

Odyssey begins with perfect launch



The 2001 Mars Odyssey spacecraft lifts off from Kennedy Space Center.



JPL and NASA's return to Mars began at 8:02 a.m. Pacific time on Saturday, April 7, as the 2001 Mars Odyssey spacecraft roared into space onboard a Delta II launch vehicle from Cape Canaveral Air Force Station, Fla.

About 53 minutes later, at 11:55 a.m., JPL flight controllers received the first signal from the spacecraft through the Deep Space Network station in Canberra, Australia indicating that all was well aboard the orbiter.

"I've never seen a more spectacular launch," said David A. Spencer, Odyssey's mission manager at JPL. "The spacecraft seems to be performing beautifully, and we're right on our timeline. This gives us a terrific start on our odyssey to Mars."

Among those who packed von Kármán Auditorium to view the launch were Spencer's wife, Sallie, and their sons, 5-year-old Jackson and 2-year-old Ben. The boys joined many other youngsters in the "Friends and Family" crowd who counted down the final seconds before launch. Sallie noted that Jackson knew that the mission "is looking for water on Mars."

Indeed, one of the orbiter's three science instruments, the thermal emission imaging system, will determine Mars' surface mineralogy, including providing data on localized deposits associated with hydrothermal and subsurface water. The gamma ray spectrometer instrument will play a lead role in determining the elemental makeup of the Martian surface. An experiment using this instrument and two neutron detectors role will possibly be able to calculate Mars' hydrogen abundance, thus inferring the presence of water.

The third instrument, called the Martian radiation environment experiment, will characterize aspects of the radiation environment both on the way to Mars and in the Martian orbit. The experiment will attempt to predict anticipated radiation doses that would be experienced by future astronauts and help determine possible effects of Martian radiation on human beings.

On Sunday, one day after launch, the Odyssey team reported that the mission was going exceedingly well.

Following acquisition of the spacecraft's signal by a Deep Space Network ground station at Canberra, Australia, shortly before 9 a.m. Pacific time Saturday, the mission team has continued to monitor the status of spacecraft subsystems, all of which are performing normally. Ground controllers established a two-way communication link between Mars Odyssey and Earth, enabling the navigation team to start collecting data to assess the spacecraft's flight path.

Among various housekeeping events Saturday, the team commanded the spacecraft to transmit to Earth at a high rate for playback of data recorded during launch. They also commanded a desaturation of the spacecraft's reaction wheels, a procedure in which the gyro-like devices are spun down in order to remove excess momentum. Ground con-



Dutch Slager / JPL Photo Lab

JPL's mission operations area in Building 264 is all smiles following the successful launch of 2001Mars Odyssey. In front of picture are mission manager David Spencer (left) and mission engineer Guy Beutelschies; at center is Marla Thornton, ground data systems engineering lead; in rear are lead navigator Robert Mase (left) and mission operations systems engineer Al Nakata.

trollers concluded that an alarm triggered shortly after launch by a temperature sensor on Odyssey's solar panel is not a concern. Saturday afternoon they switched to a ground station at Santiago, Chile, to communicate with the spacecraft. The project is using Santiago to fill gaps in its Deep Space Network tracking coverage during early cruise.

On Sunday morning the team commanded the spacecraft to transition from a "safe mode" it was in during launch to a normal operating mode. They also turned the spacecraft so that the medium-gain antenna that Odyssey is transmitting over is pointed toward Earth. The team then assessed the state of spacecraft subsystems, and in the afternoon sent a command to make the transition complete.

Early navigation calculations show that the magnitude of the first trajectory correction maneuver fine-tuning the spacecraft's flight path April 16 will be only 6 meters (about 20 feet) per second. Because that maneuver will be so small, propellant will be saved for use during Mars orbit insertion, aerobraking and the orbital mission.

The spacecraft will fire its thrusters in five small maneuvers designed to fine-tune its flight path to Mars. Odyssey will arrive at Mars on Oct. 24, when it will fire its main engine and be captured into Mars' orbit. It will spend about two months adjusting the orbit before beginning a four-year mission studying Mars.

Odyssey principal investigators at Arizona State University, the University of Arizona and NASA's Johnson Space Center will operate the science instruments. Lockheed Martin Astronautics in Denver is the prime contractor for the project, and developed and built the orbiter. Mission operations will be conducted jointly from Lockheed Martin and from JPL.

Final NASA budget proposal submitted to Congress

A final federal budget proposal for fiscal year 2002 released by the Bush administration on April 3 includes increased funding for NASA's Office of Space Science, which provides the lion's share of JPL's work.

The Office of Space Science received a proposed allocation of \$2.45 billion, \$132 million more than this year.

However, the proposed budget also includes an out-year plan for an increase in Office of Space Science funding to \$3.62 billion by FY '06. The Mars Exploration Program, part of the Office of Space Science, received a proposed \$430.9 million for FY '02, \$3.3 million more than this year.

The proposed budget also noted that future Mars funding would include:

- Formulation activity (phases A and B) for the 2005 Mars Reconnaissance Orbiter;
- Preformulation phases for Mars missions

beyond 2005, including a competitively selected 2007 Mars Scout mission, a highly capable 2007 Mars Smart Lander and Mobile Laboratory mission, and U.S. contributions to foreign Mars missions;

- Mars technology to lay the groundwork and provide new capabilities for Mars missions beyond 2005;

- Construction of a Deep Space Network 34-meter beam wave guide antenna and other DSN upgrades to reduce overload problems during Mars and other Office of Space Science missions' critical activities.

Also of interest to JPL was a proposed \$35 million in FY '02 and '03 for the construction of the new Flight Projects Center building. Construction on the facility, to be located near the intersection of Surveyor and Mariner roads, will begin in FY '02 and will be completed in FY '04.

The FY '02 budget proposal also includes an augmentation for the In-Space Transportation Initiative, which is led by NASA's Marshall Space Flight Center in Alabama. "JPL will play a significant role in that technology development activity," noted Doug Stetson, manager of JPL's Solar System Exploration Office. "Electric propulsion can benefit virtually all solar system exploration missions, including the inner solar system to Mars and smaller bodies," he said. "The technology can also be of significant benefit for outer-planets missions, including a future Pluto mission."

Funding for a Pluto mission was not included in the FY '02 budget proposal.

The proposed budget will now go to Congress, where it will be considered by Senate and House committees before expected approval next fall. FY '02 begins Oct. 1, 2001.

News Briefs



Space Place site receives award

The International Technology Education Association has presented the NASA/JPL "Space Place" outreach team with the organization's Presidential Citation "for efforts above and beyond the call of duty in service to the technology education profession."

Sponsored primarily by NASA's New Millennium Program, Space Place encompasses numerous educational products, including a Web site featuring space science- and technology-related activities at <http://spaceplace.jpl.nasa.gov>. Space Place also produces classroom activity articles published in the International Technology Education Association's monthly educator journal, monthly articles appearing on children's pages of five major metropolitan newspapers, and display materials and educational activities distributed through partnerships with museums, planetariums, libraries and community organizations nationwide.

Confidential screening available

JPL is offering employees and adult family members a free, anonymous and confidential screening for depression and alcohol problems. The program is designed to help individuals recognize the signs of depression and alcohol misuse and learn how and where to get help.

JPL's Employee Assistance Program says both illnesses are highly prevalent and can be treated. Between 17 million and 20 million Americans experience depression each year, and more than 14 million Americans have an unhealthy relationship with alcohol.

To participate in the screening, call (800) 390-7302 or go online to <http://www.mentalhealthscreening.org/screening>. The keyword is "health."

For more information, call the Employee Assistance Program at ext. 4-3680.

Electronic packaging conference set

The second annual NASA Electronic Parts and Packaging Conference on Electronic Parts, Packaging and Radiation Characterization for Space Applications will be held May 15 and 16 at the Pasadena Convention Center.

The conference, co-sponsored by the International Microelectronics and Packaging Society, carries no registration fees. For more information and to register, log on to <http://nepp.nasa.gov/pubs/socal01/index.htm>.

Mechanisms symposium set for May

NASA's Ames Research Center in Moffett Field, Calif. will host the 35th Aerospace Mechanisms Symposium May 9-11. The event will be held in nearby Sunnyvale.

More than 250 people attended last year's symposium, which promotes discussions of problems related to the design, fabrication, test and operational use of mechanisms. Thirty papers will be presented, with emphasis on hardware developments.

At least two JPL personnel reside on the organizing committee. The event rotates each year among eight NASA centers, and was hosted by JPL last year. For more information, call DONALD SEVILLA at ext. 4-2136 or log on to <http://www.aeromechanisms.com>.

Heritage Week logo contest open

JPL's American Heritage Week planning committee seeks entries for the annual event's theme and logo contest.

Entries must be the participant's original work and may not contain the trademarks, logos, copyrighted works or intellectual property of third parties.

Submittals are due by April 27 to KATHERINE YOUNKER at mail stop 238-524 or via e-mail. Prize winners will be announced May 1.

The 21st annual celebration will be held on Lab June 11 to 14.

JPL blood drives commended

The Southern California region of the American Red Cross recently praised JPL for blood drives held on Lab. The organization noted that during the Feb. 20-21 drive, 227 prospective donors provided 195 pints of blood—25 more than the organization's goal—and that approximately 585 patients will benefit.

LORETTA JAMES of the Occupational Health Services Office was given special thanks by the Red Cross for her coordination and recruitment efforts.

Saturday, May 19, at the east end of Foothill Blvd. The event is sponsored by the La Cañada Kiwanis Club, of which Gant is a member.

"We expect 60 to 65 racers to participate," Gant said. "Soap Box Derby racing is good, old-fashioned fun, appealing to both young people and their parents." He added that local winners are financially supported to travel to Akron, Ohio on July 28 for the national finals.

Gant said members of the JPL community are welcome to participate. "It would be great if one or more cars would be supported by JPL individuals, or perhaps organizational groups. Cars may be decorated as desired, including appropriate lettering, project logos, JPL decals, kids' names, and so forth."

For more information, call the Derby hotline at (818) 790-9901.

Retiree revives American tradition



Photo courtesy: Deborah Orlik

JPL retiree Daryal Gant with La Cañada resident Melissa Kent, 12, her dad, Ed, and her Soap Box Derby car. Last year, Melissa finished in 3rd place in the "super stock" car division at the national finals in Akron, Ohio.

JPL retiree Daryal Gant has discovered a great way to combine community service, helping local kids, and having fun.

Gant, who retired two years ago as director of Business Operations at the Lab, is the director of this year's La Cañada version of an American tradition, the Soap Box Derby.

He noted that former Lab Director Dr. William Pickering is among five JPL retirees involved with the event, and at least one current employee participates.

"Our first race, last May, was very successful, featuring 48 racers, ages 9 to 16," he said. "As part of our outreach program, we arranged for several young people from disadvantaged backgrounds to participate at no cost to them."

An upcoming race is set for

Architect development program accepting applications

JPL's Architect Development Program is now accepting applications for participants to join the two-year internship program starting in late summer of this year. Under the guidance of JPL's Center for Space Mission Architecture and Design, the program's purpose is to prepare JPL's next generation of mission architects who will design and implement future JPL missions.

Each year, two or three JPL employees are selected to participate in the program, in which interns work on a variety of projects in a number of disciplines. Each intern will have the opportunity to work with Team X (the Advanced Projects Design Team, comprising representatives from all the major spacecraft and mission subsystems). Program interns help develop mission proposals, become familiar with JPL tools in the automated design process, and work with JPL's industrial partners, gaining valuable perspective on how

system design is performed. In addition, interns travel to other NASA centers, fill selected project-specific roles, and work within other JPL Centers of Excellence.

Program interns work with mentors, who from the outset help them plan their two-year internship, tailoring the program to meet individual areas of expertise, professional interests, and other needs. Training is also a critical part of the internship; participants have the opportunity to attend a variety of short courses offered through JPL, NASA and outside experts.

The program selection committee is seeking candidates with flight systems experience, strong technical and problem-solving skills, leadership in technical innovation, and the ability to mentor and help others succeed.

To be considered, an applicant must be a full-time, benefits-based employee, have a bachelor's

degree or equivalent work experience, and have a minimum of five years of work experience that includes significant flight systems background.

To apply for the program, submit a resume and a one- or two-page letter, with concurrence by your division manager, stating why you should be considered for the program. Those two documents should be sent to Maria Raygoza, Human Resources Staffing (M/S T1720-C) by Friday, May 25. (You and your division manager should also retain copies.) Applications of qualified candidates will be forwarded to the selection committee, which will interview finalists and select the program's class of 2003. All applicants will be informed of the selection committee's decision by July 2.

For additional information, visit the Architect Development Program's Web site at <http://eis/adp>.

Special Events Calendar

Ongoing Support Groups

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

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

End of Life Issues and Bereavement—Meets the second Monday of the month at noon in Building 111-117. Call the Employee Assistance Program at 4-3680.

Gay, Lesbian and Bisexual Support Group—Meets the first and third Fridays 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.

Parent Support Group—Meets the third Thursday of the month at noon in Building 167-111. Call Greg Hickey at ext. 4-0776.

Senior Caregivers Support Group—Meets the first Tuesday of the month in Building 167-111. Call the Employee Assistance Program at ext. 4-3680.

Friday, April 13

FolkMusic—Singer Priscilla Herdman will perform at 8 p.m. in Caltech's Dabney Lounge. Tickets are \$12 for adults, \$4 for children under 12. Call (626) 395-4652.

Tuesday, April 17

JPL Hiking+ Club—Jeff Booth of Section 311 will present a slide show titled "Hiking in the Inca's Footsteps: The Inca Trail through Dead Woman's Pass to Machu Picchu" at noon in Building 303-209.

Wednesday, April 18

Investment Advice—Fidelity will hold one-on-one counseling sessions from 9 a.m. to 3 p.m. in T1720. For an appointment, call (800) 642-7131.

JPL-Caltech Flying Club—The spring membership meeting will be held at 7:30 p.m. at 201 East Bridge Hall, Caltech. The club, which maintains six aircraft at El Monte Airport, invites JPL and Caltech staff. Guest speaker will be Barry Schiff, an aviation safety expert and former TWA captain.

Thursday, April 19

Von Kármán Lecture Series—Space Infrared Telescope Facility astronomer Dr. Michelle Thaller will present "Infrared Astronomy: More Than the Eyes Can See" at 7 p.m. in von Kármán Auditorium. Open to the public.

Working Parents Support Group—Susan Papalia, a Pasadena-based marriage and family therapist, will present "The Chore List: A Positive System for Teaching Children Independence and Responsibility" at noon in Building 180-703 (new location for this month only for the group). Call Gregory Hickey at 4-0776.

Friday, April 20

Von Kármán Lecture Series—Space Infrared Telescope Facility astronomer Dr. Michelle Thaller will present "Infrared Astronomy: More Than the Eyes Can See" at 7 p.m. in The Forum at Pasadena City College, 1570 E. Colorado Blvd. Open to the public.

Saturday, April 21

Caltech Jazz Festival—Seating is limited for this free event, to be held from 2 to 6 p.m. at Caltech's Dabney Gardens. Call (626) 395-4652.

Sovoso World Jazz A Cappella—This ensemble sings a mix of jazz, gospel, rhythm and blues, and other styles. They will perform at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$25, \$21 and \$17. Call (626) 395-4652.

Sunday, April 22

Chamber Music—Kathleen McIntosh on harpsichord, Janice Tipton on flute and Marlow Fisher on viola will perform at 3:30 p.m. in Caltech's Dabney Lounge. Admission is free. Call (626) 395-4652.

Tuesday, April 24

Dr. Stone's Farewell—The Human Resources Directorate will be serving a free lunch, on the mall and at the 303 cafeteria (JPL badges required) from 11 a.m. to 1 p.m. A farewell program for the director on the steps of Building 180 will follow, from 1:15 to 2 p.m.

Wednesday, April 25

Investment Advice—Fidelity will hold one-on-one counseling sessions from 9 a.m. to 3 p.m. in T1720. For an appointment, call (800) 642-7131.

JIT Vendor Fair—New product demonstrations, P-card information and more will be presented from 9 a.m. to 2 p.m. in von Kármán Auditorium and the mall.

JPL Toastmasters Club—Meeting at 5:30 p.m. in the Building 167 conference room. Guests welcome. Call Jim Raney at ext. 4-6301.

Thursday, April 26

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

JPL Information Providers Fair—The Library, Archives, and Records Section 643 will sponsor "Connecting Knowledge: Celebrating the Power of Networking" from 10 a.m. to 2 p.m. in the Library, Building 111-104. Information providers from across the Lab will offer 27 poster sessions and 10 online demonstrations; refreshments will be served; and a prize drawing will be held. For the program, log on to <http://beacon/infoindex.html>. Call Robert Powers, ext. 4-9263 or Teresa Bailey, ext. 4-9233.

Saturday, April 28

Ballet Folklorico Los Lupenos—Regional dances and authentic stories from Mexico will be featured at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$22, \$18 and \$14. Call (626) 395-4652.

How Cool Is This?

By Mark Whalen

JPL engineer
welcomes
the chance
to help kids
build robots

More than 30 JPL engineers helped high school students prepare for a local regional of a robotics competition called For Inspiration and Recognition of Science and Technology (FIRST), held last month (the national competition—for which JPL sponsored seven teams—was held April 6 and 7). The goal is to generate in kids an interest in science and technology through hands-on activities, and to foster teamwork. One JPL engineer, Kevin Watson of Section 344, tells the story of how the experience inspired him as well.



QUESTION How long have you been at JPL? What are you working on right now?

A I've been at JPL for 16 years. I'm working on the electronics for the Rocky 8 rover, which is a testbed for future rover technologies.

I'm also working with a group of scientists here to develop a sensor array that detects and classifies oxidants on the surface of Mars. We wrote a well-received Discovery proposal called MAOS—Mars Atmospheric Oxidant Sensor. I would be responsible for developing the avionics.

It turns out that the proposal couldn't be funded, but it looks like it might turn into a technology program until we can fly it, perhaps in 2005 or 2007.

QUESTION How did you get involved with FIRST?

A For many years, I've been thinking about how fun it might be to work with kids. But I didn't quite know how to do it. You can't invite a bunch of high school kids into your flight laboratory and have them help you with millions of dollars worth of flight hardware.

But what has irked me for years is that many kids consider sports stars as their role models. Athletics are great, but what chance do kids actually have of becoming a Shaq [Lakers' star Shaquille O'Neal]? There's so little chance of that, and the kids get so little intellectual stimulation.

About a year ago, I was working with Rob Steele on Rocky 8, and he told me about the FIRST competition he was involved with. And immediately I said, "Sign me up." I was worried that there would be hundreds of engineers who would jump on this. I thought I might not get to work with the kids. But it turns out that only a handful volunteered to do it. Maybe they didn't understand how cool this is. After just talking to Rob for a couple of minutes, I thought this sounded great.

Early this year, at a kickoff meeting in New Hampshire, I heard a speech from the founder of the competition, Dean Kamen. His goals in forming FIRST were exactly how I looked at it: to have scientists and engineers be the new role models for kids. He wanted to team engineers from industry — and places like JPL — with high school kids and teachers to build sophisticated robots and have them compete in an elaborate game.

QUESTION Did you work with kids from just one school?

A Yes. I worked with kids from Crescenta Valley High School in La Crescenta. I had attended school there as a kid and it was among the schools that indicated they wanted engineering support. I was also fortunate in that the teacher helping the Crescenta Valley kids was Greg Neat, who also works at JPL. I've known Greg for a long time. Soon it became clear that our team would need some help in the mechanical engineering area. I approached Dan Helmick, who was also working on Rocky 8, to help out. Being really busy and not knowing what FIRST was all about, he was initially reluctant to spend any time on it. After seeing how much fun it was to work with the kids, Dan came around and was able to help us out a few hours a week.

QUESTION How was it going back to your old school? Did you meet anyone else you had known?

A It was very strange going back there. I don't think she realized it, but the current co-principal was my English teacher. I wasn't a particularly good English student, otherwise I would have mentioned it to her (laughs).

QUESTION Were a lot of the kids pretty savvy about being able to build the robots?

A At first, I thought it would be hard to find many kids who would participate, or many who would take it seriously. But it was clear early on that we had a great group of kids, a core group of six or seven. Quite a few were adept at programming; some were good at building structures; one put the electronics together with absolutely no help from me. One day the electronics were in complete disarray; the next time I showed up, everything had been mounted and correctly wired. I was very proud of the kids at that moment.

QUESTION FIRST is a competition to inspire kids. How has this experience inspired you? I heard that doing this changed your life. True?

A That's not an exaggeration; this was truly life-changing. Again, I wanted to bring kids in and show them all of the cool stuff we do here. And bringing in kids from college would be like preaching to the choir—they already know what they're going to do. When I was in high school, I would have given anything to participate in this type of activity. So to be able to influence kids who didn't have a clue as to what they're going to do with themselves, that's wonderful.

QUESTION What did the kids gain from this experience?

A I was told by two of the kids that this competition has had a huge impact on them, and that they have changed their majors in college. Also, many of them changed their opinions of what engineers and scientists are like. Just as some of the kids base their impressions of sports stars on how they are glamorized by the media, they previously saw engineers and scientists as "geeks," wearing lab coats and thick glasses and not having any fun.

QUESTION Will you participate in FIRST next year?

A Absolutely; in fact, I want to do more. The Southern California regional is going to grow, and I'm going to work hard to sign up a lot of schools. That will be done by just calling up schools to see if they want to be a part of it.

There's already a meeting set up for this month with La Canada High School. Also, I am going to help Greg Neat to develop a curriculum for a high school class at Crescenta Valley, which will be offered next year. It'll cover fundamental engineering, including topics like basic control theory, fundamental mechanisms and so forth. We'll finalize it over the summer, and may adapt some material from other curricula that have already been developed.

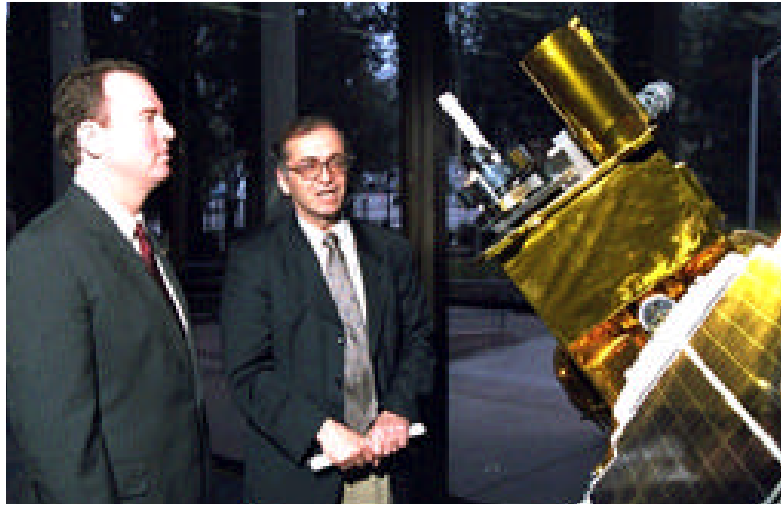
When you watch a kid figure out how a mechanism or computer program works, you can see it in their eyes—they just light up. And that's why this has been truly life-changing for me.

"When I was in high school, I would have given anything to participate in this type of activity."

— Kevin Watson,
who helped high school
kids build robots

Congressman Schiff visits Lab

Photo courtesy of Paddy Rice



Congressman Adam Schiff and members of his Washington, D.C. and Pasadena staffs toured JPL March 23 as part of a two-day staff retreat. The group was hosted by Space and Earth Sciences Director Dr. Charles Elachi and Deputy Director Larry Dumas, and was briefed on JPL's history, missions and operations; the mission control center; the latest results from the Galileo Millennium Mission; the Extra-Terrestrial Materials Simulation Lab; and the field integrated and design operations (FIDO) rover. Schiff represents the 27th congressional District, which includes JPL. At left, Elachi shows Schiff a model of Mars Global Surveyor.

Letters

I would like to thank my friends and colleagues for the great retirement party! Thanks particularly to Dean Pruitt and Marti Neale for planning and organizing; to William Rafferty for being a great boss and for his very nice comments; and to Beverly Shank for taking pictures. The food and setting were excellent, and the gifts were great and are already being enjoyed. The best part, however, was having so many of my friends there, and to recall many good memories with each of you. It was nice to have this opportunity to share the great start of my retirement. Thanks for your friendship over the short 39 years.

Nate Burrow

Thanks to Steve Synnott, Sharon Pasos, Carroll Duarte and all those JPL friends who made my retirement party a memorable occasion. Special thanks also for the beautiful flower arrangement and gifts.

George Null, Section 312

On behalf of my family and myself, I would like to thank the ERC for the beautiful ficus plant sent to commemorate my mother's passing.

Joanne Mintz

While my father died at age 95 and had lived a great life, it's still hard to say goodbye. However, our grief was eased by the many wonderful cards and notes sent by so many in the JPL community. Thank you all. A special thanks goes to my staff for their beautiful flowers and to ERC for a lovely plant.

Bill Weber

Passings

KENT WEAKS, 75, a retired senior engineer in Section 333, died of cardiac arrest Feb. 22 at his home in Oregon.

Weaks joined JPL in 1964 and retired in 1987. He is survived by his wife, Mary, five children and nine grandchildren.

DONALD FELLER, 78, a retired senior engineer in Section 345, died of cardiac arrest March 7 at his home in South Pasadena.

Feller worked at the Lab from 1978-84. He is survived by his wife, Constance, two children and four grandchildren.

Services were private.

PHILIP CARPENTER, 92, a retired mechanical technician in Section 352, died of natural causes March 13 at his home in Pasadena.

Carpenter joined JPL in 1947 and retired in 1976. He is survived by son Dennis and daughter Phyllis, two grandchildren and four great grandchildren.

Services were private.

Correction

In the March 30 issue of Universe, the list of employees who retired in March should have indicated that retiree Richard Messersmith worked at JPL for 40 years.

Classifieds

For Sale

ART WORK, 2 custom-finished wood-framed posters, ea. about 32" H by 20" W, ideal decorative items for fam. rm., office or den, \$32/ea. 236-4869.

BABY ITEMS: 2 Evenflo infant car seats w/ luggage-style handles, Looney Tunes charac., hardly used, exc. cond., \$30/ea. 626/443-9774.

BIRD CAGE, round, black, used 1 week, 32" high by 26" across, pd. \$60, sell for \$40/obo. 249-0573.

CELL PHONE ACCESSORIES, Nokia clear cases with swivel belt clip, 6100 series \$6, model 8290 \$8. 714/903-8888.

COFFEE, Kona, top of the line, 100% pure, sun dried, hand picked fr. top-quality trees, rich dark roast, ltd supply, discount 45% at introductory price of \$21/lb. 626/584-9632.

COFFEE TABLE, solid oak, 30" x 30" x 19 1/2", butcher block top, gd cond, \$40. 249-1523.

CONCERT TICKETS, N'Sync, July 24 at 7:30 p.m., Rose Bowl, plenty of tickets, best offer. 626/374-9464, after 8 p.m.

COPIER, Xerox model 5322, makes 2-sided copies, 10 sorting trays, takes all paper sizes, bypass feeder, zoom and more, service contract in place, \$1,195. 957-8813.

COUCH, futon style, queen size, good for starting out, green cover, maple wood color, \$70/obo. 626/792-8272.

DESK/CHAIR, antique mahogany, rolltop, \$1,500; **TABLES**, 2 custom rod iron indoor/outdoor, heavy glass top, \$2,500; **COUCH**, sectional, beige, almost new, \$300; **COFFEE TABLE**, \$75; **TABLES**, 4 stacked, \$200; **BAR CART**, \$150; **TOYS**, child's bike, etc, best offer. 248-8853.

DESK, Steelcase, woodgrain laminate top, side board for typewriter, and black leather executive chair, exc. cond., \$300/all. 790-4028.

DISHWASHER, Sears Kenmore, old but works perfectly, \$75; **CONVECTION OVEN**, GE, profile under counter or in wall, 30" wide, 220V, exc. cond. \$500; **HOT TUB**, Redwood, barrel nds. to be assembled w/gas heater & pump, pick up in Cyn. Country, \$400. 653-2000, Stan.

DVD, Kiss the Girls, \$15; Friday the 13th, \$10. 714/903-8888.

DVD/CD PLAYER, Toshiba SD 2150, dual disk, w/remote, Dolby digital, brand new, used 1 mo., orig. box & packing, \$175. 626/851-1303, Jay.

FABRIC for quilters/crafters, 100s of first quality, 1-yard cuts, \$2/ea. 626/449-4797.

FAX PRINT CARTRIDGES, Brother, 2 new PC-201 for use with fax 1010/1020/1030, fax 1170/1270/1570MC, MFC-1770/1970, \$10/each. 626/443-9774.

FREEZER, upright, 13.1 cu. ft., old but fair condition, \$150. 957-3675.

FURNITURE: din. rm./bedroom/living rm. sets, side chair, http://home.earthlink.net/~elrey10 for pictures, info, prices. 909/482-4425.

FUTON/BED with full pad, light Brazilian hardwood, exc. cond., \$175/obo. 626/355-7852.

GOLF BALLS, used, \$.25/ball or donation goes to pet rescue organization. 626/792-8272

GOLF CLUBS, classic graphite shaft, clubs P-3, Taylor-made Bubble II driver #1, Adams tight lies driver #3, ass'd putters & wedges, with bag & cart, exc. cond. 626/287-1025.

LAWNMOWER, Sears, gas, 3.5 HP, Briggs & Stratton eng. \$65; **GOLF CLUBS**, complete set, MacGregor, Jack Nicklaus VIP model, inc. bag, \$125. 626/799-5534.

MASSAGE CHAIR, used 5 times, EarthLite's "The Traveler" with carrying case and video, normally sells for \$489, sell for \$400. 893-3108, Carole.

MATTRESS COVER, comfortable Cuddle Ewe, soft support, CA king, 2" thick, wool, exc. cond., retail for \$350, sell \$150; **FEATHER BED**, down, CA king, gd cond., \$50. 957-8813.

PLANT STAND, lighted, 3 tier, on wheels, bulbs included, 60" high, 52" long, very good cond., \$300/obo. 248-8636.

REFRIGERATOR/FREEZER, General Electric, frost-free, 14.2 cu. ft., light almond color, runs well, \$100. 626/798-0329.

SCANNER, flatbed, HP ScanJet 5200C, Plug & Play, with OCR, works w/all operating systems, \$150/obo. 726-7701.

SKI PACKAGE, Atomic perf. RSL 180, Tyrola 290 D bindings & poles, \$50. 626/799-5534.

STAMPS, State Duck 1985-90, catalogue value \$2,700, sell \$1,200/obo. 626/433-8552, pager.

TABLE, dinette, square glass top 5' x 5' w/ metal feet and 4 matching chairs, \$800/obo; **BAR STOOLS**, 4 matching, metal frame, all in superb cond., \$400/obo. 626/398-3480.

Vehicles/Accessories

'90 ACURA Integra LS, 2-dr. hatchbk., white ext., navy int., 148K mi., exc. cond., well maint., auto. trans., a/c, cass./radio, pwr. steering, sunroof, cruise cont., gd. tires, tilt strng. whl, 27 mpg., \$4,200. 626/303-6064.

'84 AUDI 4000 S, yellow, 4 dr., 5 speed, 149K, runs very well, all service records available, \$1,200. 247-1806, after 6 p.m.

'89 CHEVROLET S10 Blazer, V6, auto, 2x2, A/C, pwr wndws/dr. locks, am/fm/cassette, cruise ctrl., tilt whl., tinted wndws., tow pkg., lug. rack, full-size spare, 128K mi., well-maintained, \$3,750. 626/794-1716.

'92 DODGE Shadow, white, auto, a/c, 114K miles, good cond., \$3,000/obo. 626/398-7573.

'97 FORD Explorer XLT, only 29K mi., new tires and brakes, all dealer servicing, exc. cond., \$14,500. 626/355-5631.

'96 FORD Explorer XLT, exc. cond., lthr, all electric, pwr. windows/doorlocks/seats, cruise contr., 6 cyl., 48K miles, roof rack, front/rear a/c, alloy whls, loaded, \$16,999/obo. 310/451-5919.

'78 FORD Fairmont, new tires/brakes/exhaust manifold/tuneup, am/fm, overall good cond., 98K miles, \$2,700. 626/355-5631.

'97 HONDA CRV, 4 WD, 53K miles, loaded, AT, alloys, ABS, new tires, exc. cond., original owner, very clean, \$14,995. 949/588-6545.

'84 HONDA CRX, red, 5 spd., rebuilt engine, runs great, 160K miles, needs body work, \$950. 626/289-3373.

'81 HONDA GL 500 Silverwing motorcycle, clean, no leakage, top cond., \$1,000/obo. 626/433-8552, pager.

'98 JEEP Wrangler Sahara, green w/ltan top, 5 spd., air, cruise, alloy wheels, 30" off-road pkg., Dana 44 axle, 50,000 miles, \$17,000. 661/297-3815, evenings, Paul.

'96 MAZDA B2000, long bed, 65,000 mi, black, gd cond., take over \$278/mo. payments for a little over 3 yrs. 545-9435 or 521-3673 cell.

'94 MAZDA 626 ES sedan, 4 dr., V6, silver w/gray leather int., auto, a/c, pwr s/w/d/l, cc, AM/FM stereo/cass, ABS, moonroof, alloy whls., exc. cond., all maint. records, \$4,950. 830-8993, eve. & wkend. or 903-8979, cell.

'91 MITSUBISHI Eclipse GLX, red/black, 5 spd, turbo, AWD, am/fm/cass. prem. sound, pwr windows/doors, new clutch, runs great, 1 owner, needs new antenna, 112K mi., \$2,900. 626/798-8065.

'90 NISSAN Pathfinder SE, V6, 4 dr., blk, 4 X 4, auto, 125K mi., good cond., new tires, \$8,100/obo. 626/577-5685.

'99 ROCKWOOD Trailer RV, 18', sleeps 6, shower, furnace, a/c, large fridge, range with oven, awning, stereo, RV cover incl., \$8,800. 363-7064.

'99 SATURN SC 2, 3 dr., 5 spd., blue ext., gray int., a/c, pwr. locks/windows/sunroof, am/fm/cd, alloy wheels, prepaid 5-yr./60K svc. plan, 3-yr./36K warranty, 25K mi., \$12,500/obo. 626/798-4265.

'95 SATURN SL sedan, 5 spd., white exterior, gray interior, A/C, 74,000 miles, exc. running cond., good physical cond., mileage 27/city, 37/freeway, am/fm/tape, no accidents, \$4,900/obo. 957-5742.

'95 TOYOTA Tacoma SR5, V6, 3.0 liter, extra cab, 5 spd., manual trans, 4W drive, most extras including shell with carpet kit, alarm, 91,000 miles, \$11,500. 790-5229, Steve.

'93 VOLVO 240 wagon, 81K miles, teal green metallic, automatic, a/c, am/fm/cassette, 3rd seat, roof rack, great family car, just had 80K service, new brakes, Blue Book is \$13,500, sell \$12,000. 626/791-4206.

'65 VW notchback, red, 2 dr., seats 4, Porsche alloy rims, CD, Kenwd. stereo, new upholstery, lic. 2WJ138, needs work, \$3,500/obo. 626/794-0652.

Wanted

CARPOOLER for existing 4-person pool, each drives 1 day/lwk, meet at Diamond Bar Park and Ride on Diamond Bar Blvd, work hours: M-Th, 7:30-4:15, Friday leave at 4 p.m. Ferne Griffin, 4-8583 or Sandy Itatani, 4-6954.

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

Free

STOVE/OVEN, old but works, pick up in Canyon Country. 653-2000.

Lost & Found

Lost: Men's glasses on 4/2, black wire frames, Dick at 4-3906 or 951-8067.

Lost: Black men's sports jacket, Enrico at 4-0478.

For Rent

ALTADENA house, 2 bd., 2 ba., hardwood floors, f/p, attached 2-car garage w/space for laundry facilities, fenced yd, on a priv. st., water, garbage and gardener included, avail. May 1, \$1,200. 626/798-3640, after April 15.

LA CANADA/FLINTRIDGE, separate sm. rm w/ bathrm, a/c, partially furn., gated separate entr., temporary OK, close to JPL, very private, \$575. 790-1893.

LA CRESCENTA, cozy 2 bd. house w/pool, private, high above Foothill, \$1,450. 952-6007.

MONTROSE apt., lg. 1 bd., 10 min. from JPL, \$675. 626/445-0884.

EAGLE ROCK house, lg. 2 bd. + office, hilltop garage, yd, view, wood floors, f/p, a/c, fridge, stove, microwave, laundry, totally remodeled, gated, 5849 Buena Vista Terrace, L.A. 90042, \$1,450 + security, 1st and last. 790-1893.

SOUTH PASADENA, furn. studio, gd area, 1718 Huntington Dr., betw. Marengo and Milan Sts., util. incl., parking space & laundry facil., no pets, \$700. 626/792-9053, Marilyn.

SYLMAR, spacious new home, option to buy, 4 bd., 3.5 ba., den, bonus rm., f/p, 2,500 sq. ft., 20 miles/JPL, gated community w/pool, near golf and mtns., \$2,295. 626/584-6526, Fred.

Real Estate

NORTH GLENDALE house, 4 bd., 2.5 ba., prime Emerald Isle area, 5 mi./JPL, attractive front vw., spacious back yd., master bd. suite, formal living & dining areas, comfortable fam. rm. w/wet bar, exc. cond., \$568,000. 244-3060.

Vacation Rental

BIG BEAR cabin, quiet area, walk to village, 2 bd., sleeps 8, completely furnished, f/p, TV/VCR, \$75/night. 249-8515.

BIG BEAR LAKEFRONT lux. townhome, 2 decks, tennis, pool/spa, nr. skiing, beaut. master bdrm. suite, sleeps 6. 949/786-6548.

CAMBRIA, ocean front house, sleeps up to 4, excellent view. 248-8853.

HAWAII, Kona, on 166 feet of ocean front on Keauhou Bay, private house & guest house comfortably sleep 6, 3 bd., 2 ba., rustic, relaxing & beautiful, swimming, snorkeling, fishing, spectacular views, near restaurants, golf courses and other attractions. 626/584-9632.

HAWAII, Maui condo, NW coast on beach w/ocean view, 25 ft. fr. surf, 1 bd. w/loft, compl. furn., phone, color TV, VCR, mcrow., d/w, pool, priv. lanai, slps. 4, 4/15-12/14 \$105/nt./2, 12/15-4/14 \$120/nt./2. \$10/nt. add'l person. 949/348-8047.

LAKE ARROWHEAD house, 4 bd., 2.5 ba., sleeps 10, secluded, relaxing, woody area of Cedar Glen, http://www.highcountryrents.com/cedar_run.html for pictures/rates, JPLers who book directly w/owner for 2 weekends get 1 + cleaning fees. \$370/weekend. 626/403-0446, owner.

MAMMOTH, Chamonix condo, 2 bd., 2 full ba., slps. 6, fully eqpd elec. kitch., incl. microwave & extras, f/p & wood, color TV/VCR, cable, FM stereo, pool, o/d Jacz., game, rec. & laundry rms, conv. to lifts, shops, spec. events, spec. midweek rates, summer rates May 1. 249-8524.

MAMMOTH, Courchevel, walking distance to Canyon Lodge and lifts, 2 bd., 2 ba., sleeps 6, fully equipped unit. 661/255-7958.

MAMMOTH, Snowcreek, 2 bd., 2 ba., +loft, sleeps 6-8, fully equipped kitchen incl. microwave, d/w, cable TV/VCR, phone, balcony w/view to mtns., Jacuzzi, sauna, streams, fishponds, close to Mammoth Creek JPL discount. 626/798-9222 or 626/794-0455.

OCEANSIDE condo, fully furn. 2 bd., 2 ba., f/p, full kitchen, quiet, relaxing, beautiful setting, located at beachside, with barbeque, pool, spa, game room, grt ocean vw, easy walk to pier and restaurants, sleeps 6, 2-night min., available weekly or monthly. 909/981-7492 or dfhaug@yahoo.com, Jim or Darlene.

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

PACIFIC GROVE hse, 3 bd., 2 ba., f/p, cable, TV/VCR, stereo/CD, well-equipped kitch. w/ microwave, beaut. furn. close to golf, beaches, 17 Mile Dr., Aquarium, Cannery Row, JPL discount. 626/441-3265.

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. 626/794-3906.

SAN FRAN., Nob Hill honeymoon suite, slps. 2 max, full kitch., maid srvc, concierge, reserve early, \$125/nite, \$750/wk. 626/254-1550.

View this and previous issues of Universe online

http://universe.jpl.nasa.gov

Editor

Mark Whalen

Design & Layout

Adriane Jach
Audrey Riethle/
Design Services

Chief Photographer

Bob Brown/Photo Lab

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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 on ad cards, available at the ERC and the Universe office, Bldg. 186-118, or via e-mail to universe@jpl.nasa.gov.

Ads 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.

Universe

Jet Propulsion Laboratory

April 27, 2001
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See Universe in color — <http://universe.jpl.nasa.gov>

Thanks for the memories



Lab bids goodbye to Stone

By Mark Whalen

With heartfelt testimonials, gifts and a bit of humor, JPL said a fond farewell Tuesday to Dr. Ed Stone, who is retiring as Laboratory director after 10 distinguished years of leadership.

Stone, who was also feted with an April 23 retirement dinner at the Pasadena Hilton hotel attended by more than 300 people, received a number of gifts and tributes from Executive Council members and others on behalf of their organizations.

With his retirement, Stone should enjoy a less hectic travel schedule. Quipped Legislative and International Affairs Manager Dr. Rich O'Toole as he offered a bouquet of flowers to Stone's wife, Alice, "This is a small token for sending her husband away every week for the last 10 years on a trip to Washington."

Stone received approximately 80 letters from foreign space agencies, NASA and ex-JPLers. Among those were notes from Dr. Ed Weiler, NASA's associate director for space science, who called Stone "a model for me in my public service science career over the past two decades," and President George W. Bush (see left).

On behalf of JPL, Deputy Director Larry Dumas presented Stone with a cruise, where "Ed and Alice can choose to go either south through the Panama Canal or north through the Inlet passage to Alaska, and if they choose to go further than that they will either have to row or come up with their own money." Dumas also presented what he termed the last flight spare Voyager record cover, a model of the same discs that still fly aboard the twin Voyagers, launched in the late 1970s.

Dr. Michael Werner, project scientist for the Space Infrared Telescope Facility,

announced the establishment of the new Dr. Edward C. Stone Award for Outstanding Research Publication, which will



Bob Brown / JPL, PhotoLab

recognize publications by JPL science and technology researchers. Up to four awards will be given each year, with winners to receive a cash prize and "we hope, a modest research grant," Werner said.

Dr. Charles Elachi, who will become the new JPL director May 1, told Stone: "You saw the future and you took us there. Thank you very much for the legacy you are leaving."

JPLers reacted with applause when Mars Program Director Dr. Firouz Naderi noted what has most impressed him about Stone. "For such a brilliant man, (he is so) unaffected and unassuming. He's eminently approachable." Naderi presented Stone with a montage of Mars landscapes.

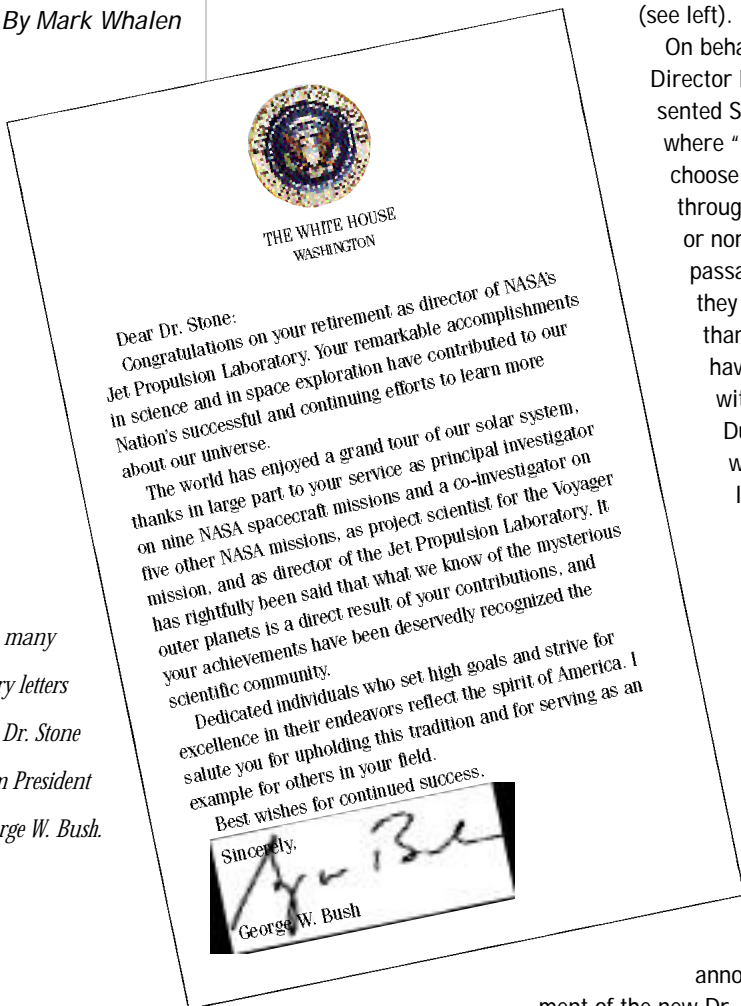
In addition to directorate representatives, Stone also received tributes and thanks from the Advisory Council for Women and the Advisory Committee for Minority Affairs for his support of the Lab's diversity efforts.

Stone thanked the gathering, noting, "This is a great way to end my wonderful 10 years at the Laboratory. At JPL, we get to do what no one else has done, and it's been a privilege for me to be a part of this great Laboratory; not just for the last 10 years, but actually since 1972, when I started on Voyager. The project continues, I hope for at least another 20 years, and I look forward to learning through that whole time period.

"The year after Voyager 2's encounter with Neptune, I was fortunate, once again, to be asked to become JPL's director beginning in January 1991.

"It wasn't always easy. But I'm especially pleased that, thanks to the efforts of everyone at the Laboratory, JPL continues to lead in this new era of frequent, lower-cost missions. I especially want to thank deputy directors Larry Dumas and Pete Lyman before him for what they have done for the Laboratory, making it possible for me to do the job I needed to do.

"I'd like to thank all of you for sharing your experience and by promising to do whatever I can to help you continue to expand the frontiers of space in the years ahead."



Among the many congratulatory letters received by Dr. Stone was one from President George W. Bush.

1 b e m e M A R S

Mars-bound Odyssey takes parting shots of Earth

By Mary Hardin

To see the color images of Earth provided by 2001 Mars Odyssey's Thermal Emission Imaging System, log on to <http://themis.asu.edu/latest.html>.

JPL's 2001 Mars Odyssey spacecraft turned its multipurpose camera homeward last week and took its first picture—a shot of a faint crescent Earth—as the spacecraft heads off toward its destination.

The image was taken as part of the calibration process for the Thermal Emission Imaging System, the camera system that is one of three science instrument packages on the spacecraft. The imaging system will study the Martian surface in both visible and infrared light and will help determine what minerals are present. It also will map landscapes on Mars at resolutions comparable to that of NASA's Landsat Earth-observing satellite.

"Not only was this a successful calibration of the instrument, it demonstrated that we can accurately point the spacecraft, and it put the team members through their paces," said David A. Spencer, the Odyssey mission manager at JPL.

"The spacecraft team did a fantastic job to

image the Earth," said Dr. Philip Christensen of Arizona State University, principal investigator for the THEMIS imaging system. "These images are spectacular, especially given how far away we were. They have given us the first-ever thermal-infrared view of Earth and the moon from interplanetary space."

The visible light image shows the night side of the crescent Earth looking toward the South Pole. Taken at the same time, the infrared image measures temperature, showing its "night-vision" capability to observe Earth even in the dark.

"The instrument measured a low surface temperature of minus 50 degrees Celsius (minus 58 degrees Fahrenheit) for Antarctica in winter, and a high of 9 degrees Celsius (48.2 degrees Fahrenheit) at night in Australia," Christensen said. "These temperatures agree remarkably well with observed temperatures of minus 63 degrees Celsius at Vostok Station in Antarctica, and 10 degrees

Celsius in Australia. Thus we demonstrated that the instrument can accurately measure temperatures, even from a distance of more than 3 million kilometers (2 million miles)."

These observations of Antarctica provide an excellent test for how the imaging system will perform at Mars, where afternoon temperatures are comparable to those in the winter night at Earth's South Pole. The Antarctic continent, which was uncharted less than 100 years ago, was the last landmass observed by Odyssey as it left Earth on its way to Mars.

The images were taken on April 19 and are available online at <http://themis.asu.edu/latest.html>.

The Odyssey spacecraft continues to be in excellent health with all its systems working normally. Odyssey is now more than 4.7 million kilometers (2.9 million miles) from Earth and traveling at a speed of about 3.3 kilometers per second (about 7,500 mph) relative to the Earth.

News Briefs



The Horsehead nebula as imaged by JPL's Wide Field and Planetary Camera 2.

100,000 pictures for WFPC2

As NASA's Hubble Space Telescope celebrates its 11th birthday, its JPL-built Wide Field and Planetary Camera 2 has added picture number 100,000 to its bulging photo album.

In honor of the birthday and by popular demand, the Hubble team has released a new WFPC2 image and an animation of the Horsehead nebula, available online at <http://www.jpl.nasa.gov/pictures/wfpc>.

Last year, 500,000 online voters, including students, teachers, and professional and amateur astronomers, chose the nebula as an astronomical target for Hubble to observe.

Acting Mars program director named

Mars Program Director G. SCOTT HUBBARD has left that position and as of May 6 will be replaced as acting director by ORLANDO FIGUEROA, currently NASA's deputy chief engineer for systems engineering.

Prior to his present position, Figueroa spent 22 years at NASA's Goddard Space Flight Center, where his experience includes engineering leadership positions with the Cosmic Background Explorer; manager for the Superfluid Helium On Orbit Transfer experiment, Small Explorers Project and the Explorers Program; and director of the Systems, Technology, and Advanced Concepts Directorate.

"It is a real privilege to rejoin the space science community," Figueroa said. "I look forward to building upon the foundation that Scott has left behind, and to the excitement of directing such an important and challenging program."

Mars sample return scenarios sought

The Mars Exploration Program has awarded four industry team contracts to conduct initial studies of specific implementation scenarios for a first Mars sample return mission that might be launched as early as 2011.

The four teams selected are Ball Aerospace & Technologies Corp., Boulder, Colo.; Boeing Company, Huntington Beach; Lockheed Martin Corp., Denver; and TRW, Redondo Beach.

The contracts are valued at \$1 million each and are to be performed over a six-month period.

The studies will formulate a broad suite of potential solutions to robotically acquiring rock and soil samples from Mars. NASA will select the best solutions for further development.

"These studies will help identify potential approaches to the mission, technology development and demonstration needs, and the infrastructure required to perform such a mission," said DR. FIROUZ NADERI, the Mars program manager at JPL. "The studies are an important part of determining potential future Mars program direction over the next decade."

Nanoscale system acquired

JPL has acquired one of the world's finest electron beam lithography systems, one that will allow researchers to work on the sub-molecular scale.

The system, operated in JPL's Micro-devices Laboratory, will allow breakthroughs in miniaturization that could

lead to significant reductions in mass and cost of spacecraft to look for traces of life on distant planets. For researchers, it means access to one of only three such systems in the world, and the only one in the public sector devoted to pure research for building the nano-scale devices of the future.

"We want to let researchers from universities, private industry and other government institutions know that we now have this capability and that it is available for their use," said JPL chief technologist DR. BARBARA WILSON.

"The E-Beam lithography system is like a very fast, very high-resolution camera, but instead of exposing photosensitive film to light, a thin layer of electron-sensitive material is exposed to electrons," said DR. PAUL MAKER, manager of JPL's Electron Beam Lithography Laboratory. "Instead of using a shutter that imprints the whole image at once, an intense electron beam focused to a tiny spot is rastered over the chip like the beam that creates the image on a television screen."

Kiwanis Club meeting set

An informational meeting will be held April 30 for the formation of a Kiwanis Club at JPL. Staff are invited to bring lunch to the meeting in Building 301-169 from 12:05 to 12:55 p.m.

Kiwanis is a worldwide service organization of nearly 300,000 members. Its primary goal is to improve people's lives, especially the needy, seniors and children, according to organizer VICTOR LEGERTON.

Included in the discussion will be the nature of the meetings and activities, benefits to members and to the Lab, and the expectations of members. Membership is open to all JPL employees and contractors. Especially encouraged to attend are those who participated in Key Club in high school or Circle K in college, both Kiwanis-sponsored organizations.

For more information, call Legerton at ext. 4-8838.

Ethics training available

The Ethics Office is scheduling and conducting classes for various group, section or division presentations. Ethics advisers are available to present at staff meetings, and training sessions last about one hour.

Call MARTHA AVIÑA at ext. 4-3154 to schedule a training session.

Summer camp is filling fast

Summer camp for the JPL/Caltech Child Educational Center is filling up fast. For best selection of dates and sites, enrollment applications need to be completed as soon as possible.

Camp begins June 25 and is offered at three locations: the CEC site near JPL; Paradise Canyon Elementary School in La Cañada; and the CEC site in Pasadena, near Caltech.

Full- and part-time schedules are available, as is tuition assistance for qualifying JPL and Caltech families.

To obtain a brochure and application or to arrange a site visit, call the CEC at ext. 4-3418 or go online to www.ceconline.org. Brochures are also available at the ERC.

Helin names asteroids in honor of Division 32 pair

Dutch Slager/JPL Photolab



Two JPL employees were honored in a ceremony earlier this month by having asteroids named after them.

Asteroid (17447) Heindl, discovered by JPL astronomer Eleanor Helin in 1990, was named for Dr. Clifford Heindl, deputy manager of Division 32, in recognition of his "outstanding contributions to the division and JPL." Asteroid (6856) Bethemmons, discovered by Helin in 1989, was named in honor of Elizabeth Emmons for her "exceptional contributions to Division 32 as its administrator."

Commemorative plaques were presented by Drs. Charles Elachi and Moustafa Chahine.

Helin discovered both asteroids at Palomar Observatory near San Diego.

Special Events Calendar

Ongoing Support Groups

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

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

End of Life Issues and Bereavement—Meets the second Monday of the month at noon. For location, call the JPL Employee Assistance Program at ext. 4-3680.

Gay, Lesbian and Bisexual Support Group—Meets the first and third Fridays of the month at noon in Building 125-133. Call the Employee Assistance Program at ext. 4-3680 or Randy Herrera at ext. 3-0664.

Parent Support Group—Meets the third Thursday of the month at noon. For location, call the JPL Employee Assistance Program at ext. 4-3680.

Senior Caregivers Support Group—Meets the first Tuesday of the month. For time and location, call the JPL Employee Assistance Program at ext. 4-3680.

Friday, April 27

Book Signing—Shane Crotty, author of *Ahead of the Curve*, a new biography of Caltech president Dr. David Baltimore, will be available to sign copies



of the book from 3 to 5 p.m. at the Athenaeum. Copies of the book, at \$29.95, will be available for purchase at that time. The book can also be ordered through the bookstore at http://bookstore.caltech.edu/html/bk_baltimore_curve.html; by e-mail at citbook@caltech.edu; by phone at (626) 395-6161; or at Caltech mail stop 1-51.

Saturday, April 28

Ballet Folklorico Los Lupenos—Regional dances, authentic stories and tableaus from Mexico will be featured. To be held at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$22, \$18 and \$14. For information, call (626) 395-4652.

Sunday, April 29

Chamber Music—Winners of the Coleman Chamber Ensemble Competition will perform at 3:30 p.m. in Caltech's Ramo Auditorium. Tickets are \$10. For information, call (626) 395-4652.

Skeptics Society Lecture—Los Angeles Times science writer K.C. Cole will present "The Hole in the Universe: How Scientists Peered Over the Edge of Emptiness and Found Everything" at 2 p.m. in Caltech's Baxter Lecture Hall. For information, call (626) 395-4652.

Tuesday, May 1

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

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

Wednesday, May 2

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

Music-on-the-Mall—The Bone Sharks will play the surfing sounds of the '60s from noon to 1 p.m. in the mall.

Thursday, May 3

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

Friday, May 4

National Anxiety Disorders Screening Day—At noon in Building 180-101, Dr. Barbara Carlson of Las Encinas Hospital will discuss methods for reducing stress from anxiety disorders such as nervousness, excessive worry, obsessive-compulsive behavior, phobias, sleeping problems and lack of concentration. Direct questions to the JPL Employee Assistance Program, ext. 4-3680.

Fri., May 4–Sat., May 5

Capitol Steps—Former Capitol Hill staffers spoof politicians and newsmakers with song parodies at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$32, \$28 and \$24. For information, call (626) 395-4652.

Sunday, May 6

Jazz Concert—The Jeff Hamilton Trio will perform at 3:30 p.m. in Caltech's Dabney Lounge. Admission is free. For information, call (626) 395-4652.

Monday, May 7

JPL 2001 Lecture Series—Michael Watkins and Ab Davis will discuss science opportunities and technical challenges of the Gravity Recovery and Climate Experiment (GRACE) mission, scheduled to launch in November. To be held at 11:15 a.m. in von Kármán Auditorium.

Tuesday, May 8

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

Wednesday, May 9

"In Praise of Permissiveness: Coaxing Cells to Make Novel Macromolecules"—Dr. David Tirrell, chair of Caltech's division of chemistry and chemical engineering, will speak at 8 p.m. in Beckman Auditorium. Admission is free. For information, call (626) 395-4652.

Information Technology Symposium—Hosted by the Center for Space Mission Information and Software Systems and the Office for Institutional Computing and Information Services, this event will offer a venue for celebrating JPL's IT community and its contributions, and for comparing notes on challenges, capabilities and accomplishments. Keynote addresses will precede more than 80 presentations and posters on IT work being performed on Lab. Thematic sessions include applications for missions, science and engineering, along with IT cross-cutting themes, infrastructure, and frontiers. For schedule, locations and pre-registration, log on to http://icis.jpl.nasa.gov/IT_Symposium/itsym2001.html. For more details, e-mail IT_Symposium@sven.jpl.nasa.gov or call Ed Ng, ext. 4-0166 or Sven Grenander, ext. 4-0156.

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

JPL Toastmasters Club—Meeting at 5:30 p.m. in the Building 167 conference room. Guests welcome. Call Jim Raney at ext. 4-6301.

Saturday, May 12

Bandorama—The Caltech Jazz Bands and Concert Band will perform at 8 p.m. in Beckman Auditorium. Admission is free. For information, call (626) 395-4652.

FAREWELL, DR. STONE

By Mark Whalen

DR. ED STONE, JPL'S DIRECTOR SINCE 1991, is stepping down on May 1. During his tenure, the Laboratory has overseen 15 missions for NASA. Stone's exploration days began in 1961 with his first cosmic-ray experiments on Discoverer satellites. He has been a principal investigator on nine NASA spacecraft missions and a co-investigator on five other NASA missions. One of his most famous contributions to space exploration is his continuing role as project scientist for the Voyager mission, whose twin spacecraft studied Jupiter, Saturn, Uranus and Neptune between 1979 and 1989. The Voyagers are still traveling in space and are expected to continue returning scientific information as they reach the outer bounds of our solar system in the next few years. Stone will return full time to Caltech as a professor and scientist, and a researcher still reaping the riches of Voyager data.



"I've gotten a lot of satisfaction from fostering opportunities for others like the opportunities I've had on Voyager."

— Dr. Edward Stone



Director
reminisces
about his
decade of
leadership

Bob Brown / JPL PhotoLab

QUESTION You began as JPL director in January 1991. Looking back on your tenure, has it turned out as you expected?

A No, not really. I did not anticipate all the changes. The nature of the program has changed dramatically from the 1980s, when we had five launches. In this new era, we've had 15 launches, and have had instruments on five other missions.

QUESTION What stands out for you when you think about the past decade?

A It's hard to imagine a more exciting decade than we've had. We have had many successes, and the level and the pace of innovation at the Laboratory has dramatically increased.

The thing I'm most pleased about is that the Laboratory continues to be the leading innovator in space in this third era of space exploration—which started with Mars Pathfinder—of going often, landing, and bringing samples back to Earth. For example, we have samples coming back from a comet in 2006 from the Stardust mission; this summer, we'll launch Genesis, which will bring back a sample of the sun.

QUESTION How do you see JPL beyond the next 10 years into the future?

A Well, the next era might be going and staying, building a permanent robotic base of operations elsewhere in the solar system, which through modern communications is as accessible as any place here on Earth. So what's out there becomes, effectively, back here. JPL could be a key factor in realizing such an era, which, I think, is a bridge to eventual human exploration of the bodies in the solar system.

QUESTION As the project scientist for Voyager, was it the most satisfying for you among all JPL missions? At the time, did you consider what Voyager's unprecedented tour of the solar system might mean to the future of NASA and the space program?

A Voyager was a unique experience for everybody involved, certainly for me. But as director of JPL, I've also gotten a lot of satisfaction from fostering opportunities for others like the opportunities I've had on Voyager.

During the Voyager mission, it was clear that none of us could have anticipated the degree of discovery we found. In that sense, it set a benchmark of exploratory robotic missions. Over that decade, from 1979 to the Neptune encounter in 1989, Voyager really engaged the public's imagination in space exploration.

QUESTION What has surprised you the most in terms of scientific discoveries?

A Well, there is always a long list of surprises, and from a science point of view it's the surprises that provide the most to be learned. If you find what you expect, that is always interesting, but it doesn't always create the same opportunities for new knowledge.

Voyager was replete with surprises, but one that was quite striking was the volcanoes on Io, a moon of Jupiter, that is 100 times more active volcanically than the entire Earth. But look at the surprises Galileo has given us at Jupiter, such as finding a magnetic field on Ganymede, and showing us that there's likely an ocean beneath Europa's icy crust. And Mars Global Surveyor has rediscovered Mars for us. The discovery of gullies on the canyon walls was not expected at all, since it was believed water was frozen kilometers beneath its crust.

I also expect there will be a lot to learn from the first digital topographic map of Earth that will be produced from the Shuttle Radar Topography Mission (SRTM).

QUESTION What were the lessons learned from the Mars 98 losses?

A We were changing to a new era of missions, and we found the limit. We tried to do two missions for the price of Mars Pathfinder, and it was just too hard. We've learned a lot from this and have put in place new processes and a better safety net so that today's project teams won't face the same limitations as we had with Mars 98. We will continue doing missions more often in this new era, but do them in a robust way.

QUESTION What will you be doing after May 1?

A I'll work more with my research group at Caltech, called the Space Radiation Lab. It's a group (Caltech professor) Robbie Vogt and I started almost 40 years ago that has focused on measuring the composition of energetic particles in space.

I'm looking forward to studying the Voyager data, as we're leaving the solar system and heading toward interstellar space; looking at more detailed data from an experiment I have on Galileo, called the Heavy Ion Counter, that measures sulfur and oxygen originating at Io; and analyzing data from the Advanced Composition Explorer (ACE), a mission that was launched in 1997 and is measuring the composition of matter from the sun.

I've been doing my research mostly on weekends, so I'm looking forward to doing these sorts of things during the week again.

QUESTION What about leisure time, when you're away from work?

A I'm looking forward to spending more time with my family. Both of our daughters and sons-in-law, along with our two grandsons, live in the area.

QUESTION Compared to when you became director, how different do you think it will be for Dr. Charles Elachi as he takes over May 1, and what are the main challenges the Lab faces now?

A Ten years ago, the number and size of JPL's projects was about to undergo significant change. There were five JPL missions launched in the 1980s. By comparison, five missions are scheduled to be launched in the next 16 months, with 14 more missions later this decade.

The challenge will be to assure the success of these missions, within affordable costs, that will allow the new pace of exploration to be maintained. This is the challenge of managing in the middle, with budgets and goals that are neither too large to be affordable nor too limited to be interesting and feasible with acceptably low risk.

QUESTION What will you remember most about the people of JPL?

A I've been energized by how much I have learned by working with everyone here. JPL is clearly the place to do what no one has done before. We can do that because everyone here is dedicated, motivated and remarkably innovative. That's the special character of JPL—it creates the environment and the opportunity for groups of people, together, to innovate new systems, ideas and approaches to push back the frontiers of space.

Letters

We would like to thank Section 369, Division 36 and all our friends at JPL for their support, prayers and the plant sent during the illness of Barbara's father, George Murphy, and his subsequent passing. The past year has been difficult, and without the support of our friends at JPL, it would have been unbearable. Thank you to the ERC for the beautiful plant sent in memory of a fine gentleman.

Erich and Barbara Corduan

The loss of our mother at the age of 85 has emptied our hearts. But the emptiness has been filled with the touches of kindness and considerations from our JPL friends. Thank you eternally!

Mits and Kathy Iwanaga

My family and I would like to express our sincere thanks and appreciation to my JPL friends and co-workers for their prayers, cards, expressions of sympathy and generous donation upon the death of my mother.

Vickie Wang

View this and previous issues of Universe online

<http://universe.jpl.nasa.gov>

Retirees

The following JPL employees retired in April:

George Javin, 43 years, Section 311; James Hix, 42 years, Section 355; Richard Dickinson, 39 years, Section 333; George Null, 39 years, Section 312; George Madrid Sr., 35 years, Section 368; Victor Tuk, 34 years, Section 388; Ross Goodman, 31 years, Section 366; E.Larry Noon, 29 years, Section 366; William Rousey, 29 years, Section 344; John South, 23 years, Section 344; Gloria Bell, 17 years, Section 313; Catherine Magnono, 16 years, Section 386.

Passings

ROBERT HOCKENSMITH, 71, a retired instrument specialist in Section 351, died of cancer Sept. 17, 2000.

Hockensmith worked at the Lab from 1974-95. He is survived by his wife, Mary, two children, three grandchildren and 1 great grandchild. Services were private.

GEORGE VOLLMER, 75, a retired engineering associate and member of the technical staff in Section 332, died of cancer March 18 at his home in Naples, Fla.

Vollmer worked at JPL from 1978-91. He is survived by his wife, Jean. Services were private.

THEODORE BALZER, 84, a retired supervisor in the former Section 631, died of heart failure March 22.

Balzer worked at JPL from 1964-91. He is survived by his wife, Patricia, three children and four grandchildren. Services were held March 30 at Palm Springs Mausoleum.

MARY LOU RYAN, 64, a senior office specialist in Section 708, died of cancer March 26.

Ryan had worked at the Lab since 1992. She is survived by her husband, Thomas, daughters Heida Jo Helm and Katherine Norris, and two grandchildren.

Services were held March 29 at Rose Hills Memorial Park in Whittier.

ROBERT HUNTE, 80, a retired senior security guard in Section 613, died of an aneurysm March 28 at his home in Pine Mountain Club.

Hunte joined JPL in 1966 and retired in 1986. He is survived by his wife, Charlotte, daughters Karen and Nancy, six grandchildren and five great grandchildren.

Services were held at Eternal Valley in Newhall.

JOHN KALVINSKAS, 74, a retired member of the technical staff in Section 355, died of Parkinson's disease March 29.

Kalvinskass worked at JPL from 1974-93. He is survived by son, Adrian. Memorial services were held April 19 at St. Philips in Pasadena.

Classifieds

For Sale

BBQ, Structo Golden Classic, approx. 1' x 2' on stand with propane, never used, \$90. 362-7187.

BIKE, mountain, Trek 990, 21 speed, steel frame, newer Rock Shox Indy front shock, gd. cond., \$275/obo. 626/797-2888.

BOOTS, ladies western, 6 1/2 m, tan, like new, HH West, \$10. 249-1523.

BURIAL PLOTS, Rose Hills Whittier, 2 plots, side by side, "Poplar Lawn," near Japanese gardens, \$1,500/ea. or \$2,500/both. 626/296-3782.

CAMERA, Leica, model Z2X with Databack and Zing case, perfect cond., \$250. 626/795-8340.

CD JEWEL CASES, 50, \$10; DIET TAPES, Jenny Craig, set of 14, \$50; COMPUTER POWER CONTROL CENTER, 5 power switches + 1 master switch, 5 surge-protected outlets + 2 modem/fax/phone jacks, new, \$20; ORGAN, Yamaha 415 electronic console w/13 pedals, 3 keyboards, 144 rhythm patterns, pd. \$7,500, sacrifice for \$3,000. 790-3899. CHINA CABINET, 1950s, Drexel mahogany, cash and carry, \$850. 353-9367.

COMPUTER, w/15" monitor, Micron desk-top, 266 MHz Intel Pentium II, 128 MB RAM, 52x CD ROM drive, 6.5 GB hard drive, 100 MB internal Zip drive, DSL ready 10/100 net card, \$450. 489-8197, Ken.

COPIER, Xerox model 5322, makes 2-sided copies, 10 sorting trays, takes all paper sizes, bypass feeder, zoom and more, service contract in place, \$1,125. 957-8813.

EXERCISE EQUIPMENT: Schwinn Airdyne with reading stand \$75; Nordic Trak with video, \$50. 790-6479.

EXERCISER, abdominal Ab Rocker, Body by Jake, like new, includes video and instruction manual, \$40. 367-0969.

FLOWERS, exotic tulips, planted from Holland bulbs in 6-in. plastic pots, in bloom or ready to bloom, \$10/pot. 323/726-7832, Ida.

FURNITURE: kitchen table set, Ethan Allen, hard maple, 48" dia. plus two leaves, 4 captain's chairs \$300; Queen Anne's high back chair and matching ottoman, blue velvet \$150. 626/355-0989.

LAWN MOWER, Murray Power Propeller, 21", 4 hp, Briggs & Stratton engine, used 3 times, sat for a year, \$90. 362-7187.

MATTRESS COVERS: comfortable Cuddle Care, soft support, CA king, 2" thick, wool, exc. cond., retail \$350, sell for \$125; feather mattress cover, down, CA king, gd. cond., \$50. 957-8813.

MISC: roll-top desk & chair, antq. mahogany, \$1,500; tables, 2 custom rod iron indoor/outdoor, heavy glass top, \$2,500; couch, sectional, beige, almost new, \$250; coffee tables, \$75. 4 stacked tables, \$200; bar cart, \$150; child's bike, toys, etc., best offer. 248-8853.

MULCH, cheap. 909/398-1854, Tom.

OFFICE FURNITURE: matching beechwood, for home/office, corner computer desk with printer shelf, 3-drawer locking file cabinet on rollers, cushioned desk chair, like new, \$325 for set, \$225 for desk alone. 790-0335.

OVEN, convection by Décor, self-cleaning, electric 220V, white, wall mount, \$150/obo. 626/584-9632.

RECORD PLAYER, Realistic, 4 speed, gd. cond., \$40; TOASTER OVEN, G.E., classic, vg. cond., \$20; COFFEE PERCOLATOR, 40 cup, stainless steel, electric, vg. cond., \$25. 626/793-1895.

SAW, Dewalt Builder's, 10" radial arm, model 3425, type A, with metal cabinet, model 9362, vg. cond., \$325. 790-3208.

STAMPS, state duck, 1985-90, catalogue value \$2,700, sell for \$1,200/obo. 626/433-8552, pager.

TABLE, dinette, square glass top 5' x 5' w/ metal ft. and 4 matching chairs, \$800/obo; BAR STOOLS, 4 matching, metal frame, all in superb cond., \$400/obo. 626/398-3480.

TREADMILL, ProForm space saver (folds up when not in use; programmable for speed and incline; many course and speed options; bought in 1998, but hardly used, \$500. 790-1979.

TYPEWRITER, antique Underwood, with cover, exc. cond., \$100 firm. 626/284-9664.

VACUUM, Hoover SteamVac Ultra, 5-brush agitator, super cond., like new, cost \$200, sell for \$130. 362-2003, Derek.

WASHER & DRYER, Kenmore, lg. capacity, used but work fine, \$50. 367-0969.

WINDOWS, alum. slider style, for home or mobile home, 5 each 3' h x 5' w, \$35/ea, one 3' h x 8' w, \$55, one 18 1/2" h x 22 1/2" w, \$16; STORM WINDOWS, alum. style, 5 each 47 1/4" h x 47 1/4" w \$65; STROLLERS: 2 umbrella, \$12/ea; 1 reg. fold up, \$16; SNOW SKI RACK, lg. car, \$75; SHED, metal, 5 1/2' d x 8' w x 5 1/2' h, still built, \$275, all are obo. 626/303-5595, Paul.

Vehicles/Accessories

'89 ACURA Legend LS, fully factory equipped, 1 owner, 170K miles but dealer replaced eng. at 70K miles, needs upholstery and touchup to a few items, mechanically good cond., 2NEN165, \$3,700/obo. 626/335-2460.

'94 CHEVROLET Blazer, only 67,000 mi., hi-output V6 Vortec eng., auto, pwr. win./dr., roof rack, exc. cond., \$9,950/obo. 626/969-7875.

'89 CHEVROLET S10 Blazer sport utility, auto V6, 2 X 2, a/c, pwr. wndws/doors, am/fm/cass., cruise ctrl., tilt whl., tinted wndws., tow pkg., lug. rack, full-sz. spare, 128K mi., well-maint., \$3,600. 626/794-1716.

'70 CHEVROLET Chevelle Malibu, 2 dr., hard top, classic muscle car, 1-year-old paint, (Chevy med. grn), new headliner/some interior, window tinting, weather stripping, new

chrome on bumpers, tires, eng./trans., mounts & more, Centerline rims, 350 eng., auto trans., runs great, 159,000 orig. mi., photos at Pj1mktg@aol.com, \$7,600/obo. 626/303-5595, Paul.

'92 CHRYSLER LeBaron convertible, V6, auto, 109K mi., red w/blk top, alloy wheels, pwr. everything, CD, great car, \$4,800/obo. 626/395-1643, Scott.

COLEMAN tent trailer, basic sleeper unit, 2 double beds, low profile for towing, 2 sets of tires, 1 set new, \$400. 353-3127, Carl.

'72 DATSUN 240Z, w/Chev. 350 V8, automatic trans, roll bar, 70K, fun car, needs tuning, moving, must sell, \$2,000/obo. 323/341 4739 or jwall@oxy.edu.

FORD CAMPER SHELL, for full size pickup, includes 4 pc. carpeted floor, side seats set, \$250/obo. 626/797-5387.

'96 FORD F-150 Eddie Bauer Special, dark blue w/gold trim, V6, std. transmission, all power, long bed, dual gas tanks, tow package, w/shell, 75K mi., exc. cond., \$8,850. 470-5265, Mark.

'94 FORD Explorer Sport, 5 speed, 4 WD, 96K mi., black, gray leather, all power, 10 disk CD, alarm, alloy wheels, 5 new tires, \$8,300/obo. 323/655-5864.

'89 FORD Ranger XLT King Cab w/camper shell & carpeted adjustable insert; V6, 2.9L eng., a/c, pwr. steering/windows/doors, tow pkg., am/fm/cass., cruise control, tilt wheel; well maintained, exc. cond., 80K miles, \$4,500/obo. 626/791-7645

'84 FORD F250 long bed extended cab, dark blue, 4 WD; and '88 PLAYCRAFT 21-ft. deck boat, 6 cyl. outboard, gray with red & black trim, all accessories included, fun-in-the-sun package, both for \$12K, will sell separately. 626/355-1022, after 6 p.m.

'00 HONDA Civic Si, completely stock, ready to modify, rear wing, front mask, tinted windows, alarm/LoJack, weather tech cargo liner, 7,200 mi., \$20,995. 661/255-5645.

'90 HONDA EX sedan, 140,000 miles, dark gray, automatic, sunroof, tinted windows, power everything, clean, all maint. records, \$6,000. 353-3818, eves. and weekends.

'89 HONDA Civic, 4 dr., only 58,000 miles, automatic, a/c, new tires, am/fm/cassette radio, good cond. \$3,950. 957-1798.

'87 HONDA Civic, 2-dr. hatchback; '83 ACCORD, LX, 2-dr. hatchback, both running, good basic transportation. 626/403-0446.

'86 HONDA Elite 150 scooter, 6,840 orig. miles, exc. cond., green/black, \$400. 909/466-8712, after 7 p.m., Charmaine.

'85 HONDA VF 500 motorcycle, 24K miles, nice cond., new chain, \$1,300/obo. 323/341-4739 or jwall@oxy.edu.

HYDRAULIC JACK, for auto, full size, \$85. 626/797-5387.

'88 JAGUAR XJ6 Vanden Plas, well-maint. luxury car, everything works, a real classic, lic. JPLJAG, \$5,000. 805/642-7053.

'96 JEEP Grand Cherokee LTD, 4 WD, V8, leather, loaded, xint. cond., 80K mi., orig. owner, \$14,500. 957-5382.

'91 LINCOLN Mark VII, only 69K mi., exc. cond., beautiful, must see, \$5,750. 542-4152.

'95 MERCEDES BENZ 500 SL conv., white w/black soft top and white hard top, 75K, all the trimmings, CD player, leather seats and custom designed Antera wheels, amazing buy, starting bid \$41,000. 434-5296.

'84 MERCEDES E 420, charcoal, 85K mi., all extras, Blue Book \$19K, sell for \$15,000. 626/355-1022, Bob and Beth, after 6 p.m.

'92 SATURN SL2, twin cam, 4 cyl., auto, re-built eng., new tires/struts/catalytic converter, tint windows, pwr. doors/windows, 124,700 mi., blue int. & ext., gd. transportation car, \$2,500/obo. 626/405-0217, Luis or Victor.

'95 TOYOTA Camry, 24,600 mi., exc. cond., orig. owner, silver, \$12,000. 249-0469.

'95 TOYOTA Tacoma SR5, V6, 3.0 liter, extra cab, 5-speed manual, 4 w/d, most extras, including shell w/carpet kit, alarm, 91,000 miles, \$11,500. 790-5229 or soburks@pacbell.net, Steve.

'95 VOLVO 850 GLT wagon, 5 spd., vg. cond., 102K mi, grn ext./beige leather int., sunroof, ABS, alarm, winter pkg., built-in child booster seat, 6 CD changer, \$11,000. 952-9463, evenings.

'65 VW Notch-Back, Lic. 2WJ138, 2 dr., seats 4, Porsche alloy rims, CD player, Kenwood stereo, new upholstery, needs work, \$3,500/obo. 626/395-6087 or 626/794-0652.

'64 VW, stock, \$500; '62 VW, stock, \$1,000. 952-6181.

Wanted

CARPPOOLER for existing 4-person pool, each drives 1 day/wk, meet at the Diamond Bar Park & Ride on Diamond Bar Blvd, work hrs.: M-Th, 7:30-4:15, Friday leave at 4 p.m. Ferne Griffin, 4-8583 or Sandy Itatani, 4-6954.

GUEST HOUSE OR APT. to rent for 1 person, 1 bd. or studio, kitch., priv. ba., close to Lab, parking, quiet, avail. by June 1. 249-4546.

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

SPACE SHUTTLE DECALS from missions STS 41-74, will pay cash or trade for decals from other missions. 352-2337.

VIDEO GAME CARTRIDGES, for Sega "Master System," also may be interested in working controllers/game pads. 626/237-0105, Eric or Azalea.

VOLLEYBALL PLAYERS, coed, all levels of play, Tuesday nts. 8-10 at Eagle Rock High School, \$3/night. 956-1744, Barbara.

Free

DOG, 4-year-old female German Shepherd mix, neutered, wonderful personality, owner recently died. 909/593-4430.

DOG, Korean Jindo, to good home, female, spayed, loving, likes hiking & long walks, owner moving. 493-2930 day, 626/792-8113,

626/449-2395 evenings.

CAT DOOR, lockable, exc. durable design, better than commercial products, fits 4" x 4.5" opening, ideal for cats being pursued, free installation if needed, within 50 mi. radius of JPL. 789-3694.

For Rent

EAGLE ROCK, house, large 2 bd. + office, hilltop, garage, yd., view, wood floors, f/p, a/c, fridge, stove, microwave, laundry room, totally remodeled, gated, 5849 Buena Vista Terrace, LA, 90042, \$1,450 + security, 1st and last. 790-1893.

LA CANADA/FLINTRIDGE, separate small rm. w/bathrm., a/c, partially furn., gated, separate entr., temporary OK, close to JPL, very private, \$575. 790-1893.

SOUTH PASADENA, apt., furnished, 1718 Huntington Dr., betw. Marengo and Milan Sts., car space, utilities paid, no pets, non-smoker. \$750. 626/792-9053, Marilyn or Ray.

SUNLAND home, 3 bd., 2 ba., ranch property w/horse corral, on 5.5 acres, 13 mi. to JPL, quiet area with views, 2 level, \$1,395. 626/584-6526, Fred.

SYLMAR home, 4 bd., 3.5 ba., den, bonus room, f/p, 2,500 sq. ft., gated community, pool, near golf and mountains, 20 mi. to JPL, option to buy, \$2,295. 626/584-6526, Fred.

Real Estate

ALTADENA, 1997 home, on lg. lot, quiet st., 7 min./JPL, 3 bd., 2 ba., 1,250 sq. ft., bright, clean, well maint., mature fruit trees, grapevine covered patio, dining rm., f/p in living rm., lg. 2-car gar. w/direct access, \$310,000. 626/798-4283 or 714/308-6886.

EAST PASADENA, exc. townhouse/condo, desirable loc., 2 bd., 1 full, 2 x 3/4 ba., 2 f/p, lg. living rm., lg. dining/sitting area, sun-room, 2-car gar., end unit, private entry, park-like grounds, pool, sauna, Jacz., newly remodeled bathrms./kitch., all new plumbing fixtures, tiles, granite in kitch., new carpets & wood floors throughout, must see, \$265,000. 626/798-2987.

GRANADA HILLS, 4 bd., 1.75 ba., pool, big backyard, quiet street, 1,750 sq. ft., redone granite kitchen, 2-car gar., \$329,000. 363-2387.

LA CANADA/FLINTRIDGE, hilltop home, above Flintridge Sacred Heart Academy, modern, designed by Millard Sheets, spec tacular views through floor to ceiling glass windows, 4 bd., 2,300 sq. ft. + 900 sq. ft. covered decks and patios, La Canada schools, by owner, \$790,000. 790-4981.

PASADENA, charming 2-bd., 1-ba., bungalow, exc. cond., new roof/plumbing/bath and 8,750 sq. ft. landscaped lot with mt. views, 7 min. to JPL, \$249,000. 626/798-5613.

TUJUNGA, 7521 Kyle St., 3 bd., 2 ba., 2,900 sq. ft. home on fenced 10,000 sq. ft. lot, gourmet kitch. w/granite countertops and 6-burner cooktop, spacious master bedrm. suite and library, oversized 2-car gar., built-in gas BBQ, exceptional storage, details at www.its.caltech.edu/~sharonb/, will cooperate with brokers, open house April 29, 1 to 5 p.m., \$349,000. 352-7321, for appt.

Vacation Rentals

BIG BEAR cabin, quiet area near village, 2 bd., sleeps 8, completely furnished, f/p, TV/VCP, \$75/night. 249-8515.

BIG BEAR LAKEFRONT lux. townhome, 2 decks, tennis, pool/spa, nr. skiing, beaut. master bedrm. suite, sleeps 6. 949/786-6548.

CAMBRIA, ocean front house, sleeps up to 4, excellent view. 248-8853.

HAWAII, Kona, on 166 feet of ocean front on Keaouhou Bay, priv. house & guest house comfortably sleep 6, 3 bd., 2 ba., rustic, relaxing and beautiful, swimming, snorkeling, fishing, spectacular views, near restaurants, golf & other attractions. 626/584-9632.

HAWAII, Maui condo, NW coast on beach, w/ocean view, 25 ft. fr. surf, 1 bd. w/loft, compl. furn., phone, color TV, VCR, mcrowv., d/w, pool, priv. lanai, slps. 4, 1/15-12/14 \$105/nt./2, 12/15-4/14 \$120/nt./2, \$10/nt. add'l person. 949/348-8047.

LAKE ARROWHEAD house, small 4 bd., 2.5 ba., sleeps 10, quiet, secluded, relaxing, woody area of Cedar Glen, http://www.highcountryrents.com/cedar_run.html for pictures/rates, JPLers book directly with owner get 2 weekends for 1 + cleaning fees, \$370/weekend. 626/403-0446, owner.

LAKE BEAR LAKEFRONT lux. townhome, 2 decks, tennis, pool/spa, nr. skiing, beaut. master bedrm. suite, sleeps 6. 949/786-6548.

MAMMOTH, Chamonix condo, at lifts 7, 8, 16, 17, walk to Warming Hut, 2 bd., 2 full ba., sleeps 6, microwave and extras, f/p & wood, color TV, VCR, cable, FM stereo, pool & sun area, o/d Jacz., game, rec & laundry rms, play & BBQ areas, conv. to hiking shops, special events, daily/weekly rates, summer rates May thru Oct. 249-8524.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, sleeps 6-8, fully equipped kitchen incl. microwave, d/w, cable TV, VCR, phone, balcony w/view to mtns., Jacz., sauna, streams, fishponds, close to Mammoth Creek, JPL discount. 626/798-9222 or 626/ 794-0455.

OCEANSIDE condo, fully furn., 2 bd., 2 ba., f/p, full kitchen, quiet, relaxing, beautiful setting. Located at beachside, BBQ, pool, spa, game room, and great ocean view, easy walk to pier and restaurants, sleeps 6, 2-nt. min., avail. weekly or monthly. 909/981-7492, Jim or Darlene, or dfhaug@yaho.com.

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

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