/built/managed by students	Appendix C [#]
Designated 501(c)(3) non-profit organization	The entire project is/will be focused on student or early career education, learning and/or engagement	Appendix A
	Work is underway on a NASA sponsored and/or selected mission not necessarily	Appendix C [#]

	focused on student or early career education, learning and/or engagement	
NASA Center, including Jet Propulsion Laboratory (JPL)	The entire project's design, development, and build is/will be managed and completed by early career NASA employees	Appendix B
	Work is underway on a NASA sponsored and/or selected mission not necessarily focused on early career NASA workforce development	Appendix C [#]

* Educational organizations include, but are not limited to: U.S. public, private, and charter schools that serve students grades K-12; and accredited higher education institutions; informal education institutions such as museums and science centers; and out-of-school-time youth-serving organizations that provide youth development activities on a permanent basis.

[#] Appendix C will be retired after this Announcement of Opportunity. It was included in this year's call to capture remaining active projects that do not fit into the renewed focus on education model going forward.

Respondents can submit only one CubeSat mission per proposal, but a CubeSat mission may involve multiple CubeSats if they are dependent on each other to accomplish the mission. Respondents may submit multiple proposals.

More information about the CSLI, including previously selected Respondents, is available at: http://go.nasa.gov/CubeSat_initiative.

A CubeSat is a type of space research nanosatellite. The base CubeSat dimension is approximately 10x10x11 centimeters (one "Unit" or "1U"). CubeSats supported by this Launch Initiative include volumes between 1U and 12U. CubeSats of 1U, 2U, and 3U size typically have a mass of 1.33 kilograms per 1U Cube. A 6U CubeSat typically has a mass under 12 kg, and a 12U CubeSat typically has a mass under 20 kg. The final allowable mass is dependent upon the selected dispenser and the launch vehicle environment.

NASA anticipates entering into one or more agreements with selected Respondents ("Collaborators") to support the CSLI. Participation in this Launch Initiative will be contingent upon selection by NASA and, for those entities external to NASA, an appropriate agreement containing standard terms and conditions for all CSLI Collaborators. In an effort to maintain uniformity amongst all CSLI Collaborators, NASA will not entertain or make changes to the standard terms and conditions outlined by the agreement. The standard Cooperative Research and Development Agreement (CRADA) will be posted on <https://www.nasa.gov/content/cubesat-launch-initiative-resources> shortly after the release of this announcement.

Appendix A and B proposed CubeSat investigations shall have **Education** (Appendix A) or **Workforce Development** (Appendix B) as a primary focus area. A secondary focus area of

Science or Technology Development is encouraged for Appendix A proposals and mandatory for Appendix B proposals. Appendix C proposals must have at least one of these focus areas. The description of the focus areas must be aligned with NASA's strategic goals and objectives in one or more of the following strategy documents.

The *NASA 2018 Strategic Plan* is available at:

https://www.nasa.gov/sites/default/files/atoms/files/nasa_2018_strategic_plan.pdf

The *NASA Strategy for STEM Engagement* is available at:

<https://www.nasa.gov/sites/default/files/atoms/files/nasa-strategy-for-stem-2020-23-508.pdf>

Science 2020-2024: A Vision for Scientific Excellence (NASA Science Plan) is available at:

<https://science.nasa.gov/science-red/s3fs-public/atoms/files/2020-2024%20Science.pdf>

A sampling of NASA's Science Mission Directorate's areas of interest can be found at these links:

<https://www1.grc.nasa.gov/space/pesto/> (See needed technologies sections.)

https://apd440.gsfc.nasa.gov/tech_gap_priorities.html

Finally, some of NASA Space Technology Mission Directorate's areas of interest can be found in [Attachment 1](#) of this document.

Technology areas of interest lists are not entirely comprehensive or reflect all of the Agency's technology gaps but are provided for reference purposes.

NASA will not transfer any funds to selected Collaborators under agreements established in response to this Announcement. Collaborators will be responsible for securing funding to support the development of their CubeSat payload, and for any and all other costs incurred by the Collaborator to participate in the CSLI.

A Collaborator may be required to reimburse NASA for the direct costs of the integration and launch activities in the event the Collaborator fails to meet its obligations under the collaboration agreement or terminates such agreement after NASA has incurred costs associated with integration.

2.0 GENERAL INFORMATION

Agency Name: NASA (National Aeronautics and Space Administration)

Opportunity Title: Announcement of CubeSat Launch Initiative

Response Due Date: Electronic Proposals may be received until the due date of November 19, 2021 at 4:30 p.m. EDT via email to hq-launchservices@mail.nasa.gov. This email address will only accept individual emails less than 10MB, so plan submissions accordingly. All submissions must be received in the NASA email box by the time and date referenced above. Late submissions will not be accepted. NASA will send a receipt confirmation for each proposal

received within one business day of receipt. If this receipt confirmation is not received, then send a follow-up email without any attachment to inquire if the proposal was received. NASA will work with the respondent to ensure that their proposals are received and considered, as long as it is prior to the above due date.

Points of Contact:

If you have any questions concerning this opportunity, please contact:

Ms. Sam Fonder
321-607- 2286
samantha.fonder@nasa.gov
and
Mr. Norman Phelps
321-698-5707
norman.l.phelps@nasa.gov

Instrument Type(s): Refer to the Appendices for the type of collaborative agreements NASA will use under this Announcement. Please note that standard CRADAs are used for Non-NASA CubeSats.

Evaluation Panel: Government and contractor personnel from NASA will participate in the evaluation of proposals. All contractor personnel participating in the evaluation will be bound by conflict of interest provisions and appropriate nondisclosure requirements to protect any proprietary information. Final CubeSat selection and ranking recommendations will be made by the CubeSat Selection Recommendation Committee (CSRC) consisting solely of NASA Government personnel.

Submission Instructions: All proposals submitted in response to this Announcement shall be emailed to hq-launchservices@mail.nasa.gov. Proposal files shall be submitted in a single bookmarked and searchable PDF of less than 10 MB. Paper submissions will not be accepted or reviewed. Any material submitted in response to this Announcement will not be returned. Proposals may be submitted at any time before the response date. Proposals received by the Government after the response date and time will not be considered. If a Respondent is concerned about information security during transmission, NASA can accept secure transmissions. Contact the Point of Contact listed above (Sam Fonder or Norman Phelps) for secure transmission requirements.

NASA will not issue paper copies of this Announcement. This Announcement does not constitute an obligation for NASA to begin negotiations or enter into agreements with any Respondents to carry out this activity. NASA reserves the right to select for negotiations all, some, or none of the proposals submitted in response to this Announcement. NASA will not provide any funding to Respondents for reimbursement of their proposal development costs.

It is NASA's policy to safeguard all proposals as confidential information, as provided by law. NASA will not, without permission of the Respondent, use the proposal contents for other than evaluation purposes supporting the CSLI program.

NASA does not intend to publicly disclose properly identified proprietary information that it obtains in response to this solicitation. As such, respondents must clearly mark any Proprietary Data in their proposal.

For purposes of this Announcement, “Proprietary Data” shall mean information set out in the proposal embodying trade secrets developed at private expense, or commercial or financial information that is privileged or confidential, and that includes a clear restrictive notice, unless the information is:

- i. Known or available from other sources without restriction,
- ii. Known, possessed, or developed independently, and without reference to such marked information in the proposal,
- iii. Made available by the owners to others without restriction, or
- iv. Required by law or court order to be disclosed.

With respect to such Proprietary Data, NASA shall:

- a. Use, disclose, or reproduce such Proprietary Data only as necessary to evaluate the proposal;
- b. Safeguard such Proprietary Data from unauthorized use and disclosure;
- c. Allow access to such Proprietary Data only to its employees, requiring access for purposes of evaluating the proposal;
- d. Except as otherwise indicated in c., preclude disclosure outside NASA;
- e. Notify its employees with access about their obligations under this Announcement and ensure their compliance; and
- f. Dispose of such Proprietary Data after evaluation of the proposal has concluded.

NASA reserves the right to amend or withdraw this Announcement at any time and for any reason.

3.0 ELIGIBILITY INFORMATION

U.S. organizations meeting the requirements set forth in the Appendices are eligible to submit proposals in response to this Announcement.

All proposals will be screened by NASA to determine their compliance with the Eligibility (Section 3.0 of each Appendix) and Proposal Instructions (Section 5.0 of each Appendix) of this Announcement. Proposals that do not comply may be declared noncompliant and rejected without further review. A submission compliance checklist is provided in Section 5.0 of each Appendix. This checklist provides Respondents a list of the compliance items that NASA will confirm before evaluating a Proposal.

Refer to the appendices for specific eligibility information.

4.0 PROPOSAL EVALUATION AND SELECTION

4.1 Evaluation and Selection Process

Proposals deemed to be compliant with this Announcement will be assessed by the CSRC against the evaluation criteria, which are outlined in Section 4.2 of each Appendix, and NASA programmatic factors. Respondents should be aware that NASA may request clarification of a specific point or points in a proposal during the evaluation and selection process. Such requests and each Respondent's response shall be in writing.

The CSRC will produce a single prioritized (ranked) list of Appendix A, Appendix B, and Appendix C proposed CubeSat investigations. Proposals are not weighed or given extra consideration in prioritization based on whether their eligibility is through Appendix A, B or C. This final prioritized list will be provided to the Selection Authority for selection purposes.

4.2 Evaluation Criteria

Refer to the Appendices for specific evaluation criteria.

4.3 Selection Notification

NASA will notify all Respondents of the results of the evaluation and prioritization process. After the completion of the evaluation and prioritization process, NASA will begin collaborating with the selected Respondent in priority order from the CSRC, the purpose of which is to define the terms and conditions of the agreement, to support Collaborators' participation in the project, and to align the recommended proposals with the anticipated launch manifest.

The NASA Selection Authority shall be the Director, Launch Services.

5.0 PROPOSAL INSTRUCTIONS

Proposals shall comply with the following requirements.

Page Limitations

Proposal Section	Total Pages
Proposal Cover Page	1
Proposal Title Page	1
Points of Contact	1
Proposal Abstract	750 words

Proposal Detail: 10
(not including other pages
listed above)

Appendices

Resumes No Page Limit

Compliance Documents No Page Limit

Additional Documentation No Page Limit

Pages in excess of the page limitations for each section will not be considered or evaluated. A page is defined as one (1) sheet of 8½ x 11 inches using a minimum of 12-point font size for text and 8-point font size for graphs.

Files shall be submitted in a single bookmarked and searchable PDF of less than 10 MB.

There is no limit on documentation for the appendices. This enables proposals to include documentation in its current format without altering or creating any new documents.

The Proposal shall include the following sections, in this order:

Proposal Cover Page (1 page): Title of Announcement and Proposal Contact Information. An optional graphic image may be included.

Proposal Title Page (1 page): Title and Notice of Restriction on Use and Disclosure of Proposal Information, if any; CubeSat Mission Parameters and CubeSat Project Details Tables (see appendices for Table format)

Points of Contact (1 page): List contact information for all Points of Contact (POCs), including a Technical POC. For each POC, provide:

- a. Name
- b. Title
- c. Address
- d. Phone
- e. Fax (if applicable)
- f. Email

Proposal Abstract (750 words): Executive summary describing the prominent and distinguishing features of the proposed CubeSat.

Proposal Detail (10 pages): This section shall contain appropriate detail as specified in each Appendix to this Announcement. The proposal shall contain sufficient information to enable reviewers to determine whether it complies with the eligibility information (Section 3.0 of each Appendix), and to assess the proposal based on the evaluation criteria (Section 4.2 of each Appendix). Appendices may be used to support the material in this section, but this section should not simply refer to an appendix to cover the required information

Proposal Appendices: Appendix documentation should be limited to information that supports the requirements identified in this Announcement of Opportunity. Additional information, such as letters of endorsement, will be disregarded.

- **Resumes**

- Resumes shall be included for key personnel. In general, resumes shall be limited to no more than 2 pages each.

- **Compliance Documents**

- Include any documents necessary to supplement the proposal text and satisfy the requirements of the compliance checklist (refer to the appropriate Appendix).

- **Additional documentation**

- Include any documentation in the Appendix that validates or supports the proposal, such as plans for the remaining CubeSat development, technical risks, and mitigation plans for those risks.

NASA Points of Contact

Ms. Sam Fonder
321-607- 2286
samantha.fonder@nasa.gov

Mr. Norman Phelps
321-698-5707
norman.l.phelps@nasa.gov

APPENDIX A

EDUCATIONAL AND NONPROFIT ORGANIZATION CUBESAT MISSIONS

A-1.0 INTRODUCTION

The CubeSat Launch Initiative (CSLI) provides flight opportunities for a limited number of CubeSats available to U.S. educational organizations and U.S. nonprofit organizations. CSLI provides flight opportunities to low-Earth orbit (LEO) as auxiliary payloads on launches, as well as deployments from the International Space Station (ISS), currently planned for 2023–2026.

NASA will provide integration and other services as necessary to complete the launch activity. NASA will not transfer any funds to selected Collaborators under agreements established in response to this Announcement.

A-2.0 GENERAL INFORMATION

In an effort to equitably provide launch opportunities to as many CubeSat projects as possible, NASA, via CSLI, is imposing a funding limit of \$300,000 for integration and launch services of any CubeSat mission selected, regardless of size. This funding limit will generally be adequate to launch a CubeSat up to 3U in size into LEO. If the complexity and orbit requirement for a mission causes the cost of the launch service to exceed this amount, the selected organization will be responsible for funding any additional costs.

Collaborators will be responsible for securing funding to support the development of their CubeSat payload and for all other pre-integration costs they incur to participate in the CSLI. In addition, a Collaborator may be required to reimburse NASA for the direct costs of the integration and launch activities in the event the Collaborator fails to meet its obligations under the CRADA or terminates such agreement after NASA has incurred costs associated with integration.

Response Due Date: Electronic Proposals may be received until the due date of November 19, 2021 at 4:30 p.m. EDT via email to hq-launchservices@mail.nasa.gov. This email address will only accept individual emails less than 10MB, so plan submissions accordingly. All submissions must be received in the NASA email box by the time and date referenced above. Late submissions will not be accepted. NASA will send a receipt confirmation for each proposal received within one business day of receipt. If this receipt confirmation is not received, then send a follow-up email without any attachment to inquire if the proposal was received. NASA will work with the respondent to ensure that their proposals are received and considered, as long as it is prior to the above due date.

Selection Notification: Selection is anticipated by March 11, 2022.

Shortly after selection, NASA will send the Collaborator a standard CRADA. The Collaborator should understand that this document is key to its successful participation in the CSLI. If the specified timeline for processing the CRADA is not adhered to, the Collaborator is subject to forfeiting their inclusion in the CSLI initiative.

The Terms and conditions outlined in the CRADA are final and are not subject to any changes.

Instrument Type: Cooperative Research and Development Agreement (CRADA).

A-3.0 ELIGIBILITY INFORMATION

A-3.1 Eligible Applicants

U.S. organizations meeting the following requirements are eligible to submit proposals in response to Appendix A of this Announcement.

- U.S. public, private, and charter schools that serve students grades K-12, and accredited higher education institutions; informal education institutions such as museums and science centers; and out-of-school-time youth-serving organizations that provide youth development activities on a permanent basis.
 - Entire project is led, built, and managed by students with a designated Faculty Advisor(s) or professional mentors. Professional project managers may serve only as advisors or mentors.
- Designated 501(c)(3) U.S. nonprofit organizations, excluding Federally Funded Research and Development Centers (FFRDCs), with an education and outreach component. Such organization shall elaborate on this aspect of eligibility and provide proof of its 501(c)(3) status.

Organizations meeting the above criteria MAY receive funding and support from other U.S. organizations, including NASA, FFRDCs, and For-Profit organizations.

NASA reserves the right to determine the eligibility status of all respondents proposing under Appendix A.

A-3.2 Eligibility Requirements

CubeSats Supported. Volumes between 1U and 12U. Deployed CubeSats cannot separate into parts smaller than 1U.

CubeSat Development Funding Commitment. The Respondent is responsible for securing funding to support the development of the CubeSat payload prior to submitting its proposal and for all other costs that Respondent incurs in order to support its participation in the project. **Letter(s) demonstrating sufficient financial support for remaining CubeSat development and operations activities are required and must be included in the Appendix material. The CubeSat Selection Recommendation Committee (CSRC) recommends budgeting adequate reserves in case of technical difficulties or cost overruns. If the financial commitment letters do not meet or exceed the anticipated CubeSat budget, the proposal will be rejected without further review.**

Relevance to NASA. Each CubeSat investigation shall demonstrate a benefit to NASA by addressing its goals and objectives. Specifically, each CubeSat investigation shall address an aspect of Education as outlined in the [Strategy for STEM Engagement](#). Ideally each CubeSat investigation will also feature a Science or Technology Development objective as identified in the [2018 NASA Strategic Plan](#), [NASA Science Plan](#), or other NASA strategic documents referenced above in Section 1 of this Announcement. After project completion, Collaborators are required to provide NASA a report and data on the educational accomplishments, and, as applicable, scientific research or technology developed or demonstrated that resulted from their CubeSat mission.

Education Benefit. The proposed investigation should demonstrate contribution to one or more of the following strategic goals of NASA STEM Engagement:

- Create unique opportunities for a diverse set of students to contribute to NASA's work in exploration and discovery
- Build a diverse future STEM workforce by engaging students in authentic learning experiences with NASA's people, content and/or facilities
- Attract diverse groups of students to STEM through learning opportunities that spark interest and provide connections to NASA's mission and work.

Further details on each of these strategic goals can be found in the link to the NASA Strategy for STEM Engagement above.

Merit Review. Prior to submission of proposals, each CubeSat investigation shall have passed an intrinsic merit review. In this review, the goals and objectives of the proposed investigation shall have been assessed to determine the educational quality of the investigation. If an additional focus area in science or technology was identified, the goals and objectives of the additional focus area shall have also been assessed in the merit review. Moreover, the review shall have assessed the overall alignment of the proposed investigation in addressing one or more of the education, science, or technology goals or objectives identified in the 2018 NASA Strategic Plan or other NASA strategic documents referenced above. The merit review panel shall have been comprised of individuals who were not on the CubeSat project team. Sufficient information must be provided in accordance with the scoring rubric (found later in this appendix) to enable the NASA evaluation panel to properly assess the merit review. Simply referring to a previously accomplished review is not acceptable.

Feasibility Review. Prior to submission of proposals, each CubeSat investigation shall have passed a feasibility review in which the technical implementation, including feasibility, resiliency, risk and the probability of success, were assessed. The feasibility review panel shall have been comprised of individuals who were not on the CubeSat project team. Sufficient information must be provided in accordance with the scoring rubric (found later in this appendix) to enable the NASA evaluation panel to properly assess the feasibility review. Simply referring to a previously accomplished review is not acceptable.

Launch Services Program (LSP) Requirements. To enhance compatibility with a Primary payload and to provide optimal manifesting opportunities, each CubeSat payload shall fully comply with the LSP requirements as described in “[Launch Services Program, Program Level Dispenser and CubeSat Requirements Document \(LSP-REQ-317.01B\)](#).” If a Respondent is unsure of compliance or would like to pursue a waiver to a requirement, the proposal shall identify the requirement needing clarification or identify the specific requirement(s) the Respondent seeks to have waived, and clearly state the rationale for waiver in the proposal. Please note that requesting a waiver does not guarantee that the waiver will be approved. CubeSat sizes up to 12U are acceptable, despite the size limits in LSP-REQ-317.01B.

A-3.3 Project Focus Areas

Proposals shall identify Education as a primary focus area. Applicants must describe in detail the educational aspect of their project and may identify and describe another focus area. A secondary focus area addressing a Scientific Research question, or a Technology Development/demonstration objective is encouraged. Post-flight NASA-required Collaborator deliverables will depend on the CubeSat’s project focus area(s) and will be specified in the agreement. When selecting more than one focus area, note that each focus area selected shall be appropriately supported (see Section A-4.2, Evaluation Criteria).

A-4.0 PROPOSAL EVALUATION AND SELECTION

A-4.1 Evaluation and Selection Process

The CSRC may consider a variety of programmatic factors in deciding whether to select a proposal, including, but not limited to, available launches, Launch Service requirements, waiver requests, and maintaining a programmatic and scientific balance. CSLI encourages proposals that geographically broaden program participation to states that previously have not been selected by the CubeSat Launch Initiative. Those states are: Delaware, Mississippi, Nevada, North Carolina, Oklahoma, South Carolina, South Dakota and Wyoming. Previous CubeSat Launch Initiative selectees are encouraged to partner with and/or mentor organizations from these states.

Selected proposals from any prior announcements that resulted in a prioritization for a launch opportunity will generally take precedence over the outcome from this Announcement. Manifest order will generally be in priority order unless critical needs dictate an earlier launch, or available flight opportunities enable an earlier launch.

NASA will establish agreements utilizing standard clauses with Respondents recommended for selection as manifest opportunities are available. In order to maintain uniformity amongst all CSLI Collaborators, NASA will not entertain or make changes to the standard terms and conditions outlined by the agreement(s). A recommendation for a selection does not guarantee the availability of a launch opportunity.

A-4.2 Evaluation Criteria

A-4.2.1 Overview

The evaluation criteria and associated weighting for all proposals are as follows:

- Relevance to one or more NASA Strategic Goals or Objectives (Section 4.2.2), weighted 40%;
- Outcome of Educational (mandatory), and Scientific or Technical (if applicable) Merit Review(s) (Section 4.2.3), weighted 30%; and
- Outcome of Feasibility Review (Section 4.2.4), weighted 30%.

A-4.2.2 Relevance to one or more NASA Strategic Goals or Objectives

Each CubeSat investigation shall demonstrate a benefit to NASA by addressing goals and objectives of the [2018 NASA Strategic Plan](#), [NASA Science Plan](#), or other NASA strategic documents referenced above, based on the selected focus area(s). If the respondent elects more than one focus area, the reviewers will evaluate the proposal based on all focus areas selected and the scores will be averaged to determine the final score.

Proposals shall include sufficient information and supporting details to enable the following factors to be assessed:

- Educational Focus (required):
 - Education Institutions: Does the proposal describe a student-led team conducting management, design, analysis, development, construction, and operation?
 - The proposal shall include a description of the education plan
 - Nonprofit organizations: Does the proposal describe student and/or early career engagement throughout the lifetime of the project?
- Scientific Investigation Focus (optional): Does the proposal exhibit potential to advance a scientific measurement, possibly using a new or enabling technology, influenced by the [NASA Science Plan](#)?
- Technology Demonstration Focus (optional): Does the proposal demonstration enhance future missions, reveal a flaw in a potentially enhancing technology, or otherwise impact the trade space for enhancing technologies? For additional guidance, please reference the Technology Roadmap outlined in Attachment 1 as well as the URLs featuring some of NASA's Science Mission Directorate's areas of interest in Section 1.
- Does the proposal demonstrate that the CubeSat investigation provides

benefits to NASA by addressing one or more of the goals and objectives of the [2018 NASA Strategic Plan](#), or other NASA strategic documents referenced in Section 1?

- Are these the same benefits that were reviewed in the merit review? If not, why not?
- Why is an orbital flight opportunity necessary or advantageous for providing these benefits to NASA?

A-4.2.3 Outcome of Educational and Scientific or Technical Merit Review(s)

Each CubeSat-supported investigation shall have passed an intrinsic merit review in which the goals and objectives of the proposed investigation were assessed to determine the educational (required) and scientific (optional), or technical (optional) quality of the investigation and the overall alignment of the proposed investigation to addressing one or more of the education, science, or technology, goals or objectives identified in the [2018 NASA Strategic Plan](#), or other NASA strategic documents referenced in Section 1 above.

Reviewers will assess the following factors. Proposals shall include sufficient information and supporting details to allow reviewers to assess these factors. The merit review panel shall have been comprised of individuals external to the CubeSat project team.

- What was the merit review process?
- Was the merit review competitive or noncompetitive?
- What were the qualifications of the merit review committee members? If possible, identify the members by name, title, and expertise. If this information is not available, please indicate so and explain why.
- What factors did the merit review use to assess merit?
- What was the outcome of the merit review?
- How did the Respondent respond to and/or address the findings of the merit review?

NASA is not specifying how the merit review shall be conducted. However, NASA is requiring that a determination of the merit of the CubeSat investigation be conducted **prior** to proposal submission. Any supporting documentation from the merit review that is useful in supporting this assessment may be included in the proposal as an Appendix.

A-4.2.4 Outcome of Feasibility Review

Each CubeSat investigation shall have passed a feasibility review in which the technical implementation, including feasibility, resiliency and the probability of success, was assessed.

Reviewers will assess the following factors. Proposals shall include sufficient information and supporting details to allow reviewers to assess these factors. The feasibility review panel shall have been comprised of individuals external to the CubeSat project team.

- What was the feasibility review process?
- What were the qualifications of the feasibility review committee members? If possible, identify the members by name, title, and expertise. If this information is not available, please indicate so and explain why.
- What factors did the feasibility review use to assess feasibility?
- How were the management team roles, experience, expertise and the organizational structure of the team assessed? Please note any past experience with CubeSat development.
- How was the technical development risk associated with the overall CubeSat mission assessed?
- If the CubeSat investigation requires critical technology development for flight readiness, how were the areas assessed and how were the plans for completing technology development assessed?
- Concerning the development of the CubeSat for flight, how was the probability of success assessed?
- What was the outcome of the feasibility review?
- How did Respondent respond to and/or address the findings of the feasibility review?
- Is there sufficient financial support for the development of the CubeSat payload and for all other costs incurred by Respondent to support its participation in the project?

NASA is not specifying how the feasibility review shall have been conducted. However, NASA is requiring that a determination of the feasibility of the CubeSat investigation be conducted **prior** to submission of proposals. Any supporting documentation from the feasibility review that is useful in supporting the

assessment, including project schedules, risk management plans and/or project development plans, may be included in the proposal as an Appendix.

Relevance to NASA (based upon the NASA 2018 Strategic Plan, NASA Strategic Goals for STEM Engagement, NASA Science Plan, and/or Science or Technology Areas of Interest)					
	Poor	Fair	Good	Very Good	Excellent
Address one or more NASA Strategic Plan Goals and Objectives	Investigation is not relevant to current NASA goals and objectives or science or technology areas of interest	Investigation is somewhat relevant to NASA goals and objectives or science or technology areas of interest	Investigation is relevant to high-level NASA goals and objectives or science or technology areas of interest	Investigation is relevant to specific goals and objectives in NASA strategic documents or science or technology areas of interest	Investigation is extremely relevant to specific goals and objectives in NASA strategic documents or science or technology areas of interest
NASA Benefits were reviewed as part of Merit Review	NASA benefits were not specifically reviewed as part of the Merit Review	NASA benefits were reviewed but Merit reviewers did not adequately address	Merit reviewers determined the investigation was relevant to NASA	Merit reviewers determined the investigation was very relevant to NASA	Merit reviewers determined the investigation was extremely relevant to NASA
Orbital flight opportunity is necessary or advantageous for providing benefits to NASA	Proposal addressed the topic but orbital flight opportunity is not necessary or advantageous for mission to be beneficial to NASA OR the proposal did not address the necessity for an orbital flight.	Proposal addressed the topic but orbital flight opportunity is only minimally necessary for the mission to be beneficial to NASA	Proposal addressed the topic and orbital flight opportunity is advantageous for the mission to be beneficial to NASA	Proposal addressed the topic and orbital flight opportunity is necessary for mission to be beneficial to NASA	Proposal addressed the topic and orbital flight opportunity is clearly necessary for mission to be beneficial to NASA

A-4.2.5 CubeSat Launch Initiative Educational and Non-Profit Organization CubeSat Proposal Evaluation Rubric

Merit Review Process - Determine scientific, education or technical quality of investigation					
	Poor	Fair	Good	Very Good	Excellent
Was the Merit Review competitive?	Merit Review process not described	Noncompetitive and limited internal reviewers; no external reviewers	Noncompetitive with combination of internal/external reviewers	Internal or external competition or noncompetitive w/ highly qualified reviewers	NASA, NSF, or similar competition
Qualification of Merit Reviewers	Merit Review conducted but merit reviewers were not qualified to assess the investigation OR Merit Review was not conducted	Merit Review consisted of one qualified internal or external reviewer	Qualified internal merit review panel	Qualified external merit review panel	Highly qualified external merit review panel
Factors used to Assess Merit Review	Factors provided but they were not relevant to proposed investigation OR Factors were not provided	Factors provided but some were not relevant and/or they were only minimally relevant to proposed investigation	Factors provided and were adequately relevant to the proposed investigation	Factors provided and all were relevant to proposed investigation	Factors provided and all were highly relevant to proposed investigation
Outcome of Merit Review - How did proposer respond and/or address the findings	Major findings noted in Merit Review and proposer did not adequately address these findings OR Findings of the Merit Review were not presented	Minor findings noted in Merit Review and proposer did not adequately address these findings	Proposer adequately addressed some but not all of the findings noted in the Merit Review	Proposers adequately addressed all findings noted in the Merit Review	Proposers thoroughly addressed all findings noted in the Merit Review OR there were no findings to address

A-4.2.5 CubeSat Launch Initiative Educational and Non-Profit Organization CubeSat Proposal Evaluation Rubric

Feasibility Review Process - Determine feasibility, resiliency and probability of success					
	Poor	Fair	Good	Very Good	Excellent
Feasibility Review Process	Feasibility Review process not described	Feasibility Review process was minimally described	Feasibility Review process was described	Feasibility Review process was clearly described	Applicable feasibility review process for NASA, NSF or similar competition was clearly described
Qualification of Feasibility Reviewers	Feasibility Review conducted but reviewers were not qualified to assess the investigation OR Feasibility Review was not conducted	Feasibility Review consisted of one qualified internal or external reviewer	Qualified internal feasibility review panel	Qualified external feasibility review panel	Highly qualified external feasibility review panel
Feasibility Review of management teams roles/experience, expertise and organizational structure	Reviewers expressed concerns related to team structure that were not addressed in proposal OR Feasibility Review did not review the management team	Reviewers expressed concerns related to team structure that were somewhat addressed in proposal	Reviewers did not express concerns about team structure	Reviewers determined the project has a qualified team structure	Reviewers determined the project has a highly qualified team structure
Technical development risk assessment	Reviewers identified risks that would have significant impact on project mission that were not addressed by proposer	Reviewers identified major risks that would have significant impact on project mission and some were not addressed by proposer	Reviewers identified moderate risks that would have moderate impact on project mission and some were not addressed by proposer	Reviewers identified minor risks that would have little impact on project mission and were not addressed by proposer	Reviewers identified risks that would have an impact on project mission and all were addressed by proposer OR no risks were identified
Assessment of probability of success	Reviewers determined low probability of success and proposer did not address concerns	Reviewers determined moderate probability of success but proposer did not address concerns	Reviewers determined high probability of success but proposer did not address concerns	Reviewers determined moderate probability of success and any issues related to success were addressed	Reviewers determined high probability of success and/or any issues related to success were thoroughly addressed
Outcome of Feasibility Review - How did proposer respond and/or address the findings	Major findings noted and proposer did not address any findings noted in the Feasibility Review	Minor findings noted in Feasibility Review and proposer did not address findings	Proposer addressed some but not all of the findings noted in the Feasibility Review	Proposers addressed all findings noted in the Feasibility Review	Proposers sufficiently addressed and responded to all findings noted in the Feasibility Review OR there were no findings to address

A-5.0 PROPOSAL INSTRUCTIONS

Proposal Detail: The proposal shall contain sufficient information to enable reviewers to determine whether it complies with the Eligibility Information (Section A-3.0) and to assess the proposal based on the Evaluation Criteria (Section A-4.2). The proposal shall also include:

- Description of CubeSat primary Education focus area and, an encouraged secondary focus area of Scientific Research or Technology Development/Demonstration.
- CubeSat Development: Schedule for remaining CubeSat development that supports a launch in 2023–2026.
- Summary of Requirement compliance (for example, LSP-REQ-317.01B) or required potential waivers.
- A CubeSat Mission Parameters Table using the following format:

CubeSat Mission Parameters								
Mission Name	Mass	Cube Size		Desired Orbit	Acceptable Orbit Range	Is an ISS deployment acceptable (~400 km @ 51.6 degree incl.)? Yes or No	Ready for Dispenser Integration Date	Desired Mission Life
			Altitude					
			Inclination					

- A CubeSat Project Details Table using the following format:

CubeSat Project Details					
Focus Area(s) Note: Education is pre-selected. An additional focus area is encouraged.	NASA Funding		Sponsoring Organization(s)	Collaborating Organization(s)	
	Yes or No	Organization		List	International Yes or No
Education <input checked="" type="checkbox"/>					
Science <input type="checkbox"/>					
Technology <input type="checkbox"/>					

- A Launch Services Program, Program Level Dispenser and CubeSat Requirements Document (LSP-REQ-317.01B) Waiver Request Table using the following format:

Launch Services Program, Program Level Dispenser and CubeSat Requirements Document (LSP-REQ-317.01 Rev. B) Waiver Request Table	
Requirement	Rationale for Waiver

- Funding Commitment: Letter(s) demonstrating sufficient financial support for remaining CubeSat development and operations.

Compliance checklist and required documents (all elements below are required)

Note: Failure to adequately address any of these items will result in the proposal being disqualified

- ☐ Respondent is a U.S. public, private, or charter school that serves students grades K-12, an accredited higher education institution, an informal education institution such as a museum or science center, an out-of-school-time youth-serving organization that provides youth development activities on a permanent basis, or a designated 501(c)(3) U.S. non-profit organization
- ☐ Proposing organization is not a For-Profit organization or an FFRDC
- ☐ Education Institution: Student led, managed and staffed team with applicable advisors/mentors clearly identified
- ☐ Non-profit Organization: Clear student and/or early career engagement throughout project
- ☐ Proposal has Education as a primary focus area and includes demonstration of the benefits to NASA based upon the 2018 NASA Strategic Plan, or other NASA strategic documents
- ☐ Proposal identifies another project focus area, if applicable, and similarly expands upon benefits to NASA
- ☐ Proposal includes a description of the merit review process and outcome including review committee membership
- ☐ Proposal includes a description of the feasibility review process and outcome including review committee membership
- ☐ Proposal fully complies with the Launch Services requirements or identifies any potential waivers
- ☐ Proposal includes a completed Mission Parameters Table
- ☐ Proposal includes a completed Project Details Table
- ☐ Proposal includes a schedule for remaining CubeSat development that supports a launch in 2023–2026
- ☐ Proposal includes funding commitment information and funding commitment letter(s) that show the budget fully covered

APPENDIX B NASA WORKFORCE DEVELOPMENT MISSIONS

B-1.0 INTRODUCTION

The CubeSat Launch Initiative (CSLI) is providing flight opportunities for NASA internal missions intended to foster early career NASA workforce development. The CSLI's goal is to promote hands on training of the early career NASA workforce and anticipates selection of one CubeSat project that meets this intention, however, this number could change depending on funding conditions. The CSLI provides flight opportunities to low-Earth orbit (LEO) as auxiliary payloads on launches, as well as deployments from the International Space Station (ISS), currently planned for 2023–2026.

NASA provides integration and other services as necessary to complete the launch activity. NASA will not transfer any funds to selected Collaborators under agreements established in response to this Announcement.

B-2.0 GENERAL INFORMATION

In an effort to equitably provide launch opportunities to as many CubeSat projects as possible, NASA, via the CubeSat Launch Initiative, is imposing a funding limit of \$300,000 for integration and launch services of any CubeSat mission selected, regardless of size. This funding limit will generally be adequate to launch a CubeSat up to 3U in size into LEO. If the complexity and orbit requirement for a mission causes the cost of the launch to exceed this amount, the selected organization will be responsible for funding any additional costs.

Response Due Date: Electronic Proposals may be received until the due date of November 19, 2021 at 4:30 p.m. EDT via email to hq-launchservices@mail.nasa.gov. This email address will only accept individual emails less than 10MB, so plan submissions accordingly. All submissions must be received in the NASA email box by the time and date referenced above. Late submissions will not be accepted. NASA will send a receipt confirmation for each proposal received within one business day of receipt. If this receipt confirmation is not received, then send a follow-up email without any attachment to inquire if the proposal was received. NASA will work with the respondent to ensure that their proposals are received and considered, as long as it is prior to the above due date.

Selection Notification: Selection is anticipated by March 11, 2022.

Instrument Type(s): N/A

B-3.0 ELIGIBILITY INFORMATION

B-3.1 Eligible Applicants

Internal NASA and Jet Propulsion Laboratory (JPL) funded Cubesat projects meeting the following requirements are eligible to submit proposals in response to Appendix B of this

Announcement.

- Team must be composed of all NASA career employees who received their terminal degree (AA, BS/BA, MS, or PhD) and are within the first 10 years of their career. Early career on-site support contractors at NASA Centers and/or JPL meeting the same criteria may also participate as core team members. NASA career employees and support contractors in the first 3 years of a discipline change may also participate as core team members. One or more team mentor(s) consisting of a senior NASA employee(s) is encouraged to promote knowledge transfer.

NASA reserves the right to determine the eligibility status of all respondents proposing under Appendix B.

B-3.2 Eligibility Requirements

CubeSats Supported. Volumes between 1U and 12U. Deployed CubeSats cannot separate into parts smaller than 1U.

CubeSat Development Funding Commitment. The Respondent is responsible for securing funding to support the development of the CubeSat payload prior to submitting its proposal and for all other costs that Respondent incurs in order to support its participation in the project. **Documentation demonstrating sufficient financial support for remaining CubeSat development and operations activities is required and must be included in the Appendix material. The CubeSat Selection Recommendation Committee (CSRC) recommends budgeting adequate reserves in case of technical difficulties or cost overruns. If the financial commitment documentation does not meet or exceed the anticipated CubeSat budget, the proposal will be rejected without further review.**

Potential Impact. Each CubeSat investigation must demonstrate potential to enable, enhance or otherwise influence the identified mission focus area in addition to the mandatory primary focus area of Workforce Development. More specifically, each CubeSat investigation shall result in an impact on future missions, advance scientific measurement, or potentially validate a new or enabling technology. After project completion, Collaborators are expected to publish or present results in a professional setting. Presentations in informal settings such as classrooms are also encouraged.

Feasibility Review. Prior to submission of proposals, each CubeSat investigation shall have passed a feasibility review in which the technical implementation, including feasibility, resiliency, risk and the probability of success, are assessed. The feasibility review panel shall have been comprised of individuals who were not on the CubeSat project team. Sufficient information must be provided in accordance with the scoring rubric (found later in this appendix) to enable the NASA evaluation panel to properly assess the feasibility review. Simply referring to a previously accomplished review is not acceptable.

Launch Services Program (LSP) Requirements. To enhance compatibility with a Primary payload and to provide optimal manifesting opportunities, each CubeSat payload shall fully

comply with the LSP requirements as described in “[Launch Services Program, Program Level Dispenser and CubeSat Requirements Document \(LSP-REQ-317.01B\)](#).” If a Respondent is unsure of compliance or would like to pursue a waiver to a requirement, the proposal shall identify the requirement needing clarification or identify the specific requirement(s) the Respondent seeks to have waived, and clearly state the rationale for waiver in the proposal. Please note that requesting a waiver does not guarantee that the waiver will be approved. CubeSat sizes up to 12U are acceptable, despite the size limits in LSP-REQ-317.01B.

B-3.3 Project Focus Areas

Proposals shall identify early career NASA Workforce Development as a primary focus area. A secondary focus area addressing a Scientific Research question, or a Technology Development/demonstration objective is also required.

B-4.0 PROPOSAL EVALUATION AND SELECTION

B-4.1 Evaluation and Selection Process

The CSRC may consider a variety of programmatic factors in deciding whether to select a proposal, including, but not limited to, available launches, Launch Service requirements waiver requests, and maintaining a programmatic and scientific balance across the sponsoring organizations.

Selected proposals from any prior announcements that resulted in a prioritization for a launch opportunity will generally take precedence over the outcomes from this Announcement. Manifest order will generally be in priority order unless critical needs dictate an earlier launch or available flight opportunities enable an earlier launch.

A recommendation for a selection does not guarantee the availability of a launch opportunity.

B-4.2 Evaluation Criteria

B-4.2.1 Overview

The evaluation criteria and associated weighting for all proposals are as follows:

- Potential Impact to NASA (Section 4.2.2), weighted 60%; and
- Outcome of Feasibility Review (Section 4.2.5), weighted 40%.

B-4.2.2 Potential Impact to NASA

Each investigation shall demonstrate potential impact to NASA goals and objectives of the [2018 NASA Strategic Plan](#), or other NASA strategic documents referenced in Section 1 above, based on the selected focus areas. The reviewers will evaluate the proposal based on the Workforce Development, and scientific or technology focus of

the project, and the scores will be averaged to determine the final score.

Proposals shall include sufficient information and supporting details to enable the following factors to be assessed:

- Workforce Development Focus (required): Does the proposal provide for meaningful involvement of early career employees in the project through management, design, analysis and development, construction, and operation?
 - The proposal shall include a description of the workforce development plan.

Proposal **MUST** also include **one** of the following focus areas:

- Scientific Investigation Focus: Does the proposal exhibit potential to advance a scientific measurement, possibly using a new or enabling technology, influenced by the [NASA Science Plan](#)?
- Technology Demonstration Focus: Does the proposal demonstration enhance future missions, reveal a flaw in a potentially enhancing technology, or otherwise impact the trade space for enhancing technologies? For additional guidance, please reference the Technology Roadmap outlined in Attachment 1 as well as the URLs featuring some of NASA's Science Mission Directorate's areas of interest in Section 1.

B-4.2.3 Outcome of Feasibility Review

Each CubeSat investigation shall have passed a feasibility review in which the technical implementation, including feasibility, resiliency and the probability of success, was assessed.

Reviewers will assess the following factors. Proposals shall include sufficient information and supporting details to allow reviewers to assess these factors. The feasibility review panel shall have been comprised of individuals external to the CubeSat project team.

- What was the feasibility review process?
- What were the qualifications of the feasibility review committee members? If possible, identify the members by name, title, and expertise. If this information is not available, please indicate so and explain why.
- What factors did the feasibility review use to assess feasibility?
- How were the management team roles, experience, expertise and the organizational structure of the team assessed? Please note any past experience with CubeSat development.

- How was the technical development risk associated with the overall CubeSat mission assessed?
- If the CubeSat investigation requires critical technology development for flight readiness, how were the areas assessed and how were the plans for completing technology development assessed?
- Concerning the development of the CubeSat for flight, how was the probability of success assessed?
- What was the outcome of the feasibility review?
- How did Respondent respond to and/or address the findings of the feasibility review?
- Is there sufficient financial support for the development of the CubeSat payload and for all other costs incurred by Respondent to support its participation in the project?

NASA is not specifying how the feasibility review shall be conducted. However, NASA is requiring that a determination of the feasibility of the CubeSat investigation be conducted **prior** to proposal submission. Any supporting documentation from the feasibility review that is useful in supporting the assessment, including project schedules, risk management plans and/or project development plans, may be included in the proposal as an Appendix.

B-4.2.4 CubeSat Launch Initiative NASA-Sponsored/Selected CubeSat Proposal Evaluation Rubric

Potential Impact to NASA - Provides meaningfully improved performance to current state of the art or capabilities					
	Poor	Fair	Good	Very Good	Excellent
Potential Impact to NASA for missions that denote a focus area on a Technology Demonstration	Positive or negative outcome has slight impact on future NASA missions	Outcome may have some impact on future NASA missions	May enhance future missions, reveal a flaw in a potentially enhancing technology, or otherwise impact the trade space for enhancing technologies	May significantly enhance future missions, reveal a flaw in a technology that could be significantly enhancing or otherwise impact the trade space for significantly enhancing technologies	May result in development of an enabling technology for future missions, reveal a flaw in a potentially enabling technology, or otherwise impact the trade space for enabling technologies
Potential Impact to NASA for missions that denote a focus area on a Scientific Investigation	Slight impact on NASA science or technology maturation strategic objectives	Exhibits a nominal response to NASA science objectives where outcome may have some impact on future NASA missions	Exhibits potential to advance a scientific measurement, possibly using a new or enabling technology, influenced by the NASA Science Plan	Exhibits significant potential to advance a scientific measurement, possibly using a new or enabling technology, relevant to the NASA Science Plan	Will produce a scientific measurement, or validate a new or enabling technology, identified in the current National Academies Decadal Surveys and/or NASA Science Plan
Potential Impact to NASA for missions that denote a focus area on Workforce Development	Nominal early career employee participation in the project; early career employee contributions are ancillary to the success of the project	Reasonable early career employee participation in the project; early career employee contributions appear to have some impact on the success of the project	Meaningful involvement of early career employees in the project through scientific or technical design and development or hands-on work	Early career employee-led project, and proposal demonstrates significant early career employee participation in the project through scientific or technical design and development or hands-on work	Early career employee-led project, and proposal demonstrates significant early career employee participation in the project through scientific or technical design and development or hands-on work plus project has the potential for scalability through partnerships, expansion to workforce development networks, and has produced transition materials/ documentation in the event team members are rotated in and out of the project.

B-4.2.4 CubeSat Launch Initiative NASA-Sponsored/Selected CubeSat Proposal Evaluation Rubric

Feasibility Review Process - Determine feasibility, resiliency and probability of success					
	Poor	Fair	Good	Very Good	Excellent
Feasibility Review Process	Feasibility Review process not described	Feasibility Review process was minimally described	Feasibility Review process was described	Feasibility Review process was clearly described	Applicable feasibility review process for NASA, NSF or similar competition was clearly described
Qualification of Feasibility Reviewers	Feasibility Review conducted but reviewers were not qualified to assess the investigation OR Feasibility Review was not conducted	Feasibility Review consisted of one qualified internal or external reviewer	Qualified internal feasibility review panel	Qualified external feasibility review panel	Highly qualified external feasibility review panel
Feasibility Review of management teams roles/experience, expertise and organizational structure	Reviewers expressed concerns related to team structure that were not addressed in proposal OR Feasibility Review did not review the management team	Reviewers expressed concerns related to team structure that were somewhat addressed in proposal	Reviewers did not express concerns about team structure	Reviewers determined the project has a qualified team structure	Reviewers determined the project has a highly qualified team structure
Technical development risk assessment	Reviewers identified risks that would have significant impact on project mission that were not addressed by proposer	Reviewers identified major risks that would have significant impact on project mission and some were not addressed by proposer	Reviewers identified moderate risks that would have moderate impact on project mission and some were not addressed by proposer	Reviewers identified minor risks that would have little impact on project mission and were not addressed by proposer	Reviewers identified risks that would have an impact on project mission and all were addressed by proposer OR no risks were identified
Assessment of probability of success	Reviewers determined low probability of success and proposer did not address concerns	Reviewers determined moderate probability of success but proposer did not address concerns	Reviewers determined high probability of success but proposer did not address concerns	Reviewers determined moderate probability of success and any issues related to success were addressed	Reviewers determined high probability of success and/or any issues related to success were thoroughly addressed
Outcome of Feasibility Review - How did proposer respond and/or address the findings	Major findings noted and proposer did not address any findings noted in the Feasibility Review	Minor findings noted in Feasibility Review and proposer did not address findings	Proposer addressed some but not all of the findings noted in the Feasibility Review	Proposers addressed all findings noted in the Feasibility Review	Proposers sufficiently addressed and responded to all findings noted in the Feasibility Review OR there were no findings to address

B-5.0 PROPOSAL INSTRUCTIONS

Proposal Detail: The proposal shall contain sufficient information to enable reviewers to determine whether it complies with the Eligibility Information (Section B-3.0) and to assess the proposal based on the Evaluation Criteria (Section B-4.2). The proposal shall also include:

- Documentation demonstrating NASA workforce development intent is being satisfied.
- Description of CubeSat primary Workforce Development and secondary focus area of Scientific Research or Technology Development/Demonstration.
- CubeSat Development: Schedule for remaining CubeSat development that supports a launch in 2023–2026.
- Summary of Requirement compliance or required potential waivers.
- A CubeSat Mission Parameters Table using the following format:

CubeSat Mission Parameters								
Mission Name	Mass	Cube Size		Desired Orbit	Acceptable Orbit Range	Is ISS deployment acceptable (~400 km @ 51.6 degree incl.)? – Yes or No	Ready for Dispenser Integration Date	Desired Mission Life
			Altitude					
			Inclination					

- A CubeSat Project Details Table using the following format:

CubeSat Project Details					
Focus Area(s) Note: Workforce Development is pre-selected, but an additional focus area is required	NASA Funding		Sponsoring Organization(s)	Collaborating Organization(s)	
	Yes or No	Organization		List	International Yes or No
Workforce Dev <input checked="" type="checkbox"/> Science <input type="checkbox"/> Technology <input type="checkbox"/>					

- A Launch Services Program, Program Level Dispenser and CubeSat Requirements Document (LSP-REQ-317.01 Rev B) Waiver Request Table using the following format:

Launch Services Program, Program Level Dispenser and CubeSat Requirements Document (LSP-REQ-317.01) Waiver Request Table	
Requirement	Rationale for Waiver

Compliance checklist and required documents (all elements below are required)

- ☐ Respondent is an internal NASA or JPL developed CubeSat.
- ☐ Proposal includes documentation demonstrating NASA workforce development intent is being satisfied.
- ☐ Proposal identifies Workforce Development and another project focus area.
- ☐ Proposal describes potential impact to NASA based upon the 2018 NASA Strategic Plan, or other NASA strategic documents
- ☐ Proposal includes a description of the feasibility review process and outcome including review committee membership
- ☐ Proposal fully complies with the Launch Services requirements or identifies any potential waivers
- ☐ Proposal includes a completed Mission Parameters Table
- ☐ Proposal includes a completed Project Details Table
- ☐ Proposal includes a schedule for remaining CubeSat development that supports a launch in 2023–2026
- ☐ Proposal includes funding commitment information that shows the budget fully covered

APPENDIX C NASA-SPONSORED AND/OR SELECTED CUBESAT MISSIONS

C-1.0 INTRODUCTION

Historically, the CubeSat Launch Initiative (CSLI) has provided flight opportunities for NASA-sponsored and/or selected missions that were developed at a university, non-profit, or NASA Center, but lacked a specific emphasis on education. CSLI is restructuring to limit the selection of NASA-sponsored or selected CubeSats in this category and therefore will only be considering missions that were sponsored or selected prior to this Announcement of Opportunity.

For the purpose of this Announcement, a NASA-sponsored and/or -selected CubeSat is defined as a CubeSat selected and funded by NASA through a competitive process for CubeSat development or is funded entirely by a NASA Center, NASA Mission Directorate, or a Federally Funded Research and Development Center (FFRDC) for the development of a CubeSat, but the project is not student/early career employee led and executed. All CubeSats developed or funded internally by a NASA Center, must be in the hardware development or implementation phase of their project.

The CubeSat Launch Initiative (CSLI) will provide or facilitate flight opportunities to low-Earth orbit (LEO) as auxiliary payloads on launches, as well as deployments from the International Space Station (ISS), currently planned for 2023-2026.

NASA provides integration and other services as necessary to complete the launch activity. NASA will not transfer any funds to selected Collaborators under agreements established in response to this Announcement.

C-2.0 GENERAL INFORMATION

In an effort to equitably provide launch opportunities to as many CubeSat projects as possible, NASA, via the CubeSat Launch Initiative, is imposing a funding limit of \$300,000 for integration and launch services of any CubeSat mission selected, regardless of size. This funding limit will generally be adequate to launch a CubeSat up to 3U in size into LEO. If the complexity and orbit requirement for a mission causes the cost of the launch to exceed this amount, the selected organization will be responsible for funding any additional costs.

In addition, a Collaborator may be required to reimburse NASA for the direct costs of the integration and launch activities in the event the Collaborator fails to meet its obligations under the collaboration agreement or terminates such agreement after NASA has incurred costs associated with integration.

Response Due Date: Electronic Proposals may be received until the due date of November 19, 2021 at 4:30 p.m. EDT via email to hq-launchservices@mail.nasa.gov. This email address will only accept individual emails less than 10MB, so plan submissions accordingly. All submissions must be received in the NASA email box by the time and date referenced above. Late submissions will not be accepted. NASA will send a receipt confirmation for each proposal

received within one business day of receipt. If this receipt confirmation is not received, then send a follow-up email without any attachment to inquire if the proposal was received. NASA will work with the respondent to ensure that their proposals are received and considered, as long as it is prior to the above due date.

Selection Notification: Selection is anticipated by March 11, 2022.

Shortly after selection, non-NASA Collaborators will receive a customized CRADA. The Collaborator should understand that this document is key to its successful participation in the CSLI. If the specified timeline for processing the CRADA is not adhered to, the Collaborator is subject to forfeiting their inclusion in the initiative

The Terms and conditions outlined in the CRADA are final and are not subject to any changes.

Instrument Type(s): Cooperative Research and Development Agreement (CRADA) unless from NASA Center.

C-3.0 ELIGIBILITY INFORMATION

C-3.1 Eligible Applicants

U.S. non-profit organizations, NASA Centers, U.S. educational organizations (K-12 public, private, and charter schools, undergraduate universities, graduate universities) and/or Federally Funded Research and Development Centers (FFRDCs) meeting the following requirements are eligible to submit proposals in response to Appendix C of this Announcement.

- The proposed CubeSat mission shall have been previously selected and funded by NASA through a competitive process for CubeSat development or is funded entirely by a NASA Center or Mission Directorate for the development of the CubeSat. To qualify for this announcement, the competitive and selection process must have been completed prior to the release of this Announcement of Opportunity and the project is not student/early career employee led and executed. (If the entire project is student/early career hire led and executed, submit under Appendix A.) After this year, this Appendix will be retired.
- Internal NASA missions proposing under these criteria must already be in the hardware development or project implementation phase of their mission.

NASA reserves the right to determine the eligibility status of all respondents proposing under Appendix C.

Organizations meeting the above criteria MAY receive funding and support from other U.S. organizations, including NASA, FFRDCs, and For-Profit organizations.

C-3.2 Eligibility Requirements

CubeSats Supported. Volumes between 1U and 12U. Deployed CubeSats cannot separate into parts smaller than 1U.

CubeSat Development Funding Commitment. Respondent must provide documentation demonstrating NASA sponsored and/or selected the CubeSat mission through a competitive process for CubeSat development, or is funded entirely by a NASA Center, NASA Mission Directorate, or Federally Funded Research and Development Center (FFRDC) for the development of the CubeSat. **Documentation demonstrating sufficient financial support for remaining CubeSat development and operations activities are required and must be included in the Appendix material. The CubeSat Selection Recommendation Committee (CSRC) recommends budgeting adequate reserves in case of technical difficulties or cost overruns. If the financial commitment documentation does not meet or exceed the anticipated CubeSat budget, the proposal will be rejected without further review.**

Potential Impact. Each CubeSat investigation must demonstrate potential to enable, enhance or otherwise influence the identified mission focus area. More specifically, each CubeSat investigation shall result in an impact on future missions, advance scientific measurement, or potentially validate a new or enabling technology. After project completion, external Collaborators are required to provide NASA a report and data on the educational accomplishments, scientific research, or technology developed or demonstrated that resulted from their CubeSat mission. Internal Collaborators are expected to publish or present results in a professional setting.

Feasibility Review. Prior to submission of proposals, each CubeSat investigation shall have passed a feasibility review in which the technical implementation, including feasibility, resiliency, risk and the probability of success, was assessed. The feasibility review panel shall have been comprised of individuals who were not on the CubeSat project team. Sufficient information must be provided in accordance with the scoring rubric (found later in this document) to enable the NASA evaluation panel to properly assess the feasibility review. Simply referring to a previously accomplished review is not acceptable.

Launch Services Program (LSP) Requirements. To enhance compatibility with a Primary payload and to provide optimal manifesting opportunities, each CubeSat payload shall fully comply with the LSP requirements as described in “[Launch Services Program, Program Level Dispenser and CubeSat Requirements Document \(LSP-REQ-317.01B\)](#).” If a Respondent is unsure of compliance or would like to pursue a waiver to a requirement, the proposal shall identify the requirement needing clarification or identify the specific requirement(s) the Respondent seeks to have waived, and clearly state the rationale for waiver in the proposal. Please note that requesting a waiver does not guarantee that the waiver will be approved. CubeSat sizes up to 12U are acceptable, despite the size limits in LSP-REQ-317.01B.

C-3.3 Project Focus Area

Proposals shall identify a primary focus area in either Education, Scientific Research, or Technology Development/demonstration. A secondary focus area is encouraged but will not affect scoring if absent. Post-flight NASA-required Collaborator deliverables will depend on the CubeSat's project focus and will be specified in the established agreement. When selecting more than one focus area, note that each focus area selected shall be appropriately supported (see Section C-4.2, Evaluation Criteria).

C-4.0 PROPOSAL EVALUATION AND SELECTION

C-4.1 Evaluation and Selection Process

The CSRC may consider a variety of programmatic factors in deciding whether to select a proposal, including, but not limited to, available launches, Launch Service requirements waiver requests, and maintaining a programmatic and scientific balance across the sponsoring organizations.

Selected proposals from any prior announcements that resulted in a prioritization for a launch opportunity will generally take precedence over the outcomes from this Announcement. Manifest order will generally be in priority order unless critical needs dictate an earlier launch or available flight opportunities enable an earlier launch.

For external NASA projects, NASA will establish agreements utilizing standard clauses with Respondents recommended for selection as manifest opportunities are available. To maintain uniformity amongst all CSLI Collaborators, NASA will neither entertain, nor make changes to the standard terms and conditions outlined by the agreement. A recommendation for a selection does not guarantee the availability of a launch opportunity.

C-4.2 Evaluation Criteria

C-4.2.1 Overview

The evaluation criteria and associated weighting for all proposals are as follows:

- Potential Impact to NASA (Section 4.2.2), weighted 60%; and
- Outcome of Feasibility Review (Section 4.2.5), weighted 40%.

C-4.2.2 Potential Impact to NASA

Each investigation shall demonstrate potential impact to NASA goals and objectives of the [2018 NASA Strategic Plan](#), [NASA Science Plan](#), or other NASA strategic documents referenced above, based on the selected focus areas. The reviewers will evaluate the proposal based on the focus area(s) selected, and the scores will be averaged to determine the final score.

Proposals shall include sufficient information and supporting details to enable the following factors to be assessed:

- Educational Focus: Does the proposal provide for meaningful involvement of students or early career employees in the project through management, design, analysis and development, construction, and operation?
 - The proposal shall include a description of the education plan.
- Scientific Investigation: Does the proposal exhibit potential to advance a scientific measurement, possibly using a new or enabling technology, influenced by the [NASA Science Plan](#)?
- Technology Demonstration: Does the proposal demonstration enhance future missions, reveal a flaw in a potentially enhancing technology, or otherwise impact the trade space for enhancing technologies? For additional guidance, please reference the Technology Roadmap outlined in Attachment 1 as well as the URLs featuring some of NASA's Science Mission Directorate's areas of interest in Section 1.

C-4.2.3 Outcome of Feasibility Review

Each CubeSat investigation shall have passed a feasibility review in which the technical implementation, including feasibility, resiliency and the probability of success, was assessed.

Reviewers will assess the following factors. Proposals shall include sufficient information and supporting details to allow reviewers to assess these factors. The feasibility review panel shall have been comprised of individuals external to the CubeSat project team.

- What was the feasibility review process?
- What were the qualifications of the feasibility review committee members? If possible, identify the members by name, title, and expertise. If this information is not available, please indicate so and explain why.
- What factors did the feasibility review use to assess feasibility?
- How were the management team roles, experience, expertise and the organizational structure of the team assessed? Please note any past experience with CubeSat development.
- How was the technical development risk associated with the overall CubeSat mission assessed?
- If the CubeSat investigation requires critical technology development for flight readiness, how were the areas assessed and how were the plans for

completing technology development assessed?

- Concerning the development of the CubeSat for flight, how was the probability of success assessed?
- What was the outcome of the feasibility review?
- How did Respondent respond to and/or address the findings of the feasibility review?
- Is there sufficient financial support for the development of the CubeSat payload and for all other costs incurred by Respondent to support its participation in the project?

NASA is not specifying how the feasibility review shall be conducted. However, NASA is requiring that a determination of the feasibility of the CubeSat investigation be conducted **prior** to proposal submission. Any supporting documentation from the feasibility review that is useful in supporting the assessment, including project schedules, risk management plans and/or project development plans, may be included in the proposal as an Appendix.

Potential Impact to NASA - Provides meaningfully improved performance to current state of the art or capabilities					
	Poor	Fair	Good	Very Good	Excellent
Potential Impact to NASA for missions that denote a focus area on a Technology Demonstration	Positive or negative outcome has slight impact on future NASA missions	Outcome may have some impact on future NASA missions	May enhance future missions, reveal a flaw in a potentially enhancing technology, or otherwise impact the trade space for enhancing technologies	May significantly enhance future missions, reveal a flaw in a technology that could be significantly enhancing or otherwise impact the trade space for significantly enhancing technologies	May result in development of an enabling technology for future missions, reveal a flaw in a potentially enabling technology, or otherwise impact the trade space for enabling technologies
Potential Impact to NASA for missions that denote a focus area on a Scientific Investigation	Slight impact on NASA science or technology maturation strategic objectives	Exhibits a nominal response to NASA science objectives where outcome may have some impact on future NASA missions	Exhibits potential to advance a scientific measurement, possibly using a new or enabling technology, influenced by the NASA Science Plan	Exhibits significant potential to advance a scientific measurement, possibly using a new or enabling technology, relevant to the NASA Science Plan	Will produce a scientific measurement, or validate a new or enabling technology, identified in the current National Academies Decadal Surveys and/or NASA Science Plan
Potential Impact to NASA for missions that denote a focus area on Education	Nominal student participation in the project; student contributions are ancillary to the success of the project	Reasonable student participation in the project; student contributions appear to have some impact on the success of the project	Meaningful involvement of students in the project through scientific or technical design and development or hands-on work	Student-led project or proposal demonstrates significant student participation in the project through scientific or technical design and development or hands-on work	Student-led project or proposal demonstrates significant student participation in the project through scientific or technical design and development or hands-on work plus project has the potential for scalability through partnerships, expansion to educational networks, or dissemination of widely-accessible educational materials

C-4.2.4 CubeSat Launch Initiative NASA-Sponsored/Selected CubeSat Proposal Evaluation Rubric

Feasibility Review Process - Determine feasibility, resiliency and probability of success					
	Poor	Fair	Good	Very Good	Excellent
Feasibility Review Process	Feasibility Review process not described	Feasibility Review process was minimally described	Feasibility Review process was described	Feasibility Review process was clearly described	Applicable feasibility review process for NASA, NSF or similar competition was clearly described
Qualification of Feasibility Reviewers	Feasibility Review conducted but reviewers were not qualified to assess the investigation OR Feasibility Review was not conducted	Feasibility Review consisted of one qualified internal or external reviewer	Qualified internal feasibility review panel	Qualified external feasibility review panel	Highly qualified external feasibility review panel
Feasibility Review of management teams roles/experience, expertise and organizational structure	Reviewers expressed concerns related to team structure that were not addressed in proposal OR Feasibility Review did not review the management team	Reviewers expressed concerns related to team structure that were somewhat addressed in proposal	Reviewers did not express concerns about team structure	Reviewers determined the project has a qualified team structure	Reviewers determined the project has a highly qualified team structure
Technical development risk assessment	Reviewers identified risks that would have significant impact on project mission that were not addressed by proposer	Reviewers identified major risks that would have significant impact on project mission and some were not addressed by proposer	Reviewers identified moderate risks that would have moderate impact on project mission and some were not addressed by proposer	Reviewers identified minor risks that would have little impact on project mission and were not addressed by proposer	Reviewers identified risks that would have an impact on project mission and all were addressed by proposer OR no risks were identified
Assessment of probability of success	Reviewers determined low probability of success and proposer did not address concerns	Reviewers determined moderate probability of success but proposer did not address concerns	Reviewers determined high probability of success but proposer did not address concerns	Reviewers determined moderate probability of success and any issues related to success were addressed	Reviewers determined high probability of success and/or any issues related to success were thoroughly addressed
Outcome of Feasibility Review - How did proposer respond and/or address the findings	Major findings noted and proposer did not address any findings noted in the Feasibility Review	Minor findings noted in Feasibility Review and proposer did not address findings	Proposer addressed some but not all of the findings noted in the Feasibility Review	Proposers addressed all findings noted in the Feasibility Review	Proposers sufficiently addressed and responded to all findings noted in the Feasibility Review OR there were no findings to address

C-5.0 PROPOSAL INSTRUCTIONS

Proposal Detail: The proposal shall contain sufficient information to enable reviewers to determine whether it complies with the Eligibility Information (Section C-3.0) and to assess the proposal based on the Evaluation Criteria (Section C-4.2). The proposal shall also include:

- Documentation demonstrating NASA sponsored and/or selected the CubeSat mission through a competitive process for CubeSat development.
- Description of CubeSat primary and, if appropriate, secondary focus area: Education, Scientific Research, or Technology Development/Demonstration.
- CubeSat Development: Schedule for remaining CubeSat development that supports a launch in 2023–2026.
- Summary of Requirement compliance or required potential waivers.
- A CubeSat Mission Parameters Table using the following format:

CubeSat Mission Parameters								
Mission Name	Mass	Cube Size		Desired Orbit	Acceptable Orbit Range	Is ISS deployment acceptable (~400 km @ 51.6 degree incl.)? – Yes or No	Ready for Dispenser Integration Date	Desired Mission Life
			Altitude					
			Inclination					

- A CubeSat Project Details Table using the following format:

CubeSat Project Details						
Focus Area(s)	Student Involvement Yes or No	NASA Funding		Sponsoring Organization(s)	Collaborating Organization(s)	
		Yes or No	Organization		List	International – Yes or No
Education <input type="checkbox"/>						
Science <input type="checkbox"/>						
Technology <input type="checkbox"/>						

- A Launch Services Program, Program Level Dispenser and CubeSat Requirements Document (LSP-REQ-317.01 Rev B) Waiver Request Table using the following format:

Launch Services Program, Program Level Dispenser and CubeSat Requirements Document (LSP-REQ-317.01) Waiver Request Table	
Requirement	Rationale for Waiver

Compliance checklist and required documents (all elements below are required)

- ☐ Respondent is a NASA Center, an U.S. educational organization, a U.S. non-profit organization, or Federally Funded Research and Development Center (FFRDC)
- ☐ Proposal includes documentation demonstrating NASA-sponsored and/or NASA-selected CubeSat mission through a competitive process for CubeSat development.
- ☐ Proposal describes potential impact to NASA
- ☐ Proposal identifies at least one project focus area and includes demonstration of the benefits to NASA based upon the [2018 NASA Strategic Plan](#), [NASA Science Plan](#), or other NASA strategic documents
- ☐ Proposal includes a description of the feasibility review process and outcome including review committee membership
- ☐ Proposal fully complies with the Launch Services requirements or identifies any potential waivers
- ☐ Proposal includes a completed Mission Parameters Table
- ☐ Proposal includes a completed Project Details Table
- ☐ Proposal includes a schedule for remaining CubeSat development that supports a launch in 2023–2026
- ☐ Proposal includes funding commitment information that shows the budget fully covered

Attachment 1

NASA Space Technology Mission Directorate Areas of Interest

The Space Technology Mission Directorate (STMD) seeks to rapidly develop, demonstrate, and transfer revolutionary, high-payoff technologies in partnership with our commercial, academic, and other U.S. Government agency partners. STMD strategically invests in technologies that enable NASA and the Nation to Go, Land, Live, Explore, and Lead.

Within that strategic framework, STMD has interest in technologies that support emerging space industries including satellite servicing and assembly, in space manufacturing, and small spacecraft technologies.

Current areas of interest for small spacecraft technologies include, but are not limited to:

Supporting National Efforts at the Moon and in Cislunar Space, Inclusive of Human and Robotic Exploration and Scientific Discovery, this includes:

- Capabilities for cislunar logistics, inclusive of weak GPS/GNSS navigation, small spacecraft scale navigation using natural signals of opportunity (such as pulsars), and interoperable communications compatible with the LunaNet architecture.

Earth-Observing Capabilities to Support Breakthrough Science and National Efforts to Address Climate Change, this includes:

- Technologies to help enable radiation tolerant / hardened interoperable RF and optical communications systems for in space relay capabilities and high bandwidth data downlink, especially compact systems that are compatible with small spacecraft platforms and are low cost enough to be deployed across large sensor webs. This may also include low cost ground terminals for optical communications.
- Technologies for cooperative heterogeneous multiplatform systems (suborbital and orbital) that can autonomously detect events or objects of interest, communicate that data to other orbital, airborne, or ground based assets, and optimize data collection across the multiplatform system with reduced reliance on human in the loop interaction.
- Technologies that support remote sensing instruments, such as compact cryocoolers, and radiation tolerant / hardened technologies for advanced sensing capabilities - including free space atom interferometry and quantum sensing. NASA is also interested in free space atom interferometry and quantum sensing capabilities for missions beyond Earth.

Technologies that Ensure National Leadership in Space and Help the Commercial Space Industry Grow, this includes:

- Technologies that support satellite servicing and assembly, including: Small inspectors to diagnose anomalies to enable corrective action and in-space repair operations. Commercial servicers that can conduct planned and on-demand repair and maintenance. Capabilities and standard interfaces to enable frequent upgrades and hosting of both operational and experimental instruments or payloads. Capabilities and standard interfaces to enable refueling of multiple vehicles in multiple orbits.
- Capabilities for small spacecraft platforms that enable future NASA, U.S. Government or U.S. commercial constellations, distributed systems, and sensor webs including interoperable communications (also see above) and capabilities that enable autonomous coordination of conjunction assessment and avoidance for small spacecraft and constellations.
- Capabilities that enable on demand access to unique orbits from standard launch opportunities.
- Propulsion systems and supporting subsystems for compact high throughput propulsion that enable greater than 1km/s of ΔV for a 12U class spacecraft. Propellant characterization for less toxic ("green") and other non-traditional propellants such as ionic liquids and gasified metallic compounds. Systems to aid deorbit from 400km+ at end of mission for small spacecraft.