



PROPOSAL GUIDELINES

Microgravity Neutral Buoyancy Experiment Design Teams
(Micro-g NExT)



National Aeronautics and Space Administration
Lyndon B. Johnson Space Center
Houston, TX

Title of Design

Design Challenge Addressed

Team Name

Optional Team Logo

Academic Institution Name

Address

Team Contact

Student Name

Email Address

Phone Number

Concept Video Pitch

Unlisted YouTube Video Link

Team Members

(Please list ALL team members. No more than 2 former Micro-g NExT team members per team. Identify former Micro-g NExT team members with an asterisk.)*

Team Member Name – Role

Email address – Academic year/Academic major

Team Member Name – Role

Email address – Academic year/Academic major

Team Member Name – Role

Email address – Academic year/Academic major

Team Member Name – Role

Email address – Academic year/Academic major

Faculty Advisor

Faculty Name

Email Address

Phone Number

Faculty Advisor Signature

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1. Introduction

Micro-g Neutral Buoyancy Experiment Design Teams (Micro-g NExT) challenges undergraduate students to design, build, and test a tool or device that addresses an authentic, current space exploration challenge. The overall experience includes hands-on engineering design, test operations, and public outreach. Test operations are conducted in the simulated microgravity environment of the NASA Johnson Space Center Neutral Buoyancy Laboratory (NBL). Teams will propose design and prototyping of a tool or simulant identified by NASA engineers as necessary in space exploration missions. Professional NBL divers will test the tools and students will direct the divers from the Test Conductor Room of the NBL facility. Micro-g NExT provides a unique opportunity to contribute to NASA's missions.

This document serves as a reference to assist potential Micro-g NExT participants with the requirements to submit a proposal. Included in this document are all required components of an official proposal. Please also review the eligibility requirements for Micro-g NExT at our website <https://go.nasa.gov/micrognext>.

2. Eligibility

Each prospective team member must meet all the following requirements:

- Enrolled as an undergraduate student enrolled in an accredited U.S. institution of higher learning (junior college, community college, college, university) at the time the proposal is submitted.
- 16 or older before arrival in Houston.
- U.S. citizen or legal permanent resident.

Additionally, each team must meet all the following requirements:

- Supervising faculty member from an accredited U.S. institution of higher learning.
- All primary team members must attend the orientation, preliminary design review, test readiness review, and prototype test week events.
- Primary team members may only participate with one team in the same challenge.
- Teams may not have more than two former Micro-g NExT team members per team.

3. Letter of Intent

A letter of intent indicates a team's intention to submit a written proposal. The optional letter of intent should follow the format below and be submitted as an email. Send the email directly to jsc-reducedgravity@nasa.gov. The letter of intent should provide:

- Team Lead contact information – this should be a **student** team member.
 - Include: name, email, academic year, academic major
- Academic institution your team represents. If your team is a multi-institutional team, list all participating institutions and designate a lead institution.
- Potential team members.
- Name(s) of faculty advisor(s).
- 2024 Micro-g NExT challenge chosen.

The optional letter on intent is due on **September 19, 2023**.

4. Concept Video Pitch

The following guidelines outline the type of content your concept video pitch should include. The video must be submitted and linked on the cover page of the proposal for full selection consideration. Note: a working prototype **is not** required for this video.

a. Content Requirements

The video can be as simple as an explanation on a dry erase board or the demonstration of a mock-up. Every video, however, must include/explain the following:

- Institution Name
- Team Name
- What is your idea/concept?
- How does it meet the requirements? (Please answer this with a brief sentence that is an overall summary.)
- How does your idea advance space exploration?

b. Format Requirements

- Needs to be 1 minute or less in duration.
- Must upload to YouTube as an **unlisted** setting so that only those with the specific URL may view the video.
 - Video title format: School Name_Team Name_2024 Micro-g NExT Concept Video
- Do not include any music, images, or videos that are copyrighted.

c. Examples

Please view the following concept pitch videos from previous teams:

- [Dartmouth College Lunar Dust Bunnies 2021 Micro-g NExT Video – YouTube](#)
- [Arizona State University Lunar Level Devils 2021 Micro-g NExT Video Submission – YouTube](#)

5. Written Proposal Tips

The following tips come from technical reviewers and will aid you in writing your proposal.

- Start your design description with an overview of your design and a visual of the entire assembly. Then, break it down into components and functionality. Explain all pertinent details to help reviewers better understand the design.
- Include technical drawings in an appendix and not in the main body of the proposal.
- Verify the CAD files you submit are the right file types. Send your CAD files in IGES or STP form.
- Use third person throughout the document. This is a best practice for all technical documents.
- An abstract is a summary of the entire document, not a summary of the challenge background or individual device components. Explain why this challenge exists and how your device is meeting that purpose and helping further spaceflight.

6. Proposal Requirements

- Each team must submit one electronic copy of an original proposal on the appropriate Micro-g NExT Challenge opening on the NASA STEM Gateway by **October 10, 2023**.

- Each proposal must be submitted in a three-section format containing the required sections in the following order: Technical, STEM Engagement, and Administrative.
- The Technical section shall not exceed 12 pages.
- All information on the title page must be complete.
- Figures and tables must be labeled and referenced within the text.

7. Technical Section

The technical section should include information on the design the team is proposing. Review points awarded to this section are worth 75% of the overall total score. Therefore, this section should include any information that a technical reviewer might find informative or instructive in understanding the aims and goals of the design. Evaluators ranking the proposal for its scientific merit will read only this section, so teams should be sure to address all relevant factors as listed below.

a. Abstract

The abstract should be a brief (up to 300 words) summary that touches upon the purpose of the challenge, the benefit to NASA and spaceflight, and a description of the prototype design being proposed.

b. Design Description

This section should include a description of the design being proposed. Describe how the proposed design meets each of the challenge requirements by including a requirements compliance table explaining how each requirement is met. Describe the manufacturing plan to create the proposed design. The manufacturing plan should include details about material selections and where the parts will be manufactured. Be sure to include at least one of the following for your design: a sketch, drawing, or photo. A CAD file(s) should also be submitted in .stp or .iges format.

c. Operations Plan

This section should include a detailed description of the test plan for the device in the NBL. List the steps of the test plan to highlight how you will conduct the operation. Include how the device should be configured before and during testing.

d. Safety

This section should describe any safety features and considerations. Include any unique hazards your device creates. Explain how you will mitigate those hazards, including testing and analysis that would be performed to prove it is safe to utilize in the NBL.

e. Technical References

Referenced works should be cited in text and in the “Bibliography”. Standard MLA format should be used. If possible, do not use websites; however, it is understood that some conference proceeding and journals are moving to an electronic-only format. Make sure that references are relevant and at least one half of the references should come from research journals.

8. STEM Engagement Section

The STEM engagement section of the proposal will include the team's plan for disseminating the results of its experiment/experience to the general public. Review points awarded to this section are worth 25%

of the overall score total. Information contained in this section should focus on what outreach activities the team intends to do and what audience will be addressed. The STEM engagement plans must be original to the team and the proposal should not be posted on any social media.

A plan is an organized way to achieve a specific objective. Random activities, even good random activities, do not constitute a plan. An outreach plan should have two major components:

- The plan – for example:
 - Description of the team’s objectives and goals.
 - What activities are planned for the upcoming year?
 - Where and when will the activities take place?
 - What audience will be targeted?
- The activities – for example:
 - What will the team do when they get there?
 - What materials will they refer to?
 - What are the main points that they will make?

For maximum point value, the plan should include the following:

- The team’s objectives in each outreach activity.
- A description of the outreach audience (K-12 class or school groups, undergraduate research symposiums, university outreach to local schools, informal groups such as Boy/Girl Scouts, after-school clubs, church groups, etc.).
- Specific plans for activities, strengthened by incorporating alignment of an activity to state or national standards that will help a K-12 teacher, or use of age/grade appropriate language during the activity.
- Letters or agreements from institutions who have accepted your invitation to address their group.
- A press and/or social media plan.
- A connection between curriculum/activity and Micro-g NExT, the NBL, or the team’s tool.

9. Administrative Section

The administrative section of the proposal contains a letter of support from the team's institution, statement of involvement from faculty advisor, evidence of a plan to acquire funding, etc. Although this section is not awarded a point value, exclusion of these materials will affect the team's overall ranking when compared to more complete submissions. Additional information will be required if selected.

a. Mentor Request

The Micro-g NExT staff pairs teams with a NASA engineer or scientist. Mentors augment the guidance provided by faculty members and the Micro-g NExT staff. If your team is currently collaborating on your project with a technical point of contact at NASA, please list the name in this section. However, this does not guarantee that this individual will be offered an official role in the program.

b. Institutional Letter of Endorsement

This letter must be on the endorsing institution’s letterhead and must come from the institution president, dean of college, or department chair. It indicates that the team’s institution has knowledge of

the team's interest in participating in this activity and endorses the team's involvement. Teams will not be considered if their institution does not approve of their involvement.

c. Statement of Supervising Faculty

A statement of support from a supervising faculty member indicates a willingness to supervise and work with the team during all stages of the activity. Teams working without a faculty advisor will not be considered. The faculty advisor must also sign off on the cover of the proposal as evidence that he/she has seen the proposal and approves of the submission.

The following statement should appear on institution letterhead and include the signature of the faculty advisor:

As the faculty advisor for an experiment entitled " _____ " proposed by a team of undergraduate students from _____ institution, I concur with the concepts and methods by which this project will be conducted. I will ensure that all reports and deadlines are completed by the student team members in a timely manner. I understand that any default by this team concerning any program requirements (including submission of final report materials) could adversely affect selection opportunities of future teams from their institution.

If your team is composed of students from more than one institution, submit the above from the lead institution. Additionally, supply a letter of support from a faculty member of each participating institution acknowledging they are aware of the participation of their student(s).

d. Statement of Rights of Use

These statements grant NASA, acting on behalf of the U.S. Government, rights to use the team's technical data and design concept, in part or in entirety, for government purposes. This statement is not required. However, teams with a Statement of Rights of Use will receive greater consideration in the proposal selection. If choosing to include these statements, **all team members and faculty advisors must sign.**

The statements read as follows:

As a team member for a proposal entitled " _____ " proposed by a team of undergraduate students from _____ institution, I will and hereby do grant the U.S. Government a royalty-free, nonexclusive and irrevocable license to use, reproduce, distribute (including distribution by transmission) to the public, perform publicly, prepare derivative works, and display publicly, any data contained in this proposal in whole or in part and in any manner for Federal purposes and to have or permit others to do so for Federal purposes only.

As a team member for a proposal entitled " _____ " proposed by a team of undergraduate students from _____ institution, I will and hereby do grant the U.S. Government a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States an invention described or made part of this proposal throughout the world.

e. Funding and Budget Statement

This section should include a simple columnar layout showing expected expenditures associated with the proposed design (materials, machining, operating, testing, shipping), transportation to/from Houston, accommodations/food/transportation during test week in Houston, etc. **It is imperative that**

teams anticipate all costs involved and actively work to seek funding. Potential sources for funding should be listed and can include institutional grants, state Space Grant funds, corporate sponsors, etc.

Items	Cost
Materials and Supplies	
3D Filament	\$85.00
Aluminum	\$75.00
Steel Rods	\$5.00
Pelican Case (29 x 18 x 11")	\$422.00
Manufacturing Costs	
Machine Shop	\$250.00
Travel	
Flights	\$4,500.00
Hotel	\$3,300.00
Ground Transportation	\$500.00
Food	\$800.00
Miscellaneous	\$375.00
Other Expenses	N/A
Total	\$10,312.00

f. Parental Consent Forms

The parental consent forms provide consent for general participation and must be submitted for any team member under the age of 18 that will be accompanying the team to Houston. Please email the Micro-g NExT Coordinators at jsc-reducedgravity@nasa.gov for a copy of this form if needed.

10. How to Apply: NASA STEM Gateway

Proposals are submitted on [NASA STEM Gateway](#). Only one member of the team (preferably the team lead) will submit the proposal on behalf of the team. During this process they will add all team members and faculty advisor by entering their name and email address. To apply, click on the respective link below for the challenge you would like to submit a proposal for.

- [Search and Rescue Platform for Optical Target Recognition \(SPOTR\)](#)
- [Lunar Mapbook Holder](#)
- [Hand Carrier for Lunar EVA Tools](#)
- [Lunar Flag](#)

11. Technical Scoring Rubric

Below is the rubric that technical reviewers will use to score the submitted proposal.

Criteria	Points	Comments
Abstract		
Please rate the overall quality of the abstract.	/5	
Design Description		
Was the design explained well?	/5	
Is each requirement met? One point for each requirement addressed.	/15	
Please rate the quality of the manufacturing plan. (0 if not included)	/5	
Please rate the effectiveness of the sketches/drawings in explaining the design. (0 if not included)	/5	
What is the likelihood this design will be succeed if selected?	/5	
Please rate the overall fidelity of the design.	/5	
Operations Plan		
Please rate the quality of the test plan.	/5	
Safety		
Are safety concerns fully addressed?	/5	
Was the testing and analysis plan explained well?	/5	
Please describe any safety concerns.	N/A	(Open ended question)
Technical References		
Are technical references provided and complete?	/5	
General		
Please rate this proposal as a technical document. (In terms of format, professionalism, ease of reading, etc.)	/5	
Any other feedback for the students.	N/A	(Open ended question)

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