Mars Express Radar Will "See" 3 Miles Into Red Planet's Crust

Artist's concept of Mars Express courtesy ESA and J-L Atteleyn.

Earthfiles, news category.

June 2, 2003 Baikonur, Kazakhstan - Today the European Space Agency (ESA) launched its first mission to Mars called "Mars Express" aboard a Russian rocket from Baikonur, Kazakhstan. Attached to the orbiter was Britain's Beagle 2 lander which will land on the surface and look specifically for signs of Martian life. The "robotic geologist" will dig into Mars soil and sample the atmosphere hunting for organic material or methane gas produced by living organisms.

Overhead, the orbiter has radar to probe as deep as 5 kilometers (3 miles) which will increase understanding about the red planet's crust since little is known beyond three feet below the surface. The mission will reach Mars orbit on Dec. 27, 2003 and then began its observations from an orbiter that has seven instruments and will communicate on the surface with Beagle 2. The orbiter will point ground-penetrating radar at Mars for the first time, probing for evidence of underground water. Beagle 2 will conduct biochemical and geological tests at a different site than the two areas where NASA's Mars Exploration Rovers will land in January 2004.

Collaborating with ESA, NASA said today, "One major question about Mars, and about instability of a planet's environment, is what became of the water that once apparently flowed in abundance on Mars' surface. NASA's Mars Odyssey spacecraft now orbiting Mars has located ice mixed into the top meter (about 3 feet) of Mars surface. Theories differ as to how much more water -- frozen or melted -- lies deeper and how much may have dissipated from the planet's upper atmosphere. Mars Express will investigate the second possibility as well as the first. The radar instrument will examine the structure and variability of the ionosphere -- the atmosphere's top layer. Other instruments will study atmospheric chemistry and structure, and the interaction of the ionosphere with the solar wind of charged particles speeding outward from the Sun.

JPL's Dr. Jeffrey Plaut - co-principal investigator for the instrument - with Prof. Giovanni Picardi, principal investigator at the Universita di Roma in Rome, Italy,

said: "With the radar, we will try to detect boundaries between layers of different types of material. "If there is a boundary between a rock-ice mixture at the surface and a rock-water mixture at depth, it will reflect the radio waves and we hope to detect it. We'll be looking for aquifers - subsurface reservoirs of liquid water - but nobody really knows whether Mars has them."

Richard Horttor, NASA Project Manager for Mars Express, said the radar instrument, named the Mars Advanced Radar for Subsurface and Ionospheric Sounding, might also detect other types of layer boundaries, such as between sediments and underlying volcanic rock, or between the polar ice caps and underlying liquid water. This type of instrument, carried by aircraft, has detected vast lakes under polar icecaps on Earth. It has not been used on another planet, though a similar instrument flew on an Apollo mission.

NASA says additional instruments on the orbiter include a high-resolution stereo color camera and an infrared mineralogical mapping spectrometer. Cooperation between American and European Mars missions extends to plans for using Mars Odyssey to relay communications between Beagle 2 and Earth when Mars Express is not in good position to do so. The Mars Exploration Rovers will use Mars Express as a relay at least once as a demonstration for even broader international interdependence in future exploration of Mars.

Two More American Rovers Are Expected to Launch June 8

The United States is scheduled to launch from Cape Canaveral, Florida two Mars Exploration Rovers on June 8.

If all goes well, by late January 2004, there should be four Earth-made orbiters cruising in the atmosphere above Mars, the two American rovers searching on the surface and the Beagle 2 lander digging into the Martian soils.

Websites:

http://mars.jpl.nasa.gov/express

http://www.marsis.com

Credits