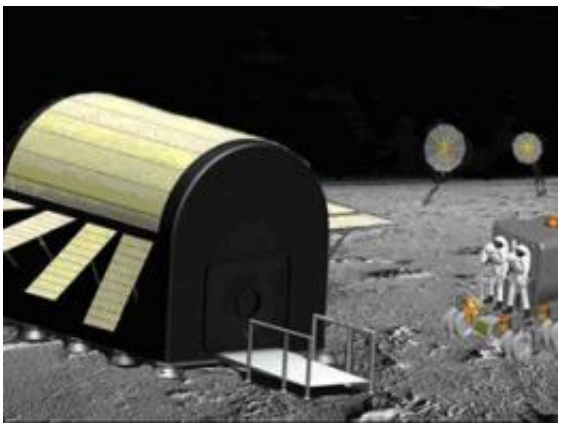
More 'Star Trek' than 'Snuggie': Student design to protect lunar outpost from dangerous radiation

May 11 2009, By Caroline Barnhill



NC State grads Michael Sieber, Ryan Boyle and Anne Tomasevich designed a lunar shield with the ability to protect its inhabitants from radiation.

(PhysOrg.com) -- Alien creatures are the least of NASA's worries when it comes to moon travel. There are several potential threats to future missions - with space radiation at the top of the list. Now, a group of students at North Carolina State University has developed a "blanket" of sorts that covers lunar outposts - the astronauts' living quarters - to provide astronauts protection against radiation while also generating and storing power.

Astronauts who previously traveled to the moon had little protection

against radiation, but were only exposed to it for a short amount of time. NASA's plans to return astronauts to the moon by 2020 - and to potentially keep them there for several months at a time - could be stymied by space radiation.

The surface of the moon is exposed to cosmic rays and solar flares - making radiation hard to stop with shielding. When these rays hit matter, they produce a dangerous spray of secondary particles which, when penetrating human flesh, can damage DNA, boosting the risk of cancer and other maladies.

Groups all over the globe are trying to determine ways to combat space radiation - including Michael Sieber, Ryan Boyle and Anne Tomasevich, all recent graduates of the textile engineering program at NC State. Their design of a lunar radiation shield with the ability to protect its inhabitants from radiation was reviewed by a panel of industry experts and chosen as one of 10 undergraduate abstract finalists in the Revolutionary Aerospace Systems Concepts Academic Linkage (RASC-AL) competition.

Sponsored by NASA and the National Institute of Aerospace, the RASC-AL competition challenges university students to think about what sorts of conditions astronauts will face when returning to the moon, then design projects that might become part of actual lunar exploration.

"We had many factors to consider in developing this outpost cover - not just being able to protect against radiation," Sieber says. "The product needed to be as lightweight as possible to feasibly fit on the transportation module, and have the ability to be easily erected by a minimum number of astronauts for immediate use once landing on the moon."

"These obstacles are where our knowledge of textile properties will give

us an advantage," adds Dr. Warren Jasper, professor of textile engineering and advisor for the project. "This is a competition aimed at aerospace engineering students, but we understand the properties associated with different textile materials, and that gives us unique insight on how to troubleshoot some of these issues."

The "lunar texshield" is made from a lightweight polymer material that has a layer of radiation shielding that deflects or absorbs the radiation so astronauts are only exposed to a safe amount. The outermost surface of the shield includes a layer of solar cells to generate electricity, backed up by layers of radiation-absorbing materials. The advantages of the materials used in the design include flexibility, large surface area, ease of transportation, ease of construction and the ability to have multiple layers of independent functional fabrics.

The students will present their lunar texshield at the 2009 RASC-AL Forum held June 1-3 in Cocoa Beach, Fla. The project will be judged by a steering committee made up of experts from NASA, industry and universities.

"We aren't even sure what the prize is for being named first place - but that wasn't what was important to us," Sieber says. "We used what we've learned throughout our college careers and were able to apply that logic to provide a solution a real-world problem. That is what is cool to us."

Source: North Carolina State University (news : web)