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'Flawless' flight takes Cassini to Saturn orbit

Upon arrival for Saturn orbit, Cassini sent back this image showing the sunlit side of a portion of the planet's rings.



Bob Brown/JPL, Photolab

Tom Gavin, associate director, flight projects and mission success, high-fives Lab Director Dr. Charles Elachi.



The celebration includes (foreground, from left) John Day, contingency system engineer; Earl Maize, Cassini deputy program manager; and Julie Webster, spacecraft team chief. Standing at left is Chris Jones, planetary flight projects director.

The international Cassini-Huygens mission has successfully entered orbit

around Saturn. At 9:12 p.m. PDT on Wednesday, June 30, flight controllers received confirmation that Cassini had completed the engine burn needed to place the spacecraft into the correct orbit. This begins a four-year study of the giant planet, its majestic rings and its 31 known moons.

"This is a tribute to the team at NASA and our partners at the European Space Agency and the Italian Space Agency, to accomplish this feat taking place 934 million miles (1.5 billion kilometers) away from Earth," said Dr. Ed Weiler, associate administrator for space science at NASA Headquarters. "What Cassini-Huygens will reveal during its tour of Saturn and its many moons, including Titan, will astonish scientists and the public. Everyone is invited to come along for the ride and see all this as it is happening. It truly is a voyage of discovery."

Referring to the past six months, during which JPL also led efforts to successfully land two Mars Exploration Rovers and fly by comet Wild 2 with Stardust, Weiler quipped, "How do we get away with having so much fun?"

Members of the Cassini-Huygens mission team at JPL broke into cheers and high-fives as NASA's Deep Space Network

confirmed receipt of the signal indicating successful entry into orbit.

"We didn't expect anything less and couldn't have asked for anything more from the spacecraft and the team," said Robert Mitchell, program manager for the Cassini-Huygens mission at JPL. "This speaks volumes to the tremendous team that made it all happen."

Dr. Charles Elachi, JPL director and team leader on the radar instrument on board Cassini, said, "It feels awfully good to be in orbit around the lord of the rings. This is the result of 22 years of effort, of commitment, of ingenuity, and that's what exploration is all about."

Dr. Carolyn Porco, from the Space Science Institute in Boulder, Colo., and

Cassini's imaging team leader, expressed "surprise and shock" at "the beauty and clarity" of the initial images of the planet's rings.

The mission will face another dramatic challenge in December, when the spacecraft will release the piggy-backed Huygens probe—provided by the European Space Agency—which will plunge through the hazy atmosphere of Saturn's largest moon, Titan.

"This was NASA doing it right," said Dr. David Southwood, director of scientific programs for

the European Space Agency. "They really gave those of us in Europe a challenge. We've got six months to go until we land on Titan. We're just praying that everything will go as well.

"This is a world mission," he added. "But it's been America's evening, with JPL representing America. We've got a lot to live up to."

Julie Webster, Cassini-Huygens spacecraft team chief, said, "The spacecraft has been an incredible joy to fly. We stand on the shoulders of people who had 40 years of experience building and designing spacecraft."

Added spacecraft team chief Jeremy Jones, "Cassini performed absolutely flawlessly."

Saturn is the sixth planet from the Sun. It is the second largest planet in our solar system, after Jupiter. The planet and ring system serve as a miniature model of the disc of gas and dust surrounding our early Sun that eventually formed the planets. Detailed knowledge of the dynamics of interactions among Saturn's elaborate rings and numerous moons will provide valuable data for understanding how each of the solar system's planets evolved.

Cassini traveled nearly 3.5 billion kilometers (2.2 billion miles) to reach Saturn after its launch on Oct. 15, 1997. During Cassini's four-year mission, it will execute 52 close encounters with seven of Saturn's 31 known moons.

JPL's ST6 software makes its own discovery

Image shows the output from the Autonomous Sciencecraft Experiment volcanic thermal detector, obtained May 7.

Software on a NASA spacecraft recently made a scientific observation on its own without human interaction. The Space Technology 6 Autonomous Sciencecraft Experiment captured images of Antarctica's Mount Erebus and detected volcanic activity.

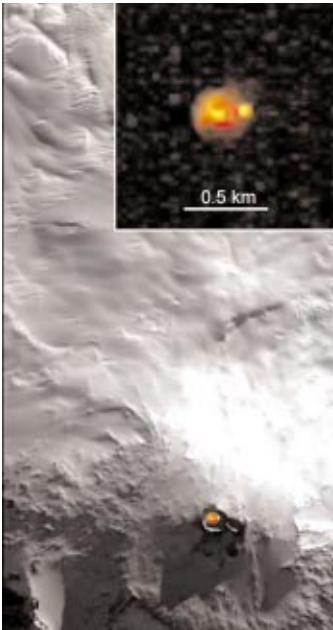
The software, developed by JPL, controls the Earth Observing-1 spacecraft. NASA's Goddard Space Flight Center manages the satellite. The software examines pictures from the Hyperion spectrometer, an instrument highly sensitive to heat released from molten lava.

After taking an image of Erebus, the software detected heat from the lava lake at the summit of the volcano and reprogrammed the camera to take more pictures. News of the detection was rapidly transmitted to scientists, where, typically, it could take months to learn a remote volcano was active. Scientists normally would need to take measurements at the volcano to detect the same type of event. Researchers at JPL and Goddard will test the Autonomous Sciencecraft Experiment on Erebus and other volcanoes for the next several months.

"Autonomous Sciencecraft is a giant leap toward a thinking spacecraft," said Dr. Steve Chien, JPL senior technologist for the software. "The software is the first use of autonomy allowing the spacecraft to make decisions without waiting for commands from scientists. It can capture short-lived science events that otherwise would have been missed."

"With this software we can monitor many more volcanoes, since it

knows how to only look at the active sites," said Dr. Ashley Davies, JPL lead scientist for the experiment. "This software can be used to track natural disasters that pose danger to populated areas, such as flooding and fires," said Rob Sherwood, JPL experiment manager.



Future versions of the software also may be used to track dust storms on Mars, search for ice volcanoes on Europa, and track activity on Jupiter's volcanically active moon Io.

NASA's New Millennium Program developed both the satellite and the software. The program is responsible for testing new technologies in space.

For more information, visit <http://ase.jpl.nasa.gov>.

UK official pays a visit



The Laboratory last month bosted Lord David Sainsbury, Great Britain's Parliamentary Under-Secretary of State for Science and Innovation. Here, Cassini Program Manager Bob Mitchell shows Sainsbury a Cassini model as British Consul General Peter Hunt and JPL Director Dr. Charles Elachi look on. Sainsbury's visit also included on overview of the Mars Exploration Program.

150 new online courses offered

By Mark Whalen

Professional Development has announced the debut this month of new online training courses for JPL employees. About 150 courses will be offered as an enhancement to the Lab's current series of instructor-led classroom sessions.

A three-month pilot program offering management and leadership courses will be available to JPL staff through vendor Targeted Learning Corp. (TLC), a leader in online education, said Professional Development Section Manager John Blowers.

One of the features of the program is its easy accessibility. Users can access the courses 24 hours a day, seven days a week, even from off-Lab. "Many people want to learn on their own time, as opposed to a scheduled training session," said JPL career counselor Mary Ellen Derro. "The Lab employs very busy people. Using TLC will allow them to get training on demand when they need it."

The new courses cover a wide breadth of topics that address critical competencies for JPL, Derro said. General categories in the course catalog include Change and Innovation, Communications, Customer Service, Group Development, Individual Development, and Management and Leadership.

Courses range from 30 to 120 minutes. All are multimedia-based, so that users can stop, pause or rewind as needed. Course materials can be downloaded and printed. A customer service office is also available.

TLC offers a new course menu each month, but once a course is presented it remains in an archive, where employees can access it at any time.

This year, Professional Development offers about 120 classroom sessions, the majority of which are science- or engineering-based. "TLC offers a whole lot more on leadership than we have now," Blowers noted.

Special Events Calendar

Ongoing Support Groups

Alcoholics Anonymous—Meetings are available. Call the Employee Assistance Program at ext. 4-3680 for time and location.

Caregivers Support Group—Meets the first Thursday of the month at noon in Building 167-111 (the Wellness Place). For more information, call the Employee Assistance Program at ext. 4-3680.

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

Gay, Lesbian and Bisexual Group—Meets the first Friday and third Thursday of the month at noon in Building 111-117. Call the Employee Assistance Program at ext. 4-3680 or Randy Herrera at 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).

Working Parents Support Group—Meets the third Thursday of the month at noon in Building 167-111. For more information, call the Employee Assistance Program at ext. 4-3680.

Wednesday, July 7

Office of Exploration Systems Update—At noon in von Kármán Auditorium, progress and plans of JPL's engagement with the Office of Exploration Systems will be discussed. A question-and-answer session will follow.

JPL Library Orientation—Come to Building 111-104 from 11:30 a.m. to noon 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 Library reference desk, ext. 4-4200.

Software Architectures Course—Classes offered by the Software Quality Improvement Project and the Center for Space Mission Information and Software Systems begin their 10-week session. Dr. Edward Colbert of USC's Center for Software Engineering will instruct students in the concepts, principles and state-of-the-art methods in software architectures. Classes will be conducted for three hours each Friday afternoon for 10 consecutive weeks, ending Sept. 17. For more information, see <http://www.abssw.com/courses/JPL2004/index.htm> or call Brian Vickers at ext. 3-0877.

Friday, July 9

Investment Advice—Fidelity will offer one-on-one counseling in Building 249-114. To schedule an appointment, call (800) 642-7131.

Mon.–Tues., July 12-13

Investment Advice—TIAA/CREF will offer one-on-one counseling in Building 249-114. To schedule an appointment, call (877) 209-3140, ext. 2614 or log on to www.tiaa-cref.org.

Wednesday, July 14

JPL Library Orientation—Come to Building 111-104 from 11:30 a.m. to noon 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 Library reference desk, ext. 4-4200.

Thursday, July 15

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

Thu.–Fri., July 15-16

Von Kármán Lecture Series—Cassini Deputy Project Scientist Dr. Linda Spilker will present "The Rings of Saturn" 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/jun04.cfm>. For more information, call Public Services at ext. 4-0112.

Friday, July 16

"Root Cause Trends for Serious On-Orbit Anomalies"—Julia White, senior engineering specialist for the Aerospace Corporation's Cross Program Research Office, will speak at 10:30 a.m. in Building 180-101. Her work addresses industry-wide issues in the fields of on-orbit spacecraft anomalies and lifetimes, lessons learned and satellite development comparisons, as well as program-specific concerns requiring a cross-program perspective.

Monday, July 19

"How to Finance Your Child's College Education"—David Levy, director of financial aid at Caltech, will speak at noon in von Kármán Auditorium. He will address the availability of student financial aid, what types are available, how much financial aid you might expect, who qualifies and how to navigate the often complex financial aid application maze. This talk will be geared to families with junior-high to high-school age children.

Wednesday, July 21

TIAA/CREF Enrollment Meeting—This workshop, to be held at noon in Building 180-101, is designed to assist employees newly eligible for the TIAA/CREF retirement plan with selection of investment options and the completion of their enrollment forms.

Another advantage of the new courses is that they offer Lab personnel "a chance to get a fresh perspective on career development and leadership," Blowers said. "Most of what we offer in the classroom is JPL-specific. Using TLC is a way to get outside JPL, to see what other organizations do."

Offering the new courses makes good business sense for JPL, Blowers said. "It would have cost us hundreds of thousands of dollars to develop and design the courses TLC is offering. We will pay about \$3,000 a month for the 150 TLC courses."

Lab staff will not be charged for TLC courses, Derro said. "Professional Development is absorbing the cost so we can assure our employees can take advantage of this." Employees will receive training credit once the course evaluation has been completed.

"If we have a positive response," Blowers added, "we will consider more 'E-learning' that's convenient for employees."

To obtain login instructions for TLC courses, visit the Education and Training website at <http://et> or the Human Resources site at <http://hr>. Derro said users must have Windows Media 8.0 or newer to access the program. Employees can contact the Professional Development customer service line at ext. 4-3750 for assistance.

Meanwhile, Professional Development continues to offer various avenues to career advancement. Tuition reimbursement is available for JPL's formal degree and certificate programs, for up to \$3,000 a year. Undergraduate programs offer up to \$5,250 a year. Graduate-level degrees, if job-related and approved by management, can be reimbursed as much as \$10,000 a year. For more information, call the Tuition Reimbursement Office at ext. 3-6611.

"From all levels of the organization, we're hearing what our customers want and we are trying to meet their needs," Derro said.

“I can’t
imagine
having a
better group
of people to
work with.
Smooth
sailing
describes it
quite nicely.”
—Bob
Mitchell

How long have you been at JPL, and what other projects have you worked on?

I’ve worked at JPL for nearly 39 years. My most recent project before Cassini was Galileo, where I started in 1979 as mission design lead. The original launch date was January 1982, but we had numerous launch slips, and we did a lot of mission redesign work.

In the fall of 1988, after Galileo’s trajectory and mission design work was all done and it was on track to launch in October 1989, I took the job of manager of the Mission Design Section 312. I fully expected that was the end of my contributions to Galileo. But then in September 1992, Galileo science and mission design manager Jim Dunne died, and I went back to Galileo to fill that role. When Neal Ausman retired, I was named Galileo mission director, and then became Galileo project manager in January 1998, and stayed there until taking the Cassini job in June 1998.

What are the mission’s most significant science goals? Is there one major priority?

You would get different answers to that from the different scientists, depending on what their individual investigations are. But as a non-scientist, I think the main single priority is Titan—not just because we have the Huygens probe, but because we will do investigations of Titan using the orbiter as well. Titan is the only moon in the solar system that has an atmosphere. Scientists tell us it’s probably like Earth was 3 billion to 4 billion years ago. It’s like Earth was put in a deep freeze and is sitting there, waiting for life to come along and form. Of course, we have no expectation of finding any life there. Huygens is going to give us in-depth, close-up observations of Titan.

The rings are also high on the priority list—they are what Saturn is most known for. They have a number of mysteries, particularly related to dynamics and longevity. We don’t know how long they’ve been there or how long they’ll be there. Most theories have them appearing relatively recently—millions of years ago. On a geologic time scale, many millions is relatively short. How were the gaps created? One of the rings appears to be braided. There are a number of phenomena in the dynamics of the rings that aren’t readily explained just by gravitational effects.

Another high priority is the small icy satellites—they have such variability. We flew by Phoebe June 11—the images are spectacular. Phoebe is one of the smaller moons—220 kilometers in diameter. Among the others, two are about 1,000 kilometers in diameter and another two are about 1,500 kilometers in diameter. They have very different features.

Iapetus has one side that is glistening white, while the other side is black as tar. There is a sharp, crisp boundary between the two sides, and scientists don’t know why it looks that way. Enceladus is another mystery just waiting to share its secrets with us.

How many of Saturn’s 31 moons will be studied?

For the four-year prime mission, the main focus is on Titan, for which we will have 45 close encounters. In addition to this, we will fly by five of the small icy moons for a total of seven encounters with these, eight counting Phoebe. We will fly by Enceladus three times and the others will be one each. These will be relatively close—within about 1,000 kilometers—where we will control the trajectory flyby point. Then there are about 50 or so more distant, non-targeted encounters with the small moons. These generally will be closer than the Voyager encounters to these bodies in 1980 and 1981.

Not nearly all of the moons are flyby candidates; some of them are farther out from Saturn than Cassini will ever travel. That was the case with Phoebe. We specifically set up the trajectory to fly by Phoebe on approach because once we go past it, Cassini’s trajectory will never again carry it that far from Saturn. The same thing is true for some of the other satellites as well.

Another thing that constrains us is there is a lot of interest in getting the spacecraft in highly inclined orbits. Some scientists are very interested in this

because they can see what Saturn’s magnetosphere is like near the pole. The imaging team likes the high-inclination orbits because Cassini can look down on the plane of the rings. But in these highly inclined orbits it becomes more difficult to have encounters with the satellites, because the satellites tend to be in the plane of the rings.

But even without getting close enough for targeted encounters, we will still get some good images of some of the other moons as well.

How many people will be working on Cassini?

We will have more than 200 engineers supporting the mission, the equivalent of about 200 full-time people. And there are about 250 scientists, about equally split between the U.S. and Europe. Most of them are not full-time on Cassini, but are university professors or associated with a research institution.

Here at JPL there are 20 to 25 scientists working on Cassini. Two of the investigations have the team leader here—Dr. Charles Elachi leads the radar team, while Dr. Arvydas Kliore leads the radio science team. They are team leaders since the instruments used for their investigations are facility instruments. Between JPL and the Italian Space Agency, we built four of these—radar, radio science, the camera and the visible and infrared mapping spectrometer.

Cassini also has eight instruments where principal investigators lead investigations. There are no PIs at JPL. There are some radar team members here, and some who work in radio science. Other teams, like the ultraviolet imaging spectrograph, have a few co-investigators from JPL. The Huygens probe instruments have two co-investigators here.

Is it fair to say that Cassini is the best-ever example of international cooperation on a NASA spacecraft? How many countries are involved? Has it been difficult to this point or smooth sailing?

Cassini–Huygens would have to be considered an excellent example of international cooperation, if not the best ever. The relationships with our international partners have been pleasant, collegial and professional. That’s not to say that we don’t have animated debates and disagreements at times, but they’re always constructive, positive and short-lived. We have a total of 17 countries involved in this effort, and it has gone just remarkably well. I can’t imagine having a better group of people to work with. Smooth sailing describes it quite nicely.

How are you and the team feeling? Excited? Nervous? Confident?

Yes, to all of those. The team is very upbeat; the Phoebe flyby got them really stoked. But the Phoebe flyby was not like falling off a log. It was our first use of optical navigation for two things: to target the spacecraft to a body this close, and in support of pointing the instruments to a target. It was also the first time we’ve done a “live update”—we had a sequence already on board, counting down to do the Phoebe observations, and in flight we changed parameters in the sequence memory that altered the pointing based on our updated knowledge of where both the spacecraft and Phoebe were.

There was some apprehension, but we had a fair amount of testing and training to validate that we could really do it, and it went off just flawlessly. The team deserves a lot of credit for an excellent job.

We’re both confident and nervous at the same time; confident because we have no reason to think the orbit insertion won’t work, nervous because if it doesn’t, well, that’s a bad day. If you were to ask me what we could work on further, I’d have to say there really isn’t anything; we think we’ve beaten down all the tall risks.

To begin to see some return from all this investment of effort will be a big plus for the troops. I can see the excitement in the hallways already.

By Mark Whalen

Long ride ends, New one begins



After a journey of almost seven years and 3.5 billion kilometers (2.2 billion miles), the Cassini–Huygens spacecraft is about to begin its four-year study of Saturn and its moons. About a week prior to orbit insertion on June 30, Universe caught up with Program Manager Bob Mitchell.



Bob Brown/JPL Photolab

Passings

THELMA CHAPMAN, 88, a retired computer programmer from Section 362, died April 28.

Chapman worked at the Lab from 1961 to 1983. She is survived by her sister, Donna Wark, and several nieces and nephews.

Services were private.

JEANETTE MILLS, 39, a former buyer and subcontract negotiator in Section 621, died June 1 in Mexico City.

Mills joined the Lab in 1989. Her duties included work on the Growth and Assignment of People Team, part of the Total Quality Management initiative in the mid-1990s. Following that assignment, she contributed to New Business Systems' Human Resources Team. She left JPL in 1998.

Mills is survived by her mother, Jean, and sisters Andrea and Regina.

Services were held June 11 at Mountain View Cemetery in Altadena.

Letters

On behalf of my family and myself, a very sincere thank you to all of my co-workers and friends who extended their love and support in the passing of my beloved father. My father was an avid admirer of JPL so your thoughtfulness and expressions of condolence, the sympathy cards and the beautiful plants that we received have an even more special meaning to our family.

Lesley Ibaven

I would like to thank my friends and co-workers for their expressions of sympathy and support on the death of my grandmother. Your words of comfort, cards and prayers made the loss more bearable. I would also like to thank the Employee Services & Recognition Office for the lovely plant they sent to my home.

Lloyd Keith

My family and I are deeply appreciative of the many cards, e-mails, gorgeous flowers and other expressions of sympathy extended by my JPL friends in the loss of my father. A special thank you to my friends and co-workers in Section 336 in particular for their caring and support during this very difficult time. Thank you also to JPL and the Employee Services & Recognition Office for the lovely plant. It serves as a reminder of the comfort that friends and co-workers bring at a time of grieving.

Joyce Donato

Classifieds

For Sale

AIR CONDITIONER, Whirlpool, room, 5900 BTU, model #ACM062, new \$200, sell for \$75/obo. 714/280-7368.

BARBECUE, Kenmore, propane grill with pushbutton ignition, side burner, wheels, tank, cover, used very little, \$150/obo. 626/254-1550.

BOOK, "The Big Band Almanac," 400 pages, describes 1920s-60s dance bands/leaders/ vocalists/musicians (Glenn Miller, Xavier Cugat, et al.), profusely illustrated & indexed, out-of-print edition, \$10. 626/793-1895.

CARPET, plush, light mauve, for 2 rooms, approx. 15' x 16' and 11' x 12', \$150. 626/794-1432.

CLOTHES, infant: jacket, red/navy blue, zip-up w/hood (Old Navy), size 2T, exc. cond., \$5/obo; sweater, sky blue w/navy trim, buttons, size 3T, \$1/obo; zipper shoes, Spongebob motif, size 11M, exc. cond., \$6/obo; photos avail. 626/791-6101.

COMPUTER DESK, on wheels, cherry veneer, made by O'Sullivan, model 61925, exc. cond., like new; sell for best offer. 626/449-0997.

CONCERT TICKETS, Pasadena Pops "Hot Latin Nights," Sat., Aug. 21 at Descanso Gardens, 7:30 pm, conductor Rachael Worby, great seats: sec. A, table F9, under tree, take picnic and visit with fellow concert lovers, see pasadenapops.com, \$65/ea. 626/ 664-6640, cell, or 626/795-4928 x214, Jerry.

COUCH, oversized, unique, designer; attractive curves, 2 pillows w/matching fabric, deep violet color w/olive green print, same as one used on MTV's "Real World Santa Monica," must see, \$450/obo, orig. \$2,000. 281-5118, James.

DINETTE SET, glass-top, 4 chair, \$80; SECTIONAL SOFA SET, beige, \$400. 626/355-7086.

DVDs/CD, all brand new and factory-sealed: Babylon 5, season 5, 6 DVD set, \$50; Matrix Revolutions DVD, \$13; Bacon Brothers Live

DVD, \$10; Josh Groban CD, \$10. 832-4681. EXERCISE MACHINES: Proform 485e, low impact, elliptical, exc. cond., still under warranty, \$150; Fitness Flyer, low impact, with arm attachment, vg cond., \$100. 213/364-0552.

FURNITURE: 2-piece Bassett sectional (1 piece is a sleeper), floral print, photo & dimensions available, cushions need new covers, rest in gd. cond., \$300/obo. 626/791-6101.

LAWN MOWER, Black & Decker electric, model MM850, 19", 4hp, rear bag, 7 height positions, blades just sharpened, \$209 new at Home Depot, super lightweight, no fumes to breathe, hassle-free starting, needs no gas or oil, gd. cond., with manual, \$110. 332-0481.

MISC: baby crib, wood, white, w/mattress, \$60/obo; dryer, General Electric, electric, heavy duty, extra-lg. capacity, 5 cycle, gd. cond., \$120; coffee table, 40", glass, photos avail., \$40. 626/844-6478.

MISC: 8' pool table, \$500; tablecloths (2), slate blue oval, 18 matching napkins and rings, \$10; punch bowl set, 18 piece, \$10; mailbox, oversized, green, \$20; wig, red, shoulder length, never used, \$20; foodsaver with bags, \$20; electric frying pan, \$10; answering machine, \$5; fishing pole (saltwater), \$25. 626/357-8210.

MISC: desk, child-sized, oak, roll-top, \$50; plate display, maple, \$25; end table, maple, \$15; wood headboard, beautiful, \$25; antique water wheel pump, \$50. 626/582-8562, Karen (in Sunland).

MISC: calculator & manual, HP 48X, \$30; computer cases, for laptop, 3, new, \$10 each; sound blaster card, unopened, \$15; scanner, basic HP, USB, software, \$20; Jaz drive, 2 GB, SCSI +7 disks, \$50; Zip drive, 100 kb, plus 12 disks, \$35; light meter, Gossen Luna-Pro, \$50. 626/825-6480.

MOVING SALE: bedroom set, beautiful; dressers; antique and classic chairs; china hutch and credenza; dining room set; antique stove; executive desk; computer desk; Mac G3 computer. 760/439-7821, Darlene or dfhaug@yahoo.com.

MOVING SALE: work tables, 2, 21" D x 29" H x 7' L, sturdy, good-looking, \$35 ea.; dining rm. table, 32" x 50", teak, \$60; garment bag, Samsonite, \$20; photo vest, lg., Tamrac, \$35; light table, \$35; darkroom printing easels, wood, set 4, \$35; matboard holder, custom-made, \$25; hand matcutter, Logan, \$13; Slik U212 w/point-shoot trigger head + 2 quick release posts, \$60. 626/355-4967.

PAGEANT OF THE MASTERS TICKETS, 2, Aug. 7, 8:30 pm in Laguna Beach, director's tier center, row DD, face value, \$40 ea. 626/793-1520.

PHOTOGRAPHIC EQUIP.: body, Nikon 8008, AF, \$200; Nikon 6006, \$150; lens, Nikon, 35-135, AF, \$120; lens, 24-50, \$150; lens, 75-300, \$100; 60 mm, \$250; 2x extender, Kenko/Nikon, AF, \$50; flash, SB-24, \$140; sync cord, SC-17, \$35; lens hood, HB-24, \$10; lens hood, HB-1, \$10; viewer, right angle, DR-3, \$30; skylight, Hoya, 62mm, \$10; polarizer filter, color, Hoya 62 mm, \$20. 626/355-4967.

PIANO by Hobart M., cable, small, upright, exc. cond., buyer arranges pick-up in Simi Valley, \$750/obo. 805/660-7446, Ben Bronwein.

PUPPIES, golden retriever, adorable, pure-bred, born 4/22/04, wonderful temperament, all shots, 2 females (\$450) & 2 males (\$400), parents on premises. 831-4990, Sonia/Robert.

SCULPTURES of wizards, 3, ceramic, exc. cond., not antiques but are unique, only 200 of each in the world, each is different, holds a small clear ball in his hand, has a beard, and is about 10" H; for Lord Of The Rings fans, \$150 ea. 352-4033, after 5.

SURFBOARD, 6'7", great cond., \$300/obo. 626/232-1022.

TABLE, dining/library/work bench, mission oak, dbl. pedestal, 10" drop leaves, 70" x 40" overall, \$50/obo; HUB, wagon wheel, 8" x 12," solid oak, sits on 1" base for elec. light seen through slats, \$25. 909/593-4046, vividavies@earthlink.net.

TENTS, Sears Hillary, 9 x 9 ft., fiberglass poles, vg. cond., 2/\$80. 626/797-6982.

THEATER TICKETS, 2, Little Shop of Horrors, Ahmanson Theatre, Aug. 26, 8 p.m., in mezzanine, orig. \$140 + fees for pair, sell \$100. 790-8523.

TOOLS: box wrench set, complete, 6 wrenches, 3/8 to 1.0, \$15; 5 open-end wrenches, small, \$5; drill bit set (13), new, \$8; tin snips, \$7; many other small tools. 626/793-1895.

TRASH CAN for inside kitchen cabinets, brand new; metal guide rail, white plastic wastebasket and screws in original box for installation, about 1 x 2 x 3' tall, \$100/obo. 626/840-0955, leave message.

TREES, Bishop pine, 2, large, healthy and beautiful, 15' and 8', \$60 and \$40, or both for \$90. 249-4361.

WALKING JOINTER for grooving joints in newly poured concrete slabs & walkways, 1/2" radius, includes 10' telescopic extension handle, new, \$55. 249-6071.

WATERBED floatation syst., with foundation, Somma-type tubes, queen size, \$75. 626/447-6423.

YARD SALE: books, bookcases, dresser, clothing and great misc. stuff, Sat., July 10, 9:00-2:00, no early birds please, 2070 Maiden Lane, Altadena, near New York Drive & Lake Ave. 323/428-4289 or 323/227-8221.

Vehicles / Accessories

'98 ACURA Integra, 2 dr., gd. cond., 5 spd., black, 73K mi., 100K mi. warranty, am/fm/CD, \$9,700/obo. 626/705-1312 or sorozco@cefcu.org.

BEDLINER, over-the-rail style, for 2001 Dodge Ram Quad-Cab pickup with 6'8" bed, factory Mopar liner with Ram logo, vg cond., \$110. 332-0481.

'81 BEEHCRAFT B-55 Baron airplane, 1540 TNT, 150 en. & props. on Colemill conversion, NDH, King silver crown avionics, KFC 200 auto pilot, new paint/interior, immaculate, considered best B-55 in the world today, make offer. 626/289-8799.

'98 BMW 323is black, automatic, leather, 2 dr., clean, power sunroof, 83K mi., alarm w/keyless entry, am/fm/cass., new brake pads, rear rotors and rear tires, \$12,500/obo. 310/614.5076.

'91 BMW 525i, 4 dr., gd. cond., automatic, burgundy, 172K mi., power moonroof, alarm w/keyless entry, am/fm/cassette, 6-disk CD

changer, \$6,300/obo. 626/705-1312 or sorozco@cefcu.org.

CANOE, Old Towne, Katahdyn, 16', burgundy, retail \$849, sell \$500. 957-7742.

'99 CHRYSLER LHS, white, exc.cond.,V6, CD player/tape deck (Infinity), chrome wheels, leather interior, full power windows/seats, heated seats, a/c front & back, cruise control, new transmission and a/c, roomy, quiet/smooth ride, only 37K mi., \$9,999. 909/225-2323.

CORONADO sailboat, 23 ft., w/Nissan 5 hp, exc. cond., radio, sails, other equipment included, ready to sail to Catalina, perfect for new sailors, must see, \$2,300/obo. 626/584-1164, Muriel.

COVER for Acura MDX, brand new in box, never used, made by Intro-Tech of silver woven polyester, cost \$160 new, sell \$120. 249-8186.

'00 FORD Taurus LX sedan, V6, 3.0L, Flex Fuel, 4-dr., a/c, automatic, power steering/ windows/door locks, tilt wheel, cruise control, am/fm stereo cassette, dual front airbags, 87K freeway mi., metallic blue exterior, gray interior, all new brakes, current registration with new smog certificate, \$4,825. 626/798-1765.

'99 FORD Windstar, 7-pass., V6, low miles, 32K, 2nd sliding door, keyless entry/security system, am/fm, cass., 10-disc CD-changer, privacy glass, power window/door, air, etc., vg cond., clean, well-maint., pics. avail., \$7,200. 653-8571, Jack.

'98 FORD Windstar GL, 3.0L, 95K mi., red, automatic transmission, airbag, a/c, radio + tapes, gd. cond., \$6,500. 952-5587, benoitte.kneib@free.fr.

GREASE/GEAR PUMP and container for auto lube jobs, 5 gal., includes 6-ft. high pressure hose and grease coupler, \$45. 249-6071.

'81 GULFSTAR 44 sailboat, center cockpit sloop, radar, loran, GPS, auto pilot, propane, stereo, 3 staterooms, 3 showers, new canvas, always privately owned, many upgrades, near Bristol cond., make offer. 626/289-8799.

'99 HARLEY DAVIDSON Soft Tail, completely custom, special construction, 80" motor, Kurykan hypercharger, lowered, wide rear tire, full fenders, blue w/tribal design, everything chrome or polished, priced to sell, \$19,500. 974-8136, Tony.

HITCH, Equal-i-zer sway control, complete system, the best sway control hitch available, exc. cond., \$160. 626/359-7666.

'88 HONDA Accord LX, 4 dr., 5 speed, a/c, cruise control, p/w, p/l, 193K mi., great for student, well maintained, \$2,200/obo. 626/332-5753, Chad.

'02 HYUNDAI Santa Fe sport utility, gold color, exc. cond., 2.4L, 4 cyl., 2WD, auto, 16K mi., a/c, am/fm stereo, single CD, power steering/windows/door locks, remote entry, cruise control, tilt wheel, roof rack, privacy glass, alloy wheels, \$14,000. 562/699-6061.

'99 LAND ROVER Range Rover, 4.0 sport utility, 4-dr., exc. cond., \$17,900. 626/379-3503, Erik.

'98 MERCEDES E430, silver & black, low miles, exc. cond., \$18,900. 626/379-3503, Erik.

'89 MERCEDES BENZ 260E, 4-door, gold, 147K orig. miles; garage kept, interior perfect, looks and runs great; new tires, brakes; \$4,500. 626/794-6860.

'97 PLYMOUTH Grand Voyager SE minivan, V6 3.3L automatic, gold, 92,000 mi.: front wheel drive, 2nd sliding door, 7 psngr., a/c, rear air, pwr. steering/windows/doorlocks, tilt whl., cruise control, am/fm stereo/cass., 6-cd player, dual front airbags, 4-whl. ABS, roof rack, privacy glass, 2 folding built-in child safety seats, rear window defroster/wiper, alloy wheels, gently used, \$7,000. 626/797-9846 or dedicatedmama@hotmail.com.

'92 PLYMOUTH Sundance, 91.5K mi., beige, automatic transmission, airbag, a/c, radio, 4 dr., new tires, good runner, \$1,400. 952-5587, benoitte.kneib@free.fr.

SEAT BENCHES for Ford Aerostar van, 2, blue, make offer. 248-0853.

'97 TOYOTA Avalon XLS, loaded, 3-CD changer, moonroof, power leather seats, wood trim paneling, pearl white color, auto, salvage history, 72K mi., exc. cond., \$8,000. 909/599-3230.

'92 TOYOTA Previa van, loaded, gd. cond., 104K mi., 1 owner, runs well, \$3,600. 952-5336.

'99 VOLVO V70 GLT-R, white, tan leather heated seats, am/fm/CD/cas. audio, moonroof, rear spoiler, roof rack, 3rd row seat, front & side airbags, full tinted glass, dual climate syst., 17" white R-wheels, hot/cold box, new tires, recent fluids change, very clean cond., 90K mi., \$10,900/obo. 653-9604, Steve.

Free

CAT, older female Siamese, left behind when family moved, 990-3586.

DINNER PLATES, Tv/patio, 20 metal trays + 60 packaged, divided paper liners. 909/593-4046, vividavies@earthlink.net.

SUNROOF PANEL with cover, for '79 Mazda RX-7, like new, removable. 626/355-7086.

Wanted

CARPOOLERS from Diamond Bar and Chino Hills, leaves Diamond Bar at 7 am. 4-9329, Shu.

BACKPACKING buddy for 1 week, Kings Cyn./Sierras trip, prefer week of July 12, strenuous hike, wish to avg. 9-12 miles a day, substantial altitude gain/loss, experienced backpacker preferred. 626/798-4265, Louise.

HOUSE or duplex to rent, need 2 or 3 bedrooms, 2 baths, must have washer/dryer hook-ups, currently living on property that has been sold, need something quick, \$1,300 max. 548-5082, Carla.

HOUSE to lease or rent, 3 bd. in Temple City. 626/574-1495, Suzi.

NANNY to care for 11-mo.-old girl and 10-mo.-old boy, loving and experienced person to provide 3 days of child care per week in our home in the NE Pasadena area, must be non-smoker and have reliable transportation. 626/811-8723, Farrah or 626/296-3185, Diana (Español).

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

SUBLET for 1 person; apt., house, guesthouse,

cottage, townhouse or condo; short term, Aug. 1- Oct. 31; unfurnished, hardwood floors preferred, no pets; within 10 mi. of JPL, near public transportation. 626/437-9593 or jolanti-tash@yahoo.com.

VOLLEYBALL PLAYERS, coed, no beginners please, Tues. nights 8 to 10 p.m. at Eagle Rock High School, \$4/nt. 956-1744, Barbara.

For Rent

ALTADENA "sabbatical house," 3 bd. + study, boundary Angeles Nat'l Forest, 3 mi. from JPL (trails to Lab behind house), view, hardwood floors, fireplace, antiques, completely furn.: dinnerware, utensils, pots/pans, linens, fine soaps, necessities included, just bring toothbrush & clothes, TV/DVD/VHS, Dish satellite, wireless DSL, garden, fruit trees, courtyard, BBQ, parking, private, immaculate, mo.-month, avail. Aug. 626/429-3405.

LA CANADA, 1 bd., 1 ba., in 4-plex, upstairs unit w/stove, safe, quiet area, \$1,000 + security. 626/798-4134.

LONG BEACH, Belmont Shore—area house for lease, short walk to water, 2 bd., 1 ba., \$1,800. 626/794-3250.

PASADENA, beautiful home in Hastings Ranch, 3 bd., den, 2 ba., central a/c, 2 fireplaces, refrigerator, stove, microwave, washer/dryer, large yard w/pool & spa, on golf course, lease required, avail. Aug. 1, \$3,300 + utilities & \$4,300 security deposit. 626/429-3677 or bettyrs@earthlink.net.

PASADENA house to share in historic Bungalow Heaven, 3 mi. to JPL, 2 bd., 1 ba., beautiful and eclectic craftsman home with yard/butterfly garden, great neighborhood, friendly neighbors, share with 30ish female JPL'r & dog, bedroom can be furnished or unfurnished, as required, short-term OK, \$550 util. incl. 626/798-4265 or lahamlin@ginkgoleaf.net.

PASADENA, 3-bd. townhouse, gated, exec. complex in quiet neighborhood, close to Huntington House, Old Town & rail, fire-place, pool, spa, covered patio, spacious, lots of closet space, laundry, all appliances, cathedral ceiling in master bd., \$2,300. 626/429-2284.

PASADENA, 3 mi. to JPL, 2 bd., 2 1/2 ba., 1 rm. as an office/den, fireplace, backyard deck w/spa, laundry closet w/hookups, dishwasher, stove, central a/c, master bd. w/walk-in closet, master ba. w/spa tub & separate shower, \$1,800 + utilities + sec. deposit, avail. Aug.1. 626/390-2474, Ann.

PASADENA, easy-going, non-smoking housemate wanted; small bedroom in 4-bd. house, walking distance from JPL (2 blocks), central air/heat, fireplace, patio and backyard, laundry and kitchen privileges, no pets, off-street parking, \$600 + \$300 deposit, utilities incl. 626/791-1768, Myr.

SUNLAND apt., 1 bd., 1 ba., large, clean, nice, 6-unit bldg., quiet, air, parking, laundry, hardwood cabinets w/built-ins, walk-in closet, new carpet, possible manager position, \$815. 248-7610.

Vacation Rentals

ARROWHEAD cabin, lake view, 6 max., \$140/wkends., \$350/wk., others available, security/cleaning deposit required. 952-6221, Mon-Thur.: 909/337-1036, Fri-Sun.

BALBOA ISLAND, cute 2 bd., 1 ba., apt., weekly rental July-Sept., fully furnished, sleeps 5, covered deck, laundry, steps to bay and canal, \$1,200-\$1,500/week. 626/429-3677 or bettyrs@earthlink.net.

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

CAMBRIA house, ocean front, exceptional white water view, accom. up to 4 people, all amenities provided. 702/256-1359, ereynolds2@cox.net.

FLORIDA condo in New Smyrna Beach, fully furn., 2 bd., 2 ba., full kitchen, 1/2 hr. to Cape Canaveral, quiet, relaxing, overlooking beach, BBQ, pool, game room, great ocean view, easy walk to stores and restaurants, sleeps 6, avail. weekly or monthly. 760/439-7821, Darlene or dfhaug@yahoo.com.

HAWAII, Maui condo, NW coast, ocean front view, 25 ft. fr. surf, 1 bd. w/loft, compl. furn., phone, color TV, VCR, microwave, d/v, pool, priv. lanai, slps. 4, laundry fac., low season rate \$115/nite/2, high season rate \$130/ nite/2, \$15/nite/add'l person. 949/348-8047 or jackandrandy@cox.net.

LAS VEGAS timeshare, 5-star resort, 7 nights, 1 bd., sleeps 4, must be 21 to register, Oct. 8-15. 626/447-4734.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, slps. 6-8, fully equip'd kitchen incl. microwave, D/W, cable TV, VCR, phone, balcony w/view to mtns., Jacz., sauna, streams, fishponds, close to Mammoth Creek, JPL disc't. 626/798-9222 or 626/794-0455 or valeriee@caltech.edu.

OCEANSIDE beachfront condo, lovely, 2 bd., 2 ba., deluxe, single level, fireplace, white water ocean views (end unit), luxurious gated complex on the sand, game rooms, fitness room, pools, BBQs, Jacuzzi, 10 min. walk to pier or harbor, slps. 6, JPL discount, www.beachvisitors.com, 760/433-4459, owner.

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

RESORTS, 5-star, includes Carmel, Tahoe, Sedona, Colorado Rockies, Florida and Puerto Rico, luxurious residential-style studios with furnished kitchenette, starting at \$480 for 7 nights, Puerto Vallarta special - studio with full kitchen, \$399 for 7 nights, partial weeks also avail. 626/794-9579 or fivestarresorts@earthlink.net.

ROSARITO BEACH condo, 2 bd., 2 ba., ocean view, pool, tennis, short walk to beach on priv. rd., 18-hole golf course 6 mi. away, priv. secure parking. 626/704-3906.

SAN FRANCISCO, Nob Hill Inn, walking dist. to Union Square, cable cars, Grace cathedral, financial district and Chinatown, non-smoking property, 15 miles from SFO, unit sleeps 4, one week from 7/30 to 8/6/2004 (Linux World Conference week), \$600. tcfcs@aprelx.com.

TIMESHARE, Americas, Asia or Europe, see directory at www.IntervalWorld.com, 2 bd., 2 ba., accommodate up to 6 adults, 4- or 5-star resorts, need 2-mo. advance planning, \$950/wk. 323/257-5703, or Edward1@gmail.com.

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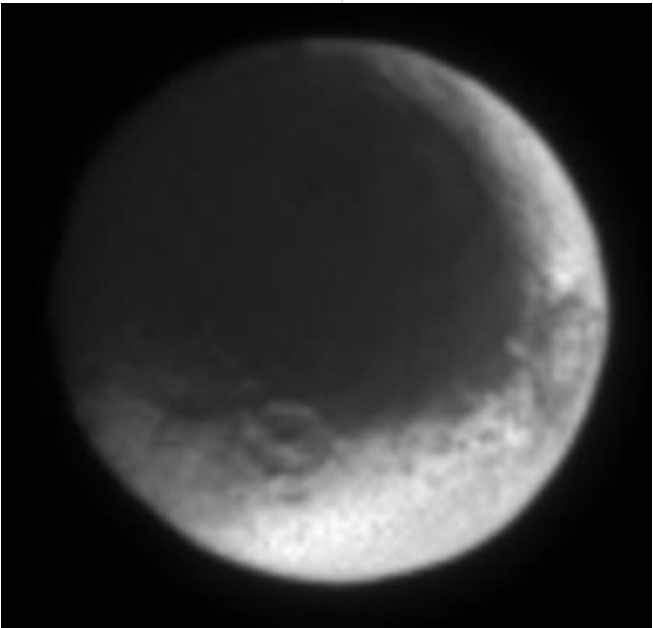
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Iapetus: Saturn's two-faced moon



This image of Iapetus was taken in visible light on July 3 with Cassini's narrow angle camera from a distance of 3 million kilometers (1.8 million miles).

The moon with the split personality, Iapetus, presents a perplexing appearance in the latest images snapped by the Cassini spacecraft.

One hemisphere of the moon is very dark, while the other is very bright. Scientists do not yet know whether the moon is being coated by foreign dark material or being resurfaced from within Iapetus' own interior.

Iapetus is one of Saturn's 31 known moons. Its diameter is about 2.5 times smaller than our own

moon's diameter at 1,436 kilometers (892 miles across). The latest image was taken in visible light with the Cassini spacecraft narrow-angle camera on July 3 from a distance of 3 million kilometers (1.8 million miles) from Iapetus.

During Cassini's four-year tour, the spacecraft will continue to image Iapetus and conduct two close en-

counters. One of those encounters, several years from now, will be at a mere 1,000 kilometers (622 miles).

When the astronomer Cassini discovered Iapetus in 1672, he noticed almost immediately that at one point in its orbit around Saturn it was very bright, but on the opposite side of the orbit the moon nearly disappeared. He correctly deduced that the trailing hemisphere is composed

of highly reflective material, while the leading hemisphere is strikingly darker.

This sets Iapetus apart from Saturn's other moons and the moons of Jupiter, which tend to be brighter on their leading hemispheres. Voyager images show that the bright side, which reflects nearly 50 percent of the light it receives, is fairly typical of a heavily cratered icy satellite. The leading side is coated with a much darker, redder material that has a reflectivity of only about 3 to 4 percent.

One scenario for the outside deposit of material would involve dark particles being ejected from the little moon Phoebe and drifting inward to coat Iapetus. One observation lending credence to an internal origin is the concentration of material on crater floors, which implies that something is filling in the craters. In one mode proposed by scientists, methane could erupt from the interior and then become darkened by ultraviolet radiation.

Iapetus is odd in other respects. It is the only large Saturn moon in a moderately inclined orbit, one that takes it far above and below the plane in which the rings and most of the moons orbit. It is less dense than objects of similar brightness, which implies it has a higher fraction of ice or possibly methane or ammonia in its interior.

Cassini's orbits around Saturn will be shaped by gravity-assist flybys of Titan. Close flybys of Titan will permit high-resolution mapping of Titan's surface with the Titan imaging radar instrument, which can see through the opaque haze covering that moon to produce vivid topographic maps of the surface.

Cassini's next encounter is a Titan flyby on Oct. 26.

For images, videos and the latest news on the Cassini-Huygens mission, log on to <http://saturn.jpl.nasa.gov> and the Cassini imaging team home page, <http://ciclops.org>.

Aura launch delayed again

The launch of NASA's Aura spacecraft atop a Boeing Delta II rocket was scrubbed early Wednesday morning due to an issue with one of the two batteries on the second stage of the launch vehicle. At approximately three minutes before the scheduled liftoff time, as the batteries were being transferred to internal power, the battery current level dropped below prescribed limits, triggering a launch hold.

Two of Aura's four instruments, the Microwave Limb Sounder and the Tropospheric Emission Spectrometer, were designed, built and tested at JPL, and they will also be operated by the Lab.

Engineers and mission managers assessed the situation Wednesday to decide a date for the next launch attempt. Two options were considered. The first was to attempt a launch on Thursday morning, July 15, during a three-minute launch window that opened at 3:01:59 a.m. PDT. The second option under consideration was to stand down until Saturday, July 17, due to range conflicts at Vandenberg Air Force Base.

Weather was a concern for a launch attempt on Thursday morning, as the forecast called for only a 60 percent probability of acceptable weather conditions. The primary concerns were thick clouds and the possibility of triggered lightning in the launch area due to the remnants of daytime thunderstorm activity in Southern California.

ESD names divisions, managers

*Philip Garrison,
the new Engineering
and Science
Directorate
deputy director.*



The results of the reorganization within the Engineering and Science Directorate have been announced.

Director John Beckman said that effective July 5, Philip Garrison is the new deputy director. Garrison was previously the manager of the Mechanical Engineering and Research Division, where he was responsible for mechanical, propulsion and thermal control systems engineering, hardware design, development, and test and research and advanced development in supporting technologies for planetary spacecraft, instruments and mobility systems.

Effective Monday, Sept. 27, the following technical divisions have been established, with their corresponding managers:

Systems and Software Division 31, Jan Chodas, manager. Previously, she was the assistant flight system manager for flight software for the Mars Exploration Rover project during the development phase and then transitioned to the role of post-landed development manager after the rovers landed successfully. Prior to this assignment, Chodas managed the Mission Software Systems Section in the Information Technologies and Software Systems Division.

Telecommunications Division 33, Kent Kellogg, manager. Kellogg is currently managing the Spacecraft Telecommunications Equipment Section 336. Previously, he was the Scatterometer Projects manager (QuikSCAT and SeaWinds), where he was responsible for implementing scatterometer instruments, managing instrument-spacecraft integration and test, launch preparations and subsequent on-orbit operations. Before joining the Scatterometer Projects Office, Kellogg supervised Division 33's Spacecraft Antenna Group.

Robotic Systems Division 34, Dr. John Klein, manager. Klein joined JPL in 1980 and has held a number of line and project positions since that time. He has been the supervisor of the Power Systems and Power Electronics Groups, deputy manager of the Power Systems Section,

manager of the Avionic Equipment Section, assistant division manager for flight projects within Division 34 and the deputy manager of Division 34.

Mechanical Systems Division 35, Kendra Short, manager. Short has been at JPL for more than 15 years. She worked on the Mars Pathfinder mission as a systems engineer, then transferred to Section 352 to work as a mechanical cognizant engineer for the Cassini mission, the Pathfinder mission and SRTM. Short became supervisor of the Structures and Configuration Group in 1997, then in 2000 became the deputy manager of Section 352, supporting the flight projects being performed in the section. In 2003, she became the collector subsystem manager for the Space Interferometry Mission instrument.

Project and Engineering Services Division 37, Dr. Magalene (Mag) Powell-Meeks, manager. Powell-Meeks was the deputy to the vice president of the NASA/JPL Services Line of Business for Lockheed Martin Information Technology. She was responsible for ensuring outstanding service, performance excellence and customer satisfaction in support of the federal government, most specifically for the NASA/JPL customer.

Instruments and Science Data Systems Division 38, Dr. Tom Luchik, manager. Luchik has been at JPL since 1985. He is currently the deputy manager of the Mechanical System Engineering and Research Division. Prior to that he was the manager of the Science and Technology Development Section in the Mechanical Systems Engineering and Research Division. He has managed the development of the Wide Field Infrared Explorer and the Confined Helium Experiment, a shuttle-based flight experiment in fundamental physics. Luchik also supervised the Low Temperature Science and Engineering Group at JPL.

News Briefs

Proia named acting CFO

STEVE PROIA has been appointed the Laboratory's acting chief financial officer and director for business operations. He replaces FRED MCNUTT, who announced earlier this month that he is leaving the Laboratory for personal reasons. Proia will serve until a permanent replacement is named.

McNutt's resignation will be effective Oct. 14. Until that date, he will serve as special assistant to JPL Deputy Director GENE TATTINI. McNutt, who joined JPL in 1999, will complete several special assignments and will assist in the search for his replacement.

Proia, deputy director for Business Operations and Human Resources and co-chair of JPL's Business Management Council, has 28 years of experience in all phases of contract management and administrative operations. He received bachelor's and MBA degrees from the University of Maryland.

Elachi garners NASA medal

JPL Director DR. CHARLES ELACHI was awarded NASA's Outstanding Leadership Medal last month. The medal is awarded for notably outstanding leadership that affects NASA's technical or administrative programs. The award may be given for an act of leadership, for sustained contributions based on a leader's effectiveness, for the productivity of the leader's program, or for the leader's demonstrated ability in developing the administrative or technical talents of other employees.

Menard honored by alma mater

JPL retiree WESLEY MENARD was recently selected as Cal Poly Pomona's Outstanding Aerospace Engineering Department Alumnus for 2004. He was selected for the honor by the Cal Poly faculty because of his achievements in the field of aerospace engineering. Menard received the award at a university banquet where he delivered the keynote address to faculty, students and alumni. Menard earned a bachelor of science in aeronautical engineering from Cal

Poly Pomona in 1961 and a master's of science in engineering from UCLA in 1963. He worked at JPL for 38 years. Menard held numerous senior positions at JPL, including managing the Solar Energy and Semiconductor Materials Section, the Thermochemical and Biological Systems Section and the Applied Mechanics Technologies Section. He retired in 2001 as manager of the Mechanical Systems Engineering and Research Division. His technical career includes research and project engineering in high-temperature gas dynamic radiation, molecular and atomic physics, thermochemistry and aeroacoustics. Cal Poly also honored Menard in 1982 by naming him Distinguished Alumnus from the School of Engineering.

Health Net drug benefits discussed

In response to inquiries from JPL staff, Health Net will provide presentations on Lab later this month on their prescription drug benefits. ALAN JACOBS, Health Net's director of pharmacy operations, will speak Monday, July 26, at 1:30 p.m. in conference room 167, and Tuesday, July 27, at 3 p.m. in von Kármán Auditorium.

Topics of discussion will include escalating prescription costs and what Health Net is doing to ensure quality while controlling costs; how to use the Health Net prescription plan; retail and mail order; brand vs. generic—dispense as written, mandatory generics (cost differential if brand is requested by member); Health Net's recommended drug list (determining what is covered, troubleshooting and what happens if a prescription is requested that is not on the recommended drug list); and prior authorization turnaround time. For more information, call the Benefits Office at ext. 4-3760.

Dodger game for JPL on Aug. 21

The JPL Store has tickets for Caltech/JPL Day at Dodger Stadium on Saturday, Aug. 21. The festivities start at 11 a.m. with a carnival for the whole family, followed by the game between the Dodgers and the Atlanta Braves at 1:10 p.m. Tickets are \$4, and are also available at the credit union in Building 218 and the credit union branch in La Cañada.

Special Events Calendar

Ongoing Support Groups

Alcoholics Anonymous—Meetings are available. Call the Employee Assistance Program at ext. 4-3680 for time and location. Caregivers Support Group—Meets the first Thursday of the month at noon in Building 167-111 (the Wellness Place). For more information, call the Employee Assistance Program at ext. 4-3680. Codependents Anonymous—Meeting at noon every Wednesday. Call Occupational Health Services at ext. 4-3319. Gay, Lesbian and Bisexual Group—Meets the first Friday and third Thursday of the month at noon in Building 111-117. Call the Employee Assistance Program at ext. 4-3680 or Randy Herrera at 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).

Working Parents Support Group—Meets the third Thursday of the month at noon in Building 167-111. For more information, call the Employee Assistance Program at ext. 4-3680.

Friday, July 16

“Root Cause Trends for Serious On-Orbit Anomalies”—Julia White, senior engineering specialist for the Aerospace Corporation's Cross-Program Research Office, will speak at 11:30 a.m. in Building 180-101. Her work addresses industry-wide issues in the fields of on-orbit spacecraft anomalies and lifetimes, lessons learned and satellite development comparisons, as well as program-specific concerns requiring a cross-program perspective.

Von Kármán Lecture Series—Cassini Deputy Project Scientist Dr. Linda Spilker will present “The Rings of Saturn” at 7 p.m. in Pasadena City College's Vosloh Forum, 1570 E. Colorado Blvd. For more information, call Public Services at ext. 4-0112.

Monday, July 19

“How to Finance Your Child's College Education”—David Levy, director of financial aid at Caltech, will speak at noon in von Kármán Auditorium. He will address the availability of student financial aid, what types are available, how much financial aid you might expect, who qualifies and how to navigate the often complex financial aid application maze. This talk will be geared to families with junior-high to high-school age children.

Tuesday, July 20

“Scientific Discovery on the Global Grid: A Computing Paradigm for the 21st Century”—Dr. Tom Yunck and Elaine Dobinson of the Exploration Systems Autonomy Section, and Brian Wilson, technical lead for the General Earth Science Investigation Suite, will speak at noon in the 167 conference room.

Wednesday, July 21

JPL Library Orientation—Come to Building 111-104 from 11:30 a.m. to noon 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 Library reference desk, ext. 4-4200. TIAA/CREF Enrollment Meeting—This workshop, to be held at noon in Building 180-101, is designed to assist employees newly eligible for the TIAA/CREF retirement plan with selection of investment options and the completion of their enrollment forms.

“TIAA Traditional in a World of Stocks and Bonds”—This 10 a.m. presentation in conference room 180-101 will look at how TIAA Traditional fits into an investor's overall asset allocation. Topics include equity returns and the high level of volatility that accompanies them, the correlation of returns among asset classes, why adding different types of equity funds offers only limited added diversification, and why TIAA Traditional fills this diversification role. To reserve a seat, visit www.tiaa-cref.org/moc or call (877) 209-3140, ext. 2614.

Thursday, July 22

Software Peer Review Class—This one-day course in T-1705 will train project element managers and cognizant engineers in how to conduct walk-throughs, peer reviews and inspections of software products, from planning and conducting to creating both detailed and summary reports. Checklists will be provided for various types of inspections and reviews. To register, go to <http://hr/et/index.html>; call Brian Vickers, ext. 3-0877, for more information.

Thursday, July 29

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



JPL Stories—Mike Sander, manager of the Exploration Systems and Technology Office, will present “Mariner Mars '64, First Spacecraft Images from Another Planet:

The Adventure Begins.” at 4 p.m. in the Library, Building 111-104. When Mariner Mars '64 returned 22 images of Mars, it began a planetary imaging adventure that has excited the public and helped make solar system exploration a central element of the U.S. civilian space program. If you have questions about the story series or wish to participate, call Teresa Bailey at ext. 4-9233.

Show your MER pride

The Caltech Employees Federal Credit Union this month unveiled this new Visa card design dedicated to the successful Mars Exploration Rovers mission.



Lab staff help burn victims



With the donations from about 140 JPLers, the JPL Fire Department recently raised about \$2,200 through T-shirt sales to benefit Firefighters Quest for Burn Survivors. The group visited the Lab in June as part of its tour of Southern California firefighting and emergency services organizations. Starting third from left are JPL firefighters Jacques Hinton, Tracie Grove, Captain Michael Tyler, Carlos Ulloa and Don Fowler. Third from right is JPL Protective Services Supervisor Joe Courtney. Those in white shirts are burn survivors who joined the tour.

You’ve been with JPL for 41 years. What were some of the early lessons you learned from the project managers you worked under?

The technical challenges in those early days were immense. I learned from the early practitioners in the space program, such as John Casani, Bill Shipley and Casey Mohl. They were all bright, disciplined thinkers who emphasized understanding problems in great technical depth. In fact, we’re still following the principles that they laid down 40 years ago.

When you addressed the Return to Flight team last year, you emphasized the importance of forging new leadership for NASA’s space flight missions. How have you set out to accomplish that? What is something that you learned from them that you still use today?

Casey, for instance, would have coffee every morning in the cafeteria at 7:15 a.m. Everyone was welcome to come, sit down, have coffee and ask questions. Guess what I do? People know that I come in to the cafeteria around 7:30 a.m., and, if they want to talk, they know where they can find me.

Do you remember making mistakes or having missteps when you were working for any of those legendary project managers? If so, how did they respond?

I was the mission assurance manager for the Voyager project and John Casani was the project manager. Casani has a very systematic approach in examining issues or problems. When you had to present a problem and the potential solution, Casani would very quickly work the discussion to the boundary of your understanding of the issue. He always worked it with you so that you were discovering the soft spots in your solution. It was always a constructive learning experience with Casani.

So, the response wasn’t to slap you down?

No. It was very much to help me. I had the opportunity of a terrific on-the-job learning experience.

So, you got to see the processes modeled?

Yes. I learned incrementally. I absorbed it all, piece by piece. I didn’t really have to think about what I needed to learn; I was lucky enough to see it modeled over time.

We recognize that in today’s environment of short development schedules, engineers don’t necessarily have the luxury of incremental learning. With new projects frequently on the horizon, we need to supplement their hands-on experience with training.

To that end, we at JPL have compiled many years of experience in our Flight Project Practices and Design Principles and we have developed a project manager’s class—where the role and responsibilities of project management are explained to newly appointed and prospective project managers. This class is popular and provides a detailed look into the life of a project manager. As a result of this class, we have increased our pool of engineers ready for a project manager assignment, and we have also had engineers recognize that project management may not be for them. This unexpected outcome from this class is beneficial to both the employees and the Laboratory.

As someone whose responsibility it is to groom project managers, what do you look for? What do you expect in people who want to be project managers?

First of all, they must have the necessary technical and leadership skills and personal integrity.

You also must be able to inspire the confidence of the project team who is going to work for you. Take Pete Theisinger, the [former] project manager of the Mars Exploration Rovers, for example. He took on the job of launching two spacecraft from a dead start in 37 months. His team members had to have faith that he was going to lead them and look after them. Those are the qualities I look for.

How do you spot the real leaders?

You have to watch their careers. What challenges have they faced? What commitments have they made and have they met those commitments? What have they delivered?

A conversation with Tom Gavin



Tom Gavin joined JPL in 1962. Currently the Associate Director of Flight Projects and Mission Success, he has served in a long list of engineering and management positions, including mission assurance manager for both the Voyager and Galileo projects, spacecraft system manager for the Cassini mission to Saturn, and deputy director for JPL’s space and Earth science programs. His previous assignment was director of space science flight projects.

Gavin was honored in 2003 as a fellow of the American Astronautical Society at their national convention in Houston. He has received NASA’s Exceptional Service and Outstanding Leadership medals, and Aviation Week & Space Technology magazine’s Laurels Award for outstanding achievement in the field of space.

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ered? In many ways, this is a natural selection process. Around here, if you say you want to be a project manager, the first question is always going to be: “What experience do you have? What have you delivered?”

The fact that you want to be a project manager doesn’t mean you are going to get the job. Part of the experience set for a project manager has to be delivery responsibility—what have you delivered successfully? Did you do it on time? Did you do it on money, be it hardware or software?

In addition to delivery experience, we are looking for the total package. How were your communications skills? How did you deal with problems? How did you deal with stress? It’s those kinds of things.

As you were going through that process yourself, was there a point where you said, “This is going to make or break me?”

Sure—again, for me it was Voyager. I was named mission assurance manager when I was 30 years old, and I was on the mission until it launched in 1977. Because of my work in the first couple years of the project, I was given responsibility for the radiation hardening of the spacecraft from all of the mission’s electronics. They said, “Okay, you go do this job.” I had that development responsibility from 1974 until launch.

Voyager leveraged everything in the rest of my life at JPL. On the other hand, if Voyager had not gone well, they might very well have said, “Well, we saw what he did.”

At the time, did you think you were in a little over your head?

I thought I was in way over my head. I was thinking, “You want me to do what?” Voyager was a real stretch for me.

Don’t you think there’s irony here? One of the things you’re talking about is making certain that people are prepared to advance to the next level. On the other hand, you’re talking about stretching, about making a leap.

That’s right. You’ve got to make people stretch a little. I decided early on that I love to run scared. Someone said to me once, “Why would you want to run scared?” I said, “Because it makes me think of all the things that could go wrong, so I can deal with them before they do.” Voyager was my biggest stretch. With the Cassini project, on the other hand, there was no reason that I couldn’t do well. I was the spacecraft manager for Cassini, and by that time I was well prepared for it.

I’m sure you still found a way to scare yourself.

I did. Before Cassini, I had always worked on the technical side of the house, where the emphasis was on meeting the engineering requirements first and foremost. Cost was secondary. Now I had a different role. That was the first time on a project that I had to manage the money, and it was definitely a stretch in that sense. So, I poured a lot of effort into learning about cost estimating and cost performance. I stumbled for a while but ultimately succeeded.

But in the end you returned money on Cassini. How did you manage that?

Some people will argue that we just had a lot of money to work with. I would say we were disciplined. From the start on Cassini, I knew what reserves we had for the spacecraft. The budget was \$611 million, and \$71 million of that was reserve. We made a series of decisions about how we would implement the project, and what type of management systems we would put in place to make certain we understood where the money was.

We did a lot of fixed-price contracting, for example. So, we said, “Let’s make sure we get the requirements right the first time, because if we fix-price this and then we go back and change requirements, we’re going to hemorrhage money.” Some of the contractors bet that we couldn’t discipline ourselves, but we did. We spent the first two years of the project making certain we understood the requirements and had the right design.

So, you delivered the goods. Then you had to leave the project when it was time for operations. How does it feel to hand off a project to someone else?

You just walk away from it. You get the new management ready, and then you walk away. It was interesting with Cassini because as we were approaching the launch, I would warn the younger staff, “You’re about to experience a feeling of separation.” There were as many

as 700 of them on the project team at one point. I would say to them, “You’ve been working now for five or six years with all of these people. You’re a part of this great Cassini team here at JPL. We’re going to launch it, and then all of this is going to go away. You’re going to have a sense of loss. You need to be prepared for that.”

How was it for you, personally?

Actually, when we came back from Cassini, it was kind of funny. Just imagine it: You’re the leader of the band. You’ve got everybody watching you. You’re down at the Cape. You’ve got the headphones on and you’re launching the spacecraft. Everybody is cheering and high-fiving, right?

Then I get back to JPL and walk into my office. Do you know what I saw in the office? Boxes and boxes and boxes. The guy who was the manager for operations came by and said, “Hi, welcome back. When can you be out of here?”

When I came back from Voyager, it was the same thing. I had been down at the Cape for four months. I showed up back at JPL, walked up to the Voyager Mission Support area and my badge wouldn’t work. I rang the bell. The girl said to me, “Can I help you? Who are you and why are you here?”

So, I guess the only way to get through that is to find the next project?

That’s right. Projects end. That’s our reality. But I love it. Listen, we are privileged. Everybody who works for this agency is privileged. We’re privileged to serve the American people the way we do. It sounds corny, but look at what the American people have allowed us to do. We need to do our very, very best. We should kick our personal interests aside. We’re doing these things in the name of science and for the American people. I never forget that.

One NASA tackling competition issue

Editor's note: This article was submitted by NASA's One NASA Team. JPL's point of contact is Cyndy Chinn.

On the One NASA survey, many employees identified the use of competition at NASA as a barrier to collaboration and information sharing. Their feedback led to the creation of One NASA Action 1c/1d: Program Priorities and Resources/Selecting Competing Projects.

Placed in perspective, NASA's science enterprises have long used competition and peer review to successfully identify the best approaches to address some of the scientific challenges within the agency's vision. More recently, many new opportunities for competition by individuals and organizations at NASA centers are arising with the birth of the agency's new space exploration vision. NASA is faced with the issue of competition on a daily basis as it seeks to balance the benefits of surfacing the best ideas and obtaining best value with the potentially adverse effects of hoarding knowledge, duplicating capabilities, inadequately maintaining critical infrastructure and building organizational stovepipes. To address this issue, a Competition Working Group has been created to focus on how competition is used at NASA.

"We are seeking to get a better understanding of the costs and benefits of internal competition so that our agency can best use it in a judicious manner," said Steve Pearson, a member of the One NASA Implementation Team and team lead for the group. NASA's chal-

lenge is finding the optimal balance between competition and cooperation. This is a very challenging task given the mix of signals being received. Individuals at centers must compete for project funding and the use of various agency resources, yet simultaneously promote cross-center teamwork.

The Competition Working Group will make recommendations and participate in the implementation of changes to current competitive practices that are assessed as unhealthy to One NASA principles. The more than 20 Competition Working Group participants, including representation from various centers and enterprises, identified three competitive environments for detailed study: Science and Technology, Programs and Projects and Institutional Investments. Each competitive environment was assigned to a specific sub-team that will submit initial findings and draft recommendations by the end of June 2004.

Once the recommendations have been developed, the Competition Working Group will meet with senior agency leadership to begin a dialog that will optimize the effectiveness and success of the overall effort. If you would like to send input to the Competition Working Group, e-mail OneNASAComments@nasa.gov.

For more information about the One NASA effort, visit www.onenasa.nasa.gov. Your feedback and participation is critical to the effort's success. Carrying out the new exploration vision depends on it.

Service awards

For the period of April through May 2004 the following JPL recipients celebrated 25 or more years of service and were invited to attend a luncheon and ceremony in their honor on May 25.

40 years: Dale Boggs, Jan Loreman, Richard Woo.

35 years: Joseph Beerer, Christopher Leng, Dora Montano, Philip Moynihan.

30 years: Arden Acord, James Arnett, Toshio Fujita, Ramon Garcia, Ronald Gillette, Michael Janssen, Danny Low, Ramachandra Manvi, Joanne Mintz, Cheryl Teramae.

25 years: Anil Agrawal, Charles Beswick, Patrick Beyer, Thomas Bickler, John Cucchissi, Bonnie Dean, Salvador Distefano, Bobbie Fishman, Steven Gunter, Sheryl Jackson, Ross Jones, Edward Litt, Robert Losey, Martha Mancilla-Wackley, Derek McMahon, Robert McMillan, John Roth, Mark Schaefer, Jeffrey Schroeder, Gregg Vane, Joseph Wiclawek.



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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.

Letters

I would like to thank my JPL friends and co-workers for their expressions of sympathy on the recent passing of my mother. My thanks also to the Employee Services & Recognition Office for the lovely plant.

Cary Loewenstein

Classifieds

For Sale

APT. CLEARANCE: household & camping items, tools, Farberware stainless steel coffee pot, electric dinner bun warmer; buy one item & get one of equal or lesser value free. 626/793-1895, Albert.

BICYCLE, road, Cannondale R400, 60 cm, circa '95, alum. frame w/RXS components, new tires, drive train could use tuneup. \$290/obo. 315/450-3309 or jaystock@umich.edu.

CAMERA, digital, Veo1300, 1.3M, 16M memory, vgc, CDs & cables, sell due to upgrade. \$25/ obo, 16M Canon memory extra. 626/304-9249, eve.

CANOE, Old Town, Katahdyn model, 16', burgundy, \$500. 957-7742.

CHILDREN'S ITEMS: wooden puzzles; books; videos; girl's toys; girl's vanity table, \$20; girl's Little Tykes toy box, \$30; girl's new sandals, \$10; new hiking books; humidifier, \$25; Hepa unit with filters, \$75; all exc. cond.; med. dog house, \$30. 249-6248.

CLOTHES: down vest, L, \$15; black ice Gore-Tex shell jacket, M, \$30; BI down parka, XL, \$40; cotton l/s field shirt, L, \$15; hooded rain poncho, L, \$20; rain pants, XXL, \$15; duofeld l/s shirt, XL, \$10; Polartec fleece pant,s XL, \$10; sweatpant,s LX, \$7; Totes raincoat, M/L, \$10. 626/355-4967.

CLOTHES, infant: jacket, red/navy blue, zip-up w/hood (old navy), size 2T, exc. cond., \$5/obo; sweater, sky blue w/navy trim, buttons, size 3T, \$1/obo; zipper shoes, Spongebob motif, size 11M, exc. cond., \$6/obo; photos avail. 626/791-6101.

COMPUTER DESK, on wheels, cherry veneer, O'Sullivan model 61925, exc. cond., like new; sell for best offer. 626/449-0997.

DIET TAPES, Jenny Craig, set of 14, \$25; CONTROL CENTER, computer power, 5 power switches + 1 master switch, 5 surge-protected outlets + 2 modem/fax/phone jacks, new, \$20; CARD SHUFFLER, Johnson, collectible, all-metal construction w/carved-wood dowel handles, stands ~6" handle-high, and ~9" by 6", \$35. 790-3899.

DODGER TICKETS, up to 4 seats in Loge 164, row J, from my season ticket package, available for most remaining games, \$14 ea. 542-9828 or kimandgene@earthlink.net.

DRESSER, 2 detachable mirrors w/hooks, 9 drawers, gd. cond., 5' 9" W x 1'19" D x 2' 6.5" H w/o mirrors, 6' 3" w/mirrors, \$165/obo; NIGHTSTANDS (2), 2 drawers, pulout table, gd. cond., 2' W x , 1' 14" D x , 1' 10" H, pics avail., \$65 ea., \$100 both/obo, set \$250/obo. 626/445-7216 or LTANEAR@hotmail.com.

FURNITURE: 2-piece Bassett sectional (1 pc. is a sleeper), floral print, photo & dimensions available, cushions need new covers, rest in gd. cond., \$300/obo. 626/791-6101.

GRANITE BLOCKS, 2, each is 2 1/2" x 7 1/2" x 7 1/2", \$15 each. 352-4033, after 5.

INFANT SEAT for swing set, full bucket, commercial quality, heavy molded rubber, riveted at hanger points, \$85 new on web, sell for \$40. 323/255-3226.

MISC: ornately carved oak desk, 50" W x 24"D w/2 matching bookcases, 50" H x 25" W x 12" D, \$500; Techline office furni., white, 6 pcs., \$350; Spanish hand-made rug, 7' x 9', bright pink & orange, \$200; tall wood-framed mirror, \$25; mission oak server, 38 W x 20 D x 37 H, \$300; 2 ceramic lamps, dusty rose, \$30; 626/584-0860, day; 626/794-3144, eve, Donna.

MISC: Kenmore 90 Series washing machine 1999, vg cond., \$75; animal carrier for transport, lg., used once, \$50; hamster cage, small, \$5; hamster cage, lg., \$10. 790-2915, Dick.

MISC: mtn. bikes, 3, \$40/ea; children's bike, \$20; wood bed frame w/box spring & matr., \$75; metal bed w/box spring & matr., \$40; bedside table, \$25; glass end tables, \$20/ea.; antique secretary desk, \$150; lamps, \$15

each. 626/429-3677 or bettyrs@earthlink.net. MATTRESS, Sealy Posturepedic, twin w/box and frame, \$175; COOKTOP, GE, \$125; exhaust hood, kitchen, 42," \$85; all items in exc. cond. 248-4637.

MISC: photo vest, lots of pockets, M, \$30; Tenba camera bag, \$15; camera fanny pack, \$15; 2 Lowe Pro bags, \$10/\$25; small Tamrac bag, \$10; metal slide box, holds 150, \$7; slide box, holds ~ 300, \$14; Nikon 8008, \$200; Nikon 6006, \$150; various Nikon lenses, Cokin and special effects filters, various prices. 626/355-4967.

MISC: turkey roaster, black iron, like new, \$8; covered aluminum cooking kettle, 5 qt., \$8; sleeping bag, inside like new, \$10; 9" skillet, stainless steel, copper clad, \$4; food chopper, \$8. 626/793-1895.

MOUNTAIN BIKE, Trek, 820, 13", RST, Capa front shock, Shimano Promax shifters/levers, blue/silver, barely used, new, \$270-\$300, sale, \$120. 626/840-5413, Ross, leave message.

MOVING SALE: work tables, 2, 21" D x 29" H x 7' L, sturdy, good-looking, \$35 ea.; dining rm. table, 32" x 50", teak, \$60; garment bag, \$20; photo vest, lg., \$35; lt. table, \$35; dark-room printing easels, set 4, \$35, matboard holder, custom-made, \$25, hand matcutter, Logan, \$13, Slik w/point-shoot trigger head + 2 quick release posts, \$60. 626/355-4967.

ORGAN, Yamaha 415 electronic console w/13 pedals, 3 keyboards, 144 rhythm patterns, pd. \$7,500, sacrifice \$2,000; PORT REPLICATOR, for IBM Thinkpad, works w/T20, T21, A20, A21, or X, R series, like new, \$85; CONTROLLER CARD, Ultra ATA w/cable, fits into 32-bit PCI 2.1 or 2.2 expansion slot on motherboard, brand new, \$20. 790-3899.

REFRIGERATOR, white 18 cu. ft., Maytag, top freezer, ice maker hookup, 4 yrs. old, \$300/obo; BEDROOM SET, headboard, lovely triple dresser, 2 good-size nightstands, maple, made by Stanley, all in exc. cond. 626/599-8473, 2-8 p.m. weekends, all day weekends.

SCUBA EQUIPMENT, ladies, only used once, 2 pc. wetsuit, \$120; fins, \$15; booties, size 7, \$10; snorkel, \$5; mask, \$5; XS gloves, \$7, pictures available. 661/297-2988, Wendy or wendalynn@moose-mail.com.

SCULPTURES of wizards, 3, ceramic, exc. cond., not antiques but are unique, only 200 of each in the world, each is different, holds a small clear ball in his hand, has a beard, and is about 10" H; for Lord Of The Rings fans, \$150 ea. 352-4033, after 5.

SEWING MACHINE CABINET for Sears Kenmore model 1750; LAWN MOWER, manual push style with grass catcher; both gd. cond., best offer. 952-8455.

THEATER TICKETS, 2, for Little Shop of Horrors, Ahmanson Theatre, Aug. 26, 8 p.m., seats in mezzanine, orig. \$140 + fees for pair, sell \$100. 790-8523.

TROPICAL FLOWERS, plumerias, variety of colors and sizes; shell gingers. 626/444-6156, Annie & Bob DePonte.

Vehicles / Accessories

'79 BAYLINER Santiago Offshore 2250 boat, 21 ft., Cuddy Cabin, newly upholstered cushions, seats 6, sleeps 4; only 400 hrs. on original Volvo Penta 225 Hp engine/outdrive; great for cruising, camping, skiing; kept in dry storage at Lake Mohave; extras incl. spare prop, dual batteries, trailer, VHF radio, cover, etc.; orig. owner, \$6,990/obo. 626/454-3628.

'95 CHEVROLET Lumina, 6 cyl., 4 spd., auto, pwr. steering/breaks/seats/door locks/mirror/window, a/c, cc, stereo, am/fm, airbags, ABS, lean, \$2,600. 626/254-8704 or 795-5378.

'98 FORD Windstar, 95K mi., automatic, a/c, red, ABS, airbag, radio/tape, vg cond., \$6,500. matuska@ppd.cz.

'95 FORD Club Wagon E150 XLT, V8, dark gray, good cond., seats 8, power windows & locks, cruise control, remote/alarm, CD, 140K mi., \$3,600. 626/797-8990.

HITCH, Equal-i-zer sway control, complete system, the best sway control hitch available, exc. cond., \$160. 626/359-7666.

'00 HONDA Civic EX, 2 dr., gd. cond., 5 speed, silver, 81K mi. am/fm/CD, sunroof, 4 brand new tires, \$7,500/obo. 468-9243.

'93 HONDA Civic, 4 cyl., 5 speed, a/c, power locks, stereo w/cass., 148K mi., gd. cond., full records, \$1,800. 957-2437, Kevin.

'89 MERCEDES BENZ 260E, 4-door, gold, 147K original miles; garage kept, interior perfect, looks and runs great; new tires, brakes;\$4,500. 626/794-6860.

'91 NISSAN 300ZX, twin turbo, V6, white, automatic, leather seats, power doors/locks/windows/steering, ABS, clean inside and out,

served at Foothill Nissan for past 6 years, \$6,800. 323/385-3617, Heriberto Corona. '97 PLYMOUTH Grand Voyager SE minivan, V6, 3.3L, automatic, gold, 92K mi., front wheel drive, 2nd sliding door, 7 passenger, a/c, rear air, pwr steering/windows/door locks, tilt wheel, cruise, am/fm stereo/cass., 6-CD player, dual front airbags, 4-wheel ABS, roof rack, privacy glass, 2 folding built-in child safety seats, rear window defroster/wiper, alloy wheels, gently used, \$7,000. 626/797-9846 or dedicatedmama@hotmail.com.

'92 PLYMOUTH Sundance, 91K mi., 4 dr., automatic, a/c, beige, airbag, radio, tape, good runner. \$1,200. matuska@ppd.cz.

'95 and '97 SATURNS, 300 and 4300. 626/379-3503, Erik Rambach.

'93 SEADOO Jet Ski, 3-seated bombardier, low hours of operation, trailer and cover included, \$3,700. 626/296-6803.

'99 TOYOTA Camry LE, auto, a/c, am/fm/cass./CD, cruise cont., all power, 76.5K mi., vg cond., new tires + battery, \$8,500/obo. 831-2923.

'02 VOLVO V4 wagon, only 13,200 mi., 4-cyl., 1.9L turbo, silver color, a/c, stereo/cassette/CD, dash cover, exc. cond., garage parked, all service records, 15K service completed, new rear brakes \$16,790. 626/355-5631, Tim.

Lost and Found

LOST: Canon Powershot 410 digital camera, last seen Friday, July 2. Ext. 4-5976, John.

Wanted

BOOKS, used or new, paperback or hardback, romance, science-fiction, mystery, etc. 248-0178, engineerbob4449@yahoo.com.

CARPOOLERS from La Verne area, leave La Verne about 6 a.m., leave Lab about 3:30 p.m. Ext. 3-2555, Dawn.

COMPUTER HELP to troubleshoot and restore health to home PC, Studio City area, will pay reasonable hourly fee. 980-1638.

HOUSE to rent/lease in Temple City, 3 bd., need by 9/1. 626/574-1495.

HOUSE, apt., guesthouse, townhouse or condo to rent or lease, 3 bd., 2 ba., willing to move in now or wait couple months, \$2,000 max. 909/964-3998, Alex.

NANNY to care for 1-yr-old girl and 10-mo.-old boy, loving and experienced person to provide 3 days of child care/week in our home in the NE Pasadena area, must be non-smoker & have reliable transportation. 626/811-8723, Farrah or 626/296-3185, Diana, (Español).

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

VANPOOL RIDERS from the W. Covina/Covina/Azusa area, leaves W. Covina (Mall) at 6 a.m., 2nd pickup at Azusa (Costco), arrives at JPL between 6:45 and 7 a.m. Ext. 3-3456, Suzanne or 4-4334, Denise.

VOLLEYBALL PLAYERS, coed, no beginners please, Tues. nights 8 to 10 p.m. at Eagle Rock High School, \$4/nt. 956-1744, Barbara.

For Rent

ARCADIA apt., 2 bd., 1 ba., garage, remodeled kitchen, refrigerator/washer/dryer in unit, a/c, dishwasher; spacious, walking distance to shops, exc. neighborhood, no pets, water/gardener/trash included, \$1,350 + utilities & security deposit. 626/576-7333.

ARCADIA, large studio, detached, separate entry, furnished, kitchen, laundry facilities, no pets, non-smokers, shared utilities, \$850. 626/574-0226.

EAST PASADENA, 2 bd., 1 ba. + lg. office (20 x 12), a/c, built-ins, new carpet/windows, freshly painted in & out, enclosed back yard + lg. fenced area for RV or boat, 2-car garage + 2-car carport, all newly painted, near Target store, no pets, owned by JPL retiree, see to appreciate, \$1,575. 626/358-1469, 626/864-1789 or danleeyinyang@aol.com.

GLENDALE house, 2 bd., 1 ba., 15 min./JPL, LR, DR, small office, covered & screened play/patio area, garage for 1 car, water/gardener paid, \$1,100. 249-3602.

HIGHLAND PARK/Los Angeles, 2 bd., 1 ba., refurbished, hardwood floors, granite counter, fridge, stove, washer, dryer, hillside view w/600 sq. ft. balcony, \$1,500/2 people, \$1,300/1, utilities included. 323/340-1489.

LA CANADA house, 3 bd., 3 ba., detached garage, new addition w/gourmet kitchen, > 2,000 sq. ft. dishwasher, a/c, laundry hookups, fireplace, spacious family rm., private yd. w/fruit trees, La Cañada schools, avail. 8/1,

\$3,000, water & gardener incl. 626/798-7276. MONTROSE apt., 2 bd., 1 ba., a/c, garden, off-street pkg., laundry, charming, view, trash/water/gardener paid, 10 min./JPL, walking distance to Montrose Mall, \$1,195. 248-4637.

MONTROSE apt., 1 bd., 1 ba., parking, stove, a/c, no pets, available approx. 8/1, \$825, owner pays water and trash. 248-9561.

MONTROSE house, large 2 bd., 1 ba., hardwood floor, newer lg. kitchen opens to deck in backyard, 2-car gar., garden-like backyard w/stone fireplace in covered area, washer/dryer, 10 min. to JPL, walking distance to Montrose Mall, \$2,200. 269-2672 or 541-0325.

PASADENA duplex, bottom floor, 850 sq. ft., 1 bd., garage parking, automatic gate, lots of storage in basement & 2nd garage, free use of washer/dryer and wireless broadband access, walking dist. to Paseo Colorado + Old Town, \$1,150, all util. included, possible discount for yard work. 626/264-2714, Jason.

SAN MARINO house, 3 bd., 2 ba., 2-car gar. w/automatic opener, newly painted, remodeled kitchen, dishwasher, a/c, laundry hookups, fireplace, spacious family rm., overlooking yard, no pets, exc. neighborh'd & school district, \$3,200 + util. & security deposit. 626/576-7333.

SUNLAND apt., large, 1 + 1, all like new, walk-in closet, hall cabinets, air, park, laundry, new carpet, dining area, full kitchen, built-in oven/cook top, 6-unit bldg, \$795. 248-7610.

TEMPLE CITY home, 3 bd., 2 ba., cul-de-sac, living rm., family rm, dining area w/brick fireplace, kitchen w/dishwasher, new stove w/vent, laundry rm., back patio w/yd, auto, sprinklers, 2-car gar. w/auto. opener, Temple City school district, new roof/blinds/ drapes/ceiling/gates, new paint in & out, \$2,200, incl. gardener and trash service. 626/590-6055, Cathy.

TUJUNGA home, 3 bd., 2 ba., 2,000 sq. ft., 2-story, gorgeous, private, hillside, 2-car attached garage, lg. lot, lots of parking, stove, dishwasher, heating/cooling, fireplace, beautiful lg. yard & garden, washer/dryer hookups, will consider pet, \$2,200, \$2,500 security, available mid-Aug., prefer lease, will consider month-to-month. 352-3840, Jim.

Real Estate

COLORADO, 10+ level acres near Rio Grande, NM border, 2 adjacent, 5-acre parcels on St. Hwy 248, will sell one or both for \$1K/acre/obo. 626/254-1550.

Vacation Rentals

ARROWHEAD cabin, lake view, 6 max., \$140/wkends., \$350/wk., others available, security/cleaning deposit required. 818/952-6221, Mon-Thur., 909/337-1036, Fri-Sun.

BALBOA ISLAND, cute 2 bd., 1 ba., apt, weekly July-Sept., fully furn., slps 5, covered deck, laundry, steps to bay + canal, \$1,200-\$1,500/wk. 626/429-3677 or bettyrs@earthlink.net.

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

CAMBRIA house, ocean front, exceptional white water view, accom. up to 4 people, all amenities provided. 702/256-1359, ereynolds2@cox.net.

GREEN VALLEY LAKE cabin, sleeps 6, near Big Bear, furnished, cable TV, fully equipped kitchen, fenced deck BBQ, pets OK, trout fishing, swimming, hiking, \$100/nt. 949/859-2237 or 323/258-4464.

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., low season rate \$115/nite/2, high season \$130/ nite/2, \$15/nite/add'l person. 949/348-8047 or jackandrandy@cox.net.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, slps. 6-8, fully eq'p'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. 626/798-9222, 626/794-0455 or valeriee@caltech.edu.

FLORIDA condo in New Smyrna Beach, fully furnished, 2 bd., 2 ba., full kitchen, half hour to Cape Canaveral, quiet, relaxing, overlooking beach, BBQ, pool, game room, great ocean view, easy walk to stores and restaurants, sleeps 6, avail. weekly or monthly. 760/439-7821, Darlene or dhauge@yahoo.com.

OCEANSIDE condo, on the sand, charming, 1 bd., panoramic view, walk to pier or harbor, pool/spa, game room, 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 mi. away, priv. secure parking. 626/704-3906.

Aura launches skyward

By Alan Buis

The Aura satellite is shown following its launch from Vandenberg Air Force Base.

Aura, a mission dedicated to the health of Earth’s atmosphere, successfully launched July 15 at 3:01:59 a.m. Pacific Time from the Western Range of Vandenberg Air Force Base, Calif., aboard a Boeing Delta II rocket. Spacecraft separation occurred at 4:06 a.m. Pacific Time, inserting Aura into a 705-kilometer (438-mile) orbit.

NASA’s latest Earth-observing satellite, Aura will help us understand and protect the air we breathe.

NASA’s Goddard Space Flight Center manages the Aura mission. The satellite’s four instruments are the Microwave Limb Sounder, Tropospheric Emission Spectrometer, High Resolution Dynamics Limb Sounder and the Ozone Monitoring Instrument. JPL developed and manages the Microwave Limb Sounder and Tropospheric Emission Spectrometer. The High Resolution Dynamics Limb Sounder was built by the United Kingdom and the United States. The Ozone Monitoring Instrument was built by the Netherlands and Finland in collaboration with NASA.

“This moment marks a tremendous achievement for the NASA family and our international partners,” said NASA associate administrator for Earth science Dr. Ghassem Asrar. “We look forward to the Aura satellite

offering us historic insight into the tough issues of global air quality, ozone recovery and climate change.

“This mission advances NASA’s exploration of Earth and will also better our understanding of our neighbors in the planetary system,” he added. “Aura joins its siblings—Terra, Aqua and 10 more re-search satellites developed and launched by NASA during the past decade—to study our home planet.”

“Many people have worked very hard to reach this point and the entire team is very excited,” said Goddard’s Rick Pickering, the Aura project manager.

With the launch of Aura, the first series of NASA’s Earth Observing System satellites is complete. The other satellites are Terra, which monitors land, and Aqua, which observes Earth’s water cycle.

Aura will help answer three key scientific questions: Is Earth’s protective ozone layer recovering? What are the processes controlling air quality? How is Earth’s climate changing? NASA expects early scientific data from Aura within 30 to 90 days.

Aura will also help scientists understand how the composition of the atmosphere affects and responds to Earth’s changing climate. The results from this mission will help scientists better understand the processes that connect local and global air quality.

Each of Aura’s four instruments is designed to survey different aspects of Earth’s atmosphere. Aura will survey the atmosphere from the troposphere, where humans live, through the stratosphere, where the ozone layer resides and protects life on Earth.

The Microwave Limb Sounder is intended to improve our understanding of ozone in Earth’s stratosphere, which is vital in protecting us from solar ultraviolet radiation. The Tropospheric Emission Spectrometer is an infrared sensor designed to study Earth’s troposphere and to look at ozone and other urban pollutants.

NASA’s Earth Science Enterprise is dedicated to understanding Earth as an integrated system and applying Earth system science to improve prediction of climate, weather and natural hazards using the unique vantage point of space.

For Aura information and images, visit <http://www.gsfc.nasa.gov/topstory/2004/0517aura.html> and <http://www.nasa.gov/aura>.

For more information about the Microwave Limb Sounder, visit <http://mls.jpl.nasa.gov>.



Photo courtesy of Goddard Air & Space Museum

Mars rovers roll into Martian winter

By Whitney Clavin



As winter approaches on Mars, JPL’s Opportunity rover continues to inch deeper into the stadium-sized crater dubbed “Endurance.” On the other side of the planet, the Spirit rover found an intriguing patch of rock outcrop while preparing to climb up the “Columbia Hills” backward. This unusual approach to driving is part of a creative plan to accommodate Spirit’s aging front wheel.

Spirit, with an odometer reading of more than 3.5 kilometers (2.2 miles), has already traveled six times its designed capacity. Its right front wheel has been experiencing increased internal resistance, and recent efforts to mitigate the problem by redistributing the wheel’s lubricant through rest and heating have been only partially successful.

To cope with the condition, rover planners have devised a roundabout strategy. They will drive the rover backward on five wheels, rotating the sixth wheel only sparingly to ensure its availability for demanding terrain. “Driving may take us a little bit longer because it is like dragging an anchor,” said Joe Melko, a rover engineer at JPL. “However, this approach will allow us to continue doing science much longer than we ever thought possible.”

On Thursday, July 15, Spirit successfully drove 8 meters (26 feet) north along the base of the Columbia Hills backward, dragging its faulty wheel. The wheel was activated about 10 percent of the time to surmount obstacles and to pull the rover out of trenches dug by the immobile wheel.

Along the way, Spirit drove over what scientists had been hoping to find in the hills—a slab of rock outcrop that may represent some of the oldest rocks observed in the mission so far. Spirit will continue to drive north, where it likely will encounter more outcrop. Ultimately, the rover will drive east and hike up the hills backward using all six wheels.

“A few months ago, we weren’t sure if we’d make it to the hills, and now here we are preparing to drive up into them,” said Dr. Matt Golombek, a rover science-team member from JPL. “It’s very exciting.”

For the past month, the Spirit rover has been parked near several hematite-containing rocks, including “Pot of Gold,” conducting science studies and undergoing a long-distance “tuneup” for its right front wheel.

Driving with the wheel disabled means that corrections might have to be made to the rover’s steering if it veers off its planned path. This limits Spirit’s accuracy, but rover planners working at JPL’s rover test facility have come up with some creative commands that allow the rover to auto-correct itself to a limited degree.

As Spirit prepares to climb upward, Opportunity is rolling downward. Probing increasingly deep layers of bedrock lining the walls of Endurance Crater at Meridiani Planum, the rover has observed a puzzling increase in the amount of chlorine. Data from Opportunity’s alpha particle X-ray spectrometer show that chlorine is the only element that dramatically rises with deepening layers, leaving scientists to wonder how it got there. “We do not know yet which element is bound to the chlorine,” said Dr. Jutta Zipfel, a rover science-team member from the Max Planck Institute for Chemistry, Mainz, Germany.

Opportunity will roll down even farther into the crater in the next few days to see if this trend continues. It also will investigate a row of sharp, teeth-like features dubbed “Razorback,” which may have formed when fluid flowed through cracks, depositing hard minerals. Scientists hope the new data will help put together the pieces of Meridiani’s mysterious and watery past. “Razorback may tell us more about the history of water at Endurance Crater,” said Dr. Jack Farmer, a rover science-team member from Arizona State University.

Rover planners are also preparing for the coming Martian winter, which peaks in mid-September. Dwindling daily sunshine means the rovers will have less solar power and take longer to recharge. Periods of rest and “deep sleep” will allow the rovers to keep working through the winter at lower activity levels. Orienting the rovers’ solar panels toward the north will also elevate power supplies. “The rovers might work a little bit more every day, or a little bit more every other day. We will see how things go and remain flexible,” said Jim Erickson, project manager for the Mars Exploration Rover mission at JPL.

For images and additional information, log on to <http://marsrovers.jpl.nasa.gov> and <http://athena.cornell.edu>.

News Briefs

MER team honored by NASA

Earlier this month, NASA honored teams of agency researchers—and their industry and university partners—whose work in safe and affordable air transportation, growth in critical national industries, enhanced national security, and scientific exploration and discovery has contributed to society.

One of the Turning Goals into Reality Awards went to the Advanced Information Technology Infusion Team for the Mars Exploration Rover mission.

The team received the Administrator's Award, which cited MER as NASA's most complex planetary rover mission to date. The citation noted: "At JPL's MER mission control, 240 scientists and engineers collaborated daily in shifts around the clock to navigate twin rovers across the rocky Martian terrain. In collaboration with JPL mission managers and personnel, NASA Ames Research Center developed automated planning and scheduling, information management and data visualization tools for MER and provided work practice studies to help engineering and science teams better meet the telerobotic mission's technical and logistical challenges."

Besides JPL and Ames, the Advanced Information Technology Infusion Team included staff from QSS Group Inc., the Research Institute for Advanced Computer Science, Alertness Solutions, Science Applications Inter-

national Corp., Deanza College, Computer Sciences Corp., San Jose State University, Raytheon, Kestrel Institute, the Office of Naval Research and Wright State University.

"Over the past 45 years, NASA's research and technology developments have transformed our society. [We celebrate] the year's most significant accomplishments that add to this NASA legacy. We are honoring these teams of women and men, along with their industry and university partners, for their contributions," said DR. J. VICTOR LEBACQZ, associate administrator for aeronautics. "Now NASA itself is transforming. The technologies recognized, and the people behind them, strengthen our capability to achieve the Vision for Space Exploration."

A total of 17 teams were honored for accomplishments in aeronautics technology, Space Launch Initiative, mission science measurement technology, innovative technology transfer partnerships and agency education outreach goals. In addition, special awards were bestowed to the Investigation Organizer Team that supported the work of the Columbia Accident Investigation Board.

A complete list of the winning teams, with synopses of their accomplishments, is available at http://www.nasa.gov/pdf/62333main_tgir_awards.pdf.

For more information about the 2004 Turning Goals into Reality awards, see <http://www.aeronautics.nasa.gov/events/tgir/2004/index.htm>.

New job search tool now online

JPL Jobs!, the internal job seeker's online job search, posting and application tool, is now available. You can use JPL Jobs! to create an online career profile, upload your resume, search for open positions and apply online, and create a "job search agent" to notify you about new opportunities that match your job search criteria.

In addition, the new application eliminates the need to complete and submit a hard copy of the Employment Opportunity Application to Staffing when applying to a posted employment requisition. Employees are encouraged to complete internal applications online; however, Staffing will accept paper forms during a transitional period.

Employees access JPL Jobs! from their NBS Toolkit. Those using PCs may access JPL Jobs! by using Internet Explorer versions 5.5 and 6.0 or Netscape Navigator version 4.7 and 7.0. Employees using Macintosh can access JPL Jobs! using Internet Explorer running under a PC emulator like Virtual PC. Macintosh users who choose not to use a PC emulator may use the existing job posting website at <http://hr/staffing/jobs.html> and continue to use the paper application process to initiate an internal job application. Staffing says Macintosh compatibility is their vendor's top priority for their next software release.

Managers who currently have access to Employ! will continue to access their Manager Toolkit, where they will find an additional tab from which they can conduct a job search, review a posted position and initiate the internal application process.

Employees have received a mailer containing a "Quick Guide" brochure to help navigate through the system. In addition, 30-minute briefings have been scheduled for Aug. 2 and 3 at 3 p.m. in von Kármán Auditorium.

For more information, call Staffing at ext. 4-5150.ext. 4-5150.

Blood drive coming up

The next JPL/Red Cross blood drive will be held in von Kármán Auditorium on Tuesday, Aug. 17, from 10 a.m. to 4 p.m. and Wednesday, Aug. 18, from 7 a.m. to 1 p.m.

To sign up, visit <http://www.givelife.org/index.cfm?hcl=JPL>. Use only work information and do not provide personal demographic information. Once you select your appointment, you will receive an automatic confirmation e-mail. Call the Red Cross at (213) 400-0140 if you need further assistance.

Advance signup sheets will also be available at JPL Occupational Health Services, Building 310-202, prior to the blood drive. For last-minute signups, or to change your appointment, call the Red Cross at (626) 960-6956, ext. 225.

To donate blood you must be at least 17 years old, weigh at least 110 pounds and be in good health.

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

Plan for FY '04 costing

With the fiscal year end coming up at the end of September, JPL's Finance and Contract Management Division reminds staff that it is time to address costing of procurements and travel that were budgeted in fiscal year 2004.

A detailed interoffice memorandum titled "Fiscal Year-End 2004 Costing and Accrual Practices," located on the Finance and Contract Management Division website at <http://fcmd/MEMO/FY2004Year-EndMemo.pdf>, provides answers to the following questions:

- When does a procurement get charged (costed) to a project/task?
- What is an accrual and how is it different from a cost?
- What procurements are accrued at month-end and year-end?
- What types of procurements are not accrued monthly or at year-end?
- What are special or ad hoc year-end accruals?
- What is the last day I can procure something and have the cost recognized on my project/task?
- What is the last day I can do a Purchase Requisition and have the cost charged to my project?
- What is the last day I can turn in a Travel Expense Report and have it included in this year's cost?
- What can the requisitioner do to expedite the costing of procurements?
- What will the Finance and Contract Management Division and Acquisition Division do to ensure costs are included in FY 2004?

Further questions? Contact one of the individuals listed on Page 5 of the memorandum.

NASA TV improves signal

NASA Television has improved coverage to viewers in Alaska and Hawaii as well as the continental United States with a switch of its signal from one satellite to two different ones.

NASA TV is now seen in the continental United States on AMC-6, at 72 degrees west longitude, Transponder 9, 3880 MHz, vertical polarization, audio at 6.8 MHz. For viewers in Alaska or Hawaii, NASA TV will now be seen on AMC-7, at 137 degrees west longitude, Transponder 18, at 4060 MHz, vertical polarization, audio at 6.8 MHz.

This satellite change is not associated with NASA TV's transformation to a digital format, scheduled for sometime in the next 12 months.

NASA TV also provides live webcasts. Log on to <http://www.nasa.gov/multimedia/nasatv/index.html>.

Special Events Calendar

Ongoing Support Groups

Alcoholics Anonymous—Meetings are available. Call the Employee Assistance Program at ext. 4-3680 for time and location.

Caregivers Support Group—Meets the first Thursday of the month at noon in Building 167-111 (the Wellness Place). For more information, call the Employee Assistance Program at ext. 4-3680.

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

Gay, Lesbian and Bisexual Group—Meets the first Friday and third Thursday of the month at noon in Building 111-117. Call the Employee Assistance Program at ext. 4-3680 or Randy Herrera at 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).

Working Parents Support Group—Meets the third Thursday of the month at noon in Building 167-111. For more information, call the Employee Assistance Program at ext. 4-3680.

Tuesday, August 3

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

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

Wednesday, August 4

Associated Retirees of JPL/Caltech—Meeting at 10 a.m. at La Cañada United Methodist Church, 104 Berkshire Place, La Cañada.

JPL Library Orientation—Come to 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, August 5

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

"Model-Driven Design With UML 2.0"—At 11:30 a.m. in conference room 180-

101, author and software-development expert Dr. Bruce Douglass will discuss the forthcoming Unified Modeling Language specification, which enhances the ability of the user to model for larger and more complex systems. UML 2.0 has added explicit notions of architectural structure and improved the ability to decompose complex systems. The talk is presented by the Center for Space Mission Architecture and Design.

Mon.-Tues., August 9-10

Investment Advice—TIAA/CREF will offer one-on-one counseling. For an appointment, visit <http://www.tiaacref.org> or call (877) 209-3140, ext. 2614.

Tuesday, August 10

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

Wednesday, August 11

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

JPL Library Orientation—Come to 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 the 167 conference room. Call Debbi Llata at ext. 4-8374 for information.

Thursday, August 12

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

Thu.-Fri., August 19-20

Von Kármán Lecture Series—Orbiting Carbon Observatory deputy principal investigator Charles Miller will present "Understanding Atmospheric CO₂ and its Impact on Climate Change" 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/aug04.cfm>. For more information, call Public Services at ext. 4-0112.

CloudSat radar on the move

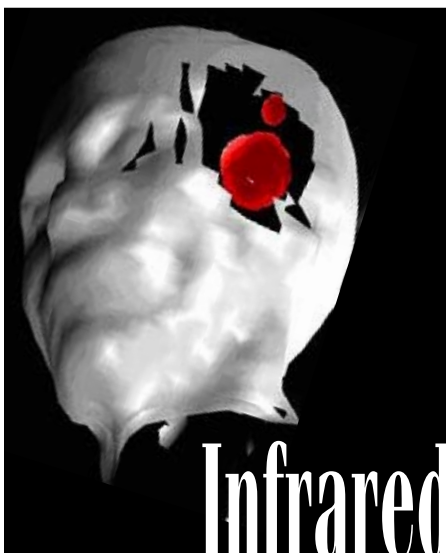


Photo courtesy of Steve Greenberg and Dobra Higuera

The CloudSat satellite's Cloud Profiling Radar is shown being prepared for shipment on July 14 from JPL to industrial partner Ball Aerospace & Technologies Corp. The flight instrument arrived at Ball two days later. The instrument's post-shipment functional and performance verification was completed on July 20 and mechanical integration between the instrument and the CloudSat spacecraft bus was successfully completed on July 21.

CloudSat, part of NASA's Earth System Science Pathfinder program, is a mission to study the effects of clouds on climate and weather. The mission will use radar to measure the vertical structure of clouds and cloud properties from space. CloudSat is a partnership between JPL, Colorado State University, the Canadian Space Agency, the U.S. Air Force and the U.S. Department of Energy. Ball Aerospace is building the spacecraft.

Launch is planned for April 2005 from Vandenberg Air Force Base in California.



Infrared camera helps surgeons map brain tumors

By Natalie Godwin

Using an infrared video camera developed by scientists at JPL, surgeons are testing thermal imaging and image processing to see if they can create useful maps of brain tumors.

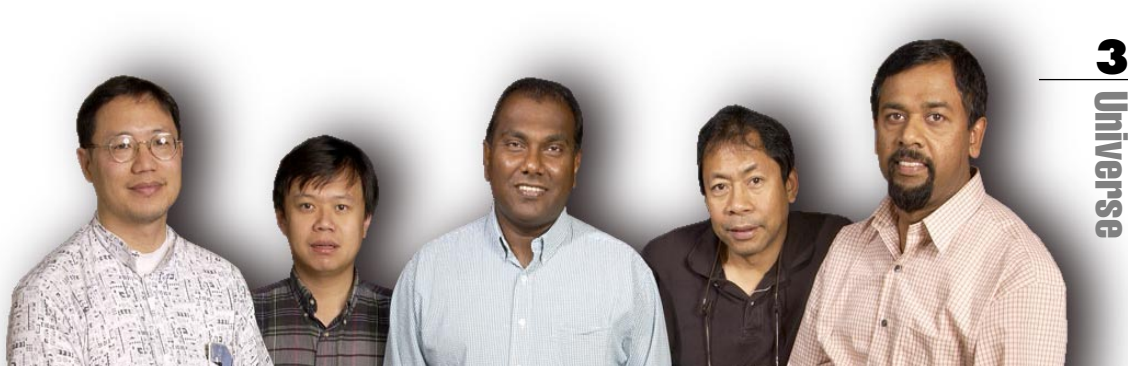
Researchers want to see if the camera, which detects infrared—or heat—emissions, might help neurosurgeons better visualize tumors before they operate and also find tiny clusters of cancerous cells that might remain after surgery.

NASA scientists already use infrared technology to map Earth's surface and search for distant objects in the universe. Firefighters use it to locate people trapped in buildings, and military forces track down their targets hiding in the dark.

Physicians have used infrared technology for mapping the roots of skin cancer, but it's never been used for brain tumors until now.

Doctors at USC's Keck School of Medicine are using the JPL-developed camera and infrared imaging in a trial. They're trying to see if they can sketch tumor margins by detecting temperature changes during surgery, since tumor cells emit more heat than healthy ones. "The camera's precision allows it to map temperature differences of one-hundredth of a de-

JPL's Infrared Focal Plane Array Technology Group developed the infrared camera. From left: John Liu, Ricky Chuang, Sarath Gunapala, Don Rafol and Sumith Bandara.



gree Celsius at a high resolution," said Dr. Sarath Gunapala, supervisor of the Infrared Focal Planes and Photonics Technology Group in Section 384 and lead engineer for the camera.

Currently, neurosurgeons delve carefully into the brain and remove as much of the tumor as they can see under magnification. However, they may take healthy tissue along with the cancerous cells or leave residual cells that can grow back along the tumor's margins.

"Brain tumor tissue looks the same as healthy tissue on the edges," said Babak Kateb of the Keck School of Medicine, a research fellow and lead scientist of the project. "Tumor cells use different biochemical pathways from normal cells, and when researchers use the infrared camera, they can pick up hotspots or areas of tissue warmer than normal tissue," he added.

After doctors receive infrared images of the brain, imaging-processing software marks the boundaries between tumor regions and surrounding healthy tissue. "We are refining software similar to what our group has been using for analyzing rocks on Mars and other planets," said Dr. Wolfgang Fink, JPL senior researcher.

"An advantage of thermal imaging is that it's non-invasive," said Dr. Peter Gruen, a neurological surgeon at the Keck School of Medicine. "It measures heat energy emerging from patients without exposing them to X-rays or intravenous solutions, and is performed without incisions or contact to the brain tissue," he added.

A clinical study of this proposed mapping process is underway at the Keck School of Medicine.

This is another example of the great benefits of transferring NASA-developed technology for the public good.

For more information on the USC study, log on to <http://www.usc.edu/keck.html>.

For more information on the infrared camera, visit <http://www.jpl.nasa.gov/technology/features/tech930.html>.

Lab proposal selected for New Frontiers Program study

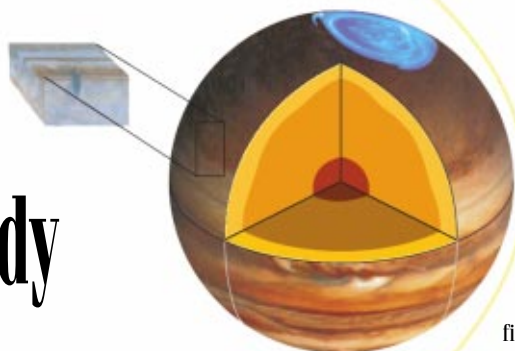
NASA earlier this month announced the selection of two proposals for detailed study as candidates for the next mission in the agency's New Frontiers Program. One of the proposals—a mission that would orbit Jupiter from pole to pole for the first time to conduct an in-depth study of the giant planet—would be led by a JPL principal investigator with significant support from co-investigators and other staff.

Dr. Scott Bolton of the Astrophysics Element 3262 is named as principal investigator for the proposed "Juno" mission. This investigation proposes to use a highly instrumented spacecraft placed in a polar orbit about the planet Jupiter to investigate the existence of an ice-rock core, determine the global water and ammonia abundances in Jupiter's atmosphere, study convection and deep wind profiles in the atmosphere, investigate the origin of the Jovian magnetic field and explore the polar magnetosphere.

Juno's goal is to understand Jupiter's origin and evolution. "As the archetype of giant planets, Jupiter can provide the knowledge we need to understand our own solar system and the planetary systems being discovered around other stars," Bolton said. "Conventional theories for solar system origin and evolution do not explain the new planetary systems being discovered. New theories are being developed to accommodate the new observations of extrasolar planets, while still explaining the existence of our own system in which we live. The stakes are high, as systems like ours may be required to provide planets in which life can originate and evolve. How common are such systems?"

"As our most massive planet and thus the one most similar to the even more massive extrasolar planets being discovered, Jupiter is clearly the critical piece in this puzzle," he added. "When, where and how Jupiter formed must have played a key role in the formation of the other planets, including Earth and the delivery of its endowment of volatiles."

Juno places a spinning spacecraft into an elliptical polar orbit around Jupiter for about one year. The orbit has a very close perijove, or the point in orbit closest to the planet (about 5,000 kilometers above the cloud tops), initially placed near Jupiter's equator. Juno carries precise, high-sensitivity microwave radiometers that are used to determine the deep global water (oxygen) and ammonia (nitrogen) abundance. The Galileo probe determined that Jupiter has about three times the amount of heavy elements (relative to hydrogen) than the sun. Unfortunately, Bolton said, Galileo did not measure the abundance of water. The amount of water in Jupiter is of interest because it discriminates among current theories of Jupiter's formation (water in the form of icy planetesimals is probably the carrier for Jupiter's enrichment of heavy elements). The icy planetesimals that mixed with the proto-solar nebula to form Jupiter are fundamentally important because they may have been the primary source of water to our solar system. The microwave radiometry also investigates how deep Jupiter's zones, belts and other atmospheric features go (this is the most basic question of Jovian atmospheric dynamics).



The proposed Juno mission would orbit Jupiter from pole to pole.

With its radio science system and magnetometers, Juno proposes to make high-accuracy maps of Jupiter's gravity and magnetic fields by exploring the internal structure, core mass and origin of the dynamo. These measurements tell us a great deal about how, where and when Jupiter formed. Juno also carries an extensive suite of in situ fields and particles experiments and remote sensing to provide the first in-depth investigation of Jupiter's polar magnetosphere and aurora.

Juno co-investigators from JPL are John Anderson (Section 331K), Samuel Gulkis (3220), Candice Hansen (3222), Michael Janssen (3265), Michael Klein (9020), Steven Levin (3265) and Edward Smith (3263). Bolton said other key JPL personnel on Juno include Sami Asmar (Section 331K), Mark Hofstadter (3220), Neil Murphy (3263), Glenn Orton (3222), Daniel Santos-Costa (4500) and Thomas Spilker (311B).

The second proposal chosen by NASA as a New Frontiers candidate is "Moonrise: Lunar South Pole–Aitken Basin Sample Return Mission," with Dr. Michael Duke of the Colorado School of Mines as principal investigator. This investigation proposes to land two identical landers on the surface near the moon's south pole and to return more than two kilograms (about five pounds) of lunar materials from a region of the moon's surface believed to harbor materials from the moon's mantle.

"These two outstanding proposals were judged to be the best science value among the seven submitted to NASA in 2004," said Dr. Ed Weiler, NASA's associate administrator for space science. "It was a very tough decision, but we're excited at the prospect of the discoveries either of them could make in continuing our mission of exploration of the solar system, and what they could tell us about our place in the universe," he added.

Following detailed mission concept studies, due for submission by March 2005, NASA intends to select one of the mission proposals for full development as the second New Frontiers mission by May 2005. The selected New Frontiers science mission must be ready for launch no later than June 30, 2010, within a mission cost cap of \$700 million.

Each proposal will now receive up to \$1.2 million to conduct a seven-month implementation feasibility study focused on cost, management and technical plans, including educational outreach and small business involvement.

The two selected proposals were submitted to NASA in February 2004, in response to the New Frontiers Program 2003 and Missions of Opportunity Announcement of Opportunity.

The New Frontiers Program is designed to provide opportunities to conduct several of the medium-class missions identified as the top priority objectives in the Decadal Solar System Exploration Survey, conducted by the Space Studies Board of the National Research Council.

NASA's New Horizons mission, which will fly by the Pluto-Charon system in 2014 and then target another Kuiper belt object, was designated the first New Frontiers mission.

View this and previous issues of Universe at
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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 bousing and vehicle advertisements require that the qualifying person(s) placing the ad be listed as an owner on the ownership documents.

Passings

DR. HERMAN THORMAN, 82, a retired aeronautics engineer, died Jan. 11.

Thorman joined JPL in 1956. He worked on the design of the Sergeant missile and designed instruments and propulsion systems for robotic moon missions, including Surveyor. He later worked in the Deep Space Network as test and training system engineer and command system engineer. He retired in 1987.

Thorman is survived by his wife, Dorothy, son Tom and daughter Susan.

Letters

On behalf of my family and myself, I want to thank my friends and co-workers at JPL for their expression of sympathy and support in the loss of my mother. We are deeply indebted to you all for your thoughtfulness and kind words and for the flowers and plants. I also want to thank the JPL Employee Services and Recognition Office for the lovely plant they sent to my home.

Phil Varghese

I would like to thank my friends and co-workers in Sections 348 and 3428 for their caring and support during the recent illness of my husband. It meant a great deal to both my husband and myself and knowing that my fellow group members were there for me eased my burden considerably.

Stephanie Cowans

On behalf of Jan and myself, thanks to all for your kind expressions of sympathy after the passing of my precious little sister, Jeanne. Thanks also to JPL for the beautiful plant.

Pat Beyer

We would like to convey our heartfelt thanks to all of our JPL co-workers for their prayers and support at the passing of our dearly loved mother and grandmother. The many beautiful flowers, plants and cards were greatly appreciated. Words seem inadequate when we try to express our gratitude for the kindnesses shown during this most difficult time.

Glenn Knosp and family
and Gail and Bill Robinson

I would like to sincerely express my thanks to everyone here at JPL for their sympathy and condolences on the recent death of my dear wife, Sally Ann Bennett. Sally was an avid science and science fiction buff and took a great deal of pleasure in our family's association with JPL. A special thanks to my co-workers for the beautiful flowers. They really meant a lot to us. Thanks so much again.

Johnny C. Bennett

Retirees

The following JPL employees retired in July:

Frank Stott, 31 years, Section 514; Carroll Winn, 30 years, Section 800; Frederick Mintz, 22 Years, Disability; Jacquie Clark, 21 years, Section 703; James Kimberling, 21 years, Section 5124; Edward Romana, 11 years, Section 701.

Classifieds

For Sale

AIR CONDITIONER, Whirlpool, room, 5900 BTU, model #ACM062, new \$200, sell for \$55. 714/280-7368.
BEDS: single, light wood, \$100/obo; trundle, single (second bed rolls out from under), white metal, \$100/obo; all with mattresses, gd. cond. 626/794-1133.
CANOE, Old Town, Katahdyn model, 16', burgundy, \$500. 957-7742.
CLOTHES, infant: jacket, red/navy blue, zip-up w/hood (Old Navy), size 2T, exc. cond., \$5/obo; sweater, sky blue w/navy trim, buttons, size 3T, \$1/obo; zipper shoes, Sponge-bob motif, size 11M, exc. cond., \$6/obo; photo of each item avail. 626/791-6101.
COFFEE TABLE, beautiful, round, 45" dia.,

solid dk brown wood, imported from China, carved design around perimeter, \$285. 545-0455.
COMPUTER DESK, on wheels, cherry veneer, made by O'Sullivan, model 61925, exc. cond., like new; sell for best offer. 626/449-0997.

COMPUTER MONITOR, Phillips 19", works just fine, cables incl., \$100. 310/489-8308, Peter.

COMPUTERS: Macintosh, G4 Dual 500 w/832 MB, 60 GB, internal Zip, Airport, Soundblaster, Radeon 8500, Mac OS 9/X Jaguar, \$600; Blueberry G3 iBook 300 w/288 MB, 20 GB, Airport, 3 GB USB HD, Mac OS 9/X 10.1, no battery, <http://haighworld.com/mac> for pics/info, \$300. 321-7461 or brian@haighworld.com.

COUCH, 8 ft., beautiful white satin, elegant, clean, \$295; matching 6-foot love seat, \$265; free microwave with purchase of both pieces. 545-0455.

CURIO CABINET, rosewood, 5 shelves, beveled glass doors and sides, mirrored back, lighted, 2-shelf storage cupboard on bottom, 78" H x 38" W x 14" D, exc. cond., photos available, \$275. 323/257-7928.

DODGER TICKETS, selected games from season ticket package, Loge level (orange), Aisle 132 (at 1st base), 2 tickets/game at face value of \$30/ticket, see www.delunac.net/tickets for details and available games. 626/296-1253.

DRESSER, Queen Anne style w/mirror, \$200; CHEST, \$300; or \$400 for both. 626/441-4940, ronak_1999@yahoo.com, Roy.

DRYER, gas, Kitchen Aid, ~6 yrs. old, gd. cond., \$70. 626/798-6488.

FURNITURE: couch, 7', med. blue; love seat & chair, southwest décor; bar dinette set w/4 mauve padded stools; each set \$100/obo. 626/794-1133.

FURNITURE for living/family rm.: curio cabinet, wood end/coffee table, 2 stiefel lamps, 8' couch, 2 chairs, 2 reclining loungers, kitchen table w/4 chairs, throw rugs, plant stands, good cond. 957-4770.

FURNITURE: ornately carved oak desk, 50" W x 24" D w/2 matching bookcases, 50" H x 25" W x 12" D, \$500; Techline office furn., white, 6 pieces, \$350; Spanish hand-made rug 7' x 9', bright pink & orange, \$200; tall wood-framed mirror, \$25; mission oak server, 38 W x 20 D x 37 H, \$300; 2 ceramic lamps, dusty rose, \$30; 626/584-0860, day, 626/794-3144, eve, Donna.

FURNITURE, 'This End Up,' solid wood, 2-seater couch, armchair w/arm/table extension, ottoman, occasional table, retail \$1,282, sell \$500/obo. 626/303-3877, Margaret or Jim.

MISC: audio oscillator, \$10; turkey roaster, covered, vg cond., 15 x 11 x 7 1/2, \$7; covered porcelain vegetable dish w/handles, flower design, \$9; glass coffee jug with handle, 2 qt., \$5; 2 badminton raquets, like new, \$4/ea.; covered aluminum cooking kettle, 5 qt., \$8; electric dinner bun warmer, gd. cond., \$7. 626/793-1895, Albert.

MISC: 8' pool table, \$500; tablecloths (2), slate blue oval, 18 matching napkins and rings, \$10; punch bowl set, 18 piece, \$10; mailbox, oversized, green, \$20; wig, red, shoulder length, never used; electric frying pan, \$10; answering machine, \$5; portable basketball set, needs net, \$200; fishing pole, saltwater, \$25. 626/357-8210.

MISC: sleeping bag for adult, roll-up, inside like new, \$10; 2 standard bed pillows, non-allergenic, new, \$5/ea.; blanket, pink, polyester, full size, new, \$8; lifesaver boat cushion, \$4; food chopper, hand operated, \$8; 10" glass hr'drv dish w/handles, cut glass, \$4; other items. 626/793-1895, Albert.

MISC: SBC light meter w/case, Luna Pro, \$75; 2 Sima film shield bags, \$5 ea; Nikon close-up filter, 6T, \$25; Tiffen 81B filter, 62mm, \$7; Tiffen Enhancing filter, \$15; Hoya UV & Skylight, 1B, 62mm, \$7 ea; T-mount adapter, Canon, \$5; Saunders slide magnifier, \$5; luggage, exc. cond., shoulder bag, \$20; Wheel-a-board, 22" suitcase, red, \$35. 626/355-4967.

MISC: Sony Walkman, Memorex Walkman, Sony am/fm/cass. Walkman, \$15-20/ea.; Nokia 1260 w/case \$35; Suunto Wristop computer, \$250; diamond ring, \$90; intercom system \$40; lantern stand, \$5; 2 small Coleman lanterns, \$5/ea.; water purification system, \$50. 897-1203, Valerie.

MOVED SALE: Torino table and 6 chairs in merlot from Z Gallerie, \$800 (paid \$1,470 in 1/03); treadmill, Pro-Form 585, accurate performance, \$200; garage door opener, Genie, screw drive, model IS 550/A, \$50; good twin mattress, \$50; Sharp TV-VCR combo, 14", color, \$50. 626/794-7972.

PHOTO EQUIPMENT: travel carrying case for photos ~36 x 30", \$15; projection screen w/stand, ~ 40 x 40, \$20; Gordon Wiltzie limited edition photos (2), framed, signed, Sunrise at Temple Crag, #1 of 250, Dueling Rattlesnakes, both \$75/ea.; Litedisk, 42", white/white round reflector, \$25; Starblitz, 160A flash, \$5; 80-270 Tamron hardcase, \$5; flash reflector, \$3; Sunpak 422D flash, \$25; Nikon HN-24 hood, \$5. 626/355-4967.

PIANO by Hobart M Cable, small upright, exc. cond., buyer arranges pick-up in Simi Valley, \$750/obo. 805/660-7446, Ben Bronwein.

SOFA SLEEPER, queen, + matching love seat, 4 years old, from Feddes store, muted green, exc. cond., professionally cleaned, \$750 for pair. 626/351-7615, Anne.

SECTIONAL, approx. 9' x 7', needs re-upholstering, frame and cushions in gd. cond., \$50. 626/850-4378.

SECTIONAL, 2-piece Bassett (1 piece is a sleeper), floral print, photo & dimensions available, cushions need new covers, rest in gd. cond., \$300/obo. 626/791-6101.

THEATER TICKETS, 2, for Little Shop of Horrors, Ahmanson Theatre, Aug. 26, 8 p.m., seats in mezzanine, orig. \$140 + fees for pair, sell \$100. 790-8523.

THERAPY MACHINE, HYS-398, digital, used a few times, Chinese/Eng. user's manual, microcurrent for acupuncture, massage,

manipulation, etc., \$200/obo. 626/840-0955, leave msg.

WASHING MACHINE & DRYER, Maytag electric, older model, yellow, \$50/ea. 626/850-4378.

WASTEBASKET, white, plastic w/metal guide rail, about 1 x 2 x 3 ft. tall, installs inside kitchen cabinets to hide trash, brand new, in orig. box with screws for installation, \$80/obo. 626/840-0955, leave msg.

WATERBED floatation syst., w/foundation, Somma-type tubes, queen sz., \$75. 626/447-6423.

Vehicles / Accessories

BATTERY, Optima 800U "Red Top," new with top and side terminals, it didn't fit the car I wanted to use it in, \$75/obo. 249-1801 or veyron@access4less.net.

'98 BMW M3, 4 dr., 5 spd., 3.2L, 16 DOHC, 24-valve fuel-injected eng., sporty bright metallic blue, black leather int., ABS, power everything, a/c, am/fm/cass., 17" alloy wheels, sunroof, 98K mi., gd. cond., \$17,500. 248-0869.

'98 BMW 323, 85K mi., black, auto, 2 dr., leather, sunroof, new brakepads and rear rotors, new rear tires, great condition, \$10.9K. 310/614-5076.

'95 BUICK LeSabre, loaded, leather seats, 130K mi., runs great, \$3,100. 626/447-6423.

'97 CHEVROLET Suburban, LS, V8, driver & passenger airbags, power everything, no accidents, flawless cond., vake3377@yahoo.com for pics, \$11,000/obo. 846-0053.

'98 FORD Explorer XLT, 4WD, 57,777 mi., exc. cond., rear a/c, 6-CD player, more features, picture on www.cars.com, \$8,888. 548-1312, Ray or melvanh@pacbell.net.

'98 FORD Explorer XLT, 100K mi., 5.0L V8, gd. cond., \$6,000. 562/477-0063.

'96 FORD Explorer SUV, excellent condition, 69,000 miles, loaded, leather seats, 4WD, 6 cyl., auto, 6-deck CD, must see to appreciate, \$7,995. 244-5489.

'90 FORD Bronco II XLT, 4 x 4, 97K mi., auto, a/c, cruise cont., pwr. steering/brakes/windows/ door locks, tinted windows, low restriction exhaust, looks nice, runs well, gd. tires, new smog cert., e-mail kiwixplant@adelphia.net for pictures, \$1,600. 805/523-7782, after 6 p.m.

'99 GMC Yukon Denali, 76K mi., loaded, 4WD, leather, 6-CD changer, exc. cond., \$16,000/obo. 800/937-9200, Levi or Cathy.

'01 HONDA CBR 929RR, 4K mi., bought brand new in '03, \$6,700/obo. 661/251-1590.

'93 HONDA Del Sol, exc cond., auto, a/c, targa top, radio/tape, remote/alarm, pics at www.hotplasma.com/delsol.htm, \$2,900/obo. 626/286-3037.

'88 HONDA Accord, 4 dr., auto, trans., a/c, power dr. lock, 87K mi., new cond., \$2,500. 909/629-2891.

'98 LEXUS ES 300, premium sound system, loaded, 85K mi., \$10,000. 645-2478.

'94 LEXUS LS 400, champagne, immaculate cond, inside & out, all service records available, leather in pristine condition, special chrome rims and wheels, new stereo, 157K mi., \$8,400/obo. 468-0603, Walter Victor.

'90 LEXUS ES 250, exc. cond., 130K mi., \$6,500/obo. 957-2421.

'95 MAZDA MPV LX van, dual a/c, CD changer, exc. cond., 138K mi., runs great, beige color, \$3,800. 562/695-5197.

'97 MERCEDES BENZ 420, only 71K mi., exc. cond., loaded, black on black, \$18,200. 406-2928.

TIRES (4), P285 60R16, \$25/ea. 897-1203, Valerie.

Free

CLEAN FILL DIRT, 20 cu. yds. avail., haul as little or as much as you like, near Los Robles/Jackson, Pasadena. 626/791-3103, dtrask6@its.caltech.edu.

COMPOSTER, free-standing, tumbler-style, w/instructions; CARDBOARD BOXES, left over from moving. 610-8445, Harold or Torrie.

JACKETS, size 18, hardly worn: pink, Sag Harbor; navy, Radcliffe; soft floral on beige background, Radcliffe; all 3 have roll-up sleeves. 626/449-0997.

MISC: lg. wooden work bench, commercially fabricated, w/3 drawers & electrical hook-ups, 35" D x 66" W x 32" H, top shelf 17" D, 66" W; table saw, very old Craftsman, mounted on stand w/wheels; electric planer for wood, very old, mounted on stand w/wheels; drill press, old, lg., commercial, floor mounted, converted to 110V; air compressor, commercial, old, lg, gas engine, street tire mounted (trailer); countertop, lg., thick stainless steel mounted on plywood, 12" H back-splash, 24" D x 66" W. 626/794-0455.

TRAMPOLINE, 14' round, you pick up, close to Lab. 952-7940, Mickie.

Lost & Found

Found: Glasses, in 180-903. Ext. 4-3406, Donna.

Wanted

CARPOOLERS from La Verne area, hours 7 a.m. – 3:45 p.m. Ext. 3-2555, Dawn.

DRUM SET, 3 piece, with cymbals and stool, for beginner. 541-9091.

HOUSE RENTAL, somewhere between LAX, Santa Monica and JPL. 562/477-0063.

HOUSE / APT. RENTAL, 1 or 2 bd., for new JPL postdoc (working at Caltech) for initial 11 mo. from late Aug., prefer semi-furn. & close to transport. dlondish@hotmail.com, Diana.

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

VANPOOL RIDERS from Victor Valley/Hesperia. Ext. 4-1424, Scott.

VOLLEYBALL PLAYERS, coed, no beginners please, Tues. nights 8 to 10 p.m. at Eagle

Rock High School, \$4/nt. 956-1744, Barbara.

WASHER/DRYER, stackable unit. 952-7940, Mickie.

For Rent

ALTADENA "sabbatical house," 3 bd., study, boundary Angeles Nat'l Forest, 3 mi./JPL (trails to Lab behind house), view, hardwood floors, antiques; completely furn. including dinnerware, utensils, pots/pans, bed linens & towels, fine soaps, necessities incl.; just bring toothbrush & clothes; TV/DVD/VHS, Dish satellite, wireless DSL; garden, fruit trees, BBQ, parking; priv., immaculate; month-month rent. 626/798-3235.

ARCADIA apt., 2 bd. + den, 1 ba., garage, remodeled kitchen, refrigerator/washer/dryer in unit, a/c, dishwasher; spacious, walking distance to shops, exc. neighborhood, no pets, water/gardener/trash included, \$1,350 + utilities & security deposit. 626/576-7333.

LA CANADA house, 3 bd., 3 ba., detached garage, new addition w/gourmet kitchen, > 2,000 sq. ft., dishwasher, a/c, laundry hookups, fireplace, spacious family room, private yard with fruit trees, La Cañada schools, \$3,000, water & gardener incl. 626/798-7276.

NORTH GLENDALE, 2 bd., 1 ba., duplex, hardwood floors, laundry, garage, extra parking, a/c, lg. bdrms, 819 N. Verdugo, \$1,325. 726-1270.

N. GLENDALE townhouse, 2 bd., 2 1/2 ba., tile and wood floors, 2-car garage, avail. Sept. 1, lease, \$2,050. 265-3855, Suraiya.

PASADENA, executive home in Upper Hastings Ranch, 3 bd., 2 ba., den, family room, newly remodeled kitchen and baths w/corrian and granite countertops, washer/dryer, central a/c & heat, gardener incl., \$2,950, lease required. 626/429-3677 or bettyrs@earthlink.net.

PASADENA, spacious very private rm. + priv. ba. in condo, prime location nr. Caltech, quiet, very clean, lg. closets, shared kitchen/liv. rm., lg. balcony/nice view (green trees), gated security garage, laundry in bldg., quiet male preferred, \$530 + \$35 util. 626/796-9221.

SAN MARINO home for lease, 3 bd., 1.5 ba., walking dist. to Carver Elementary and San Marino High, refrigerator, range, microwave (brand new), newly painted, cent. a/c + heat, alarm system, covered patio, 2-car attached garage, 1580 Bellwood Rd., \$3,200, includes gardener, trash and water. 714/553-8585, Richard Tan.

SAN MARINO house, 3 bd., 2 ba., 2-car garage w/automatic opener, newly painted, remodeled kitchen, dishwasher, a/c, laundry hookups, fireplace, spacious family rm. overlooking yard, no pets, exc. neighborhood and school district, \$3,200 + utilities & security deposit. 626/576-7333.

SYLMAR townhouse to share, spacious, 1 bd. with bath, close to 210 and 118 freeways, near shopping centers and restaurants, prefer male, non-smoker, no pets, asking \$800. 365-2098.

TUJUNGA home, 3 bd., 2 ba., 2,000 sq. ft., 2-story, gorgeous, private, hillside, 2-car attached garage, large lot, lots of parking, stove, dishwasher, heating/cooling, fireplace, beautiful large yard and garden, washer/dryer hookups, will consider pet, \$2,100 + \$2,500 security, available Aug. 5, prefer lease, will consider month to month. 352-3840, Jim.

VAN NUYS house, 2 bd., 2 ba., den could be 3rd bd., pool, lg. rms., central air/heat, 2.5 garage, close to fwys, shopping and schools; \$2,500 w/security deposit. 786-2289, 7-8 p.m., AJ Martinez.

Vacation Rentals

ARROWHEAD cabin, lake view, 6 max., \$140/wkends., \$350/wk., others available, security/cleaning deposit required. 818/952-6221, Mon.–Thur.: 909/337-1036, Fri.–Sun.

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

CAMBRIA house, ocean front, exceptional white water view, accom. up to 4 people, all amenities provided. 702/256-1359 & ereynolds2@cox.net.

FLORIDA condo, New Smyrna Beach, fully furnished, 2 bd., 2 ba., full kitchen, half hour to Cape Canaveral, quiet, relaxing, overlooking beach; BBQ, pool, game room, great ocean view, easy walk to stores and restaurants, sleeps 6; avail. weekly or monthly. 760/439-7821, Darlene or dhauge@yahoo.com.

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., low season rate \$115/nite/2, high season rate \$130/ nite/2, \$15/nite/add'l person. 949/348-8047 or jackandrandy@cox.net.

LAS VEGAS timeshare, 5-star resort, 7 nights, 1 bd., sleeps 4, must be 21 to register, Oct. 8–15, dates and location (Palm Springs, Tahoe, Utah, Dana Point, Ramona) can be changed. 626/447-4734.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, slps. 6–8, fully equip'd kitch. incl. microwave, D/W, cable TV, VCR, phone, balcony w/mtn. vw., Jacz., sauna, streams, fishponds, close to Mammoth Creek, JPL disc'nt. 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 room, 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 mi. away, priv. secure parking. 626/704-3906.

VANCOUVER, British Columbia, Metrotown, hotel voucher for 3 nights at the AAA, 4-diamond Hilton, next to BC's largest shopping/ent. center, only 1 block from Skytrain station, see at www.hiltonvancouver.com, expires Aug. 30, '04, \$150/obo. 714/996-9334, Steve.