



HulC
HUMAN LANDER CHALLENGE

NASA'S HUMAN LANDER CHALLENGE

2027 Phase 1 Guidelines

Theme: Lunar Communications



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Change Log:

(Changes made after the initial publication date will be listed here).

The Human Lander Challenge (HuLC) is administered by the National Institute of Aerospace on behalf of the National Aeronautics and Space Administration (NASA). HuLC is sponsored by the Human Spaceflight Mission Directorate (HSMD)'s Human Landing System (HLS) Program Office.

Challenge Overview



The Human Lander Challenge (HuLC) is an initiative supporting NASA's efforts to explore innovative solutions for a variety of known technology development areas for human landing systems (HLS). Landers are used to safely ferry astronauts to and from the lunar surface as part of the mission architecture for NASA's Artemis campaign. Through this challenge, college students contribute to the advancement of HLS technologies, concepts, and approaches. Improvements in these technology areas have the potential to revolutionize NASA's approach to space exploration, and contributions from the academic community are a valuable part of the journey to discovery.

HuLC is open to teams comprised of full-time or part-time undergraduate and/or graduate students at an accredited U.S.-based community college, college, or university. HuLC projects allow students to incorporate their coursework into real aerospace design concepts and work together in a team environment. Interdisciplinary teams are encouraged.

NASA's 2027 Human Lander Challenge (HuLC) invites collegiate student teams to develop **innovative, systems-level solutions that improve critical aspects of lunar communications performance**. This year's theme focuses on advancing network capabilities for lunar landers throughout cislunar transit and lunar surface operations. The initiative emphasizes developing robust communication architectures that support reliable command, telemetry, and data transmission during all mission phase – from Earth departure through lunar orbit insertion, descent, and sustained surface operations.

Based on a review of initial proposal package submissions (5-7-page proposal and 2-minute video) in Phase 1, up to 12 teams will be selected to receive a \$9,000 prize and advance to Phase 2, which includes a final design review at the HuLC Forum in Huntsville, Alabama in June 2027. Teams selected to advance to Phase 2 are responsible for developing a technical paper and poster and giving an in-person presentation to a panel of NASA and industry subject matter experts during the HuLC Forum. The overall top three placing teams will share a total prize purse of \$18,000:

- First Place - \$10,000
- Second Place - \$5,000
- Third Place - \$3,000

Context for 2027 Topic: Lunar Communications

As human exploration pushes beyond low Earth orbit toward sustained lunar presence missions and future missions to Mars, the role of lunar communications becomes increasingly vital. Designing for deep space is challenging due to mission duration, criticality, and extreme environmental conditions.

Challenge Description and Proposal Subtopics

Reliable lunar communications infrastructure is one area that must be tackled to ensure the safe and effective operation of human and non-human missions on the Moon. NASA invites collegiate student teams to explore innovations and potential solutions to lunar communications challenges and constraints.

The 2027 HuLC competition calls on students to develop ideas that support NASA's lunar exploration goals (refer to [NASA's Lunar Communications and Navigation Architecture](#), [NASA's Artemis Missions](#), and [NASA's Moon Base](#)). Participating teams will develop innovative, systems-level solutions to understand, establish, and optimize lunar communications systems for landers and surface operations that can be implemented within 3-5 years.

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While the focus of the 2027 HuLC Competition is lunar and cislunar communications, the Moon serves as a proving ground for future human exploration of Mars. **Proposed solutions should be designed to address lunar communications needs first and foremost.** However, where appropriate, teams may consider how their concepts, architectures, technologies, or operational approaches could support future Mars exploration objectives. Formal analyses of Martian environments are not required, but taking Mars into consideration when designing for cislunar environments shows depth and should be considered where possible.

Potential solutions areas include, but are not limited to, the following subtopics categorized by hardware, software, and architecture:

Hardware:

- **Space Rated Wireless Networks and Electronics:** Develop a robust wireless networking system (Wi-Fi, 5G, or other protocol) capable of enabling seamless collaboration and data exchange between astronauts, rovers, habitats, and lunar landers on the lunar surface. Consider the effects of space conditions on communication system electronics (transceivers, amplifiers, processors etc.). Designs should address extreme temperature cycling (-150°C to +120°C), high radiation doses, shock, vibration, and vacuum conditions while maintaining reliable connectivity for HD video, telemetry, and voice communications.
- **Antenna Signal Propagation, Modeling, and Environmental Mitigation:** Create predictive models and innovative hardware solutions to understand and mitigate signal degradation caused by regolith interference, terrain shadowing, dust accumulation, and thermal stress in the lunar environment. Consider antenna designs and protective technologies that maintain signal strength. Validate models through simulation and testing to ensure reliability during landing and extended surface operations.

Software:

- **Data Efficiency and Link Optimization:** Design a next-generation compression algorithm that maximizes data throughput for voice, video, and telemetry over bandwidth-limited links while prioritizing mission-critical data and operating within spacecraft power and processing constraints. Create an innovative modulation scheme and data format architecture that improves Earth-Moon communication efficiency within existing Deep Space Network infrastructure. Consider advanced error correction, adaptive modulation, or novel waveform designs that handle the 1.3-second one-way light speeds and varying link geometries.
- **Network Management and Scheduling:** Design an intelligent scheduling and resource allocation system that manages limited ground station antennas and spacecraft radios to serve dozens of cislunar users simultaneously, dynamically prioritizing based on mission criticality and handling emergency communications. Create a data aggregation and relay architecture that reduces the burden on Earth-based ground stations while ensuring all users maintain effective communications.

Architecture:

- **Surface Comm System Architecture:** Develop a resilient, redundant terrestrial network architecture with multiple transport paths, automatic failovers, and limited interruptions across geographically distributed ground stations. Create a mission operations framework that optimizes lunar lander relay operations, addresses visibility windows and power budgets, and scales from initial missions to sustained lunar presence. Optimize the placement and topology of communication nodes across the lunar surface, including lander-based relay systems and rover networks. Design for scalability as lunar operations grow from initial missions to sustained presence with dozens of surface elements. Consider including or excluding orbital comm system solutions.
- **Orbital Comm System Architecture:** Design a comprehensive lunar orbiting relay satellite constellation that provides continuous or near-continuous communication coverage for Human Lander System operations and other surface assets across the lunar surface. Your architecture should address orbital mechanics (including coverage gaps at polar regions), inter-satellite links, Earth relay capabilities, and integration with lander to create a resilient communication network that minimizes single points of failure. Propose a scalable solution that balances mission requirements, launch costs, and operational complexity while ensuring reliable connectivity during critical mission phases such as descent, surface operations, and ascent. Consider including or excluding surface comm system solutions.

The subtopics above reflect real-world needs identified by NASA engineers and scientists and present meaningful opportunities for students to directly influence technologies that support the future of human spaceflight. **However, teams may propose solutions outside of these examples.**

Design Constraints and Guidelines

Lunar Communications are critical for crewed space missions, responsible for maintaining reliable command, telemetry, and data transmission between lunar surface assets, orbiting relays, and Earth-based mission control. **Technologies, instrumentation, designs, and approaches developed for HuLC must survive and operate in extreme environments in cislunar space and on the moon.**

- Environmental Survival Requirements:
 - Extreme temperature variations (lunar: -150°C to +120°C; cislunar vacuum)
 - High radiation exposure in cislunar and interplanetary environments
 - Lunar dust abrasion and electrostatic effects
 - Micrometeorite and debris impact resistance
- Additional constraints include:
 - Minimal barriers to NASA adoption (e.g., low mass, small size, low power, etc.)
 - No additional risks posed to crew
 - Ability to survive launch loads
 - Must support uninterrupted surface coverage for at least 30 continuous days.
 - Ideal hardware lifespan of at least 5 years.

This framework ensures that lunar communications infrastructure integrates seamlessly into existing NASA mission architectures while maintaining crew safety and mission success across diverse lunar and deep-space operational scenarios.

Proposed Solutions Must Consider

Proposals must be innovative and include a clear description of the need, utilization or application, impacts, and outcomes in reducing and mitigating the risks posed by long duration space flights or lunar surface stays. Proposing teams should clearly identify their assumptions and provide rationale to support them. The list below includes some recommended assumptions, but adjustments are permitted if accompanied by good engineering rationale.

- Targeted use within 3 to 5 years
- Cost-effectiveness with well justified estimates
 - Solutions should be affordable enough to merit consideration for implementation
- Simplicity of implementation, operational use, and interpretation
- Design for cislunar and/or lunar environments as applicable (Refer to the [SLS-SPEC-159 NASA Cross-Program Design Specification for Natural Environments \(DSNE\) Revision I](#))
- Designed for deployment on or implementation within NASA/commercial HLS lunar surface.
- Key technologies where relevant, including technology readiness levels ([TRLs](#)), as well as the systems engineering and architectural trades that guide the recommended approach
- Technical merit and rationale of mission operations in support of a sustainable space exploration program
- Supporting engineering analysis and justification of assumptions
- Appropriate assessment of project schedule and milestones, as well as appropriate development and annual operating costs (i.e., budget)
 - Appropriate assessment of costs includes technology maturation, system development, mission infusion/adoption, integration, and operations (as applicable)
- Adherence to the requirements and constraints of the design competition

Participation Agreement

Proposers must acknowledge that they have read and agree to abide by the full [HuLC Participation Agreement](#). By submitting to the HuLC Competition, all members of your team agree to the terms and conditions contained in this Participation Agreement.

Eligibility

NASA welcomes submissions from teams from accredited U.S.-based community colleges, colleges, or universities. Teams may be comprised of a combination of full-time or part-time undergraduate and/or graduate students, and can include senior capstone students, clubs, multi-university teams, or multi-disciplinary teams. **Additional Eligibility restrictions apply. Please see the [Participation Agreement](#) for full eligibility requirements.**

Team Size

There is no limit to the number of students who may participate on a HuLC team during the competition year. However, each team must consist of:

- One faculty advisor with a university/college affiliation at a U.S.-based institution, and
- A minimum of 2 student members who are U.S. citizens or lawful permanent residents from that U.S.-based university/college who work on the project **and will present at the culminating HuLC Forum if the team is selected as a finalist.**

Forum Attendance

- If selected as a finalist:
 - **only U.S. Citizen and lawful permanent resident team members may attend the Forum**, and
 - at least two U.S. citizen or lawful permanent resident student team members must attend the HuLC Forum.
- At least one faculty advisor is highly encouraged to attend the Forum with each team. Team-affiliated industry advisors may also attend the Forum.
- If finalist teams desire to bring more than 10 students to the HuLC Forum, permission must be requested from the HuLC Program Staff prior to registering. Requests will be reviewed, and approvals will be granted on a case-by-case basis, space permitting. Due to space limitations, approvals will likely not be granted for more than 15 students per team to attend the HuLC Forum.

While advisors can contribute to the team's work, it is expected that the bulk of the work is completed by the student team members. Student team members are also expected to be the presenters of their work at the Forum.

NEW for 2027: Foreign National Policy and Acknowledgement Form

Policy: Although eligible foreign nationals attending the proposing U.S.-based university/college can participate on a HuLC Team, they are not eligible to win a prize from NASA, and they will not be permitted to attend the culminating Forum if the team is selected as a finalist.

Acknowledgement Form: When submitting the proposal, teams are required to upload a signed [HuLC Foreign National Acknowledgement Form](#) for **each** foreign national team member, acknowledging the policy above.

NEW for 2027: HuLC LLM and AI Use Disclosure Policy

Tools like large language models (LLM) or generative artificial intelligence (gen AI) may be used to develop parts of a team's submission, but the outputs of these tools must be significantly analyzed and synthesized

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by human team members. All uses of these tools must be acknowledged and each team's proposal (and later technical paper, if selected as a finalist) must include a paragraph disclosing which tools were used, how they were used, and must provide justification for why the tool was used in place of traditional methods (i.e., peer reviews, CAD modeling, etc.). Generated images must include captions with, at a minimum, the name and version of the tool used, and date of generation.

2027 will be the first year that use of LLM/gen AI is permitted for submission development, but there remains a strong preference for traditional research and development methodology. Teams are expected to use good judgement regarding the appropriate use of AI for all aspects of their HuLC submissions (proposal, technical paper, presentation, poster). Excessive use may negatively impact selection.

NASA and the NIA reserve the right to reject or disqualify any submission if the use of AI tools and software is not disclosed or adequately described.

Dates and Deadlines

All deadlines must be met by 11:59 PM Eastern on the date specified below, unless otherwise indicated.

Phase 1: Notice of Intent and Proposal Package	
Date	Description
October 15, 2026	Deadline to Submit a Notice of Intent
October 22, 2026	(Noon ET) Deadline to Submit Questions for Q&A Session
November 16, 2026	Q&A Session for Interested Teams
March 4, 2027	Deadline to Submit a Proposal Package
April 7, 2027	Teams Notified of Selection Status

Phase 2: Final Deliverables and Forum	
Date	Description
May 20, 2027	Deadline to Register and Pay for the HuLC Forum
June 1, 2027	Deadline to Submit a Technical Paper
June 17, 2027	(Noon ET) Deadline to Submit Presentation Chart Deck and Technical Poster Files
June 21-24, 2027	NASA's 2027 Human Lander Challenge Forum in Huntsville, AL

How to Compete in HuLC

PHASE 1

1. Thoroughly review the Challenge Guidelines
2. Find a qualified advisor and a team of students with a variety of skills
3. Read the entire [Participation Agreement](#) to ensure your team meets eligibility requirements
4. Submit a non-binding Notice of Intent (NOI) by the deadline
5. Attend the Q&A Session
6. Submit a Proposal and Video by the deadline
7. Proposals are evaluated by the Judges
8. Up to 12 teams receive \$9,000 and advance to Phase 2 as Finalists

PHASE 2

1. Further develop your concept and submit a Technical Paper and Poster
2. Give an in-person presentation at the HuLC Forum in June
3. 1st, 2nd, and 3rd place teams share a total purse prize of \$18,000

Notice of Intent (NOI)

Notice of Intent (NOI) Submission Deadline: 11:59 PM Eastern on October 15, 2026

Visit the HuLC Competition Website to complete the brief [online NOI Submission Form](#).

Interested teams are strongly encouraged to submit a Notice of Intent (NOI) to compete by the deadline to stay informed of competition updates, and to ensure an adequate number of reviewers. Teams who submit NOIs by the deadline will receive all competition updates and an invitation to participate in the Q&A session prior to the proposal due date.

The following information will be required or requested on the NOI submission form:

- Name of U.S.-Based College/University
- Name(s) of any Collegiate or Industry Partners
- Project Title, if known
- Subtopic or Focus Area being Addressed, if known
- Contact Information for Primary Faculty Advisor and Student Team Lead
- Contact Information for any Additional POCs, if applicable
- Synopsis of Proposed Concept (max 3,000 characters) to provide a high-level overview of the proposed concept or potential concepts.

Note: Submitting an NOI does not bind any participant or team to submitting a proposal. It is understood that NOIs are due early in the development process, and teams will still be in the process of fleshing out many of the details of their concepts. We fully expect that teams' concepts will change and evolve between the NOI and Proposal Package submissions, as in-depth research and analysis is conducted. Teams have the full flexibility to change ideas, concepts, and/or category selection as they work over the course of the semester. Information submitted in the NOI does not need to match the proposal submission.

Proposal Package Guidelines

Proposal Package Submission Deadline: 11:59 PM Eastern on March 4, 2027

To participate in the HuLC Competition, teams will [submit a proposal package](#) consisting of:

- A 5-7-page proposal,
- A 2-minute video, and
- A graphic depicting team's concept.

Teams are encouraged to review the [Resources Webpage](#) on the HuLC Website, which provides resources to assist in the development of the team's proposal package.

Proposal Expectations

- Proposals should be 5-7 pages in length.
- Proposals should clearly articulate the innovation and design being proposed, including original engineering analysis planned and/or in progress. It will not be enough for teams to indicate they will address the requirements later in the Technical Paper.
- Robust proposals are expected to demonstrate significant progress in your design and analysis. The HuLC Judging Panel will be looking for mature concepts with associated in-progress and completed analysis at the proposal stage. Proposals should not defer fundamental design decisions or present multiple competing approaches with the expectation that these decisions will be made later in the competition. The proposal should reflect the total scope planned for the Technical Paper. All analysis results to-date (in summary form, if necessary, due to space limitations) should be included, leaving

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placeholders for analysis not yet completed. It is imperative that proposing teams apply all of the criteria from the HuLC Design Constraints and Guidelines in their design details. Teams can get a better understanding of what the judges are ultimately looking for in final deliverables by carefully reviewing winning papers, presentations, and posters from previous teams in the [HuLC Archives](#).

- Submitting teams pledge that the team is the sole author of the submission, that the submission is wholly original, that it does not infringe on any copyright or any other rights of any third party of which the team is aware, and that the submission is free of malware. Teams may not have any portion of their submissions created by ineligible individuals.

Required Proposal Content

Proposing teams will develop a 5–7-page proposal that includes the following sections, at a minimum:

- Cover Page (**not included in the page limit**) with the following required information:
 - University Name
 - Project Title
 - Full Names of all Team Members, with:
 - Academic Level (Undergraduate or Graduate)
 - Major of Study
 - **New!** Citizenship (U.S. Citizen, Lawful Permanent Resident, or Foreign National)
 - Graphic or Image of Part or All of the Proposed Concept (No Hand-Drawn Sketches)
- **Quad Chart** (**not included in page limit**)
 - Use the [HuLC Quad Chart Template](#) found on the “Proposal” section of the [Resources Webpage](#), incorporating it into the body of the proposal document as its own separate page.
 - A Quad Chart is a way for teams to display standardized information that helps evaluators quickly compare many projects. Teams must use the provided template to create a quad chart and insert the chart into their proposal. Quad charts must address:
 - The team’s major objectives and technical approach to the problem being addressed in their chosen subtopic or solution area
 - An image/graphic of part or all of the concept
 - Key design details and innovations of the concept
 - A summary of schedule and cost for the proposed solution’s path to adoption
- The body of the proposal should outline/include (**Max of 7 pages**)
 - Summary Statement/Executive Summary (**Max of 150 words**)
 - An overall summary of the innovative solution, including a title of the project, a synopsis of the specific subtopic being addressed, an overview of the proposed solution, and a statement of the impact the innovative solution will have on human exploration goals.
 - How does the proposed solution address NASA’s Lunar Communications and Navigation Architecture objectives? (Refer to [NASA’s Lunar Communications and Navigation Architecture](#))
 - How does the proposed solution address NASA’s human exploration challenges? (Refer to [NASA’s Plan for Sustained Lunar Exploration and Development](#) and [NASA’s Initial and Sustained Artemis Human Landing Systems](#).)
 - How the proposed solution is applicable to cislunar and lunar environments [[SLS-SPEC-159 NASA Cross-Program Design Specification for Natural Environments \(DSNE\) Revision I](#)]
 - Indicate *WHY* you chose your solution / design / approach in terms of *VALUE* in the areas of potential mission / system impacts, technology readiness, affordability, programmatic implementation, and risk.
 - Detailed information on the verification and validation of the solution
 - Teams need to prove their analysis is correct and believable to the judges. They should clearly detail how they are solving what they set out to solve, and that they are solving the problem in the appropriate manner with the appropriate tools/equipment.

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- Capture risks associated with development, verification, and validation of the solution – and define mitigation plans for them.
- Innovative approaches / capabilities / technology
 - For each innovative element included in the design, provide a brief justification describing why it was selected instead of a conventional or proven alternative and how it improves or provides value to the overall mission concept.
- Realistic technology assumptions, including realistic NASA Technology Readiness Level Definitions and justifications where appropriate
- Original analysis and engineering
- Detailed information about the work conducted in various trades, concepts, and technical analyses
- Key findings supporting the envisioned solution
- Adherence to the [Design Constraints and Guidelines](#)
- Mass and size estimates (as appropriate)
- Appropriate budget assessment (including an assessment of cost margin) and **an explanation of the assumptions**. Use of analogs and NASA costing tools is strongly encouraged.
- Proposed path-to-flight project timeline for Development, Test, and Evaluation (DT&E) of proposed solution – assuming a mission in the next 3-5 years.
- AI Disclosure Statement (**not included in the page limit**)
 - Any use of generative AI in developing the proposal must be disclosed and appropriately cited in a concise paragraph on a separate page at the end of the proposal. Refer to the [HuLC LLM and AI Policy](#) for details on what information should be provided.
- Appendices (**not included in page limit**)
 - Appendices are to be used for references and calculations **ONLY**. There is no preference in citation formatting, but references must be formatted uniformly and correctly. Just listing a link to the source is not acceptable.
 - **Judges are not obligated to look at the appendices**. Include important details in the body of the proposal paper to ensure they are reviewed.

Proposal Formatting Guidelines

Teams are responsible for the formatting and appearance of their proposal.

- **Length:** Proposals must be a minimum of 5 pages and a maximum of 7 pages, inclusive of all text, graphics, tables, and charts. in length.
 - The Cover Page, Table of Contents (if used), Quad Chart, and Appendices are excluded from this page count.
 - References should be placed in an appendix at the end of the document. **Appendices are to be used for references and calculations ONLY and do not count toward the page limit.**
 - **NEW!** References and citations must be uniformly listed in AIAA style.
 - Reviewers are not obligated to look at the appendices. Important figures and documentation must be included in the main body of the paper, or they will not be scored.
 - **NEW!** Proposals which include content in the appendix other than references and/or calculations may be *disqualified*. Appendices are not to be used as an extension of the main body of the paper.
- **Layout:**
 - Single spaced, single column format.
 - Standard 1" (2.54 cm) margins on all sides.
- **Graphics, Tables, and Charts:**
 - Strongly encouraged where appropriate – effective visuals can convey complex ideas more clearly than text alone.

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- Figures and tables must be legible without magnification, embedded in the document, and in digital format.
- Image files should have a minimum resolution of 150 dpi.
- Full page graphics are limited to standard, 8.5 x 11 sized page. Graphics larger than this may be counted as multiple pages.
- **Fonts:**
 - 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 must be 11 or 12 pt throughout, including in all tables, charts, and graphs. **Any text smaller than this will not be reviewed.**
- **File Type:** Proposals must be submitted as PDF files (Max 100MB).

Video Expectations

As a part of the proposal submission process, each team must include a 2-minute video. The video is a tool helpful for communicating aspects of your concept that may be difficult to capture in the written proposal, providing an opportunity to use animation, graphics, simulations, or other creative approaches to visually demonstrate how your proposed concept works or highlight unique aspects of your approach.

Video Formatting Guidelines

- **Length:** Videos may not exceed 2 minutes in duration.
- **Orientation:** Videos should be horizontal, not vertical
- **Submission:**
 - Videos must be uploaded to YouTube, providing the video's YouTube URL on the online Proposal Package submission form. **Other video file types will not be accepted.**
 - Videos must be **externally accessible** via link and set to either **Unlisted or Public** visibility on YouTube.
 - Tip: YouTube accounts often require verification before videos can be fully uploaded. If your video remains "processing," [verify YouTube account settings](#).
- **Content Requirements:**
 - The lead university name and project title must appear in text at the beginning of the video.
- **Copyright Compliance:**
 - NASA-created images may be used, but the NASA "meatball" and "worm" logos may not
 - Teams must not use copyrighted music or images.
 - It is the responsibility of the team to follow copyright law. Neither NASA nor NIA can approve the use of copyrighted material.
- **YouTube Video Title:**
 - Use the format "**2027 HuLC Proposal – University Name, Project Title**"
 - Abbreviations and acronyms may be used if required to meet YouTube's character limits.

Submitting the Proposal Package

To upload your proposal and video (.pdf file and YouTube link), please visit the [Challenge Details Webpage](#) and complete the [online Proposal Package Submission Form](#). Utilize the [Checklist for a Successful Proposal](#) to ensure your proposal is complete prior to submitting.

No revisions will be accepted after submission. Proof the proposal and video files carefully. In the event of technical issues (e.g., corrupted file, broken link), we will attempt to contact the team– so ensure the submission form includes current contact information. **Late submissions will not be accepted;** the form will close promptly at midnight Eastern Time.

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The following information will be required or requested on the Proposal Package Submission Form:

- Certification that team meets eligibility requirements
- Name of U.S.-Based College/University
- Name(s) of any Collegiate or Industry Partners
- Project Title
- Chosen Subtopic or Focus Area
- Contact Information for Primary Faculty Advisor and 2 Student Team Leads
- Contact Information for any Additional Points of Contact, if applicable
- File Upload for PDF Proposal Document
- File Upload for High Resolution Graphic Depicting Team's Concept
 - Each team is required to upload a high-resolution graphic file (minimum 300 PPI) that may be used to publicly highlight the team's participation in HuLC. While this image will not be scored, it should be suitable for external sharing and may be featured on websites, social media, promotional materials, NASA reports, and similar outlets.
- URL for Team YouTube Video (Video must be "Unlisted" or "Public")
- A 2-3 sentence synopsis of the proposed project that briefly highlights any innovations (Max 600 characters)
- Acceptance of the [HuLC Participation Agreement](#)
- PDF File Upload for [Phase 1 Faculty Advisor Approval Attestation](#) Using the Provided Template
 - The attestation form serves two key purposes:
 - To confirm that the Faculty Advisor has reviewed and approved the team's proposal submission.
 - To acknowledge that the Faculty Advisor has read and agrees to comply with the full [HuLC Participation Agreement](#). By submitting to the HuLC Competition, all team members – including the Faculty Advisor – agree to the terms and conditions outlined in the Participation Agreement.
 - **Important Note:** Submissions without a valid Faculty Advisor Approval Attestation will be deemed non-compliant and will not be reviewed.
- PDF File Upload for [Foreign National Acknowledgement Form](#) (one for each foreign national team member)
- ***Financial Information** – For use only if a team is selected as a finalist.
 - **Financial Point of Contact (POC):** someone employed by the university who can receive and manage funds on behalf of the team.
 - Student team members **may not** be Financial POCs.
 - **Mailing address for prizes/awards:** Must be a college / university address.
 - Awards cannot be mailed to team members or residential addresses.
 - **File upload for the primary university's completed [Vendor W-9 Form](#):**
 - This form must be completed by the primary university's accounting department, a department admin or account specialist.
 - A completed [IRS W9 Form](#) from the lead institution is an acceptable substitution for the Vendor Form.

***Information Regarding Required Vendor W-9 Form**

Ensure the submitted W9 is correct at the time of proposal submission. HuLC program staff will immediately verify Vendor W-9 Forms and Financial POCs for all proposing teams. If this information is incorrect at the time of submission, it could result in delays in prize disbursement.

Phase 1 Evaluation Criteria

The HuLC judging panel is comprised of NASA and industry experts who will score each submission based on adherence to the guidelines and constraints and the published evaluation criteria. The [2027 HuLC Phase 1 Scoring Matrix](#) outlines how the Proposal Package will be evaluated, including point value assessment. The proposal and video together can earn a maximum of 100 points.

Proposal Evaluation Criteria (95 points Total)

Proposals will be judged based on:

- **Technical Credibility and Feasibility (Max 50 points)**
 - Objectives are clearly articulated, and solution enables or advances NASA's exploration goals
 - Refer to [NASA's Lunar Communications and Navigation Architecture](#), [NASA's Plan for Sustained Lunar Exploration and Development](#) and [NASA's Initial and Sustained Artemis Human Landing Systems](#).
 - Demonstrates applicability for operation in cislunar and/or lunar environments
 - Demonstrates feasibility for addressing lunar communications needs, supported by evidence of technical maturity, compliance with HuLC constraints, and potential for meaningful impact on HLS challenges
 - Demonstrates system-level impacts with sufficient technical detail, analysis, and design. Contains realistic assumptions, justification, and supporting evidence for the proposed solution
 - Provides a thorough and feasible verification and validation approach
 - Identifies risks associated with development, verification, and validation of the solution, with accompanying mitigation plans
- **Technical Innovation (Max 25 points)**
 - Demonstrates a new or novel concept, capability, technology, architecture, approach, or application for lunar communications
- **Technical Management (Max 20 points)**
 - Development and implementation plan is adequate and thorough, and the path-to-adoption schedule and milestones are reasonable and clearly defined
 - Estimated costs and associated margins or uncertainties are reasonable and reflective of the proposed solution's required technical development and maturity
 - Demonstrates a credible path for successful development, implementation, and/or adoption of the proposed solution
 - Proposal is clearly written, well organized, and effectively communicated
 - Adheres to all HuLC Guidelines, including AI/LLM usage acknowledgements

Video Evaluation Criteria (5 Points Total)

- Effectively communicates key aspects of the team's concept and/or improves understanding of the proposed solution
- Video is organized, visually effective, and easy to follow, with content clearly supporting the proposed solution

Tips and Traps

Tips

- Read ALL guidelines and requirements found in this document. Carefully review submission requirements prior to the submission deadline.
- Where there aren't specific requirements listed in the theme, research and justify your assumptions. An important part of conceptual design is the ability to make reasonable assumptions to address uncertainties and to understand the consequences of those assumptions. Provide adequate analysis and documentation (i.e., support) for your expected outcomes.

2027 HUMAN LANDER CHALLENGE PHASE 1 GUIDELINES

- Find a balance between sound technical analysis and innovative concepts. Innovation will be rewarded, but not at the expense of fundamentals.
- Start with a big picture view of your concept, rationale, and goals. Don't jump immediately into the details of design or tool development, etc. Find balance between accurately addressing the overall approach and supporting specific focuses within your solution. If you drill down and focus your research and engineering on a particular design element to validate, you will still need to provide sufficient relevance, connection, and context to the broader solution.
- A picture is worth a thousand words and can convey a lot of information. Images for the proposal are a plus. However, the proposal should not contain any hand-drawn sketches. AI-generated images must include a caption with the name and version of tool used, and date of generation.
- If results/details are not available yet or are still being finalized, it is still valuable to indicate that you will have them and how you are determining them, sources of validation, etc. If it is not mentioned, judges will assume it is not being addressed.
- Consult the technical resources provided and make use of any published papers and reports available to you. See the [Resources Webpage](#) for a preliminary list of resources and recommended reading.
- Participate in the Q&A Session. If you are unable to attend, visit the [FAQs page](#) about a week after the deadline and carefully review the Q&A Session Summary Document posted there.
- Submit all materials on time; late submissions will not be accepted.
- Utilize all available page space.

Traps

- Do not copy information found on Google or generated by AI tools. Analyze your research findings.
- Poor grammar, typographical errors, etc. do not reflect well on your team. Report quality will impact the judges' scoring.
- Do not include hard-to-read figures, charts, or text in your proposal. Follow established font size requirements, because judges often will not read graphics or charts with font smaller than 11pt.
- Appendices are not to be used as an extension of the main body of the paper. Proposals which include content in the appendix other than references and/or calculations risk disqualification.

Announcement of Finalists and Phase 1 Prizes

Up to 12 finalist teams will be announced in April 2027. Each eligible team will receive a \$9,000 prize issued to their university and advance to Phase 2 of the competition, which includes a final design review at the HuLC Forum. Allocation of the funds is at the discretion of the team's faculty advisor. Reviewers' feedback will be distributed to all submitters at selection notification.

Deliverables for Finalist Teams

Teams selected to receive funding and advance to Phase 2 are responsible for the following project deliverables. **Additional details on these deliverables will be communicated to finalist teams after selection.**

- 10–15-page Technical Paper
- Technical Poster
 - Teams must submit a digital poster file **and** bring a full-size printed poster for display during the Forum's poster session (48"x36")
- 25-minute Presentation, with an additional 20-minutes of Q&A at the HuLC Forum in June

All finalists' technical papers, presentations, and posters will be posted and archived on the HuLC Website, and winning technical papers may be submitted through [NASA's Technical Report Server \(NTRS\)](#). All work published to the HuLC website may be referenced by others, including future HuLC participants.

Phase 2 Prizes

Teams selected to receive funding and move on to Phase 2 are responsible for the development of a technical paper, technical poster, and a presentation during the HuLC Forum in June 2027 at or near NASA's Marshall Space Flight Center in Huntsville, Alabama. During the culminating Awards Ceremony at the HuLC Forum, awards will include 1st, 2nd, and 3rd place, and any other panel-determined honors (e.g., Best Technical Poster, Best in Systems Engineering, etc.). The overall top three teams will receive an additional prize distributed in the same manner as the initial award, as follows:

- First Place - \$10,000
- Second Place - \$5,000
- Third Place - \$3,000

Contact Information

For HuLC inquiries, please contact the NIA HuLC Program Team at HuLC@nianet.org.