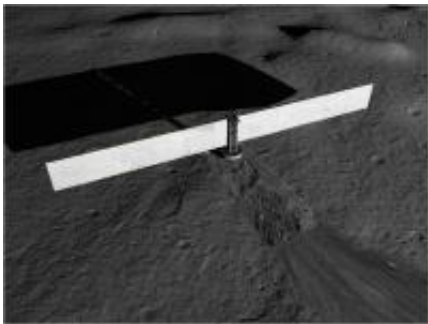


Important Tests for Lunar Habitat Power System Began

February 20 2009, by Janet Anderson



An artist's concept of a fission surface power system on the surface of the moon. The nuclear reactor has been buried below the lunar surface to make use of lunar soil as additional radiation shielding. The engines that convert heat energy to electricity are in the tower above the reactor, and radiators extend out from the tower to radiate into space any leftover heat energy that has not been converted to electricity. The power system would transmit a steady 40 kW of electric power, enough for about eight houses on Earth, to the lunar outpost. Credit: Courtesy NASA

(PhysOrg.com) -- NASA today begins testing elements of a power system that is a potential candidate to provide the energy needed to support a human outpost on the moon.

NASA's Marshall Space Flight Center in Huntsville, Ala., has a one-of-a-kind test facility that enables engineers to simulate the nuclear power process of heat transfer from a reactor to a power converter - without

using nuclear materials. For this particular test series, the Marshall reactor simulator will be linked to a Stirling engine, developed by NASA's Glenn Research Center in Cleveland. The Stirling engine, named for 19th-century industrialist and inventor Robert Stirling, converts heat into electricity.

The Marshall reactor simulator includes a specialized pump, provided by the U.S. Department of Energy, and a coolant loop filled with a mixture of sodium and potassium. The coolant loop provides heat to the Stirling engine at conditions very similar to an actual fission-based surface power system. The joint testing will help resolve potential integration issues and provide information and experience needed to reduce technology risks associated with this system concept. Testing is expected to run through 2009.

"Fission surface power systems could be an important source of energy for exploration on the moon and Mars," said Mike Houts, project manager for nuclear systems at Marshall. "This power system could provide an abundant source of reliable, cost-effective energy and may be used anywhere on the lunar surface."

A fission-based surface power system would offer consistent power in the harsh environment of space. The proposed system is capable of generating 40 kilowatts of electricity, enough to power approximately eight houses on Earth.

"The testing of the Stirling engine with the Marshall reactor simulator will be a key factor in demonstrating the readiness of fission surface power technology, and would provide NASA with an efficient and robust system to produce power in the harsh environment on the moon and Mars," said Lee Mason, principal investigator at Glenn for the fission surface power project.

A nuclear reactor used in space is very different than Earth-based systems. There are no large concrete cooling towers, and the reactor is about the size of a propane tank used to run a backyard grill. The energy produced from a space reactor is much smaller, but more than adequate for the projected power needs of a lunar outpost.

The test series is being conducted as part of the fission-based surface power project, within NASA's Exploration Technology Development Program, which is tasked with developing advanced technologies that will enable NASA to conduct future human exploration missions, while reducing mission risk and cost.

Provided by NASA

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