

June 2008

Astrobiology Science and Technology for Exploring Planets

In the era of planetary exploration now under way, researchers are investigating whether life exists or has existed beyond Earth. Astrobiology is thus an increasing focus of planetary exploration missions. Astrobiology investigations require the development of biologically relevant, miniaturized instrumentation capable of extensive, autonomous operations on planetary surfaces – first Mars, then other Solar System bodies. To this end, and in collaboration with the other agencies, NASA’s Astrobiology Science and Technology for Exploring Planets (ASTEP) program, an element of the Astrobiology Program in the Planetary Science Division of the Science Mission Directorate, supports investigations that focus on exploring Earth’s extreme environments to learn how best to search for life on other planets.

ASTEP is a science-driven exploration program conceived to help produce new science and operational/technological capabilities that will enable further planetary exploration. The program aims to lower the risks of planetary exploration through technology development and systems-level field tests that also obtain scientific data and operational experience in Earth’s extreme environments. A unique and central feature of the ASTEP program is the use of terrestrial field campaigns to advance science and technology and NASA’s overall exploration capabilities.

The program’s top three priorities are science, technology, and field campaigns. ASTEP science investigations entail biological research in terrestrial environments that are analogous to those found on other planets, past or present. ASTEP investigations are expected to improve understanding of the constraints on life in extreme environments.

The ASTEP program sponsors the development of technologies that enable remote searches for life in extreme environments, including planetary surfaces and subsurfaces. These technologies include *in situ* laboratories, sample acquisition and handling techniques, remote sample manipulation, and mobile science systems.

ASTEP field campaigns are designed to demonstrate and validate potential planetary exploration science and technology in extreme environments on Earth. These field campaigns are conducted in a manner approximating operations on an actual planetary mission. By taking this approach, ASTEP campaigns are expected to contribute to better understanding of the performance, capabilities, and efficiencies of tested systems, gaining operational experience along the way. ASTEP expeditions also provide opportunities for communicating with public audiences about the conduct of science and exploration. Expeditions may incorporate public information initiatives such as weblogs, live satellite links with science museums, and “embedded” journalists.

Contact: Linda Billings, Communications Coordinator, Astrobiology Program, lbillings@seti.org. For more information, see: <http://astrobiology.nasa.gov>.