

# Cosmic Challenges

By DEEPANJALI KAKATI

The National Aeronautics and Space Administration's contest program seeks innovative ideas from common people to solve space travel problems.

**T**hrough the ages, out-of-the-box thinking has taken mankind beyond boundaries and limitations. To support NASA programs such as the Vision for Space Exploration—the plan to return humans to the moon, paving the way for journeys to Mars and beyond—the space agency has set up a program of competitions to get ordinary people's ideas on solving problems of space travel and extra-planetary living.

Called Centennial Challenges, the contests are designed to find low-cost solutions to technological obstacles ([www.centennialchallenges.nasa.gov](http://www.centennialchallenges.nasa.gov)).

Unlike many other science contests, the Centennial Challenges awards are given for actual working models rather than theoretical proposals, and prizes of \$200,000 and above are being offered. The current plan is to fund competitions through 2011.

The competition is open to all Americans and also to foreign participants, provided the team leader is a U.S. citizen and the participating organization is either based in or has offices in the United States. The teams have the right to sell their product, service or technology to whomever they wish, provided they abide by U.S. laws regarding the sale and export of technology.

Unfortunately, none of the entries in the first two contests, held in 2005, won the prize money as the entries did not succeed well enough in solving the problems NASA had set.

The next challenge, which will be conducted in April 2007 and is still open for entries, is the

Astronaut Glove Challenge, in which competitors must create a glove that is lighter, stronger, more comfortable and flexible than the current model. "Reducing space suit glove fatigue is a critical technological goal that, if successful, would have an important impact on astronaut performance and mission planning," says Douglas Cooke of the NASA Exploration Systems Mission Directorate.

Each team will have to provide two gloves for three different tests. First, the force required to move the fingers and thumb will be measured. Gloves requiring the least force will get the most points. The gloves will then have to perform certain tasks inside a depressurized box. The most points would go to the team that completes the most tasks within a set time. The gloves will also be tested for their ability to withstand pressure.

Other challenges coming up next year include the Lunar Regolith Excavation Challenge in May and the Lunar Lander Challenge in October. For the first, teams will have to design and build autonomously operating systems that will excavate lunar regolith, or "moon dirt," and deliver it to a collector. The Lunar Lander Challenge is looking for a vehicle capable of ferrying cargo or humans back and forth between lunar orbit and the surface of the moon.

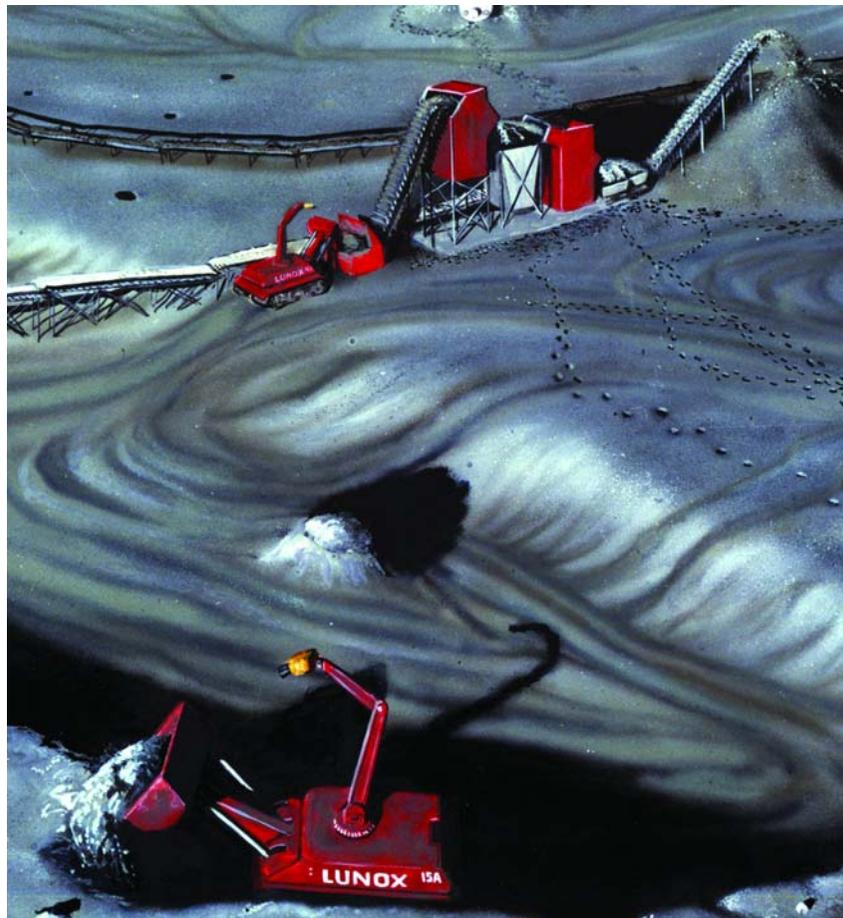
"Since we are really just starting up, there have not yet been any final results from the contests that NASA has adopted to solve the real problems of space and aeronautics," says Ken Davidian who works with the Centennial Challenges program.



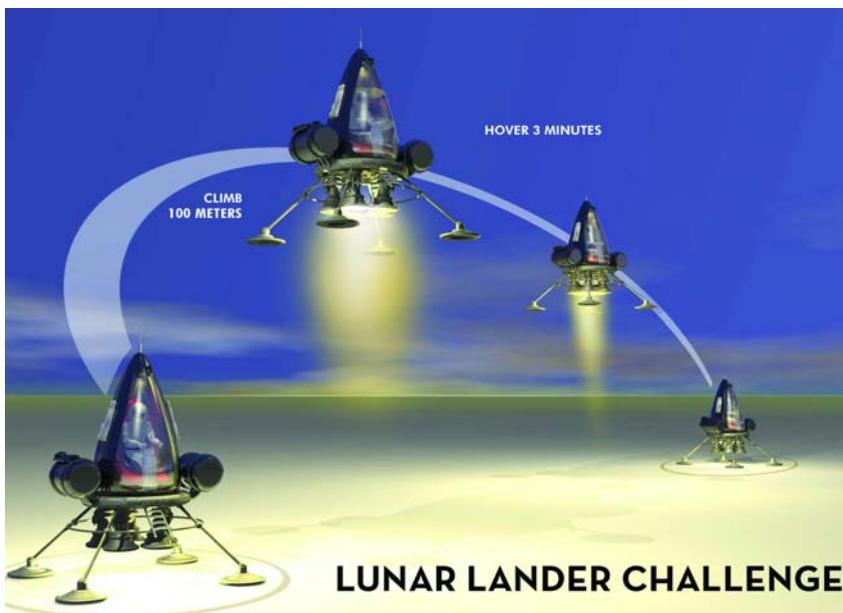
Above: Competitions in 2007 include the Astronaut Glove Challenge for which participants must create a lighter, stronger and more comfortable glove than the current model.

Above right: In the Lunar Regolith Excavation Challenge participants must build a system to dig up lunar regolith, or "moon dirt," and deliver it to a collector. Teams will be judged on the quantity of regolith delivered in 30 minutes.

Right: The Lunar Lander Challenge is looking for a vehicle that can ferry cargo or humans back and forth between lunar orbit and the surface of the moon. Contestants have to create a rocket-propelled vehicle that will take off, climb to a set altitude, fly and land on a fixed target. The vehicle must then return to its original launch pad.



Photographs courtesy NASA



“However, there has been a focusing of attention within the different technology communities in the prize subject areas. This in itself is a useful result for NASA because it attracts the energy and intelligence from new and broad sources of innovation.”

Davidian says that the participants come from a wide range of ages and backgrounds. Entries come from small businesses, private innovators and university teams.

A 2003 NASA Space Architect study, assisted by the California-based non-profit X PRIZE Foundation, which creates and manages prizes that drive innovators to solve some of the major challenges facing the world today, led to the establishment of the Centennial Challenges. The contests were named in honor of the 100th anniversary of the first manned airplane flight by Orville and Wilbur Wright in Kitty Hawk, North Carolina. 🚀