

News Release

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Canadian, German and U.S. space agencies work together to test rovers, science instruments, and oxygen-making technology in Hawai'i

HILO, Hawai'i – A test site on the island of Hawai'i, managed by the Pacific International Space Center for Exploration Systems (PISCES) is the scene of a unique international collaboration in science, engineering, and medicine. For the past two weeks, space scientists and engineers from Canada, Germany and United States have been testing rovers, site preparation, science and resource prospecting instruments, and oxygen production equipment that could potentially be used for future space exploration missions. . They are also performing field exercises in space medicine and lunar geology.

The tests provide valuable information about systems that could potentially support an extraterrestrial or planetary exploration mission by minimizing the amount of water and oxygen that must be transported from Earth and protecting hardware once it is there. The PISCES site on the lower slopes of Mauna Kea contains volcanic soil that closely resembles the soils and terrain found on the surfaces of the Moon and Mars.

“While a human mission to the Moon may be awhile down the road, it is critical to develop and test technology now to ensure the safety and survival of astronauts as well as the ability to use the resources of space for a variety of materials when the time comes.” said Dr. Frank Schowengerdt, Director of PISCES.

NASA's exploration architecture plans on utilizing on-site planetary resources to generate the amount of oxygen that four to six people living at an outpost might breathe in a year. The field demonstrations in Hawai'i show how planetary materials might be excavated and how oxygen can be manufactured from those materials and stored.

A remarkable level of international collaboration and integration is being demonstrated at the field test site. Tests for NASA's RESOLVE prototype prospector rely on Canadian

systems developed under Canadian Space Agency contracts, including the tandem rover platform and adaptation of the TriDAR 3D-vision system. NASA is testing the integration of a solar concentrator, carbothermal reduction system, pneumatic feed system, electrolyzer and oxygen liquefaction system. That entire system is also being tested jointly with a load-haul-dump rover delivery system and a fuel cell system, funded by the Canadian Space Agency and developed by NORCAT and its subcontractors with support by Natural Resources Canada. Tests of the Mössbauer spectrometer for soil analysis, a co-operative by NASA Johnson Space Center and the German Aerospace Center, are also being tested on the Canadian-developed rover platform. Other tests include two different methods for soil sintering, which stabilizes the soil for landing pads or roadways, using solar concentrators and resistive heat; autonomous landing pad construction; site verification using ground-penetrating radar (GPR); a German Aerospace Center test of a mechanical digging mole; mobility tests of a specialized rover with wheels that allow the rover to move sideways, like a crab, on rocky terrain; and numerous scientific research experiments.

“NASA runs tests at sites around the world to simulate the moonscape and other space environments,” said Bill Larson, head of NASA’s In-Situ Resource Utilization project at Kennedy Space Center. These “analog” activities help us evaluate the interactions of multiple systems relating to mobility, infrastructure, and effectiveness in harsh climates. These demonstrations in Hawai‘i will provide valuable information for subsequent hardware and mission concept development.”

The field test is led by the Canadian Space Agency in partnership with NASA Johnson Space Center, Kennedy Space Center, Glenn Research Center, Langley Research Center, and Goddard Space Flight Center. In addition to the three space agencies, companies and universities conducting tests include Electric Vehicle Controllers Ltd. (EVC), Honeybee Robotics, Hochschule Bremen, Neptec Design Group, Northern Centre for Advanced Technology, Inc. (NORCAT), Ontario Drive and Gear Ltd. (ODG), Orbital Technologies Corp. (Orbitec), PACEAS Technologies Ltd., Physical Sciences Inc. (PSI), Virgin Technologies Inc., Xiphos Technologies, Inc., University of Toronto Institute for Aerospace Studies (UTIAS), and Arizona State University.

PISCES works with the State of Hawai‘i to attract high-tech industry and bolster the island’s technical work force through research and education programs. Speakers from the Canadian Space Agency, NASA, PISCES and DLR spoke to students at Hawai‘i schools the week of Jan. 25. PISCES also lined up a teacher workshop on the free, web-based education program, www.SpaceClass.org, to be held Monday, Feb. 8, at 3:00, at the Institute for Astronomy Auditorium in the UH-Hilo Campus Technology Park.

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