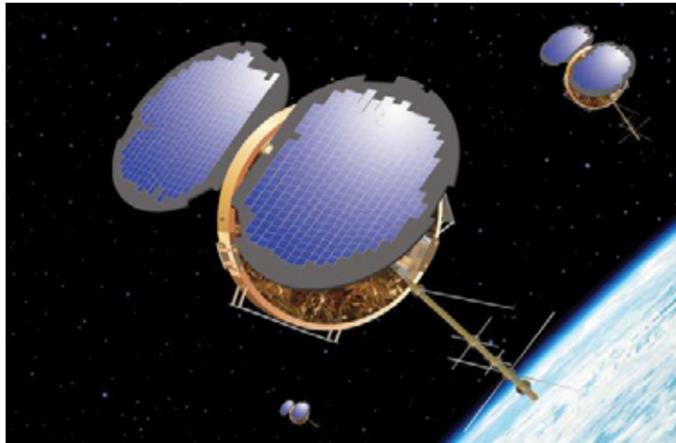


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JPL receiver onboard weather satellite

Launch due April 14

By Mark Whalen



A globe-spanning constellation of six satellites expected to improve weather forecasts, monitor climate change and enhance space weather research is scheduled for an April 14 launch from Vandenberg Air Force Base. JPL designed the mission's primary instrument, a science Global Positioning System (GPS) space receiver, and will provide instrument flight software and technical support for the five-year project.

A joint U.S.-Taiwan project, the Constellation Observing System for Meteorology, Ionosphere and Climate (COSMIC) is scheduled to launch at 5:10 p.m. Pacific time.

The constellation is expected to capture 2,500 GPS occultations per day and will be the first to provide atmospheric data daily in near-real time over all the oceans and continents for both research and operational weather forecasting. The six spacecraft will start at an initial orbit near 400 kilometers (about 250 miles) above the Earth's surface, and will be raised one-by-one to their final 800-kilometer orbit during the first 13 months of the mission.

COSMIC will measure high vertical-resolution profiles of atmospheric temperature and water vapor in the troposphere and stratosphere and ionospheric electron densities at higher altitudes.

Each spacecraft will carry a JPL-designed GPS receiver. The technology is based on the radio occultation (limb sounding) technique that was developed by the Laboratory in the 1960s for planetary atmospheric studies. Since the 1990s JPL has been a leader in the adaptation of this technique for use in Earth orbit with the GPS. Recently, a second-

generation space instrument designed by JPL, called the BlackJack space receiver, has been proven on missions including the Challenging Minisatellite Payload (CHAMP), the Argentine Satellite de Aplicaciones Cientificas-C (SAC-C) and the Gravity Recovery and Climate Experiment (GRACE). This has led to the development of the Integrated GPS Occultation Receiver (IGOR) for COSMIC by industrial partner Broad Reach Engineering.

"Based on early analysis of CHAMP and SAC-C data and simulation studies," noted Dr. George Hajj of JPL's Orbiter and Radiometric Systems Group, "we expect COSMIC to have a significant impact on weather analyses and forecasts." He cited improved 24- to 96-hour forecasts, typhoon forecasts and cyclone prediction.

"It is expected that the COSMIC data will become one of the main data streams for weather centers worldwide," Hajj said. "It is a big accomplishment."

JPL will be a processing center for COSMIC data. Hajj's group will provide preprocessing and data calibration.

"The self-calibrating property of GPS occultations makes these measurements particularly attractive to establish a stable, long-term record for climate monitoring," Hajj added. "The COSMIC mission will give us average temperature measurements accurate to within 0.1 degree Celsius, allowing us to measure climate variability and detect trends over the next decade."

The Ionospheric and Atmospheric Remote Sensing Group, led by Tony Mannucci, will provide temperature and water vapor profiles.

"Right now, our focus is to build on what we've learned with precursor missions to develop a truly unassailable climate record that can be relied on for decades to come," Mannucci said. "We expect constellations such as COSMIC will continue to be deployed and that we can establish a long-term stable and accurate atmospheric temperature record that the scientific community wants and needs."

JPL has also provided ground testing of engineering and flight model equipment.

The mission is the product of an agreement between the American Institute in Taiwan and the Taipei Economic and Cultural Representative Office in the United States. The array is based on a system design provided by the University Corporation for Atmospheric Research.

For more information, visit <http://www.cosmic.ucar.edu> to learn more about the COSMIC mission and <http://genesis.jpl.nasa.gov> to learn more about GPS occultation remote sensing.

NASA reinstates Dawn mission

By Mark Whalen



NASA senior management announced a decision March 27 to reinstate the JPL-managed Dawn mission, a robotic exploration of two major asteroids. Dawn had been canceled because of technical problems and cost overruns.

The mission, named because it was designed to study objects dating from the dawn of the solar system, would travel to Vesta and Ceres, the two most massive asteroids orbiting the sun between Mars and Jupiter. Dawn will use an electric ion propulsion system validated on Deep Space 1 and will orbit multiple objects.

Dawn originally was selected in December 2001 and was set for launch in June 2006. Technical problems and other difficulties increased costs and delayed the projected launch date. Most project work was put on hold for nearly six months while NASA assessed the overall project cost and risk. Now that the project has been reinstated, the launch will occur about June 2007 and the cost has risen from \$373 million to \$446 million.

"It will be a challenging year," said Dawn Project Manager Keyur Patel. "The technical issues are understood, and we are moving forward."

Dawn system engineer Dr. Marc Rayman noted that the mission's science timeline is not affected by the delayed launch.

He said the targeted flyby of Mars in early 2009, the arrival at Vesta in 2011 and encounter at Ceres in 2015 would stay the same as planned.

"The use of the ion propulsion system gives us so much maneuvering capability that we're not constrained by the normal planetary alignment

and tight celestial mechanics most missions deal with," Rayman said. "We will have plenty of time to acquire a great science bounty at what I view as some of the last unexplored worlds in the inner solar system."

Patel said about 30 JPL staffers are currently working on the project. At launch, that number will be between 150 and 180 personnel, from both JPL and industrial partner Orbital Sciences Corp. JPL is responsible for project management, systems engineering, mission design and navigation, delivering some portions of the spacecraft and mission operations. Orbital will supply the spacecraft and is responsible for assembly, test and launch operations. In addition, two of the science instruments are provided by partners from Italy and Germany.

A NASA Discovery Program mission, Dawn will be the first spacecraft to orbit two target bodies after leaving Earth. The principal investigator is Chris Russell of UCLA.

The reinstatement resulted from a review process that is part of new management procedures established by NASA Administrator Michael Griffin. The process is intended to help ensure open debate and thorough evaluation of major decisions regarding space exploration and agency operations.

"We revisited a number of technical and financial challenges and the work being done to address them," said NASA Associate Administrator Rex Gveden, who chaired the review panel. "Our review determined the project team has made substantive progress on many of this mission's technical issues, and, in the end, we have confidence the mission will succeed."

Cassini finds moonlet evidence in Saturn's rings

Scientists with JPL's Cassini mission have found evidence that a new class of small moonlets resides within Saturn's rings. There may be as many as 10 million of these objects within one of Saturn's rings alone.

The moonlets' existence could help answer the question of whether the rings were formed through the breakup of a larger body or are the remnants of the disk of material from which Saturn and its moons formed.

"We acquired this spectacular, one-of-a-kind set of images immediately after getting into orbit for the express purpose of seeing fine details in the rings that we had not seen previously," said Carolyn Porco, Cassini imaging team leader and the study co-author. "This will open up a new dimension in our exploration of Saturn's rings and moons, their origin and evolution."

For images and other information, visit www.nasa.gov/cassini.

News Briefs



MRO adjusts orbit

JPL's Mars Reconnaissance Orbiter on March 30 began a crucial six-month campaign to gradually shrink its orbit into the best geometry for the mission's science work.

After successfully entering orbit around Mars on March 10, the spacecraft is in its aerobraking phase. This process uses friction with the tenuous upper atmosphere to transform a very elongated 35-hour orbit to the nearly circular two-hour orbit needed for the mission's science observations.

The phase includes about 550 dips into the atmosphere, each carefully planned for the desired amount of braking. At first, the dips will be more than 30 hours apart. By August, there will be four per day.

NASA debuts engineering network

Rearchitecting the way engineers share knowledge, the new NASA Engineering Network is an enhanced knowledge-management system that provides capabilities to search across distributed engineering data sources, build technical communities of practice and create online presence for agency engineers.

The network's centerpiece is the "Lessons Learned" portal that describes events, records lessons learned and includes recommendations for future actions.

Sponsored by NASA Chief Engineer CHRIS SCOLESE, the NASA Engineering Network is managed by JPL's Knowledge Management Technologies Program. Access the network at <http://nen.nasa.gov>.

Cassini-Huygens team honored

The Cassini-Huygens probe team has been named winner of the National Space Club's 2006 Nelson P. Jackson Aerospace Award.

The club selects the Jackson award recipient annually. The selected individual, team or firm is one having been responsible during the preceding year for outstanding contributions to the missile, aircraft and space field. The award is a memorial to the late Nelson "Pete" Jackson, past president and one of the founders of the National Space Club.

The award was received by Cassini Program Manager BOB MITCHELL March 17 in Washington, D.C. For more information, visit www.spaceclub.org/dinner_06.html.

Lab helps FIRST competitors

It wasn't the final four, but it was definitely an exciting time for some Southern California high school students who won a regional game of robotics basketball. Now they're heading to the finals in the FIRST (For Inspiration and Recognition of Science and Technology) competition later this month.

The students and their customized robots, with precision parts and shooting capabilities, defeated 47 other

teams during the regional competition held in March at the Great Western Forum. About 20 engineers from JPL helped students in building the robots and provided technical advice during the competition.

"This was a wonderful opportunity for students who are interested in engineering and science to work with mentors and a team to accomplish something extraordinary they will treasure their entire lives," said BRIAN MUIRHEAD, JPL's chief engineer and a judge at the competition.

The contest was one of 30 regionals held around the country. More than 340 teams from around the world will next compete in the national robotics competition at the Georgia Dome in Atlanta, April 27-29. The championship team alliance, made up of three teams, will work together in the national competition. The team includes West Covina High School, High Tech High School in Los Angeles, and Chaminade College Preparatory in West Hills.

Kids' day set for April 27

"Shaping the Future" is this year's theme for JPL's Take Our Children to Work Day, scheduled for Thursday, April 27. All children between the ages of 9 and 17 are welcome. The registration deadline is April 14.

Patterned after the Ms. Foundation's national "Take Our Daughters and Sons to Work Day," this event is designed to help expand your child's awareness of his or her potential, and the future options available in exploring space.

Register at <http://hr.jpl.nasa.gov/toworkday>, then print the medical release/authorization form and obtain an approval signature from your JPL supervisor. The signature of the child's parent or guardian is also required.

For more information, please visit <http://hr.jpl.nasa.gov/toworkday> or call NANCY KAPELL, ext. 4-9432.

Fitness classes start May 1

A new session of fitness classes for JPL employees will begin the week of May 1. A lottery system will be used to select class attendees; the deadline to submit a lottery form for this session is Friday, April 14.

Those interested must have a signed "Wellness Program/General Release" form to participate in the lottery and attend classes. For more information and required forms, visit <http://hr.jpl.nasa.gov/esr/wellness/index.htm>.

Rocket radar 40th reunion in May

The JPL radar program was initiated almost 40 years ago with the May 9, 1966 launch of an L-band radar on an Aerobie rocket. To commemorate the event, all active and retired JPL staff who have been involved in the NASA/JPL Radar Development Program are invited to a reunion on Friday, May 12.

RSVP to VALERIE SEARLS at (818) 345-9447 or e-mail Valerie.Searls@jpl.nasa.gov.

Special Events Calendar

Ongoing Support Groups

Alcoholics Anonymous—Meets Wednesdays at 11:30 a.m.

Caregivers Support Group—Meets the first Thursday of the month at noon in Building 167-111 (the Wellness Place).

Codependents Anonymous—Meets at noon every Wednesday.

Lambda (Gay, Lesbian, Bisexual and Transgender Networking Group)—Meets the first Friday and third Thursday of the month at noon in Building 111-117. For more information, call Randy Herrera, ext. 3-0664.

Parents Group for Children With Special Needs—Meets the second Thursday of the month at noon in Building 167-111 (the Wellness Place).

For more information on any of the support groups, call the Employee Assistance Program at ext. 4-3680.

Friday, April 7

Caltech Dance Show—At 8 p.m. in Ramo Auditorium. Features include pieces from traditional hula to innovative salsa, from captivating belly dance to contemporary jazz, representing almost every segment of the Caltech community in the cast of more than 50 dancers. Tickets are \$5 (unreserved seating). For more information, call (626) 395-4652 or visit www.events.caltech.edu.

Ladysmith Black Mambazo—Offering native South African musical traditions to the sounds of Christian gospel music, the a capella group will perform at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$32, \$28 and \$24; \$10 for high school age and younger. For more information, call (626) 395-4652 or visit www.events.caltech.edu.

Sunday, April 9

Caltech Dance Show—At 2 p.m. in Ramo Auditorium. Features include pieces from traditional hula to innovative salsa, from captivating belly dance to contemporary jazz, representing almost every segment of the Caltech community in the cast of more than 50 dancers. Tickets are \$5 (unreserved seating). For more information, call (626) 395-4652 or visit www.events.caltech.edu.

Tuesday, April 11

JPL Stamp Club—Meeting at noon in Building 183-328.

Wednesday, April 12

"Bacterial Biofilms: Far More Than A Collection of Germs"—Dr. Dianne Newman, Caltech associate professor of geobiology and environmental science, will deliver this free lecture at 3:30 p.m. in Beckman Auditorium. For more information, call (626) 395-4652 or visit www.events.caltech.edu.

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

JPL Chorus—Meets at noon in Building 233-303. For more information, call Shary DeVore at ext. 4-1024.

JPL Library Orientation—Stop by Building 111-104 at 11:30 a.m. for an overview of the Library's products and services, and learn how to access numerous electronic resources from your desktop. For more information, call the reference desk, ext. 4-4200.

JPL Toastmasters Club—Meeting at 5 p.m. in conference room 167. Call Dirk Runge, ext. 3-0465, or visit www.jplcaltechtostmasters.com.

"Nature-Deficit Disorder and the Effects on Children"—Child advocate Richard Louv will speak about the effects of alienation from nature on children, families and communities at 7 p.m. in Caltech's Ramo Auditorium. For more information, call Deborah Williams-Hedges at (626) 395-3227.

Thursday, April 13

Clogging Class—Meets at noon in Building 300-217. For more information, call Shary DeVore at ext. 4-1024.

Science 101 Lecture Series—Dr. Lee-Lueng Fu, project scientist for TOPEX/Poseidon, Jason and the Ocean Surface Topography Mission, will present "Oceanography 101: Ocean Currents, Sea Level and Climate Change" at noon in von Kármán Auditorium.

Thu.-Fri., April 13-14

Von Kármán Lecture Series—Dr. Jeff Plaut, co-principal investigator of the Mars Advanced Radar for Subsurface and Ionosphere Sounding instrument aboard the European Space Agency's Mars Express orbiter, will lecture at 7 p.m. Thursday in von Kármán Auditorium and Friday in Pasadena City College's Vosloh Forum, 1570 E. Colorado Blvd. Thursday's lecture will be webcast at <http://www.jpl.nasa.gov/events/lectures/apr06.cfm>. For more information, call Public Services at ext. 4-0112.



Saturday, April 15

JPL Gun Club—Pistol shoot and competition will be held at Angeles Shooting Range starting at 9 a.m. Open to all current members and anyone wishing to join the club. Range fees are \$5 for members; add \$10 for club dues to join or renew your membership. Rules and safety instructions will be covered prior to the competition. Open to all calibers and experience levels. For more information, call Gary Bivins, ext. 3-1888.

Wednesday, April 19

TIAA/CREF Enrollment—This workshop is designed to assist employees newly eligible for the Caltech/JPL retirement plan with selection of investment options and the completion of their enrollment forms. At noon in T1720-137.

Wed.-Thurs., April 19-20

Investment Advice—TIAA-CREF will offer one-on-one counseling in T1720. For an appointment, visit www.tiaa-cref.org or call (626) 432-6363.

Friday, April 21

Caltech Women's Club—A "Welcoming Coffee" will be offered from 9 to 10:30 a.m. in Caltech's Red Door Café. For more information, contact Katie Clark at (626) 403-7163 or ktclark@caltech.edu; or Vilia Zmuidzinas, (626) 398-4413 or vilia@caltech.edu.

Indian Dance and Music—Cultural arts troupe Ranganiketan will present *Journey to the Foothills of the Himalyas* at 8 p.m. in Caltech's Ramo Auditorium. Tickets are \$15 for adults, \$10 for high school age and younger. For more information, call (626) 395-4652 or visit www.events.caltech.edu.

Saturday, April 22

What's That Noise?—Comic, performance artist, mime, storyteller and magician Michael Trautman will explore the secrets of creating sound effects at 2 p.m. in Caltech's Beckman Auditorium. Tickets are \$12 for adults, \$7 for high school age and younger. For more information, call (626) 395-4652 or visit www.events.caltech.edu.

Sunday, April 23

Chamber Music—Pianist William Chapman Nyaho will perform works by composers of African descent in a free concert at 3:30 p.m. in Caltech's Dabney Lounge. For more information, call (626) 395-4652 or visit www.events.caltech.edu.



Dutch Slager / JPL Photolab

Allen Awards presented

From left: Dr. Charles Elachi, Dr. Lorene Samoska, Dr. Daniel Stevens, Dr. Linda del Castillo, Chief Technologist Dr. Paul Dimotakis, Chief Scientist Dr. Tom Prince.

Three JPL scientists have received the 2005 Lew Allen Award for Excellence. The annual awards recognize and encourage significant individual accomplishments or leadership in scientific research or technological innovation by JPL employees during the early years of their professional careers.

The recipients are Dr. Daniel Stevens of Division 32, Dr. Linda del Castillo of Division 37 and Dr. Lorene Samoska of Division 38.

Stevens received his award for revealing the early history of the universe by demonstrating that the formation of galaxies began earlier than previously believed. Del Castillo was honored for the development of high-temperature resistant electronics. Samoska was cited for the development and the fostering of millimeter-wave power amplifier technology.

Each winner received a wall plaque and a research award of \$25,000 from the Research and Technology Development Fund, which is used at JPL to enhance the professional efforts of the awardees.

The award was established in 1990 of Dr. Lew Allen, who served as JPL's director from 1982-90.

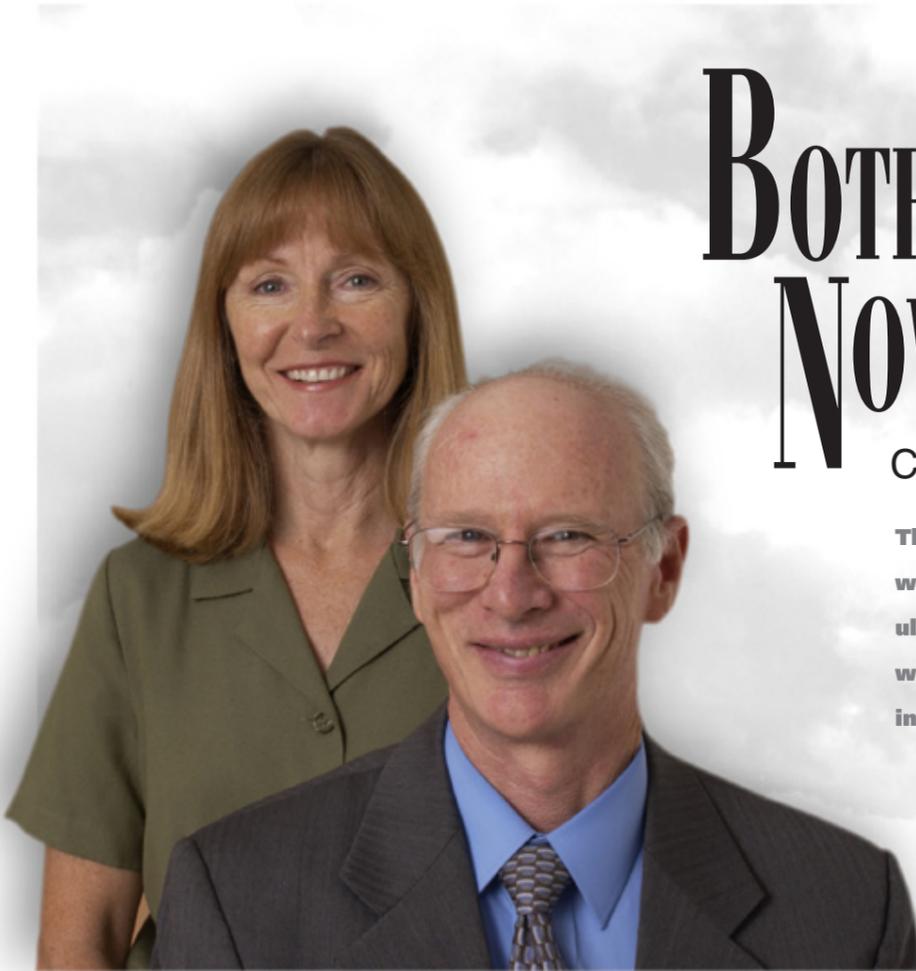
BOTH SIDES Now

By Rosemary Sullivant

CLOUDSAT IS READY TO FLY

The mists of uncertainty about clouds' role in weather and climate will clear when NASA's CloudSat takes flight this month. Scheduled for launch April 21 from Vandenberg Air Force Base along with its partner spacecraft Calipso, CloudSat will provide the first inside look at Earth's clouds on a global scale.

*CloudSat deputy principal investigator Deborah Vane
and project manager Tom Livermore.*



Once in orbit, CloudSat and Calipso will join NASA's Aura and Aqua satellites and the French satellite PARASOL as part of the A-train, a flotilla of Earth-observing satellites.

Deborah Vane, CloudSat's deputy principal investigator, has been involved with the JPL mission from its inception and was a driving force behind CloudSat's selection as an Earth System Science Pathfinder mission in 1999.

What will CloudSat do?

CloudSat provides a new, three-dimensional perspective on clouds. It will answer questions about how they form, evolve, and affect our weather, climate and water supply.

There is nothing remotely like this data. We've never before seen below the tops of the clouds from above or above the bottom of the clouds from below. We've been lacking all the information in between.

The CloudSat science team is already working with numerical weather forecasting centers, including the European Centre for Medium Range Weather Forecasting and the Naval Research Laboratory, to improve forecasts by modeling clouds better. We have similar partnerships with climate modeling groups to validate and improve predictions of cloudiness in climate models.

How did the mission get started?

CloudSat came out of the World Climate Research Program, which noted that we were missing vertical information on clouds for climate studies. The mission was a natural for JPL with our experts in spaceborne radars. With scientific leadership from the principal investigator at Colorado State University, we developed the mission concept and our second proposal was accepted.

How does CloudSat work?

CloudSat is an active system. It produces its own energy—a 94 GHz wavelength that interacts with the condensed water and ice in clouds. Some of this energy is reflected back to the spacecraft radar. By measuring the time between the pulses and reflections, we build up an image of all the “scatterers”—the cloud particles—from the top of the atmosphere down to the surface. What we get is similar to a CT scan—a slice through the clouds. It gives us the vertical structure of clouds. From this information, we can derive other products, measurements of ice, liquid water, precipitation occurrence and atmospheric heating.

What's the relationship between CloudSat and Calipso?

We'll be launched together, but we are on separate satellites. Once we're in orbit, we'll fly in formation 15 seconds apart.

We both look at clouds but in different ways. The radar on CloudSat can see a range of clouds from thin clouds up to clouds that are thick with precipitation. The lidar on Calipso will be able to observe aerosols and very thin clouds. Together we can begin to study the possible effect that aerosols may be having on clouds and precipitation.

Where will you be on launch day?

Nothing would keep me away from Vandenberg. I've waited 12 years for this. I have no idea how I'll feel when I see that huge vehicle with all these years of our work onboard.

I know the instrument will work. It's up to the launch people to give us a good ride.

CloudSat Project Manager Tom Livermore joined the mission in late 1998, just after NASA approved an extended study phase for the mission before its final selection.

Who has been involved in creating CloudSat?

We have multiple partners. The radar was developed here at JPL. The Canadian Space Agency contributed the power transmitter tubes and the radar receiver. JPL built the rest of the instrument and integrated it.

We've also worked with the Cooperative Institute for Research in the Atmosphere at Colorado State University, where Prof. Graeme Stephens, our principal investigator, is located. The institute is going to do the data processing. The U.S. Air Force at Kirtland Air Force Base in New Mexico will do satellite control and ground operations.

Ball Aerospace built the spacecraft bus and integrated the flight system at their facility in Boulder, Colorado.

Another partner is the Department of Energy, which is making a significant contribution to the validation effort—and, of course, there is our launch partner, the Calipso mission.

What were the major challenges for the mission?

There was really only one big challenge: the development of the high-voltage power supply. JPL had built power supplies with about half of the required high-voltage level, but we seriously underestimated what it would take to build this one.

We discovered a major thermal design problem just two days before the end of final qualification tests for a June 2004 launch. We had to solve the problem somehow, and we did so with a lot of support from JPL, external experts and the Cloud Profiling Radar team. The final solution was to rework the thermal design of the whole instrument to reduce the temperature of the power supply.

Another challenge was keeping the partnerships alive.

CloudSat has been at Vandenberg since May 2. What's been going on since then?

First we completed our post-ship testing and then CloudSat and Calipso had to be integrated into the dual-payload attach fitting, which allows the two spacecraft to be launched on the same Delta II rocket. All of this was completed as planned. Delays have occurred due to launch vehicle issues, a strike by Boeing machinists and competition with other launches.

Where will you be at launch?

I'm going to be where the action is—at the Air Force operations center in Albuquerque, N.M., where we will pick up the first signals from the spacecraft after it separates from the launch vehicle. This will occur about 97 minutes after launch. The data will be relayed to us from the Air Force tracking station on Hawaii and will tell us that the satellite was injected into the correct orbit and is beginning to deploy the solar arrays.

During the following days and weeks, we'll bring the spacecraft up to a fully operational state, initialize the radar and then boost the system into orbit with the A-train. At that point, we will begin radar transmissions and science data acquisition.

How long before we start to see results?

The great part of this mission, unlike others, is that scientists will be able to use the data right away to begin answering question about the use of clouds in weather modeling, possibly making quick improvements in forecasting models.

CloudSat's nominal mission is 22 months, but the spacecraft has at least three years of fuel. Assuming that everything works well, it is a candidate for an extended mission providing further information on clouds and how they impact global change.

180 stair construction proceeds

By Mark Whalen



photo courtesy of Pam Brown

Passings

RICHARD STILES, 78, a retired documentation specialist, died March 13. Stiles was an employee of Telos Corp. for more than 10 years, and worked primarily in the Control Center Data Systems Development Section (367). He retired in 1999 as a Madan Tech employee in Section 393.

Stiles is survived by his wife, Alice, a sister, five children, 10 grandchildren, and one great-grandchild. A "Roast for Richard" is being planned; call Alice Stiles at (626) 449-8035 for details.

Letters

Dear friends and colleagues, it is impossible for me to thank you with the gratitude I feel for your kindness and generosity. I am humbled by the outpouring of sympathy and love that I have received upon the death of my beautiful daughter and her husband. They were soulmates to the end.

As many of you know, on March 13 Kathleen and Peter Tomarken were taking off in their Beechcraft Bonanza for Santa Monica on a flight to transport a cancer patient to UCLA Medical Center as part of Angels Flight West humanitarian program. Upon takeoff, a connecting rod broke, creating a massive hole and seizing the engine.

Peter was a heroic pilot, keeping the plane on a level flight throughout the terrible ordeal trying to land safely on the water. The plane bounced twice when it hit the water; the second bounce is the event that probably killed them.

This sudden and traumatic accident has been a life-challenging event for the entire family. I don't think I could have gotten through it without the support of all my friends at JPL.

I wish I could thank you each personally but that would be very hard. I thank those of you who came out that cold rainy day to the cemetery for the four hours of the service. Thank you for the basket of food that we lived on for days; thank you for the baskets of flowers. Thank you also for the financial help, which is considerable and very welcome.

Your heartfelt support underlines the fact that in spite of our individual differences, we are still very much a JPL family. May God bless you all.

Sherri Eastman

Classifieds

For Sale

BED, queen, frame, mattress and box spring, \$50; queen sleeper sofa, \$35. 626/398-7504, after 6 p.m.

DINING ROOM SET, 8-pc., beautiful glass table with iron-rod legs, 6 matching cream-colored chairs and an elegant baker's rack, all 8 pieces for \$1,000/obo (original price was >\$6,000). 626/798-3683, Lanie.

DODGER TICKETS: up to 6 together, various dates, section TD 7, row N, on or close to the aisle, \$5/ticket, about 50 games remaining. 626/644-0793.

DODGER TICKETS: 2 per game, front row, Section 32 RS, \$13/ticket, face value, various dates incl. 4/19, 5/3, 5/10, 5/24, etc., about 10 games remaining. 626/644-0793.

DRESSER, solid walnut, 14-drawer; 69" W x 18" D, with walnut-framed mirror (can be used separately); excellent construction and condition. \$450. 626/355-3886.

JEWELRY: man's 8.5" titanium & 24K YG bracelet (22 grams of solid TA2 grade tita-

nium, hand polished & finished w/5 inlays of 24K IPG 3mic gold plating), \$60; woman's titanium ring band (6AL-4V Aerospace grade titanium 10mm wide high polish/finish), size 6.75, \$35. kar10026@hotmail.com.

MISC.: diamond ring, David Yurman "X" sterling silver w/pave diamonds, sz. 6, pd, \$900, sell for \$700/obo; ring, pearl & diamond 14K white gold, size 6, \$120; handbag, new, Via Spiga dark brown leather "Amelle" shoulder bag, 15" W x 6" H x 3" D, paid \$250, sell for \$125; handbag, new in box, Dooney & Bourke, black w/brown, all-weather Leather 2 collection mini skinny case, 4" H, 6" L, .75" W, pd, \$65, sell for \$45. 653-9037.

MISC.: coffeemaker, Cuisinart, 2 to go, new, \$25; hair straightener, MaxiGlide, w/extra ceramic flat plate, \$60; Barton's Creek Snuggles doll, 13.25" tall, new in box, \$25; picture, Paradise Waterfall, 46" x 29", moving water & bird sounds (volume control), creates the illusion of moving water, paid \$250, sell for \$100. 653-9037.

MISC.: digital SLR, Canon EOS 20D 8.2MP camera with EF-S 18-55mm f/3.5-5.6 lens, new in box, \$1,180; KVM switch, Zonet, 2 ports, new, \$15; shredder, Fellowes P-45C, new, \$35; monitor, NEC 17" w/ VGA and BNC inputs and anti-glare glass panel, good condition, \$40. 626/390-1932.

MISC.: brand new Panasonic DVD recorder/player, all the bells and whistles, paid \$180, sell for \$180/obo; Sharp VCR, no frills, works great, \$50/obo; kid-size pool table, finished pine, really nice, all accessories included, \$300 firm. 626/859-6393, Cheryl.

MISC.: home gym, \$50; crimp hair iron, \$5; women's "cowboy" boots, gray, sz. 7 1/2, gd. cond., \$50; fishing reels (freshwater), \$10/ea.; electrolysis machine, \$20; camping chairs (4), camouflage, \$10 ea.; twin mattress, fair cond., \$10; coffee table + 2 end tables (glass tops, black finish), \$50 all. 626/357-8210.

MOVING SALE: rectangular glass dining table w/4 chairs, \$50; beige/off-white striped couch & loveseat, \$90; queen queen sleeper couch & loveseat, \$200; living rm. entertainment center, \$45; rectangular oak coffee table (some scratches), \$50; microwave w/table, \$10; 2 stools, \$10; queen bedrm. set w/2 nt. tables & dresser, \$200; computer desk & bookcase, \$40; tall white bookcase, \$15; 626/284-4080, www.stefanini.us/4sale, Heather/Mike.

OBOE, Yamaha, almost never used, brand new reed, \$1,200 new, sell for \$800. 951-8588.

ORGAN, Hammond electronic console, 13 foot pedals, 2 keyboards + rhythm console, mint condition, \$250. 626/798-6886.

PIANO, Kawai grand, 6'1", polished ebony, excellent cond. and tone, piano bench and lined piano cover included, pick up in Altadena, \$10,300, home.earthlink.net/~briazen/piano, 626/398-6564.

SOFA, full size, from Coos Bay Collection, 4 yrs. old, \$150; MATTRESS & BOX SPRING, full size, \$50; pictures and more details at <http://web.mac.com/orzewalla/Web/Site/Sofa.html>. 626/372-5107, evenings.

TELEVISION, Casio handheld color LCD TV-980, brand new, sealed package, 2.3" anti-glare screen and passive-matrix LCD display; pixel count: 39,600; reception: VHF Ch. 2-13, UHF: Ch. 14-69; power: AC operation or runs for up to 4 hours on AA batteries; \$65, negotiable. 626/794-9579.

TROPICAL PLANTS, plumerias, variety of colors & sizes; shell gingers. 626/444-6156.

WRENCH SETS, Sears Craftsman metric, cheap, various sizes, excellent condition. 626/241-7084, Steve.

Vehicles / Accessories

'02 BMW 330i, 3.0 L, 4 dr., Sea Foam Green metallic, beautiful, low mileage (28,700 mi.), still under full factory warranty, 5-sp. manual; with sport pkg.; alloy wheels, full power seats, moon roof, fold-down rear seats w/ski bag, BMW roof rack; pictures at <http://web.mac.com/dwc791/Web/Site/BMW.html>; \$24,000. 626/318-4999, dwc791@mac.com.

'02 BMW K1200RS motorcycle, excellent condition, 6,400 miles, Corbin seat, Staintune exhaust, also have orig. unused stock exhaust, \$8,200. 626/578-9219.

'68 CHEVY Camaro SS, 350 hp, 49,000 mi., clean int., engine runs great, a restoration/st. rod project I am unable to complete; front right replacement fender is in primer color, add new paint and you have a fantastic car; see <http://www.sassybee.com/camaro>; \$16,000/obo. 310/445-6625, Steve.

'02 CHRYSLER PT Cruiser Ltd., cranberry ext. w/gray leather & suede int., moonroof, new brakes, rotors, tires & battery; automatic, a/c, heated seats, am/fm/CD/cassette; ABS, frt. & side airbags; 51K, 7-year, 85K transferable warranty; Kelley Blue Book is \$9,800 for good condition, sell \$8,900/obo. 661/993-9239 or saracenstan@aol.com.

'98 DODGE Dakota, V6 3.9 L, automatic transmission, 2 WD, 80,000 miles, a/c, CD, pickup shell, new tires, all maintenance re-

Construction activities continue on the stairwell located on the west side of Building 180, which has undergone retrofitting activities for the last three months. The work is expected to be completed by the end of April.

After a seismic evaluation several years ago, it was recommended that the stairwell undergo retrofitting to protect the building from a sizeable earthquake, said Mark Gutheinz, manager of the Facilities Engineering and Construction Section.

Work crews chiseled to the steel interior structure of the building where brackets were welded to support new steel connection points. They then installed braced metal connections onto the main stanchion and wrapped tubular steel around the original stairwell. The building was closed for several Saturdays in order to ensure that asbestos fireproofing in the building was not disturbed during the significant construction activities.

"It has taken a lot of precision work to do this job," Gutheinz said, noting that the building was constructed in 1964. "Everything has gone very smoothly, and the design far exceeds seismic requirements."

cords, runs great, \$5,100. 310/795-8949.

'02 FORD Escape XLS, 5-speed manual, a/c, roof rack, 56K mi., white, tires/brakes replaced last year, vg condition, 100% dealer servicing, \$8,150 (below Blue Book value). 626/836-6729, Tim, evenings/weekends.

'97 HONDA CR-V, extremely well (garage) kept, 1 owner, super clean, super dependable, no problems; recently installed new timing belt, part of routine maintenance; 150,000 miles; \$7,200. sunwarm@netzero.net or 626/622-4141.

'96 HONDA Accord LX, silver, 2 door, vg condition, only 113K miles, regularly serviced, great commuter or first car for the kids, \$4,745. 626/808-8753.

'89 HONDA Civic, 2-door hatchback, blue, 77,800 miles, 4-speed manual; good, reliable, peppy, economical transportation; \$500 below Blue Book. 626/403-0446.

'98 JEEP Grand Cherokee Limited, silver, 6 cyl., 2WD, leather interior, power windows/locks/mirrors/seats, am/fm/CD/cassette, lots of extras, custom car cover, 89K miles, excellent cond., \$7,850/obo. 661/284-2840.

JEEP Cherokee bra (classic style), like new, \$40. 626/359-7666.

'03 TOYOTA Highlander Ltd., only 31K mi., top of the line, leather, all auto/power, a/c, multi-disc CD, front & side airbags, sliding sunroof, towing package, black with tan interior, excellent condition, like a new car, \$22,500 (Blue Book price). 626/296-3441.

'98 TOYOTA Sienna minivan, V6 LE, 194 HP, 88K miles, light blue, exc. cond., dual a/c, 12-disc CD changer, dual sliding doors, 1 owner, \$6,500. 909/592-2279.

'93 TOYOTA Camry, 4 dr, dark blue, auto, a/c, am/fm/cass., pwr. windows/locks, 161K mi., clean, great cond., \$3,300, home.earthlink.net/~briazen/93camry, 626/398-6564.

'96 WINNEBAGO Adventurer 32' Class A motorhome, Ford 460, 35K miles, services recent and up to date; 6 Kw generator, ducted dual a/c, driver door, hydraulic leveler, queen bed, oak interior, 2 TVs and much more; NADA valuation \$25K (low) to \$30K (avg.); make offer, must sell. 805/584-6766.

Free

HUTCH, elevated, for rabbit. 626/345-0681.

Wanted

APARTMENT for young JPL engineer: Los Feliz, Silver Lake, Echo Park, Highland Park, Eagle Rock, or near 2 fwy, beginning May or June. 323/668-9756, leave msg.

BABY CLOTHES & ITEMS that are new or gently used for ages 0-2 years old. 626/398-0810, Connie Gennaro.

DAYBED, if you have one you wish to get rid of. 626/296-3441.

FREEZER, large, good cond. 626/345-0681.

SINGERS for the JPL Chorus, all levels, a fun time, working on songs for kids in hospitals during lunch once a month, rehearsals Wed. at noon in 233-303, Shary, ext. 4-1024.

SOFTBALL PLAYERS, female, for JPL B League, experienced players a plus, do not have to be JPL employees. 626/359-7608, Rick.

SPACE INFORMATION/memorabilia from U.S. & other countries, past & present, for personal use. mrayman@alumni.princeton.edu, 790-8523, Marc Rayman.

SUBARU Outback, low-mid mileage, manual. 626/277-9360, rembrandtschaefer@yahoo.com.

VANPOOL RIDERS, Valencia to JPL, leaves K-Mart 6:30 a.m., leaves JPL 4 p.m., \$110/month or \$5.50/day. 653-9134, Chris.

Real Estate

MONTEBELLO townhome, 2 bd., 1.5 ba., Pergo floors, new garage door, high ceilings, attached 2-car garage, 2 stories, HOA \$199 incl. water/trash/ins., central a/c & htr., near fwy., 25 min. to JPL, 2 mi. from Mt. mail, move-in cond., great for 1st-time buyer, \$380K. 323/725-1022.

NEWHALL condo, 2 bd., 2 ba., vaulted ceilings, balcony, cent. air, new custom-built cabinets in garage, refinished kitchen cabinets, attached 2-car gar., recently re-tiled kitchen & bath, close to Metrolink and shopping, MLS# R2022669, \$365K. 626/712-8064, Tai (Prudential Cal Realty) or iat321@yahoo.com.

For Rent

ALTADENA, 1-bd. cottage, beautifully refurbished, completely furnished, cable TV, wireless internet, quiet park-like grounds, patio, avail. for short term (a few days to a few months). 626/798-0226.

ALTADENA, 2-bd. rustic home atop a mesa in the San Gabriel Mtns., 4 miles to JPL; wild-life, stream, hiking, biking trails on and across property; includes den, 1 ba., nice kitchen w/plentiful cabinet space + refrigera-

tor and stove, porch with view to the ocean, beautiful living rm., utility rm.; outside newly repainted; ideal for 1 or 2 wilderness lovers; available May 1; \$1,300, one-year lease, references required. 626/798-6886.

ALTADENA, clean, quiet, furnished guest studio; pool, fireplace, close to Eaton Canyon; non-smoker, no pets; \$700, utilities included. 626/398-7504.

ALTADENA, fully furnished 1-bd., 1-ba. guest house, 600 sq. ft., ideal for 1 person, hardwood floors, TV/DVD/CD, dinnerware, utensils, pots/pans, bed linens & towels, utilities included (electrical, gas, water and trash), street parking, no smoking, no pets, month-to-month lease OK. \$1,200. 626/791-0317.

ALTADENA house, 1,300 sq. ft. furnished (negotiable), washer/dryer incl., 2 bd. w/ built-in closets + office + sunroom, 2 new ba., living room, dining area, 2-car garage, 3 mi. from JPL, central air/heat, backyard with covered BBQ area, \$2,250 (water incl.) + sec. deposit, available July. 626/497-8801.

ALTADENA Country Club area, 3 ba., 2 ba., 1,932 sq. ft. with spacious, sun-filled rooms; family room, den, living room, dining room, kitchen with breakfast bar and gas cooktop; large, secluded backyard w/gas BBQ island and sink, and new pergola; fresh exterior paint & recent interior paint throughout; see www.2065holliston.com.

ARCADIA apt., 2 bd. + 2 ba., garage, a/c, stove, new paint/carpet/flooring, clean, convenient location, walking dist. to shops + food court, nr. JPL/Caltech, SA mall and 10/210 fwys., no pets, \$1,399. 626/576-7333.

LA CRESCENTA guest house w/full kitchen, new appliances, fully furnished, utilities included, north of Foothill, \$850. 438-6887.

LA CRESCENTA house, 3155 Orange Ave., 2 bd./den, 1 ba., FVCA, frplc., yard FR/RR, dbl. garage, move-in cond., \$1,800. 248-4708.

MONROVIA, small but clean and tastefully decorated guest house + bonus bldg.; very private, ideal for 1 person.; incl. refrig, stove, washer & dryer; trash and water provided; great for would-be gardeners; avail. May 1; \$800 + \$600 sec. dep. 626/357-6955.

TUJUNGA: share this incredibly cool mtn.-top house with me: 1 bd. in 2-bd. house; all utilities included; washer/dryer, half of 2-car garage, extra storage, wood shop; fully furnished kitchen & living room; beautiful view; digital cable and wireless (extra); very quiet/peaceful; pets considered.; more info and pictures avail.; I'm 31, single male; \$875. verdugoverde@comcast.net. 359-0285, Ben.

Vacation Rentals

ASPEN, brand new Hyatt Grand, 2 bd., 2 king beds, queen sofa bed, luxuriously furnished living room and kitchen, fireplace, spa tub, plasma TV, washer/dryer, complimentary internet and continental breakfast; 1200 sq. ft., sleeps 8, May 16-20, 2006; view resort at www.aspen.hyatt.com; \$75/night, no taxes; standard Hyatt rate is >\$490/night. 626/794-9579 or festarresorts@earthlink.net.

BIG BEAR LAKEFRONT luxury townhome, 2 decks, indoor pool/spa, near skiing, beautiful master bd. suite, slps. 6. 949/786-6548.

FLORIDA condo, beautifully furn. 2 bd., 2 ba., 2nd floor, on the surf of New Smyrna Beach, half-hour to Cape Canaveral, 90 min. to Disney World; enjoy all the comforts of home, quiet, relaxing, overlooks beach, BBQ/pool/game room, easy walk to stores and restaurants. 760/439-7821, Darlene, dfhaug@yahoo.com.

GRAND TETON / YELLOWSTONE Nat'l Parks, visit in style, 2 bd. + loft townhome, totally outfitted, stunning Teton view, sleeps 6, cable, microwave, etc., borders Grand Teton, conniematt@sbcglobal.net.

HAWAII, Maui condo, NW coast, ocean front view, 25 ft. fr. surf, 1 bd. w/loft, compl. furn. phone, color TV, VCR, microwave, d/w, pool, priv. lanai, slps. 4, laundry fac., \$145/nite/2, \$20/nite/add'l person. 949/348-8047, jackandrady@cox.net.

MAMMOTH, Meadow Ridge, 2 bd., 2 ba., + loft, sleeps 8; great family unit and location; walking distance to Eagle Lodge; includes fully equipped kitchen: microwave, new dishwasher, new oven; cable TVs, VCR, DVD, CD/cassette stereo, free wireless internet access; close to pool, Jacuzzi, spa; JPL discount. 240-8763 or anahid@KazEng.com.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, slps. 6-8, fully equip'd kitchen incl. microwave, D/W, cable TV, VCR, phone, balcony w/mtn. view., Jacz., sauna, streams, fishponds, close to Mammoth Creek, JPL disc'nt., no pets. 626/798-9222, 626/794-0455 or valeriee@caltech.edu.

OCEANSIDE condo, on the sand, charming 1 bd., panoramic view, walk to pier or harbor, pool, spa, game rm., slps. 4. 949/786-6548.

ROSARITO BEACH condo, 2 bd., 2 ba., ocean view, pool, tennis, short walk to beach on priv. rd., 18-hole golf course 6 mo. away, priv. secure parking. 626/794-3906.

JPL'S ONLINE NEWS SOURCE



<http://dailyplanet>

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Notice to Advertisers

Advertising is available for JPL and Caltech employees, contractors and retirees and their families. No more than two ads of up to 60 words each will be published for each advertiser. Items may be combined within one submission. Ads must be submitted via e-mail to universe@jpl.nasa.gov and are due at 2 p.m. on the Monday after publication for the following issue.

All housing and vehicle advertisements require that the qualifying person(s) placing the ad be listed as an owner on the ownership documents.

News Briefs	2	Level A Bonus Awards	3
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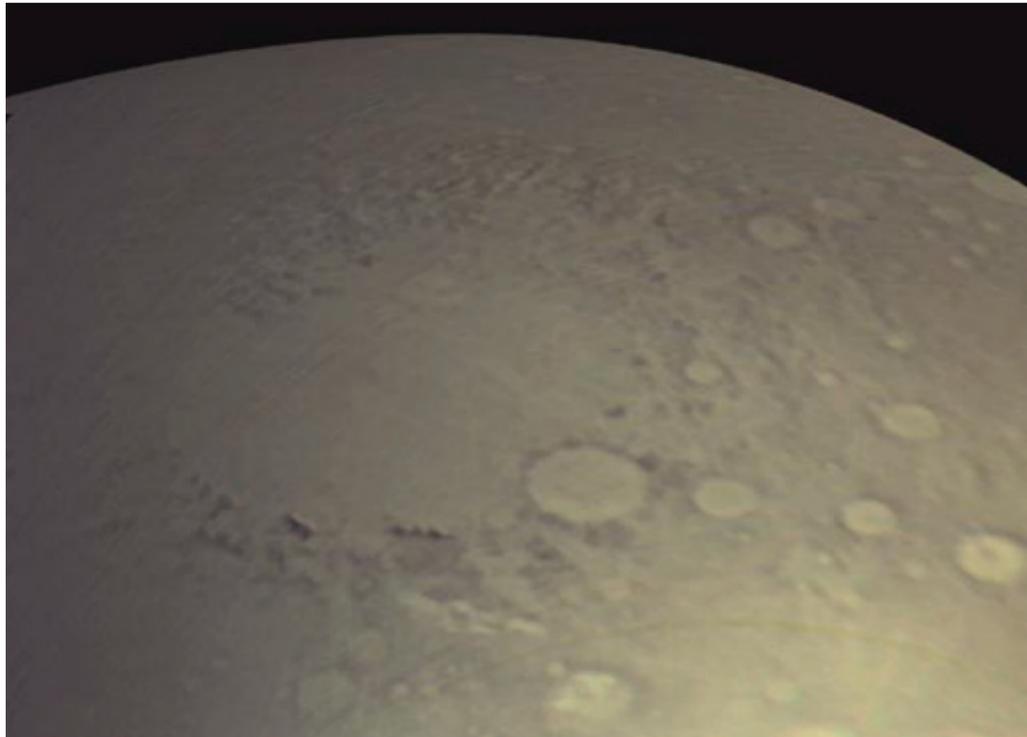
New Mars cameras debut

Spacecraft adjusts orbit



By Guy Webster

The Mars Color Imager camera on Mars Reconnaissance Orbiter acquired this wide-angle view of Mars on March 24 as part of a checkout of the orbiter's payload.



RESEARCHERS ON APRIL 13 RELEASED THE FIRST Mars images from two of the three science cameras on JPL's Mars Reconnaissance Orbiter.

Images taken by the orbiter's context camera and Mars Color Imager during the first tests of those instruments at Mars confirm the performance capability of the cameras. The test images were taken from nearly 10 times as far from the planet as the spacecraft will be once it finishes reshaping its orbit. Test images from the third camera of the science payload were released previously.

"The test images show that both cameras will meet or exceed their performance requirements once they're in the low-altitude science orbit. We're looking forward to that time with great anticipation," said Dr. Michael Malin of Malin Space Science Systems, San Diego, the team leader for the context camera and principal investigator for the Mars Color Imager.

The cameras took the test images two weeks after the orbiter's March 10 arrival at Mars and before the start of "aerobraking," which reshapes the orbit by using controlled contact with Mars' atmosphere.

The orbiter is currently flying in very elongated loops around Mars. Each circuit lasts about 35 hours and takes the spacecraft about 27,000 miles (43,000 kilometers) away from the planet before swinging back in close.

On April 12, a short burn of intermediate-sized

thrusters while the orbiter was at the most distant point nudged the spacecraft to pass from approximately 70 miles (112 kilometers) to within 66 miles (107 kilometers) of Mars' surface.

"This brings us well into Mars' upper atmosphere for the drag pass and will enable the mission to start reducing the orbit to its final science altitude," said Dan Johnston, the deputy mission manager.

After hundreds of passes through the upper atmosphere, the drag will gradually reduce the far point of the orbit until the spacecraft is in a nearly circular orbit every two hours.

After the spacecraft gets into the proper orbit for its primary science phase, the six science instruments onboard will begin their systematic examination of Mars. The Mars Color Imager will view the planet's entire atmosphere and surface every day to monitor changes in clouds, wind-blown dust, polar caps and other variable features.

Images from the context camera will have a resolution of 20 feet (6 meters) per pixel, allowing surface features as small as a basketball court to be discerned.

The new images are available online at www.nasa.gov/mro, www.msss.com/mro/ctx/images/2006/04/13 and www.msss.com/mro/marci/images/2006/04/13.

For more detailed information about Mars Reconnaissance Orbiter, see <http://mars.jpl.nasa.gov/mro>.

Cosmic launch is successful

A globe-spanning constellation of six weather and climate research satellites based on global positioning system occultation technology developed at JPL successfully launched from Vandenberg Air Force Base, Calif., Friday, April 14, at 6:40 p.m. Pacific time aboard a Minotaur rocket.

The Constellation Observing System for Meteorology, Ionosphere and Climate network, or Cosmic, is expected to improve weather forecasts, monitor climate change and enhance space weather research.

JPL designed Cosmic's primary instrument, a science global positioning system receiver, based on its proven BlackJack space receiver.

The five-year mission is a cooperative program between the American Institute in Taiwan and the Taipei Economic and Cultural Representative Office in the United States. The University Corporation for Atmospheric Research, Boulder, Colo., manages the mission and designed the satellite array system.

The low-orbiting satellites will be the first to provide atmospheric data daily in real time over thousands of points on Earth. They will measure the bending of radio signals from the U.S. global positioning system as the signals pass through Earth's atmosphere, a technology known as radio occultation.

CloudSat launch due early Friday

As Universe went to press, the JPL-managed CloudSat mission was preparing for its launch from Vandenberg Air Force Base on Friday, April 21, at 3:02 a.m. Pacific time.

The Delta II launch vehicle will also carry the Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation (Calipso) spacecraft. Together, the satellites will study the role that clouds and aerosols play in regulating Earth's weather, climate and air quality.

View the CloudSat web video and podcast at www.jpl.nasa.gov/news/spotlights/200604-cloudsat.cfm. For other mission news and updates, visit www.nasa.gov/mission_pages/cloudsat/main/index.html.

Rovers see layers, head for new sites

By Guy Webster

This image shows coarse-grained layers from around the edge of a low plateau called "Home Plate" inside Mars' Gusev Crater.

JPL'S MARS ROVER SPIRIT HAS REACHED A SAFE site for the Martian winter, while its twin, Opportunity, is making fast progress toward a destination of its own.

The two rovers recently set out on important—but very different—drives after earlier weeks inspecting sites with layers of Mars history. Opportunity finished examining sedimentary evidence of ancient water at a crater called "Erebus," and is now rapidly crossing flat ground toward the scientific lure of a much larger crater, "Victoria."



Spirit studied signs of a long-ago explosion at a bright, low plateau called "Home Plate" during February and March. Then one of its six wheels quit working, and Spirit struggled to complete a short advance to a north-facing slope for the winter. "For Spirit, the priority has been to reach a safe winter haven," said Dr. Steve Squyres of Cornell University, principal investigator for the Mars Exploration Rover project.

The rovers have operated more than eight times as long as their originally planned three-month mission. Each has driven more than 6.8 kilometers (4.2 miles), about 11 times as far as planned. Two years ago, the project had already confirmed that at least one place on Mars had a wet and possibly habitable environment long ago. The scientific findings continue.

Opportunity spent most of the past four months at Erebus, a highly eroded impact crater about 300 meters (1,000 feet) in diameter, where the rover found extensive exposures of thin, rippled layering interpreted as a fingerprint of flowing water. "What we see at Erebus is a thicker interval of wetted sediment than we've seen anywhere else," said Dr. John Grotzinger of Caltech. "The same outcrops also have cracks that may have formed from wetting and drying."

News Briefs



Cryocooler deal for Webb telescope

NASA has awarded a subcontract to Northrop Grumman Space Technology in Redondo Beach to develop an ultra-cold mechanical helium cryocooler for the Mid-Infrared Instrument on the James Webb Space Telescope. The contract totals about \$22 million.

JPL is the U.S. partner in developing the instrument, along with a consortium sponsored by the European Space Agency. With a planned 2013 launch, the Webb Space Telescope will study the earliest galaxies and some of the first stars formed after the Big Bang. The cryocooler delivery date is 2010.

The Mid-Infrared Instrument must be cooled to 6 Kelvins (minus 449 degrees Fahrenheit), much colder than the planned 40 Kelvins (minus 388 Fahrenheit) temperature of the Webb Space Telescope. This will allow the instrument to detect room temperature heat emitted by stars, galaxies and other objects.

Goddard Space Flight Center manages the Webb telescope for NASA.

Savings offered on inventory

General Inventory, in operation under Division 37 for six months, will reduce the cost of all items in the inventory by 30 to 45 percent, starting May 1. Also, the savings on all items previously purchased in FY '06 will be credited to customers' accounts.

Located in Building 171-107, General Inventory provides non-flight support hardware to meet JPL science and engineering development needs, including non-flight electronic parts, fasteners, connectors, wire, batteries, electrostatic discharge items, safety items and much more (including the highest-use items previously in General Stores). The operation is open Monday through Friday from 7:30 a.m. to 4 p.m.

A new website and catalog (<http://generalinventory>) have been added, as has an integrated inventory site that also includes the Flight Hardware Logistics Program, flight fasteners, metal stores, wire and connectors, electronic parts and pyrotechnics inventories (<http://integratedinventory>). Future enhancements may include kiosk workstations for automated ordering, high-resolution pictures for the online catalog, and vending machines for the most commonly requested items, with 24/7 accessibility.

For more information, call ext. 4-6642, or TERRY BADGLEY, (inventory operations), 4-5023; NICK VAN DER WENDE, (inventory information systems), 3-5324; KEN VAN AMRINGE, (inventory manager), 3-4815; and CHRIS DOKMAJI (webmaster), 4-3457.

Summer camp signups available

Signups are now available for the Child Educational Center's 10-week educational summer camp, which will be offered from June 20 to Aug. 25. Families can apply for the full summer or for weekly sessions.

Camps will operate from 7 a.m. to 6 p.m. in La Cañada at the Oak Grove site near JPL and in Pasadena, near

Caltech. Both sites serve children who are entering 1st through 7th grades.

Camp activities include arts and crafts, creative expression (writing, music, dance and drama), swimming, gardening and organized sports and games. A science component includes demonstrations of basic concepts and allows children to perform experiments and document their findings.

Field trips include the IMAX Theater, California Science Center, Pasadena Junior Theater, bowling, ice skating and special tours of JPL and Caltech.

For children going into the 5th through 7th grades, the CEC also offers "The Zone," a program with specialized trips and activities such as roller skating, miniature golf and the beach.

The CEC will also offer its new Performing Arts Camp, the Traveling Troubadours, to a limited number of children who are entering grades 3 through 7. Children will be involved in all aspects of producing a play, which will be presented to parents, peers and the public. Enrollment is scheduled on a full-time basis in two-week sessions, each of which will focus on a different production and audience in order for children to have two different experiences should they choose to enroll in both sessions. Space is limited in both sessions, Aug. 1-12 and Aug. 15-25.

In addition to the performing arts and summer camps, the CEC provides before- and after-summer school care from June 27 to July 29 to children attending summer school in La Cañada at Paradise Canyon Elementary School.

For more information or to arrange a site visit, call the CEC at ext. 4-3418 or visit www.ceconline.org.

Blood drive in May

JPL Occupational Health Services reports that while recent blood donations have been adequate to meet area patient needs, supplies are critically low, especially with the high demand for type O blood.

Blood donors are asked to help by donating during the next JPL/Red Cross drive, to be held in von Kármán Auditorium on Tuesday, May 16, from 9 a.m. to 4 p.m. and Wednesday, May 17, from 7 a.m. to 2 p.m.

Everyone who participates in the May blood drive will receive a coupon for Baskin Robbins.

Sign up at <http://www.givelife.org/index.cfm?hcl=JPL>. Enter "JPL" instead of a zip code or sponsor code, then click "search" and the JPL blood drive dates will come up.

Advance signups will also be available at Occupational Health Services, Building 310-202, prior to the blood drive. For last-minute signups, or to change your appointment, please call the Red Cross at (213) 400-0140.

To donate blood you must be at least 17 years old, weigh no less than 110 pounds, lived in the United States for no less than three years, and be in good health. There must be at least 56 days between your blood donations.

For more information, visit www.redcross.org/services/biomed/blood/supply/tse.html.

Special Events Calendar

Ongoing Support Groups

Alcoholics Anonymous—Meets Wednesdays at 11:30 a.m.

Caregivers Support Group—Meets the first Thursday of the month at noon in Building 167-111 (the Wellness Place).

Codependents Anonymous—Meets at noon every Wednesday.

Lambda (Gay, Lesbian, Bisexual and Transgender Networking Group)—Meets the first Friday and third Thursday of the month at noon in Building 111-117. For more information, call Randy Herrera, ext. 3-0664.

Parents Group for Children With Special Needs—Meets the second Thursday of the month at noon in Building 167-111 (the Wellness Place).

For more information on any of the support groups, call the Employee Assistance Program at ext. 4-3680.

Saturday, April 22

Folk Music—Singer Priscilla Herdman will perform at 8 p.m. in Caltech's Dabney Lounge. Tickets are \$15 for adults, \$5 tickets for children. For more information, call (626) 395-4652 or visit <http://events.caltech.edu> or <http://folkmusic.caltech.edu>.

What's That Noise?—Comic, performance artist, mime, storyteller and magician Michael Trautman will explore the secrets of creating sound effects at 2 p.m. in Caltech's Beckman Auditorium. Tickets are \$12 for adults, \$7 for high school age and younger. For more information, call (626) 395-4652 or visit www.events.caltech.edu.

Sunday, April 23

Chamber Music—Pianist William Chapman Nyaho will perform works by composers of African descent in a free concert at 3:30 p.m. in Caltech's Dabney Lounge. For more information, call (626) 395-4652 or visit www.events.caltech.edu.

Tuesday, April 25

Caltech Women's Club Preschool Playgroup—Meets in Tournament Park (off Wilson Avenue south of California Street in Pasadena) for children's crafts, songs, stories and play while adults socialize. Group also meets May 2. For more information, e-mail smiller@caltech.edu.

Wednesday, April 26

Caltech Women's Club "Wednesday in the Park"—Meets in Tournament Park for playtime for the children and socializing for adults. Rain location is Brown Gym. Group also meets May 3. For more information, e-mail smiller@caltech.edu.

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

JPL Chorus—Meets at noon in Building 233-303. For more information, call Shary DeVore at ext. 4-1024.

JPL Library Orientation—Stop by Building 111-104 at 11:30 a.m. for an overview of the Library's products and services, and learn how to access numerous electronic resources from your desktop. For more information, call the reference desk, ext. 4-4200.

Thursday, April 27

JPL Golf Club—Meeting at noon in Building 306-302.

Caltech Architectural Tour—Hosted by the Caltech Women's Club, from 11 a.m. to 12:30 p.m. Free and open to the public. Meet at the Athenaeum front hall, 551 S. Hill Ave. For reservations, call Susan Lee, (626) 395-6327.

Clogging Class—Meets at noon in Building 300-217. For more information, call Shary DeVore at ext. 4-1024.

Saturday, April 29

Celtic Music—Fiddler Natalie MacMaster will perform at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$29, \$25 and \$21; high school age and younger, \$10. For more information, call (626) 395-4652 or visit www.events.caltech.edu.

"Money For College: How Much Is Enough?"—David Levy, director of financial aid at Caltech, and Catherine Thomas, associate dean of admissions and financial aid at USC, will present this seminar from 10 a.m. to noon at Verdugo Hills Hospital, 1812 Verdugo Blvd., Glendale. For more information or to RSVP, call the Child Educational Center, ext. 4-3418.

Sunday, April 30

Chamber Music—Winners of the Coleman Chamber Ensemble Competition will perform at 3:30 p.m. in Caltech's Ramo Auditorium. Tickets are \$15; high school age and younger, \$10. For more information, call (626) 395-4652 or visit www.events.caltech.edu.

Tuesday, May 2

JPL Gamers Club—Meeting at noon in Building 301-227.

JPL Genealogy Club—Meeting at noon in Building 301-271.

Wednesday, May 3

Associated Retirees of JPL/Caltech—Meeting at 10 a.m. at La Cañada United Methodist Church, 104 Berkshire Place, La Cañada. Call (626) 794-1698 to leave a message.

JPL Chorus—Meets at noon in Building 233-303. For more information, call Shary DeVore at ext. 4-1024.

JPL Library Orientation—Stop by Building 111-104 at 11:30 a.m. for an overview of the Library's products and services, and learn how to access numerous electronic resources from your desktop. For more information, call the reference desk, ext. 4-4200.

"Why Are Prices So Bizarre?"—Dr. Preston McAfee, professor of business economics and management at Caltech, will discuss the paradoxes of consumer pricing at 8 p.m. in Beckman Auditorium. Free admission. For more information, call (626) 395-4652 or visit www.events.caltech.edu.

Thursday, May 4

"JPL and the President's Vision: An Update"—Michael Sander, manager of the Exploration and Systems Technology Office, will discuss JPL's work with NASA's Exploration Systems Mission Directorate from 11:30 a.m. to 1 p.m. in von Kármán Auditorium.

JPL Gun Club—Meeting at noon in Building 183-328.

Friday-Sunday, May 5-7

Political Satire—Capitol Steps will perform in Caltech's Beckman Auditorium at 8 p.m. Friday and Saturday and at 3:30 p.m. Sunday. Tickets are \$35, \$31 and \$27; high school age and younger, \$10. For more information, call (626) 395-4652 or visit www.events.caltech.edu.

Sunday, May 7

Spring Potluck—Presented by the Caltech Women's Club, Wednesdays in the Park, Preschool Playgroups and Babysitting Co-op, from 4 to 7 p.m. at Tournament Park. Plates, cups, drinks and utensils are provided; just bring a dish to share. Entertainment and crafts will be offered. Contact Caroline Haider Sutton at mcsutton10@hotmail.com or Nancy Hewett at Nancyhewett@earthlink.net.



Stardust educators show their appreciation



Aimee Meyer, right, outreach manager for the Stardust comet sample-return mission, receives a plaque of appreciation for her efforts on the project's educator fellowship program. At left is Ken Atkins, the original Stardust project manager; at center is Adair Teller of the Bellflower Unified School District, who represented the educators who have participated in the Stardust education effort. Stardust educator fellows have grown from 10 the first year of the mission to more than 60 today.

Dutch Slager / JPL Photolab

Top Performers



Standing, from left: Former JPL Director Dr. Ed Stone, Jeremy Jones, Steve Flanagan, Steve Chien, Ronald Ross, Art Hammon, Donald Argus, Dara Sababi, JPL Chief Scientist Dr. Tom Prince, Timothy Larson, Dr. Firouz Naderi, JPL associate director, programs, project formulation and strategy. Seated, from left: Dong Wu, Lee-Leung Fu, Matt Golombek, Ed Hirst, David M. Seidel, Melissa English.

Dutch Slager / JPL, Photolab

Thirteen of JPL's top performers were formally honored at a Level A Bonus Award ceremony and last month at Caltech's Athenaeum.

The JPL Bonus Award Program was established in 1999. Today, the program consists of various award levels for individuals and teams. The Level A Bonus Award is designed to honor individuals based on four categories of excellence and is the highest award level in JPL's program. Award categories are Strategic Leadership, Scientific and Technical Excellence, Effective Business Management, and Effective Partnerships and Relationships.

In addition, four individuals, including two honorable mentions, received the Dr. Edward Stone Award for Outstanding Research Publication.

For more information about the awards, visit <http://hr.jpl.nasa.gov/esr/BONUS>.

The 2006 Level A Bonus Award honorees:

STRATEGIC LEADERSHIP

Steve Chien: Outstanding strategic leadership and vision as the principal investigator of the Autonomous Sciencecraft Experiment, which successfully demonstrated software technology that autonomously detects and tracks scientific processes.

Steve Flanagan: Successful strategic leadership in the management of JPL's Capability Maturity Model Integration level 2 achievement for selected mission-critical software tasks, laying a foundation for projects and mission software practitioners based on industry best practices.

Lee-Lueng Fu: Outstanding strategic leadership by providing scientific guidance to the ocean surface topography missions for the past 15 years, culminating in the Jason mission ranking the highest of all Earth science missions at NASA in 2005.

Edward Hirst: Outstanding strategic leadership in the Stardust risk management effort through detailed as-built, risk, certification and implementation reviews, culminating in the successful critical events readiness review and approval by the Governing Program Management Council.

Jeremy Jones: Outstanding strategic leadership contributions to the navigation of the Cassini orbiter and Huygens probe, leading to the success of the Huygens mission to Titan.

Thomas McVittie: Significant strategic technical leadership contributions in the infusion of a new generation of ground system software architecture and technology, resulting in reduced cost and risk for JPL missions and for cross-center system architecture leadership and partnering.

Ronald Ross: Strategic leadership of cryocooler development and implementation, and for successfully infusing it into a flight application for the Mid-Infrared Instrument.

Dara Sabahi: Outstanding strategic leadership in assuring the successful deployment of the Mars Advanced Radar for Subsurface and Ionosphere Sounding antenna.

SCIENTIFIC AND TECHNICAL EXCELLENCE

Matthew Golombek: Outstanding scientific contributions in demonstrating accuracy in predicting safe landing sites on Mars for Pathfinder and the two Mars Exploration Rovers.

Timothy Larson: Outstanding technical contributions as the mission assurance manager for the Deep Impact launch and encounter, including effective project risk assessment and communication.

EFFECTIVE BUSINESS MANAGEMENT

Melissa English: Exceptional business leadership and technical guidance in the implementation of the integrated Planning, Inventory, and Costing System's Phase I and Phase II systems.

EFFECTIVE PARTNERSHIPS AND RELATIONSHIPS

Virgil Hammon: Outstanding professional contribution in developing innovative hands-on educational materials through partnering with Bay Area Writing Project/California Writing Project, Foundations in Reading Through Science and Technology, Caltech Pre-College Science Initiative and other classroom educators.

David M. Seidel: Outstanding professional contributions in leading a team of professional educators, faculty and administrators to enrich and complement state-required curriculum with NASA-related materials.

EDWARD STONE AWARD FOR OUTSTANDING RESEARCH PUBLICATION (LEAD AUTHORS)

Donald Argus: "Interseismic Strain Accumulation and Anthropogenic Motion in Metropolitan Los Angeles," *Journal of Geophysical Research*.

Dong Wu: "Upper Atmosphere Research Satellite Microwave Limb Sounder Cloud Ice Measurements and Implications for H₂O Transport Near the Tropopause," *Journal of the Atmospheric Sciences*.

HONORABLE MENTION

Krzysztof Gorski: "HEALPix: A Framework for High-Resolution Discretization and Fast Analysis of Data Distributed on the Sphere," *Astrophysical Journal*.

Ron Kwok: "On Large Outflows of Arctic Sea Ice into the Barents Sea," *Geophysical Research Letters*.

Thanks for all your help!



Clerks are shown in a JPL photo from 1952. Administrative assistants have kept up with numerous changes in office technology since then.

By Mark Whalen

Sure, you answer your own phone and type your own memos. But what about your office furniture, computer, travel schedule and so many other necessary tasks? Well, you can thank your secretary or administrative assistant.

Many people will do just that next Wednesday, April 26, on Administrative Professionals' Day. Matter of fact, the entire last week of April is now annually celebrated as Administrative Professionals' Week.

Just as JPL has evolved over the decades, so has the role of the administrative assistant. But the appreciation for their dedication has remained constant.

Many tasks formerly done by secretaries and administrative assistants have gone away or have changed their method of delivery. For example, now, instead of lugging printed

documents to meetings, many people carry a laptop computer. But who was there to help you learn PowerPoint and Excel?

And when paper timecards were replaced by web-based tools, who helped to make sure you got paid on time?

Sharon Chapman, the Science Division secretary, first worked at JPL from 1958-60. She left to get married and raise a family, returning in 1978. She's been here ever since.

In the early days, before photocopiers, she recalled, everything was typed on a mimeograph sheet, which was paper with a layer of ink on its backside that would copy the typing to other pages.

When she returned for her second stint on Lab, the technology of the day—the self-correcting IBM Selectric typewriter—gave her a little trouble. "I was set in my ways," she said. "It wasn't fun, but I got used to it."

Later, when personal computers became commonplace, she considered that another challenge, "but I enjoyed it. I've learned both PC and Mac, no problem at all."

Somewhat surprisingly, she said she misses the days of typing science papers, with their quirky symbols and equations. "I really enjoyed that, it was a lot of fun," she said. "But scientists pretty much type their own things now."

Chapman likes the fact that personal relationships between staff and managers have grown over the years. And her supervisors have shown their appreciation.

"Nowadays I'm closer to the bosses than before," she said. "When I was a group secretary we didn't talk to the managers very much—we had to go through the section secretary, who would then talk to the manager. Today it's much more of an open-door policy, where we can talk about anything."

"Everyone becomes friends and we all work as a team. It's been a fast time and I've enjoyed it immensely."

Male secretaries have always been a rarity in the workplace. It's worked out well, though,

Continued on page 4

Thanks

Continued from page 3

for Roderick Hayden, who became a JPL employee in 1999 after a couple of years here as a contractor.

Hayden acknowledged that it took a bit of time for some veteran employees, whom he called traditionalists, to get used to the idea of a male assistant.

"The feedback I got at first was, 'Oh no, a male secretary?' Now people treat me very well. I've been around, people know who I am now and I think I've developed a good reputation."

He and colleague Betty Rippey are responsible for about 180 people in one of the largest organizations on Lab, the Inner Planet Flight Dynamics Section 343.

"People are very nice, very pleasant," he said of the section staff. "I do feel appreciated."



Sharon Chapman and Roderick Hayden.



Photos by Tom Wayne / JPL Photolab

Passings

ROBERT LEE ROBINSON, 68, a retired engineer from Section 344, died March 30.

Robinson worked at JPL from 1978 to 1999. He is survived by his wife, Janice Eileen, daughters Debra and Cynthia and grandchildren Joseph, Tony, Nicole, Annie and Andrew.

Letters

My family and I would like to thank my co-workers for their sympathy and kind thoughts on the passing of my grandmother. She was with us for 95 memorable years! The plant is beautiful and much appreciated!

Kirsten Badaracco

This is a personal thank you to all of my JPL family, who have been so supportive of me and my family during the recent passing of my father, Tom, 92. The plants and floral arrangements were beautiful, and added greatly to the spiritual and celebration of life services. Please continue to keep us in your thoughts and prayers.

G.T. O'Connell

The sadness felt by my sister's death was lightened by the outpouring of sympathy and support from my friends and colleagues. The JPL plant was beautiful. The donations to cancer research are very much appreciated and will aid in the search for a cure.

Elaine Lowrie

Dear friends and colleagues: My family is extremely grateful for all of the support we received with the passing of my father. During the '60s my father would get us kids up early in the morning (west coast) to crowd around the "black and white" RCA-TV to watch Mercury, Gemini and Apollo launches. Later we would marvel as the Voyager spacecraft began their journeys. We want to thank everyone for the flowers, plants and support. God bless,

Robert W. Johnson

I would like to thank my friends and colleagues in Section 315 for the beautiful flowers I received after my father passed away. Your support during his illness and your expressions of sympathy all helped to make a difficult time a little easier. I would also like to thank those of you who attended the service. I was grateful for your presence, it really meant a lot to me.

Cozette Parker

Retirees

The following JPL employees retired in April:

Albert Chang, 40 years, Section 9110; John Houseman, 39 years, Section 532; Michael Keesey, 33 years, Section 343R; Michael Jahan, 31 years, Section 3560; Shuchi Hsiao, 29 years, Section 334; Wilbur Marner, 25 years, Section 3500; Dan Hoffman, 16 years, Section 1080; Tommy Dearmond, 15 years, Section 373D; Vicki Laidig, 14 years, Section 1080; David Petterson, 10 years, Section 3243.

Classifieds

For Sale

BEDROOM SET. solid pine, incl. headboard, footboard and rails, 9-drawer dresser with mirror and 3-drawer night table, exc. condition, \$450/obo. 626/791-5498, Joe.

CAMERA, Minolta underwater Weathermatic, 35 mm film, in excellent shape; complete kit incl. removable viewfinder, film roll holders, case; auto-focus, auto-wind, flash, close-up mode, \$30. tom_farr@mac.com, 248-8619.

COMPUTER, Sony VAIO Notebook, TX670 P/W, new in sealed box, 1 GB RAM, 60 GB HD, MS Windows XP Professional, w/SP2, DVD-RW, wireless, Bluetooth, \$2,250. 626/318-6370.

COMPUTER, Sony VAIO desktop, 19" CRT, Pentium 4 2.4 GHz, 80 GB HD, 1 GB RAM, CD-RW X40 DVD-ROM X16, Win XP Pro. 626/405-1939, koby_sh@hotmail.com

DINING SET, 1930s carved oak, table w/6 oval cane-back chairs, veneer top carved on outer sides, detailed carved legs as well as under tabletop on sides, no table leaves, L 56" x W 42" x H 29 1/2," 4 chairs, 2 armchairs, all have spiral backs & legs, removable seats, can e-mail photos, beautiful condition, \$850, cash or cashier check, buyer responsible for pickup. 626/470-5303, 9-4 p.m., Monrovia.

DODGER TICKETS: selected games from season ticket package, Loge level, Section 134 (at first base), 2 tickets per game at face value of \$35/ticket. www.delunac.net/tickets or 626/296-1253 for details & avail. games.

DODGER TICKETS (2), from season ticket package, preferred Loge box, Aisle 150 Row C, \$30/ticket. thinkblue06@hotmail.com.

DODGER TICKETS: up to 6 together, various dates, section TD 7, row N, on or close to the aisle, \$5/ticket, about 50 games remaining. 626/644-0793.

DODGER TICKETS: 2 per game, front row, Section 32 RS, \$13/ticket, face value, various dates incl. 4/19, 5/3, 5/10, 5/24, etc., about 10 games remaining. 626/644-0793.

INKJET CARTRIDGES, (4), black, Epson compatible T044120 (T0441), standard capacity (C64/C66/C84/C86/CX4600/CX6400/CX6600), \$25. 362-2003.

MISC.: diamond ring, David Yurman "X" sterling silver w/pave diamonds, sz. 6, pd. \$900, sell for \$700/obo; ring, pearl & diamond 14K white gold, size 6, \$120; handbag, new, Via Spiga dark brown leather "Amelie" shoulder bag, 15" W x 6" H x 3" D, paid \$250, sell for \$125; handbag, new in box, Dooney & Bourke, black w/brown, all-weather Leather 2 collection mini skinny case, 4" H, 6" L, .75" W, pd. \$65, sell for \$45. 653-9037.

MISC.: coffeemaker, Cuisinart, 2 to go, new, \$25; hair straightener, MaxiGlide, w/extra ceramic flat plate, \$60; Barton's Creek Snuggles doll, 13.25" tall, new in box, \$25; picture, Paradise Waterfall, 46" x 29", moving water & bird sounds (volume control), creates illusion of moving water, pd. \$250, sell for \$100. 653-9037.

MISC.: brand new Panasonic DVD recorder/player, all the bells and whistles, paid \$180, sell for \$175/obo; Sharp VCR, no frills, works great, \$45/obo; kid-size pool table, finished pine, really nice, all accessories included, \$300 firm. 626/859-6393, Cheryl.

MISC.: home gym, \$50; crimp hair iron, \$5; women's "cowboy" boots, gray, sz. 7 1/2, gd. cond., \$50; fishing reels (freshwater), \$10/ea.; electrolysis machine, \$20; camping chairs (4), camouflage, \$10 ea.; twin mattress, fair cond., \$10. 626/357-8210.

MOVING SALE: full bed (53" x 75"), \$50; bedroom furn. set (2 chests of drawers, 2 night tables, desk, chair), \$180; love seat, blue, \$80; microwave cart, \$25; parquet end table, \$20; spice jar lamp, \$15; computer stand, \$15; small dresser, \$20; cable spool table, \$15; GE toaster oven, \$6; blender, \$5; electric coffee pot, \$5. 323/344-7209, evenings, weekends.

MOVING SALE: ironing boards (2), \$5 each; electric broom, \$10; carpet sweeper, \$5; electric hedge trimmer, \$5; lawn edger, \$4; lawn spreader, \$5; flatware set (missing a few pcs.), \$6; dishes, brown, service for 4, \$8; 10-speed bicycles (3) in various stages of disrepair, \$20 ea.; bricks and boards for bookcases, make an offer. 323/344-7209, eves, weekends.

TV, Casio handheld color LCD TV-980, brand new, sealed package, 2.3" anti-glare screen & passive-matrix LCD display; pixel count: 39,600; reception: VHF Ch. 2-13, UHF: ch. 14-69; pwr.: AC or runs for up to 4 hours on AA batteries; \$65, negotiable. 626/794-9579.

TV, 42" Philips, like new, \$1,200/obo. 626/301-1179 or 626/644-2228.

TROPICAL PLANTS, plumerias, variety of colors and sizes; shell gingers. 626/444-6156.

Vehicles / Accessories

'68 CHEVY Camaro SS, 350 hp, 49,000 mi., clean int., engine runs great, a restoration/st. rod project I am unable to complete; front right replacement fender is in primer color, add new paint and you have a fantastic car; see http://www.sassybee.com/camaro; \$16,000/obo. 310/445-6625, Steve.

'93 HONDA Accord, white, 10th anniversary edition, immaculate cond., complete detailed in and out, recent major service, complete maintenance records, am/fm/cass., new tires, 190K miles, \$3,800. 562/692-9611, Craig or Karen.

'89 HONDA Civic wagon, 250,000 miles, body good, runs, needs some work, make offer. 957-0743, Karen.

steering and so much more, great cond., \$19,990/obo. 626/793-3408.

JEEP Cherokee bra (classic style), like new, \$40 (originally sold for \$95). 626/359-7666.

'02 NISSAN Sentra GXE, 4 dr., 65K mi., automatic, radium gray w/matching spoiler, intermittent wipers, passenger airbag, pwr. brakes/mirrors/steering, rear defrost, cruise control, grt. for commuting, \$6,900. 626/963-7227, eves, npgcable.com.

SNOW CHAINS, cable type, fit most 15" and 16" tires, complete list avail., used, gd. cond., w/case, \$10. tom_farr@mac.com, 248-8619.

'05 TOYOTA Tundra access cab limited, 4 x 4, black with beige leather, snug-top shell, TRD off-road package, spray-in bedliner, excellent condition, 10K miles, remaining warranty, \$28,000. 626/222-1725.

'03 TOYOTA Highlander Ltd., only 31K mi., top of the line, leather, all auto/power, a/c, multi-disk CD, front & side airbags, sliding sunroof, towing package, black with tan interior, excellent condition, like a new car, \$22,500 (Blue Book price). 626/296-3441.

'98 TOYOTA Sienna minivan, V6 LE, 194 HP, 88K miles, light blue, exc. cond., dual a/c, 12-disc CD changer, dual sliding doors, 1 owner, \$6,500. 909/592-2279.

'01 VOLVO S80, 6-cyl. 2.9 L, moonroof/beige leather, automatic, FWD, a/c, power steering/windows/door locks, telescoping wheel, cruise control, am/fm stereo/cassette/multi-CD, premium sound, dual front airbags, front side airbags, ABS (4-wheel), stability/traction, dual power seats, moonroof, cold-weather package, 46,900 miles, \$17,500. 626/278-5207 or dnelnash@aol.com.

'01 VOLVO V-70 wagon, 50K miles, sunroof/leather/CD, excellent condition, \$14,300/obo. 626/797-8929.

'68 VW Karmann Ghia, w/the restorer in mind, needs int./ext. TLC, \$1,100. 626/284-0274.

'96 WINNEBAGO Adventurer 32' Class A motorhome, Ford 460, 35K miles, services recent and up to date; 6 kW generator, ducted dual a/c, driver door, hydraulic leveler, queen bed, oak interior, 2 TVs and much more; NADA valuation \$25K (low) to \$30K (avg.); make offer, must sell. 805/584-6766.

Wanted

APARTMENT for young JPL engineer: Los Feliz, Silver Lake, Echo Park, Highland Park, Eagle Rock, Atwater, Tujunga or near 2 fwy, beginning June. 323/668-9756, leave msg., or e-mail rockettothemoon@yahoo.com.

GUEST HOUSE for single mom with 7 yr. old; would like full kitchen w/stove, refrig. and wash/dryer hookups (W/D not critical); no farther than Monrovia or going west toward Glendale/Burbank/San Fernando; apt. info welcomed as well. 683-3098, Anita or aserrato13@yahoo.com.

HOUSING: need to rent unfurn. guest house/bungalow in Crescenta Valley, \$800/mo. max., quiet, handicapped accessible (fairly flat entrance), parking, have 1 cat. 249-0485.

ROOM TO RENT for college student starting in June, JPL summer intern, quiet, neat, animal lover. 530/524-2509, Milecy.

SPACE INFORMATION/memorabilia from U.S. & other countries, past & present, for personal use. mrayman@alumni.princeton.edu, 790-8523, Marc Rayman.

VANPOOL RIDERS, Valencia to JPL, leaves K-Mart 6:30 a.m., leaves JPL 4 p.m., \$110/month or \$5.50/day. 653-9134, Chris.

Real Estate

ALTADENA Country Club area, 3 ba., 2 ba., 1,932 sq. ft. w/spacious, sun-filled rooms; family rm., den, living rm., dining rm., kitchen w/breakfast bar and gas cooktop; lg., secluded backyard w/gas BBQ island and sink, and new pergola; fresh exterior paint & recent interior paint throughout; see www.2065holliston.com.

DEL MAR timeshare condo, 2 bd., 2 ba., living room, fully equipped kitchen, pool, Jacuzzi, BBQ area, game room, walk to beach; high season, 1 week; \$4,000. 626/507-8083, David or 626/215-3323, Kitty.

NEWHALL condo, 2 bd., 2 ba., vaulted ceilings, balcony, cent. air, new custom-built cabinets in garage, refinished kitchen cabinets, attached 2-car gar., recently re-tiled kitchen & bath, close to Metrolink and shopping, MLS# R2022669, \$365K. 626/712-8064, Tai (Prudential Cal Realty) or iat321@yahoo.com.

UPLAND, 4 bd., 2.5 ba., living rm. w/fireplace, formal dining rm., lg. kitchen w/table nook, laundry rm., central air/heat, center courtyard., mt. vw., attached 2-car gar.; new front door, new windows and sliding doors, lg. lot w/RV parking, firepit in back patio & much more. 909/946-3443, Paul or 909/946-3859, Carol.

For Rent

ALTADENA, comprehensively furn. extended-stay sabbatical house: 3 bd., study, boundary Angeles Nat'l Forest, 3 mi. from JPL, trail access, view, fireplace, oak floors, antiques; furniture, beds, dinnerware, utensils, pots/pans, all linens & towels, fine soaps, necessities included, just bring toothbrush & clothes; TV/DVD/VHS, Dish satellite, wireless DSL; garden, fruit trees, covered patio, garage; private;

avail. June. 626/798-3235.

ALTADENA: lg. rm. 3 miles from JPL in 4-bd., 2-ba. house with JPL employee, share kitchen & appliances, very quiet neighborhood, cable modem, 2 fireplaces, BBQ, in-ground pool, \$600 including utilities. 634-5136.

ALTADENA, 2-bd. rustic home atop a mesa in the San Gabriel Mtns., 4 mi. to JPL; wildlife, stream, hiking, biking trails on & across property; incl. den, 1 ba., nice kitchen w/plentiful cabinet space + refrig. and stove, porch with view to the ocean, beautiful living rm., utility rm.; outside newly repainted; ideal for 1 or 2 wilderness lovers; avail. May 1; \$1,300, 1-year lease, references required. 626/798-6886.

ALTADENA, for lease, executive guesthouse on over 1/2 acre estate; features 1 bd., newly remodeled interiors with first-class upgrades, amazing mountain views in a sought-after neighborhood of multi-million-dollar homes; \$1,495. 626/483-6399, Sam.

ARCADIA apt., 2 bd. + 2 ba., or 1 bd. + 1 ba., garage, a/c, veneer, new paint/carpet/flooring, clean, convenient location, walking dist. to shops + food court, nr. JPL/Caltech, SA mall and 10/210 fwy's., no pets, \$1,099/\$1,299. 626/576-7333.

PASADENA, 3 bd., 2 ba. house in Upper Hastings Ranch; 1,850 sq. ft., 7,500 sq. ft. lot; spacious living room w/fireplace, family room w/dining area, central energy-efficient a/c; just finished extensive remodeling with new paint, floors, windows, French door, recessed lights etc.; 15 min. to JPL, 10 min. to Caltech; avail. in May for summer, furnished or unfurnished; \$2,500 + sec. deposit. 626/351-8608.

PASADENA, room with private entrance in beautiful home, beautiful garden setting, above golf course; private bedroom, private remodeled ba., kitchenette; ideal for a very quiet and neat person; no pets; month-to-month lease. \$750. 626/798-4056.

PASADENA, two, 2-bd. townhouse-type apts., each with 1 1/2 ba., fireplace, freshly painted in Earthy colors, newly tiled and carpeted interiors, appliances included; has that '70s feel, very spacious, laundry rm. on premises; near shopping and transportation; 1 unit is \$1,595, the other \$1,695. 626/536-5592, Leslie.

PASADENA, 4 bd., 3 ba., 2,400 sq. ft. house and 3-car garage built in 1989; prestigious Art Center/Rose Bowl area; private and peaceful nature setting w/mtn. views from every room; 2 fireplaces and extensive marble, granite and wood floors; 15 min. to JPL from residential streets; asking \$2,900. 626/744-5328.

SAN GABRIEL VILLAGE, beautiful 3-bd., 2-ba. house for lease; dining/family rm., fireplace, double garage, large private fenced yard, large patio, beautiful hardwood floors, gardener paid; interior and exterior freshly painted, new tile in stall shower and tub shower; drive by 610 Arroyo Ave., 20 min from JPL; \$2,300. 626/792-3732.

TUJUNGA: share this incredibly cool mtn.-top house with me; 1 bd. in 2-bd. house; all utilities included; washer/dryer, half of 2-car garage, extra storage, wood shop; fully furnished kitchen & living room; beautiful view; digital cable and wireless (extra); very quiet/peaceful; pets considered; more info and pictures avail.; I'm 31, single male; \$875. verdugoverde@comcast.net, 359-0285, Ben.

Vacation Rentals

BALBOA ISLAND duplex, weekly May-August; fully furn. 2 bd., 1 ba. upstairs w/private covered patio, and 3 bd., 2 ba. downstairs w/patio & BBQ; newly renovated downstairs; washer/dryer, parking; located steps from bay & canal, and a short walk to main st. shops & restaurants; rent one or both; upstairs \$800-\$1,200/wk.; downstairs \$1,700-\$2,100/wk. bettyrs@earthlink.net or 626/351-9641.

BIG BEAR LAKEFRONT luxury townhome, 2 decks, indoor pool/spa, near skiing, beautiful master bd. suite, slps. 6. 949/786-6548.

FLORIDA condo, beautifully furn. 2 bd., 2 ba., 2nd floor, on the surf of New Smyrna Beach, half-hour to Cape Canaveral, 90 min. to Disney World; enjoy all the comforts of home, quiet, relaxing, overlooks beach, BBQ/pool/game room, easy walk to stores and restaurants. 760/439-7821, Darlene, dhauge@yahoo.com.

GRAND TETON / YELLOWSTONE National Parks, visit in style, 2 bd. + loft townhome, totally outfitted, stunning Teton view, sleeps 6, cable, microwave, etc., borders Grand Teton. conniematt@sbcglobal.net.

HAWAII, Maui condo, NW coast, ocean front view, 25 ft. fr. surf, 1 bd. w/loft, compl. furn. phone, color TV, VCR, microwave, d/w, pool, priv. lanai, slps. 4, laundry fac., \$145/nite/2, \$20/nite/add'l person. 949/348-8047, jackandrandy@cox.net.

LAS VEGAS timeshare condo, one blk. from the Strip; 2 bd./2 ba., sleeps 6, pool, AC/htr., fully equipped kitchen, TV, VCR; available May-July at \$125/wkday and \$150/wknd. 909/896-4762.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, slps. 6-8, fully equip'd kitchen incl. microw., D/W, cable TV, VCR, phone, balcony w/mtn. vw., Jacz., sauna, streams, fishponds, close to Mammoth Creek, JPL disc'nt., no pets. 626/798-9222, 626/794-0455 or valeriee@caltech.edu.

OCEANSIDE condo, on the sand, charming 1 bd., panoramic view, walk to pier or harbor, pool, spa, game rm., sleeps 4. 949/786-6548.

ROSARITO BEACH condo, 2 bd., 2 ba., ocean view, pool, tennis, short walk to beach on priv. rd., 18-hole golf course 6 mo. away, priv. secure parking. 626/794-3906.

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