

BIG IDEA CHALLENGE

2024 Final Deliverables Guidelines

Inflatable Systems for Lunar Operations

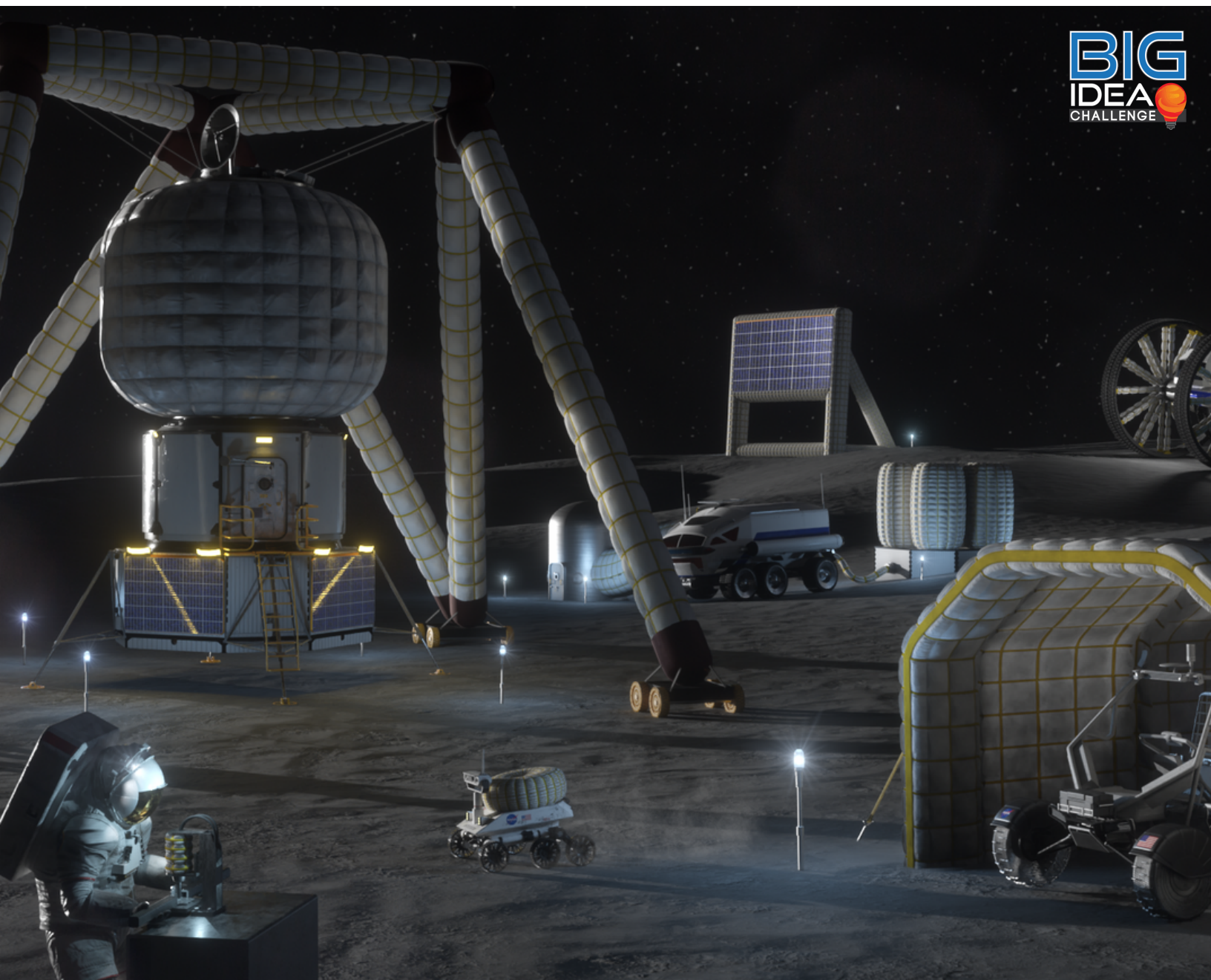


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Deliverables for Finalist Teams

Teams selected to receive funding and attend the on-site Forum are responsible for the following Project Deliverables, all of which must be releasable to the public with no copyrights asserted:

- Mid-Project Report (due June 4, 2024)
 - A 5-9-page report demonstrating where the team is in the development of their system.
 - Reports must provide confidence the team can complete their system by the challenge delivery dates to receive the 2nd half of their stipend award.
- Fall Status Report (due September 10, 2024)
 - 2-page status summary
- 15-25-page Technical Paper (due October 16, 2024)
- Verification through Testing and Demonstration
 - Finalist teams will need to demonstrate a working technology – both **prior to and during** the BIG Idea Forum.
- 20-25-minute Presentation, with an additional 25 minutes of Q&A at the BIG Idea Forum
- Technical Poster (for Poster Session conducted during on-site Forum)
 - Teams must submit a digital poster file and bring a full-size printed poster for display during the Forum’s poster session.

Technical papers, presentations, and posters will be posted and archived on the BIG Idea Website, and technical papers may be submitted through [NASA’s Technical Report Server \(NTRS\)](#). Finalist teams are expected to present the results of their BIG Idea project first at the 2024 BIG Idea Forum, waiting until after the Forum to share their project at outside technical conferences via papers or presentations, unless specifically invited by NASA, NIA, or APL to share their work prior to the Forum.

Additionally, at the time of selection, student team members are to provide their first name, last name, and current school email address to NIA for inclusion in NASA’s STEM Gateway. Student team members will receive an email from NASA STEM Gateway prompting them to complete their profile, connected to their “.edu” email. This profile is required for any future NASA internship application and serves as an official NASA record of individual student participation in the challenge. Individual information shared on NASA’s STEM Gateway will not be released to the public.

Mid-Project Report (MPR)

Mid-Project Report deadline: 11:59 p.m. ET on June 4, 2024

Prior to receiving the second stipend installment, each BIG Idea Challenge team must successfully pass a mid-project status assessment that demonstrates where they are in the development process. The purpose of the assessment is to provide the BIG Idea Challenge judges with evidence that shows the team can perform the work identified in their proposal.

The Mid-Project Assessment is a Pass/Fail assessment based on the submission of a 5–9-page report outlining the progress teams have made on the design, analysis, and development of their concept since it was first proposed. The report should detail how the team plans to achieve the proposal goals with the budget and schedule remaining. The report should discuss expected results and any adjustments made to the original goals. Teams must pass this assessment to receive their 2nd stipend installment, which will come from the National Space Grant Project via the team's state Space Grant Consortium. Failure to pass this review may lead to delays in receiving the stipend, or withdrawal of invitation to the competition.

MID-PROJECT REPORT CONTENT

- **Cover Page (Excluded from page limitation)**
 - Project Title
 - University name
 - Full names of all team members, with Academic Level (graduate or undergraduate) and Major
 - Identify any foreign nationals
 - Faculty/industry advisor's full name(s) and affiliation
 - CAD Drawing/Photo/Image of your concept
- **Executive Summary (1 page maximum)**
 - An overall summary of the lunar inflatable system concept, including:
 - a brief synopsis of the operational scenario/use case the inflatable technology is addressing
 - an overview of the inflatable technology solution
 - a review of the inflatable technology or system at the end of the project
 - a one paragraph statement on the proposed verification testing
 - a statement of the impact the innovative technology concept will have on lunar exploration and mission goals
- **Technical Progress (5 pages maximum)**
 - What has been done so far? Discuss progress made to date in research, fabrication, and testing.
 - Provide CAD drawings and/or photos of your concept
 - What has been learned? Discuss any modifications to the original plan of work.
 - Discuss any significant design and/or scope changes and the reasoning behind those changes.
 - Discuss any issues that have occurred and their impact on your original plans.
 - What work remains to be done?
 - Identify upcoming major technical milestones

- Identify potential schedule risks and provide mitigation plans to help overcome them.
 - Identify any opportunities that may enhance the project (e.g., new collaborations, alternate facility found for improved testing)
 - Assess team's ability to complete the project as proposed, on time.
- **Safety Plan** (including building and testing hazards and planned mitigations, such as Personal Protective Equipment (PPE), if needed)
 - **Disclaimer:** The safety plan requirement is meant to ensure that teams have carefully thought about safety in the execution of their concept development and testing. Each BIG Idea university is responsible for the safety of its students. Neither NASA, the National Institute of Aerospace, nor the Johns Hopkins University Applied Physics Laboratory accepts responsibility for any safety hazards as a result of the development of this technology.
 - ***See "Additional Requirement" below for details on the Safety Letter each university must supply with their Mid-Project Report.*** The Safety Letter does not count toward the minimum/maximum page count.
- **Risk Matrix (1 page maximum)**
 - The intent behind this requirement is to get teams to acknowledge there are always risks and to think about them early in the development process. Take time to identify risks to your development project through November 2024.
 - A risk is a threat to the completion or performance of your system or something that interfaces with your system that may be realized in the future and negatively impact the team's ability to meet the stated goals. The risk may be related to institutional support for project execution, or to one of the following project execution domains:
 - Safety
 - Technical
 - Cost
 - Schedule
 - Look for risks that are specific to your project and approach. A helpful model for a risk statement is: Given that [CONDITION], there is a possibility of [DEPARTURE] adversely impacting [ASSET], which can result in [CONSEQUENCE].
 - Include your project Risk Matrix. A Risk Matrix is a graphical representation of the **Likelihood** and **Consequence** scores of a risk. The rows of a Risk Matrix show likelihood scores, while the columns show the consequence scores. Each cell in a Risk Matrix can be represented by a Priority Score.
 - See NASA S3001: Guidelines for Risk Management
 - [Risk Matrix Template \(one example\)](#)
 - Note: sometimes, "**Likelihood and Consequence**" is displayed as "**Probability and Impact**"

		Probability			
		1 = high (80% ≤ x ≤ 100%)	2 = medium high (60% ≤ x < 80%)	3 = medium low (30% ≤ x < 60%)	4 = low (0% < x < 30%)
Impact	A=high (Rating 100)	(Exposure – Very High) (Score 100)	(Exposure – Very High) (Score 80)	(Exposure – High) (Score 60)	(Exposure – Moderate) (Score 30)
	B=medium (Rating 50)	(Exposure – High) (Score 50)	(Exposure – Moderate) (Score 40)	(Exposure – Moderate) (Score 30)	(Exposure – Low) (Score 15)
	C=low (Rating 10)	(Exposure – Low) (Score 10)	(Exposure – Low) (Score 8)	(Exposure – Low) (Score 6)	(Exposure – Low) (Score 3)

- **Project Management (2 pages maximum)**
 - Provide an updated schedule/timeline of tasks and deliverables and report on project expenses incurred to date. Show that the critical path for completing their project is well understood.
 - For both schedule and budget, provide comparisons to the original plans. Discuss any major departures and the impact on future plans. For the schedule, it is acceptable to focus on major milestones.
 - *Note that procurement delays generate more issues to challenge teams than any other source. Understand your university procurement processes and order custom parts as early as possible! This includes the procurement of resources needed for testing.*
- **Safety Letter (Excluded from page limitation)**
 - **Teams will be required to submit a signed Safety Plan Letter**, (Please use [the template Safety Plan Letter](#) provided in the MPR section of the [2024 Challenge Details Page](#) under “Submission Forms for Finalist Teams.”)
- **Optional Augmentation Files**
 - The online Mid-Project Submission form will also include optional fields for teams to upload video or other files they may want to share to augment their report.

GENERAL MID-PROJECT REPORT FORMATTING INSTRUCTIONS

Teams are responsible for the formatting and appearance of their mid-project reports. 5 pages minimum; 9 pages maximum (including figures and tables). The Cover Page and Safety Letter do not count toward the minimum or maximum page limits.

- Figures and tables placed in the file must be in digital format. Please integrate figures, charts, and tables directly into the text (do not place them at all the end).
- Reports should be single spaced and formatted as a single column.
- Margins should be a standard 1" (2.54 cm) all the way around (top, bottom, left, and right).
- Please use fonts common to Macintosh and PC platforms, i.e., Times, Times New Roman, Helvetica, or Arial for text; Symbol for mathematical symbols and Greek letters.
- Font size can be either 11 or 12
- File size cannot exceed 100 MB.
- Mid-project reports must be submitted as PDF files.

MID-PROJECT REPORT EVALUATION

The judges will review each team's report (and optional augmentation files) to evaluate the team's progress towards competition readiness. Please note that the maximum file size for any one file is 100 MB.

MPRs will be evaluated based on the following areas: technical progress, project management, and safety & risk. These areas will undergo a pass/fail evaluation by the judges. During their evaluation the judges will be looking for reports that demonstrate the following criteria:

- **Technical Progress:** the team has demonstrated adequate technical progress toward their stated goal and has presented a credible path to a working prototype by the deadline.
- **Management Plan:** project milestones have been met as laid out in the original schedule and spending is on track compared to the original budget. Any deviations from the plan have been identified and credible mitigation paths presented.
- **Safety Plan:** the team has thoroughly addressed potential safety issues.
- **Risk Matrix:** the team has identified potential risks (technical, schedule and budget) and provided a credible mitigation plan. Any risks that will be accepted without mitigation have been assessed (likelihood and consequence) appropriately and a path to success is defined.

If there are any concerns regarding a team's verification demonstration or scheduled timeline, that team may be asked to conduct a follow-up "face-to-face" meeting with the judges via a virtual platform. At that point, the judges may request adjustments and/or improvements be made before moving the team to the next phase of the competition.

SUBMITTING THE MID-PROJECT REPORT

To upload your team's Mid-Project Report and any optional augmentation files, please visit the "Submission Forms for Finalist Teams" section of the [2024 Challenge Details Page](#) on the BIG Idea Challenge Website to complete the online MPR submission form.

No revisions can be accepted to your final Mid-Project submission, so please proof your files very carefully before submitting it. If there are any technical problems with the content of your paper or video file (for example, a file was corrupted), we will try to contact you immediately, so it is very important that you provide us with up-to-date contact information on the submission form.

Late submissions will not be accepted, and the submission form will close promptly at midnight.

Fall Status Report

Fall Status Report deadline: 11:59 PM ET on September 10, 2024

Finalist teams will provide a brief summary update in September. The Fall Status Report is limited to 2 pages and should provide a high-level, concise overview of the team's progress in completing their project as outlined in the proposal.

FALL STATUS REPORT CONTENT

- Summary of progress and accomplishments to date

- Summary of remaining work (i.e., major milestones) needed to complete the project
- An assessment of whether the project is on track or at risk of falling behind schedule (and if so, identify the issues and the mitigation plans to course correct)
- Report on budget status including overall percentage of budget spent and identification of any major expenditures remaining.
 - Example: *70% spent; 30% remaining. We are on track based on our scope. Major expenditures remaining include a \$10,000 XYZ test, \$12,000 travel to the Forum, and approximately \$9,000 in labor.*

GENERAL FALL STATUS REPORT FORMATTING INSTRUCTIONS

Teams are responsible for the formatting and appearance of their fall status reports. 1 page minimum; 2 pages maximum (figures and tables are optional and do not count in the page maximum). A cover page is not required.

- Figures and tables placed in the file must be in digital format.
- Reports should be single spaced and formatted as a single column.
- Margins should be a standard 1" (2.54 cm) all the way around (top, bottom, left, and right).
- Please use fonts common to Macintosh and PC platforms, i.e., Times, Times New Roman, Helvetica, or Arial for text; Symbol for mathematical symbols and Greek letters.
- Font size can be either 11 or 12
- File size cannot exceed 100 MB.
- Fall status reports must be submitted as PDF files.

SUBMITTING THE FALL STATUS REPORT

To upload your team's Fall Status Report and any optional augmentation files, please visit the "Submission Forms for Finalist Teams" section of the [2024 Challenge Details Page](#) on the BIG Idea Challenge Website to complete the online Fall Status Report submission form.

No revisions can be accepted to your final Fall Status Report submission, so please proof-read your files very carefully before submitting it. If there are any technical problems with the content of your paper or augmentation files (for example, a file was corrupted), we will try to contact you immediately, so it is very important that you provide us with up-to-date contact information on the submission form.

Late submissions will not be accepted, and the submission form will close promptly at midnight.

Technical Paper & Verification Testing Results Demonstration

Technical Paper and Verification Testing Results Demonstration deadline: 11:59 PM ET on October 16, 2024

TECHNICAL PAPERS CONTENT

Teams will develop a 15–25-page technical paper that describes their concept. The technical paper must include the following sections:

- **Cover page** (Excluded from page count)

- University name
- University or industry partners if any
- Project Title
- Full names of all team members, with Academic Level (graduate or undergraduate) and Major
 - Identify any foreign nationals
- Faculty/industry advisor's full name(s) and affiliations
- Space Grant Affiliation
- **Quad chart** (Excluded from page count)
 - Please use the [BIG Idea Tech Paper Quad Chart Template](#) found on the [2024 Challenge Details Page](#) of the BIG Idea Challenge Website under "Submission Forms for Finalist Teams" then "Paper & Verification Testing."
 - Quad charts must address:
 - Concept Synopsis
 - An Image/Graphic of the Concept
 - Innovations (Briefly describe how new innovative approaches / capabilities / technologies increase the State of the Art (SOA) for enabling the development of lunar infrastructure from the proposed inflatable technology.
 - Verification Testing Results & Conclusions
- **Executive summary** (Not to exceed one page)
 - An overall summary of the innovation, including a one paragraph synopsis of the operational scenario/use case the proposed technology is addressing, an overview of the proposed technology solution. Summarize the findings in a one paragraph statement on the verification testing results and conclusions, and a statement of the impact the innovative technology concept will have on lunar exploration goals.
- **Problem statement and background** (Not to exceed two pages)
 - Describe the problem that is being addressed
 - Provide a high-level description of the proposed solution.
 - Identify the mission scenario and/or use case where the proposed inflatable system would be most applicable and advantageous.
- **Project Description** (Not to exceed ten pages)
 - Description of the concept
 - Describe the concept lifecycle, including all design assumptions. Discuss the approach to development, implementation, and testing.
 - Highlight and explain any design changes/improvements made since the mid-project review.
 - Describe how your concept integrates and operates with external lunar systems and what enabling systems are needed.
 - Identify specific potential stakeholders/funders (i.e., Exploration, Science, Commercial) who could benefit from project, and how they will benefit from your concept.
 - Design and Analysis
 - Describe key parts and subsystems using written descriptions, photos and CAD, as appropriate. Provide justification for your design decisions.
 - Provide a detailed description of deployment mechanisms and operations.

- Describe the theoretical/computational analysis (such as stress analysis, thermal analysis, etc.) used to arrive at the design including key performance parameters (KPP).
 - Discuss technical performance metrics such as (but not limited to): mass, volume (packaged and deployed), power, processing speed, bandwidth.
- Risk management:
 - Discuss remaining project-specific risks, their likelihood, consequence and mitigation plans. Include the project risk matrix showing the top ten risks.
- **Verification testing on Earth** (Not to exceed seven pages)

Prototype Demonstration: Teams should describe a complete system but can focus their prototype demonstrations on how they overcome the key technology challenges for implementing their concept. Examples include demonstrating innovative fabrication processes, generating test data that confirms innovative loads analysis methods, demonstrating innovative system deployment methods, or demonstrating innovative test environments.

 - Describe your verification process. Teams must describe HOW their technology was demonstrated on Earth to provide confidence it can work in a lunar environment.
 - How did you accomplish a realistic simulated environment? What aspects were considered from the [DSNE](#)?
 - What testing facilities, instrumentation, and sensors were used?
 - Did you consider the unique lunar environments expected?
 - Describe team's safety plan and protocols followed.
 - Discuss the results of the team's prototype demonstration and how successful it was at deploying and inflating here on Earth.
 - Describe the key performance parameters based on the mission scenario/use case being addressed. Provide estimates of the current value of the selected performance parameters.
 - Describe what type of data was used or collected, and how it informed your solution
 - Describe any challenges you faced and how you mitigated them.
 - Was there critical testing that could not be performed due to budget and schedule constraints?
 - What were the key results of the tests?
 - Discuss the verification testing conclusions:
 - Did the verification testing indicate the proposed technology or system solution can achieve the proposed objectives? (i.e., will your designed solution work as intended?)
 - What conclusions are you able to draw about the problem and your design solution?
 - Did the verification testing indicate that the proposed technology or system solution can be scaled for different mission scenarios?
- **Path-To-Flight** (Not to exceed two pages)
 - A brief discussion on the concept's anticipated path-to-flight for a lunar mission to the Moon, including rationale for trades and critical modifications that would need to be made to the design for use on the Moon.
 - Present a potential path to implementation on the lunar surface:
 - What components need additional qualification?
 - What remaining design work needs to be done prior to building flight hardware?
 - Discuss any plans/opportunities to continue concept development, if applicable.

- **Project Management** (Not to exceed three pages)

- Discuss your team leadership and management approach. How were major decisions made? How did the team communicate?
- Provide your project schedule in a detailed timeline including development and verification timeline.
 - The critical path in a project is the series of tasks that together have no schedule slack to delivery. Identify the critical path for your project. Are the items on the critical path different from what was expected?
 - Discuss how actual completion dates of the major milestones compare to the plan in the proposal. Explain any major differences and discuss the team's approach to managing schedule slips.
- Provide your detailed budget, including all relevant expenditures.
 - Compare the actual expenditures to the proposed plan and discuss any major deviations.
 - Explain how the team managed budget constraints and purchasing decisions.
 - Budget should be broken down by Phase 1 and Phase 2.
 - Recognize all sponsors and/or grants.
 - Report the total amount of funding received outside of the BIG Idea Challenge awards.
 - Quantify any sponsorships and/or in-kind contributions to the best of your ability.

TECHNICAL PAPER FORMATTING GUIDELINES

- Papers should be single spaced and formatted as a single column.
- Figures and tables placed in the file must be in digital format. Please integrate figures, charts, and tables directly into the text (do not place them at all the end).
- Margins should be a standard 1" (2.54 cm) all the way around (top, bottom, left, and right).
- 15 pages minimum; 25 pages maximum
- The Cover Page, Table of Contents, and Quad Chart will not count toward the minimum or maximum page limits.
- References should be included as an appendix and will not count toward the minimum or maximum page limits.
 - **Appendices are to be used for references, calculations, and explanatory figures (with captions) ONLY.**
- Please use fonts common to Macintosh and PC platforms, i.e., Times, Times New Roman, Helvetica, or Arial for text; Symbol for mathematical symbols and Greek letters.
- Font size should be either 11 or 12 pt.
- Technical papers must be submitted as PDF files.

TECHNOLOGY VERIFICATION THROUGH TESTING AND DEMONSTRATION

Finalist teams will need to demonstrate physical working technology – both prior to and during the BIG Idea Forum. Teams are encouraged to be creative in designing tests and demonstrations to be as realistic as

possible (e.g., operation and environments). Flight-rated components and materials aren't expected for the prototype, but teams should try and use as close a corollary as is feasible under the constraints of the competition.

Reminder: Modeling and simulation results are not a replacement for physical hardware test results but can be used to support the findings from hardware testing.

- **PRIOR TO THE FORUM:** Teams are required to provide a visual demonstration of their verification testing results prior to the Forum, and document the results in their technical paper.
 - **Prototype Demonstration Video:** Along with the technical paper, teams must also submit a video demonstrating prototype deployment and inflation from a stowed configuration here on Earth. Teams are welcome to submit any number of additional demonstration files via animation, modeling and simulation, etc.
- **DURING THE FORUM:**
 - **Team Presentations:** It is expected that the team's presentation made during the Forum will incorporate an animated, simulated, or otherwise functional demonstration of their solution. Teams can showcase their solutions through a variety of visual and physical modalities, including but not limited to a modeling and simulation experience (including Virtual Reality), application software demonstration, slides, charts, graphic representations, video, animations, data visualizations, etc.
 - **In-Person Demonstration:** Teams will also be required to perform an in-person demonstration of their working technology during the November Forum. The basic expectation is that teams will be able to replicate a small prototype demonstration of their system or sub-system deploying and inflating from a stowed configuration in the controlled environment at the Forum.

SUBMITTING THE TECHNICAL PAPER AND VERIFICATION DEMONSTRATION FILES

To upload your team's Technical Paper (.pdf file) and Verification Demonstration file(s), please visit the [2024 Challenge Details Page](#) on the BIG Idea Challenge website to complete the online submission form. The online Technical Paper and Verification Demonstration submission form will include fields for teams to upload the required video demonstration and any other concept demonstration files.

Additional requirements when submitting the technical paper:

1. High Quality Photo/Graphics Upload: Each team must upload two high-quality photos or graphics (minimum 300 DPI), for use when mentioning your team's participation in the BIG Idea Challenge. These photos may be used by NASA, NIA, or JHU/APL on websites, in news releases, in social media posts, in promotional material, in NASA reports, etc.
 - a. The first upload should demonstrate some sort of testing (with team members included in the photo).
 - b. The second upload should depict your team's concept.

Although only 2 images will be required when submitting the technical paper and verification files, additional optional upload fields will be available on the Technical Paper submission form for teams who want to share more than 2 photos or images.

2. **Faculty Advisor Approval:** To ensure all papers have been reviewed and approved by the primary faculty advisor, teams will be required to submit a signed Faculty Advisor Attestation Form (using the template provided). This form should NOT be included in the Technical Paper PDF. Instead, the submission form will include a separate upload field for the Faculty Advisor Attestation Form.

Submissions without a valid Faculty Advisor Attestation Form will be deemed noncompliant and will not be reviewed.

No revisions can be accepted, so carefully review your Technical Paper file before submitting it. If there are any technical problems with the content of your paper (for example, your file was corrupted), we will try to contact you immediately, so it is very important that you provide us with up-to-date contact information on the submission form.

Late submissions will not be accepted, and the submission form will close promptly at midnight.

Presentation and Technical Poster Files

Presentation and digital poster files submission deadline: 4:00 PM EST November 2, 2024

PRESENTATION FILE GUIDELINES

Each team will be given a 50-minute timeslot in the Forum agenda: presentations should be 20-25 minutes and will be followed by a 25-30-minute Q&A session with the judges. The expectation is that presentations will be given by the student team members. Teams may choose who speaks and who doesn't speak during the presentation. However, we encourage all student team members to stand together at the front of the room during the presentation to be available to answer questions, even if they are not presenting.

Each presentation file must include a Cover Slide that includes:

- Project title
- University name
- Faculty advisor's name(s)
- Team member's names

Slide readability and ratio

The presentation room may be very large. Please ensure the font on your power point is large enough for those to see from the back of the room. Take advantage of high contrast options and avoid black screen backgrounds. Emphasize slide readability, especially for significant figures/calculations. Utilize a 16:9 presentation aspect ratio.

Dark videos/animations and black backgrounds do NOT typically show well in presentation settings and should be avoided.

Presentation should reflect the technical paper

If errors were discovered after the technical paper was submitted, teams should take this time to address them. Significant information discussed during the presentation that was not included in the technical paper will be penalized for scoring.

TECHNICAL POSTER

Finalists will be required to present technical posters describing their project. Teams must submit a digital poster file and bring a full-size printed poster for display during the Forum's Poster Session.

The Poster Session gives teams an opportunity to expound on important concepts in their presentations. It also allows the judges to follow up on presentations by asking additional questions for further clarification.

Printed Poster Guidelines

Each team will be given one 6' table on which to display their printed posters during the Forum's poster session. One free-standing tri-fold foam/cardboard poster board will be made available for each team to use at no charge. Thumbtacks and double-sided tape will also be available to secure posters to the tri-fold boards. **Teams are responsible for printing and bringing their own posters to the forum, and posters should be exactly 48" x 36."**

Digital Poster Guidelines

Each team is also required to submit the digital file of their poster. Digital posters will be displayed on the BIG Idea Challenge Website, and as such, will need to follow some standard guidelines:

- Posters must be 48" x 36" (9600 pixels x 7200 pixels)
- Posters should be formatted horizontally
- Poster file size limit is 100MB
- Poster file should be submitted as a PDF file
- Images and graphs should be clear, legible, and appropriately sized for the poster
 - Images and graphs embedded within the poster should be "print-ready," with a minimum DPI of 150 whenever possible.
- Links or redirects in the body of their poster can be used sparingly, but they shouldn't be used to add/supplement important information to the Technical Paper.
 - This includes redirecting to a webpage, video, or any other content.
 - Whenever possible, all content should be included in the text or directly embedded within the PDF.

SUBMITTING THE PRESENTATION AND DIGITAL POSTER FILES

To upload your team's Presentation and Digital Poster files, please visit the [2024 Challenge Details Page](#) on the BIG Idea Challenge website to complete the online presentation and digital poster submission form. Presentation and digital poster files must be submitted by 4:00 PM EST three days prior to the Forum (November 2, 2024) using the online upload tool.

Late submissions will not be accepted, and the submission form will close promptly at 4:00 PM EST.

Revisions to presentation and digital poster files will not be accepted after the 4:00 PM deadline – no exceptions.

Final Scoring at the 2024 BIG Idea Challenge Forum

The [judging panel](#) is comprised of NASA and industry experts who will evaluate and score the competition between participating teams. Design projects will be evaluated and judged based on adherence to the guidelines and constraints and the published evaluation criteria. **Final scoring considers the technical paper, presentation, and poster session.**

FINAL SCORING MATRIX (120 POSSIBLE POINTS)

A printable version of the [Final Scoring Matrix](#) can be found on the [2024 Challenge Details Page](#) on the BIG Idea Challenge website.

Technical Paper Evaluation Criteria (Max 80 Points)

Verification Testing (Max 25 points)

- Did the team demonstrate a working system/sub-system of the inflatable technology?
- Did the team adequately identify and mitigate the key risks associated with development and operation of the inflatable technology or system?
- Was the testing conducted at a high enough level of fidelity to provide confidence the technology would work in a lunar environment?
- Did the verification testing increase the technology's TRL, or advance the state of the art?
- Were the test results in line with the expected results developed through analytical methods?
- Did the team draw adequate conclusions about their design solution?

Technical Credibility and Feasibility (Max 25 points)

- How well did the team's implementation of their inflatable technology or system meet the original goals and objectives?
- How well did the team describe their development effort, including all design assumptions and decisions and address fabrication, materials selection, transport, deployment, operations, etc.?
- Did the technology reach the minimum Technology Readiness Level (TRL) of 4?
- Did the team demonstrate a cost effective and viable solution for their proposed inflatable technology or system?
- Is the technology able to operate for the entire mission duration in the harsh lunar environment?
- Did the team identify the performance needs of potential stakeholders/funders (i.e., Exploration, Science, Commercial)?
- Will the hardware scale as needed to meet the operational concepts?

Innovation (Max 10 points)

- Have any innovative or unique concepts, materials, and/or applications been demonstrated via the inflatable technology or system?
- Were there any innovations in the test set-up, test methodology, or test analysis?

Technical Management (Max 10 points)

- Did the team perform effective project management & demonstrate responsiveness to unplanned events?
- How well did the team manage the project's budget, schedule, and scope?
- How well did the team adhere to the requirements and constraints provided for the design competition?
- Did the team provide adequate justification for exceeding any established constraints?

Path-to-Flight (Max 10 points)

- Did the team describe the technology's anticipated path-to-flight for a mission to the Moon?
- Did the team provide sufficient rationale for any trades conducted and modifications made for successful operation of their technology on the Moon, as opposed to operation on Earth?
- Have all major components been identified and assessed for operation in the expected lunar environments?

Presentation Evaluation Criteria (Max 15 Points)

- Clear presentation of information provided in technical paper
- Consistency with technical paper
- Quality of response to questions for presentation, models and/or prototypes
- Presence of teamwork and integration

Poster Evaluation Criteria (Max 5 Points)

- Poster quality (aesthetics & creativity): visually compelling; creative use of color, graphics, images, and/or photos
- Organization of components clearly present information provided in technical paper.
 - *Note to the teams from the judges: When it comes to the Technical Poster, Less is More!*
- Audience engagement with judges and other participants (including responses to questions)

Bonus Points (Max 20 Points)

- On-site Tech Demonstration at the Forum: Was the team able to conduct a successful small working prototype demonstration of their system/sub-system of the inflatable technology deploying from a stowed configuration on-site at the 2024 BIG Idea Forum? (Max 10 points)
- At the time of Forum, has the technology demonstrated enough merit that NASA should consider investing in making the concept flight-ready? (Max 5 points)
- Has the technology reached a TRL of 5 or greater? (Max 5 points)

Contact Information

For BIG Idea inquiries, please contact the BIG Idea Program Team at BigIdea@nianet.org.



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