

Robotic rover, spacesuited geologist work together

NASA RECENTLY TESTED a remotely operated planetary rover and an advanced prototype spacesuit in southern California to see how robots and humans might someday work best together to explore other planets.

A team of scientists and engineers from JSC and Ames Research Center conducted the first field test involving the Russian-built Marsokhod and a geologist wearing a NASA advanced prototype spacesuit February 22-25. Dubbed the Astronaut-Rover Interaction for Planetary Surface Exploration (ASRO) experiment, the four-day primary science mission was conducted in the Mojave Desert, east of Los Angeles; a public demonstration was held on February 27.

JSC provided the spacesuit, visual-tracking software, and associated human space exploration expertise, while the rover activity was led by Ames. Together, the team was able to take the first steps in developing

a synergistic relationship between the two types of explorers.

"NASA envisions future planetary surface space walks to be a cooperative effort, with robots assisting humans to increase productivity during these time-limited excursions away from the base station," said Robert Yowell of the Extravehicular Activity Projects Office at JSC.

The ASRO Project should improve the safety and performance of human surface operations, and therefore help minimize the cost of human planetary missions. Specifically, the team hopes to learn how the rover and the astronauts can collaborate in various operational tasks, leading to recommendations for improving the designs of future advanced spacesuits and rovers.

"The test is part of a continuing NASA effort to better identify the challenges facing future human explorers of other worlds, and the technologies that will be needed to meet those challenges,"

explained Joyce Carpenter, deputy manager of the JSC Exploration Office. "While we are in the early stages of learning how to explore other planets, NASA has not identified any specific human missions beyond Earth's orbit."

NASA acquired the Marsokhod rover from Russia and equipped it with improved avionics, computers and science instruments. It features six titanium wheels, a robotic arm to pick up soil samples and stereo video cameras mounted on a pan-and-tilt platform to transmit live images of the field test via a

satellite back to scientists at Ames. The 165-pound rover is three feet wide and 4.5 feet long, with a mast that extends about 4.5 feet high to hold the cameras.

The spacesuit is constructed primarily of fabric, with ball bearings that allow the wearer to move more easily when the suit is inflated to 3.75 pounds per square inch above the local pressure, as it would be on the

Moon or Mars. A self-contained liquid air backpack provides life support, cooling, communications and power. The suit and backpack have a weight of about 150 pounds on Earth. ■



JSC geologist Dean Eppler wears a spacesuit during the test. The Marsokhod served as a scout and videographer, transmitting advance images of the site and the geologist's activities back to Ames and JSC.

JSC Photo S99-3981 by Mark Sowa

New energy-saving systems to be installed at JSC

JSC HAS SELECTED Honeywell Inc. to survey and install energy-saving heating, ventilation, air-conditioning, and lighting systems in 147 buildings across the center. The contract was awarded through a U.S. Department of Energy Savings Performance Contract (Super ESPC) delivery order and is valued at approximately \$43 million over its 23-year term. It is the largest delivery order to date against any DOE Super ESPC.

Through a procurement process called energy-saving performance contracting, Honeywell will replace existing energy

systems with new equipment and cutting-edge energy management technology. The cost of the replacement systems, about \$20 million, will be paid for by the savings reaped from the new, more energy-efficient systems. No additional tax dollars will be spent.

Phase one of this multiphase performance contract includes installing energy-efficient lighting and compressed air systems, reducing water consumption and improving air-conditioning controls at JSC, the Sonny Carter Training Facility, and Ellington Field. Installation of the user-friendly Honeywell

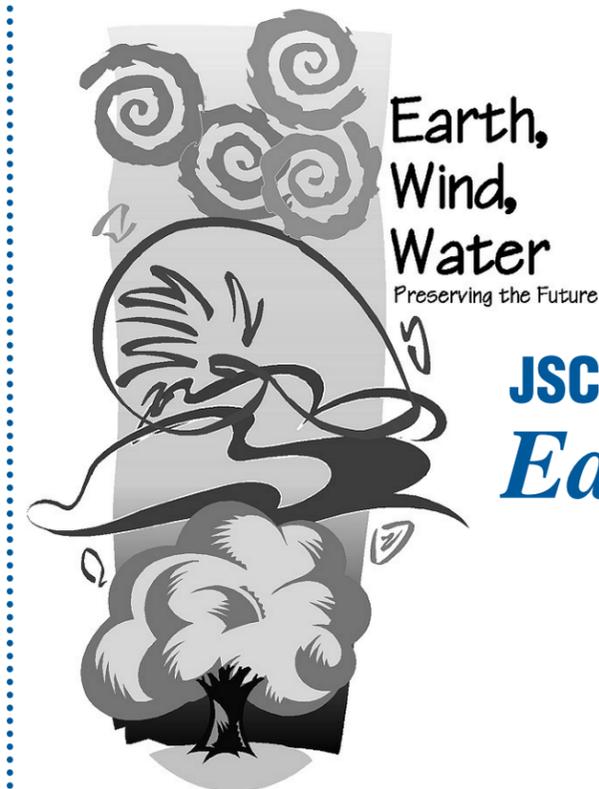
Excel Facility Integrator System, an Energy Management Control System, will enhance JSC's ability to cost-effectively monitor and manage the site environment, and thereby improve comfort for JSC personnel.

The lighting retrofit began in Bldg. 45 the week of March 8 and lighting work in Bldg. 1 will start the first week of April. Installation of the remaining energy-saving equipment was scheduled for March 22. There will be an overall 15-month installation period for this project.

Secretary of Energy Bill Richardson summed up the energy-saving performance

contract process: "The private sector does the work, the federal manager gets a smaller energy bill, and we all get enhanced energy security and a cleaner environment."

Super ESPCs are a product of the U.S. Department of Energy's Federal Energy Management Program, which offers technical and contractual assistance to government agencies that choose renewable energy and more efficient building technologies to meet legislative mandates for lower energy consumption and reduced greenhouse gas emissions. ■



**Earth,
Wind,
Water**
Preserving the Future

JSC to celebrate Earth Day

WORLDWIDE EARTH DAY is just around the corner, and JSC is in the planning stages of a celebration for employees. The 1999 JSC Earth Day event will be celebrated April 22 with exhibits at the Gilruth Center and tours of the newly planted "conservationscape" on the south side of Bldg. 30. The theme of this year's event is "Earth, Wind and Air: Preserving the Future."

The exhibits at the Gilruth will be open from 10 a.m. - 1:30 p.m. Exhibitors will answer questions about earth

friendly options for gardening, landscaping, recycling, wildlife and lots of other topics. As usual there will be lots of giveaways and door prizes. Astronauts will be available to sign autographs from 10 a.m. - 1 p.m.

Experts from Clean Water for Armand Bayou will be giving tours of the conservationscape on the hour from 10 a.m. - 2 p.m. Everyone who takes the tour will be given a bedding plant similar to those planted at Bldg. 30, while supplies last.

To help advertise JSC's Earth Day 1999 celebration, the Earth Day Planning Committee is sponsoring a

children's poster contest. Children between the ages of 2 and 16 can enter an original poster demonstrating the Earth Day theme. Winners will be selected in four age categories. The winning posters will be displayed in selected lobbies the week before Earth Day. For complete poster contest rules, contact Cindi Watson at x37242 or Terri Blackwelder at x37247 or look for the Earth Day homepage on the Center Operations homepage early in April.

JSC civil servant and contractor employees and families are invited to join other local federal agencies in the Texas Land Board's Texas beach cleanup on April 24 from 8:30 a.m. - noon at Galveston Island. Anyone interested in helping clean up a couple of miles of Galveston Beach can meet at the Sea-Arama parking lot in Galveston at 8:30 a.m. Look for the U.S. Environmental Protection Agency reserved beach area between 89th Street and West Beach. A free hot dog lunch will be provided or bring a picnic lunch and join other federal employees on the beach for lunch and volleyball. Look for more information on the Earth Day homepage or call Ramone Harper at 281/983-2235.

For more information on Earth Day, call Jo Kines at x33218. ■