Efforts to contact Polar Lander wind down

Repeated attempts to communicate with the lander since its expected touchdown Dec. 3 have been met with silence.

“The Mars Polar Lander flight team played its last ace,” said Project Manager Richard Cook following an unsuccessful attempt in the early morning of Dec. 7 to get the lander to talk to Earth via the currently orbiting Mars Global Surveyor. Cook said the team will continue trying to communicate with the lander for another week or so.

Cook praised the flight team for its attempts to contact the spacecraft, even sleeping on the floors of their offices at times. “We’re certainly disappointed, but we’re extremely determined to recover from this and go on.”

Another communication attempt took place late afternoon Dec. 7, when a 46-meter (about 150-foot) antenna at Stanford University listened without success for a signal from the lander’s UHF antenna. Engineers then commanded the spacecraft to use its medium-gain antenna on Dec. 8 to begin a scan of the entire sky. During the scan, the antenna was asked to bend and stretch in every possible direction, in essence “craning its neck” in an effort to be heard by mission controllers on Earth.

The Deep Space 2 microprobes that accompanied Mars Polar Lander have also been silent and their batteries by now are depleted. “Just getting the probes to the launch pad was a measure of success,” said Project Manager Sarah Gavit.

Review boards will be set up within JPL and at NASA to study the cause of the apparent loss and explore ways to prevent a recurrence.

“What we’re trying to do is very, very difficult,” Cook said. “We hope people, and children in particular, will see from this experience that the mark of a great person, or group of people, is the ability to persevere in the face of adversity.”

MISSION PLANNERS FOR JPL’S MARS POLAR LANDER ARE WORKING TO IMPLEMENT A PLAN TO USE MARS GLOBAL SURVEYOR TO TAKE PICTURES OF THE LANDING SITE FOR POLAR LANDER SOMETIME THIS WEEK IN HOPE OF SPOTTING THE SPACECRAFT OR ITS PARACHUTE.
Senior research scientists appointed

P.I. Director Dr. Edward Stone has promoted four P.I. employees to the position of senior research scientist. Newly named to the position are D.R.S. DAVID CRISP of the Earth and Planetary Atmospheres Element, 3233; DARWIN DISSALAR of the Communications Systems and Research Section 331; JIAN FEYMAN of Space Physics and Astronomy 3329 and WILLIAM MCRATH of the Microwave & Lidar Technology Section 336.

Crisp was named in recognition of his contributions to the development of advanced numerical methods for studying transport solar and thermal radiation in the Earth, Mars, and these methods are currently being used to refine our understanding of the temperature structures, compositions, and climates of the atmospheres of Venus, Earth, Mars, and Neptune. Dissalvar specializes in the development and application of error correcting codes and modulation systems for telecommunications. His inventions and innovation use of technology have made significant contributions to deep space communications and mobile telephony and mobile data communications.

ARS continued from page 1

Inaugurating a new generation of operational atmospheric sounders with modern technology, ARS will provide improved weather forecasts and better monitoring of changes in Earth’s climate. Using new cutting-edge technologies, the instrument is a major innovation over existing weather satellites and will significantly advance the science of weather prediction.

“ARS will make highly accurate measurements of air temperature, humidity, clouds and surface temperature and give meteorologists new insights into Earth’s changing climate,” said Dr. Moustafa Chaiane, ARS science team leader and P.I. chief scientist. “The instrument will read atmospheric temperature to within 1 Kelvin (1 degree C or 1.8 degrees F) per kilometer of altitude in the lower atmosphere. That degree of accuracy will allow weather forecasters to significantly improve and extend their weather predictions for any information area.

The Aqua mission will make global measurements of atmospheric and surface temperatures to answer important questions of global change and global warming. Flying alongside ARS are two other atmospheric monitors—the Advanced Microwave Sounder Unit and the Humidity Sounder for Brazil—as well as the Advanced Microwave Scanning Radiometer, the Clouds and Earth’s Radiant Energy System, and the Moderate Resolution Imaging Spectroradiometer.

ARS will help scientists piece together the wild weather puzzle that has punctuated closing decades of the 20th century. Continuous measuring more than 2000 separate spectral channels, ARS will carry out its passive remote sensing measurements using a high-resolution spectrometer. The highly sensitive sensor will be able to precisely sample the atmosphere in the infrared spectral region from 3.74 to 15.4 microns (a micron or micrometer is equal to 1 millionth of a meter) for information from the ground up to as high as 50 km (30 miles).

With its atmospheric cousins, ARS may be able to help scientists sort out meteorological phenomena. Weather flukes, such as hurricanes Floyd, Gert and Harvey and many more born during last summer’s particularly severe hurricane season, and other horrific weather events, such as the torrential Midwest floods of 1993 or the 1997-98 El Nino, one of the worst of the 20th century, will be measured much more accurately. Understanding these severe weather events will tell scientists more about how Earth’s climate is evolving.

ARS follows in the footsteps of the National Oceanic and Atmospheric Administration’s High Resolution Infrared Sounder and the Microwave Sounding Unit, which are the heart of the National Weather Service’s current operational weather forecasting system. NASA has flown aboard NOAA’s various polar orbiting satellites for nearly 20 years. In recent years, however, the National Weather Service has furthered higher accuracy requirements to significantly improve its weather prediction capability. In addition to measuring lower atmospheric temperature at an accuracy of 1 Kelvin in layers of 1 kilometer (0.62 mile) thick, ARS will measure humidity to within 20 percent accuracy, sensing measure temperature and moisture profiles by observing the infrared spectral signatures of carbon dioxide and water vapor. Atmospheric gases such as carbon dioxide, water vapor, ozone, and methane strongly absorb around specific wavelengths of infrared energy, and this absorption causes one as looks deeper into the atmosphere. By observing at very high spectral resolution, or in very narrow bands, and at many wavelengths, scientists will be able to “see” different levels of the atmosphere. To determine the temperature or humidity at a specific altitude, ARS will take samples from different infrared bands and combine them to derive a vertical profile of the state of the atmosphere.

From these measurements, climate experts will be able to study Earth’s water and energy cycles and how they are affected by cloud types, properties and the extent or amount of cloud cover will show them how these feisty marvels of nature are affected by changes in temperature, evaporation, condensation rates and atmospheric circulation patterns. Their content will also shed more light on how greenhouse gases such as carbon dioxide, water vapor, industrial pollutants and aerosols are trapped in Earth’s layer.

View this and previous issues of Universe online

http://universe.jpl.nasa.gov

Special Events Calendar

Ongoing
Alcoholics Anonymous—Meeting at 11:30 a.m. Monday, Tuesdays, Thursdays; Women’s only and Fridays. Call Occupational Health Services at ext. 4-3319.

Codpendents Anonymous—Meeting at noon every Wednesday. Call Occupational Health Services at ext. 4-3319.

Gay, Lesbian and Bisexual Support Group—Will meet only once on December, Friday, at noon in Building 111-137. Call employee assistance counselor Cynthia Cooper at ext. 4-3960 or Randy Herrera at ext. 3-0664.

Parent Support Group—Meets the fourth Tuesday of the month at 4:00 p.m. For location, call Layne Dutra at ext. 4-6498.

Senior Caregivers Support Group—Meets the second and fourth Wednesdays of the month at 6:30 p.m. at the Senior Care Network, 837 S. Fair Oaks Ave., Pasadena, confer room #4. Call (626) 397-3110.

Tuesday, December 14
JPL Stamp Club—Meeting at noon in Building 183-328.

Wednesday, December 15
JPL Drama Club—Meeting at noon in Building 301-107.

JPL Hiking Club—Meeting at noon in Building 238-543.

Thursday, December 16
JPL Golf Club—Meeting at noon in Building 304-90.

Von Kármán Lecture Series—Dr. David Diner, principal investigator of NASA’s Multi-Angle Imaging SpectroRadiometer (MISR) instrument, will speak at 7 p.m. in von Kármán Auditorium. Open to the public.

Friday, December 17
JPL Dance Club—Meeting at noon in Building 300-217.

Von Kármán Lecture Series—Dr. David Diner, principal investigator of NASA’s Multi-Angle Imaging SpectroRadiometer (MISR) instrument, will speak at 7 p.m. in the Forum at Pasadena City College, 1570 E. Colorado Blvd. Open to the public.

Wednesday, December 22
JPL Drama Club—Meeting at noon in Building 301-107.

Tuesday, January 4
JPL Genealogy Club—Meeting at noon in Building 301-169.

Wednesday, January 5
Associated Retirees of JPL/CALTECH Board—Meeting at 10 a.m. at the Caltech Credit Union, 528 Foothill Blvd., La Cañada.

JPL Drama Club—Meeting at noon in Building 301-107.

Thursday, January 6
JPL Gun Club—Meeting at noon in Building 303-104.

Friday, January 7
JPL Dance Club—Meeting at noon in Building 300-217.

Sunday, January 9
Chamber Music—South American harpist Alfredo Rolando Ortiz will perform at 3:30 p.m. in Caltech’s Dabney Lounge. Admission is free. For information, call (626) 395-4652.
FLAW, and then fixing the problem” because this activity helps us to learn quickly and adapt to new situations.

The focus then shifts to the importance of embracing challenges and the future. And we will work hard to make sure that the past lessons are learned and applied to future endeavors.

The internal review board, which will share its findings with a special committee of the Caltech Board of Trustees, and I am especially confident, that the board will be prepared to make recommendations that are in the best interest of Caltech faculty and students.

But scrutiny and criticism can be good things. We are accustomed to it as an integral part of the scientific process. It is the practice of asking tough questions and searching for answers, even when those answers may not be easy.

The American people have always supported the space program, as was NASA Administrator Dan Goldin. The JPL review team was led by a team of accomplished scientists and engineers who are dedicated to excellence in their work.

We've been asked to review the entire Mars Program. And it is precisely what we need to do in order to ensure that the future of space exploration is bright.

There are always constraints and compromises to be made. But that's what we are doing. They have asked us to review the entire Mars Program. And that is what we are doing. They have not, as has been reported in the press, reviewed the entire project.

We can turn back the clock to another era... the intelligent application of technology and process is the key to breakthroughs in exploration.

So, the day ahead will not be easy. At times we will be uncomfortable with some of the past. But at the end of the week, we will learn from what has happened and JPL will be a better place for it.

APPROACH: And let us not forget the all the support that has come our way this past week. It's when times are difficult that you find out who really supports the space program. And we are very fortunate in having seen the statement of support e-mailed to you by Executive Director Dr. Edward Stone and the Chair of the Board of Directors.

But even there we have invented new technologies and a new pathway that will certainly fly on future missions. Deep Space 1 was about trying to learn what was out there. We did that with large, expensive spacecraft that flew as infrequently as once a decade. These missions have given us, and will continue giving us, the American people, as evidenced in a recent poll, a strong in favor of planetary science.

Next, we need to work hard to make sure that the future of space exploration is bright. We need to work hard to make sure that the future of space exploration is bright. We need to learn from what has happened and JPL will be a better place for it.

APPROACH: So let us now turn to the broader context. The greater the context, the broader the view. What is the broader context of the Laborator...?

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in the press, requested us to review the entire planetary program.

That said, what does it mean ‘to review’ the entire Mars Program? Let me start by saying what it doesn’t mean, based on NASA guidelines...

• The Mars Program is not being canceled.
• The Mars Program is not moving elsewhere.
• Not all money is going to be taken away from other projects.
• No money is being taken away from the Mars Program.

What the JPL review decided means is... the mission will be continued, albeit with some changes, including a shift in emphasis towards robotic missions.

More than anything else, we need to ensure that we have adequate resources to undertake the missions in the revised architecture—both here on the ground and at Mars. NASA has stressed that we, not the schedule, should determine what and when we are ready to launch. Just as the shuttle does not launch until it is absolutely safe to do so, we are being urged that the same priority for mission safety hold true for our robotic missions. Do we have sufficient infrastructure to support our missions? Do we need more robust system for navigation, surface reconnaissance, and communications? Are we moving at the right pace?

It’s unlikely that the ‘01 Mars lander will be launched in ‘01, and that would likely affect other missions downstream. I realize this will be a difficult decision, but we need to be confident that the mission is the hardest thing we do, and returning a sample will be a higher priority. We have to do everything we possibly can to ensure success so that we can continue exploring Mars with the support of the American people. If that means going somewhat slower, then that is what we will do.

What does this mean for science? There has always been—and there should always be—an inherent tension between the needs of engineers and scientists when designing a spacecraft. There are always constraints and compromises to be made. Science is not an exact science, and it starts with safety—because we have to land safely before we can do the science.

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...Continued on page 4.
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