News Release

CONTACT:
Bill Farrand, (303) 735-0251
farrand@spot.colorado.edu
Preston Dyches, (303) 735-6074
preston.dyches@colorado.edu
www.spacescience.org

June 6, 2003

BOULDER SCIENTISTS WILL
EXPLORE MARS WITH NEW ROVERS

Two research scientists with the Space Science Institute of Boulder, Colo. are part of a NASA science team that will use two new rovers to explore the surface of Mars beginning in early 2004.

Bill Farrand is a Boulder geologist who specializes in the use of satellite technology to measure a planet's surface properties, a technology known as remote sensing. Mike Wolff is an astronomer based in Augusta, Ga. who studies the atmosphere and climate of Mars.

The two identical Mars Exploration Rovers will be launched in June 2003, and will arrive at the red planet in January 2004. The rovers will use the same airbag landing technology pioneered by the 1997 Mars Pathfinder mission.

"The mission's objective is to go to sites where there is evidence that water has acted in the past and to try to get a better idea of what role water has played in the geologic history of Mars," Farrand said.

The two distinct sites which the rovers will visit are Gusev crater, believed to be the site of an ancient lake and Meridiani Planum, a region that has deposits of gray hematite, which is a type of iron oxide often associated with water-lain mineral deposits.

Scientists will steer the rovers to interesting targets identified using stereo imaging cameras – which see the scene around the rover in three dimensions – and spectroscopy, which uses light to discover what elements and chemical compounds are present in the scene.

"I'm making use of my background in mapping low-abundance materials – materials which are, relative to the rest of the stuff in the scene, rare," said Farrand, "We'll be able to determine right away if we have some of the more interesting low-abundance materials, and that will help us to identify rocks that were perhaps formed through aqueous [flowing water] or hydrothermal activity.

Farrand explained, "When we look at a scene with the spectrometer, each pixel contains a combination of the light from a number of different materials. We compare what the rover actually sees with models of what we expect to find on the surface, and things that don't fit that model are perhaps some of these low-abundance materials.

"In other words, we first account for what we know the Martian geology to be, then we see how what we find fits into that model," he said.

Because Mars is, on average, more than 100 million miles from Earth, it can take more than to 15 minutes for commands from Earth to reach Mars, and the same amount of time to receive the rovers' reply.

"It's definitely not like driving a remote control car," said Farrand. "A couple of times each Martian day, which is called a sol, the science team members for each rover meet to decide where it might be interesting to send the rovers next.

"Using the rovers' stereoscopic cameras, we build a 3-D image of the terrain, so that when we have a 'drive-sol' where the rover is going to be moving, we are able to send a series of commands, like 'drive forward 3 meters, turn right 1 meter, go forward 4 meters.' There are emergency hazard sensors too, in case the rover runs into something unexpected. If that happens, it goes into standby mode and calls home for instructions."

Farrand hopes to find mineralogic and geologic evidence to support theories for how some of Mars' intriguing mineral deposits formed. "For instance," he said, "the hematite at the Meridiani Planum landing site is very often associated with water-linked deposits. If we could determine definitively the origin of that hematite, I think that would be a big success."

Farrand and Wolff also are participating in a student intern program related to the mission. For his part, Farrand will mentor a teacher and two students from Centaurus High School in Lafayette, Colo.

The Mars Exploration Rover program is managed for the NASA Office of Space Science by the Jet Propulsion Laboratory, a division of the California Institute of Technology, in Pasadena, Calif.

The Space Science Institute is a nonprofit organization with the unique mission to integrate world-class scientific research with education and public outreach. The Institute involves research scientists in education programs, such as traveling exhibits and web sites, which bring science to the public and educators and allow scientists to contribute directly to education.

###

Space Science Institute
3100 Marine Street
Suite A353
Boulder, CO 80303-1058
(303) 492-3774
www.spacescience.org