

Technology Challenge Award Criteria

Participation in this award competition is optional. The winning team will receive a prize of \$1000.00.

This award challenges participants to apply their engineering skills to develop mobility devices. The goal of the Technology Challenge Award is to involve students in hands-on engineering experiences related to NASA's mission of exploration and discovery. Mobility devices, such as rovers, simulate the extension to astronauts' range and carrying capabilities as they explore other worlds.

Teams will focus on **creativity, ingenuity** and **effectiveness** as they design and build a particular component technology of a rover. This technology is built to aid navigation of the extraterrestrial-like surfaces of the NASA Human Exploration Rover Challenge course.

2014 Wheel Design and Fabrication

In the 2014 NASA Human Exploration Rover Challenge, the Technology Challenge will concentrate on Wheel* Design and Fabrication.

** Wheel refers to the rover components that provide contact with the surface. Those components might consist of wheels, belts, tracks, treads, skids, rails, rollers, etc.; it is through these components that force is exerted on the surfaces being navigated across, to provide propulsion (thrust) and steering.*

The design should take into account the following criteria:

- Safety
- Adaptability to different surfaces
- Durability and strength
- Traction
- Stability
- Performance
- Maneuverability
- Ground Contact Area
- Flotation (less sinkage)

Note: Other mobility component technologies will be investigated and tested in future Rover Challenges.

Judging

A team of judges, selected by the Jacobs ESSSA Group of Huntsville, Ala., will determine, based on the material presented and on visual inspection, which entries produced, documented and explained the technology challenge solution to best meet the performance requirements.

Note: This judgment is based on the professional opinion of the judges and not on the race results!

Judging will take place in two parts:

- Technology Challenge Written Report
- Oral Interview/Presentation/Wheel Inspection

Oral Interview judging will take place in the mornings of April 11 and April 12 in the Pit Area.

Technology Challenge Report:

1. Each team will supply documentation detailing their design and how that design meets the criteria listed above.
2. The teams' documentation should answer the "who, what, where, how and why" questions of the design.

Questions to be answered shall include, but are not limited to:

- a. Who are the members of your team and the advisor?
 - b. Who was responsible for the wheel design solution?
 - c. How much did it cost?
 - d. Where was the work completed?
 - e. What materials did you use to fabricate the wheels?
 - f. What was the process used to design the solution?
 - g. How did you construct the solution?
 - h. How did you pay for it?
 - i. What design features enhance the robustness of the wheel to ensure survival on the race course?
 - j. What part is most likely to break? Why?
 - k. What can/should be done to minimize the effects of this failure?
 - l. What is the most important lesson learned on the project to date?
3. Documentation shall be limited to 10 (8.5 x 11) pages (10 single-sided or five double-sided) or the equivalent. Drawings, pictures and figures are not considered

in the page count.

4. Documentation may be sent by one of the following options:
 - a. Regular Mail: Postmarked no later than **April 5, 2014**, and sent to:
Mr. Bradley Biehn
2813 Wayne Drive, S.E.
Decatur, AL 35603-5655-11
ATTN: Technology Challenge Award
 - b. Emailed to:
bradley.biehn@nasa.gov
 - c. Web Page: Send Web page address to the above email. Please request confirmation that your documentation has been received.

All submissions will be confirmed by email.

So that we may confirm your submission, confirmation of receipt must take place before the start of the race signifying your team entry in the Technology Challenge Award competition.

Technology Challenge Oral interview/Presentation/Wheel Inspection

A team member will discuss the technology challenge solution with the judges. The team should be able to discuss in detail the design, manufacturing, test, documentation, and implementation of the technology challenge solution. A formal presentation (power point, etc.) is not required for the interview. Visual aids such as test components, spares and models (both hardware and computer-based) can be used to discuss the team's technology solution.

Questions: Any questions about the 2014 Technology Challenge Award -- Wheel Design and Fabrication should be directed to Bradley Biehn at 256-544-2688.