



NASA'S HUMAN LANDER CHALLENGE

Full competition details can be found on the [HuLC Website](#).

2026 THEME: LONG DURATION SPACEFLIGHT ECLSS

As human exploration pushes beyond low Earth orbit toward sustained lunar presence and future missions to Mars, the role of Environmental Control and Life Support Systems (ECLSS) becomes increasingly vital. Designing ECLSS for deep space is uniquely challenging due to mission duration, limited resupply, and extreme environmental conditions. NASA's 2026 Human Lander Challenge (HuLC) invites student teams to develop innovative, systems-level solutions in response to one of the sub-topic areas that improve critical aspects of long duration spaceflight ECLSS performance.

Innovate, collaborate, and leave your mark on the future of spaceflight!

SUBTOPICS

NOISE SUPPRESSION AND CONTROL

Currently, fans and other ECLSS hardware on the ISS create loud, pervasive background noise. Future long-duration missions require more effective noise mitigation strategies to support crew health, communication, and overall mission success. Teams should propose innovating concepts to reduce, isolate, or manage noise generated by ECLSS systems in long-duration space habitats (long term lunar stays or human missions to Mars).

POTABLE WATER DISPENSER

Potable water dispensers are necessary to rehydrate dry foods and prepare beverages in microgravity, but current systems are only capable of producing a small amount of heated water and no cold water. Future astronauts will benefit from a solution that delivers both on demand hot and cold water for daily use. Teams should design a novel potable water dispenser that can safely and efficiently deliver temperature-controlled water for astronauts' food and beverage needs, emphasizing ergonomics and throughput while minimizing waste and cleaning requirements.

SENSOR REDUCTION IN HARDWARE HEALTH MONITORING SYSTEMS

Current space systems monitor hardware health using a multitude of sensors to closely track and assess critical hardware, depending on how critical the hardware is. This approach is effective, but increases the overall mass, power usage, and system complexity. Future missions to the Moon or Mars require more efficient ways to monitor the health of ECLSS hardware with fewer sensors. Teams should propose solutions that lead to mass and power savings by increasing sensor capacity, capability, efficiency, or reliability of hardware health monitoring systems while reducing the total number of sensors required.

FLUID TRANSFER BETWEEN SURFACE ASSETS ON THE MOON AND MARS

Surface assets on the lunar and Martian surface will involve multiple assets which must share or transfer fluids such as water, waste, fuel, and oxygen. Future mission success requires efficient and reliable fluid transfer between these systems despite extreme environmental conditions (reduced gravity, dust, temperature fluctuations, etc.). Teams should propose solutions for safe, reliable, and efficient fluid transfer between surface assets on the Moon and/or Mars, addressing compatibility between assets, leak mitigation, ease of use by astronauts and/or robotic systems, and other unique challenges posed by the environment.

ABOUT HULC

Through HuLC, college students contribute to the advancement of NASA's Human Landing System (HLS) technologies, concepts, and approaches. Teams address annually changing topics with proposed solutions to real HLS challenges.

ELIGIBILITY HuLC is open to teams of undergraduate and graduate students at accredited U.S.-based community colleges, colleges, and universities. Full eligibility guidelines are available on the [HuLC Website](#).

PRIZES In Phase 1, up to 12 teams will earn \$9,000 each and advance to Phase 2. The top 3 Phase 2 winners will split another \$18,000 at the HuLC Forum!



HuLC
HUMAN LANDER CHALLENGE

HuLC.nianet.org

HuLC@nianet.org



Scan the QR code to learn more!

DATES AND DEADLINES

PHASE 1

Oct. 20, 2025: Deadline to Submit non-binding Notice of Intent
Nov. 4, 2025: Q&A Session for Interested Teams
Mar. 4, 2026: Deadline to Submit Proposal and 2-Minute Video
Apr. 6, 2026: Up to 12 Finalist Teams Selected

PHASE 2

May 27, 2026: Deadline to Submit Technical Paper
Jun. 18, 2026: Deadline to Submit Presentation & Digital Poster
Jun. 23-25, 2026: 2026 HuLC Forum in Huntsville, AL



NASA's Human Lander Challenge is administered by the National Institute of Aerospace on behalf of the National Aeronautics and Space Administration (NASA).