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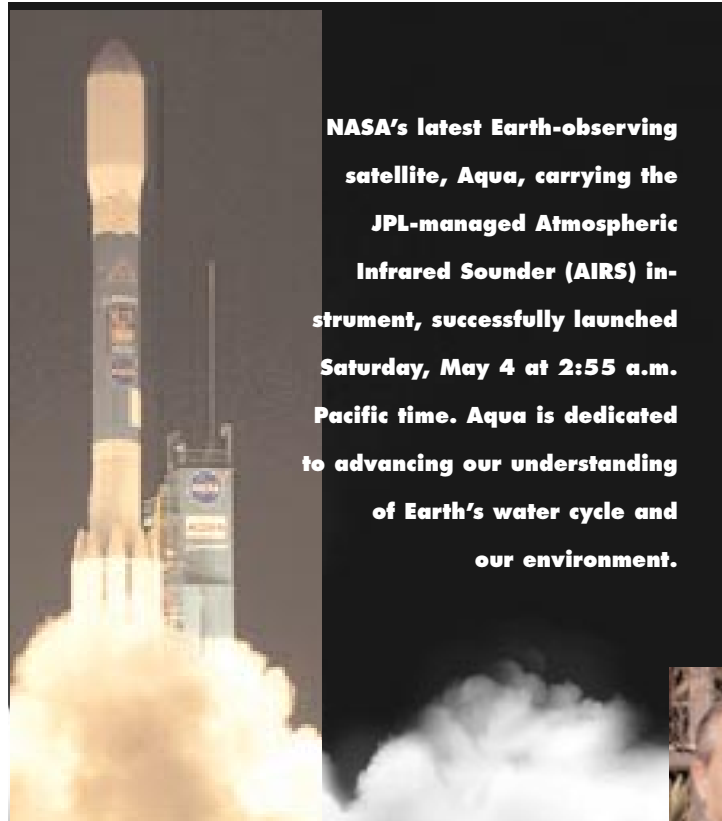
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1 b e m e
e A R T H

JPL instrument carried into Earth orbit

By Alan Buis

Aqua, carrying JPL's Atmospheric Infrared Sounder, launches from Vandenberg Air Force Base May 4. At right are AIRS Project Manager Dr. Avi Karnik (left) and science team leader Dr. Moustafa Chabine.



NASA's latest Earth-observing satellite, Aqua, carrying the JPL-managed Atmospheric Infrared Sounder (AIRS) instrument, successfully launched Saturday, May 4 at 2:55 a.m. Pacific time. Aqua is dedicated to advancing our understanding of Earth's water cycle and our environment.

THE SPACECRAFT LIFTED off from Vandenberg Air Force Base, Calif., aboard a Delta II rocket. Spacecraft separation occurred at 3:54 a.m. Pacific time, inserting Aqua into a 705-kilometer (438-mile) orbit.

"The Aqua project has truly been a team effort and we are very excited this morning," said Aqua project manager Phil Sabelhaus at NASA's Goddard Space Flight Center, Greenbelt, Md.

The primary goal of Aqua, as the name implies, is to gather information about water in Earth's system. Equipped with six state-of-the-art instruments, Aqua will collect data on global precipitation, evaporation and the cycling of water. This information will help scientists all over the world to better understand Earth's water cycle and determine if the water cycle is accelerating as a result of climate change.

JPL's AIRS will measure Earth's atmosphere and surface, allowing scientists to improve weather prediction and observe changes in Earth's climate. Aqua will circle the globe almost 15 times a day in polar orbit, with AIRS observing and characterizing the entire atmospheric column from the surface of Earth to the top of the atmosphere. The instrument will provide data on surface emissivity and temperature, atmospheric temperature and humidity, cloud cover and height, and spectral outgoing infrared radiation. It will also measure ozone and other greenhouse gases. These data will help researchers increase their understanding of Earth's global water and energy cycles, climate variation and trends, and the response of the climate system

to increased greenhouse gases. The results will be improved weather forecasts, better understanding of factors influencing climate prediction and air quality, and better ability to reduce economic and human losses from weather-related hazards.

AIRS will help fill a void in current weather and climate observations, as two-thirds of the precipitation on land comes from the 75 percent of the world covered by oceans. Weather balloon data provides most of the information about Earth's atmosphere, with about 4,000 "radiosonde" balloon launches each day. AIRS, however, will provide 100 times the coverage balloons do, including over the oceans, which weather balloons do not observe.

Three NOAA scientists on the AIRS science team will analyze data in support of weather-forecasting, and AIRS Data from will be provided to the National Oceanic and Atmospheric Administration within three hours. Data for climate research purposes are received, analyzed and archived at Goddard Space Flight Center within 72 hours," said AIRS Project Scientist Dr. George Aumann. The AIRS science team provides the algorithms for data analysis. Implementation of the science algorithms is carried out in Division 38 under Steven Friedman and data validation is carried out in Division 32 by a science team lead by Dr. Mike Gunson.

Aqua is the latest in a series of Earth Observing System spacecraft, following the Terra satellite launched in December 1999. Aqua will cross the equator daily at 1:30 p.m. as

it heads north. The early afternoon observation time contrasts with the Terra satellite, which crosses the equator between 10:30 and 10:45 a.m. daily. Aqua's afternoon observations, combined with Terra's morning observations, will provide important insights into the daily cycling of key scientific parameters such as precipitation and ocean circulation.

Aqua is a joint project among the United States, Japan and Brazil. The United States provided the spacecraft and four of the six scientific instruments. In addition to the JPL-provided Atmospheric Infrared Sounder, the other U.S. instruments include the Moderate Resolution Imaging Spectroradiometer and the Advanced Microwave Sounding Unit, both provided by the Goddard center, and the Clouds and the Earth's Radiant Energy System, provided by NASA's Langley Research Center, Hampton, Va.

Japan's National Space Development Agency provided the Advanced Microwave Scanning Radiometer, while the Instituto Nacional de Pesquisas Espaciais (the Brazilian Institute for Space Research) provided the Humidity Sounder for Brazil.

For more information, visit the Aqua website at <http://aqua.nasa.gov> and the AIRS site at <http://www.jpl.nasa.gov/airs>.



Photo by Bob Brown / JPL Photolab

Mom, dad bring their children to work

More than 700 youngsters dropped by the Lab Thursday, April 25 for "Bring Your Child to Work" day, JPL's version of the national "Take Our Daughters to Work" day. Left, a Mars rover makes its way over visitors, and below two boys set sail their "straw rockets." Besides having free rein to shadow their parents in their laboratories and offices, the children also enjoyed presentations by JPL scientists, engineers and technologists. The day was sponsored by the Human Resources Division, Diversity Programs Office, Advisory Council for Women, Advisory Committee on Minority Affairs and New Professional Network.



Photos by Bob Brown / JPL Photolab



News Briefs

JPL takes the reins on Jason 1

Jason 1's oceanography mission to monitor global climate interactions between the sea and atmosphere reached another major milestone in late April with the successful handover of day-to-day operations from the French Centre National d'Etudes Spatiales to JPL.

JPL is now responsible for around-the-clock real-time monitoring of Jason 1's health and status, and for generating and uploading weekly stored command sequences to the spacecraft for mission planning, payload commanding, navigation, ground station acquisition and routine maintenance.

The French Space Agency's Satellite Control Center in Toulouse, France, will continue to perform spacecraft engineering and navigation tasks. Both organizations will be jointly responsible for processing mission science data.

"Jason's measurement performance to date has been excellent," said DR. LEE-LUENG FU, Jason project scientist at JPL. "The early mission phases have been very smooth. This success is due in large part to the hard work and outstanding cooperation between the U.S. and French teams, who continue to work together to leverage experience and efficiencies gleaned from a decade of joint Topex/Poseidon operations. We look forward to continuing to work with the French to establish routine mission operations."

Lab would support Pluto mission

At the request of the New Horizon principal investigator, JPL will provide deep-space navigation design and support for the mission to Pluto if the mission is approved to proceed to the

implementation phase.

"JPL is the premier organization in the world for deep-space navigation and therefore it is frequently asked to provide this capability to principal investigator-led missions," said DR. FIROUZ NADERI, director for JPL's Solar System Explorations Programs Directorate. A recent example of this, he pointed out, was JPL leading an award-winning navigation team to successfully land Applied Physics Laboratory's NEAR Discovery mission on the asteroid Eros.

Blood drive coming up

The next JPL/Red Cross Blood Drive will be held in von Kármán Auditorium May 14 from 10 a.m. to 4 p.m. and May 15 from 7 a.m. to 1 p.m.

Sign-up sheets will be available at Occupational Health Services, Building 310-202, and at their home page, http://eis/medical/blood_form.html.

Last-minute signups, may go directly to von Kármán at their preferred time. Be prepared to wait a little longer if you do not have an appointment.

To change an appointment, call the Pasadena Red Cross at (626) 929-4151. For questions regarding donations or eligibility, call Red Cross nursing personnel at (800) 843-2949, ext. 5521, or visit <http://www.sgvarc.org>.

JPL Occupational Health Services said the Red Cross collected 164 pints of blood during the Feb. 19-20 blood drive on Lab, and 492 lives will benefit from that collection. OHS added that the Red Cross is currently experiencing a critical shortage of all types of blood, especially the O negative type, and their inventory continues to remain below desired levels.

As part of the Level A Bonus Awards in February, four JPL scientists have received the 2001 Edward Stone Award for Outstanding Research Publication.

This new award, issued by the Office of the Chief Scientist, recognizes and encourages publication of significant research results in science and in technology by JPL employees throughout their professional careers. It is named in honor of former JPL Director Dr. Edward Stone, who led JPL from 1991-2001.

The recipients are: Gerhard Klimeck, Section 381, for "Off Zone Center or Indirect Bandgap-Like Hole Transport In Heterostructures," *Physical Review B*, Volume 63, 2001.

William Read, Section 3272, for "UARS Microwave Limb Sounder Upper Tropospheric Humidity Measurement: Method and Validation," *Journal of Geophysical Research*, in press.

Following are other Bonus Award winners, as selected by JPL's Compensation Advisory Subcommittee, for accomplishments that had Labwide impact. Honorees received their awards in March for either Outstanding Accomplishments or Outstanding Leadership.

Issued by Office of the Director: Kimberly Simpson, Section 470; Arthur Murphy Jr. (134); Neil Yarnell (310).

Issued by Business Operations and Human Resources Directorate: Domingo Dongon Jr. (2724), Thomas Lynch (2613), Richard Hann (241), Debra Giles-Zemitis (2124), Vivian Pahati (2151).

Issued by Engineering and Science Directorate: Ernesto Rodriguez (334), Dr. William Banerdt (3236), Mark Dragovan (3231), Marc Foote (386), Dr. Bobby Williams (312), Dr. Karen Buxbaum (354), Donald Sevilla (352), Gary Glass (336), Randall Bartman (383), Timothy Munson (335), Emily Law (369).

Issued by Planetary Flight Projects Directorate: Chester Sasaki (480), David Spencer (410), Roger Gibbs (410), Robert Mase (312), Carl Kloss Jr. (313), Guy Beutelschies (313).

Issued by Office Of Safety and Mission Success: Khanara Ellers (510).

Issued by Solar System Exploration Programs Directorate and Mars Exploration Program Office: Sarah Gavit (620), Curt Henry (313), John Brophy (353).

Issued by Astronomy and Physics Directorate: Daniel Coulter (713), Amit Sen (387).

Issued by Earth Science and Technology Directorate: Yunjin Kim (802), Gary Kunstmann (840), Avinash Karnik (877), Ronald Ross Jr. (354.)

Issued by Interplanetary Network Directorate: James Border (335).

To learn more about the Bonus Award program, visit <http://eis/sec614/reward> and click on "Bonus Awards" in the "Recognition" section.

Special Events Calendar

Ongoing Support Groups

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

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

Gay, Lesbian and Bisexual 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.

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.

Working Parents Support Group—Meets the third 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.

Friday, May 10

Brazil: Giant of the South—This travel film will be shown at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$9 and \$7. Call (626) 395-4652.

Presentation on Stress and Anxiety—Dr. Charles Barr, a psychologist in private practice in Pasadena, will discuss available treatment at noon in von Kármán Auditorium. For questions, call the JPL Employee Assistance Program office at ext. 4-3680. For more information on anxiety, visit <http://www.nimh.nih.gov/anxiety/anxietymenu.cfm> or <http://www.freedomfromfear.org>.

Von Kármán Lecture Series—Mars Odyssey Project Manager Roger Gibbs will present "The Odyssey to Mars" at 7 p.m. at Pasadena City College, 1570 E. Colorado Blvd., Building C, Room 333. Visit the von Kármán Lecture Series website at <http://www.jpl.nasa.gov/events/lectures/may02.html> or call Public Services at ext. 4-0112.

Saturday, May 11

Bandorama—The Caltech Jazz and Concert Bands will perform a program to be determined at 8 p.m. in Beckman Auditorium. Admission is free. Call (626) 395-4652.

Folk Music—Singer/songwriter James Lee Stanley will appear at 8 p.m. in Caltech's Dabney Lounge. Tickets are \$12 for adults, \$4 for children under 12. Call (626) 395-4652.

Tuesday, May 14

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

TIAA/CREF Workshops—"Taking A Realistic Look At Equity Returns," from 10 a.m. to noon, will focus on a better perspective on equity performance that should help tune out the fund choice "noise" and discuss how to best meet your financial goals. "A Woman's Money, A Woman's Future," from 1 to 3 p.m., will offer tips and tactics on investment basics and portfolio building by selecting the best products for meeting your financial goals. Both workshops will be held in Building 180-101.

Thursday, May 16

Working Parents Support Group—Dr. Linda Poverny will present "Children and Drugs: Symptoms and Strategies" at noon in Building 167-111. Poverny, who specializes in crisis intervention and providing treatment for substance abuse, is a former faculty member of the USC School of Social Work. For more information, call JPL's Employee Assistance Program at ext. 4-3680.

TIAA/CREF Enrollment Meeting—Employees newly eligible for Caltech/JPL retirement plan participation can come to Building 180-101 at noon for assistance in selecting investment op-

tions and completing enrollment forms.

Wed.-Thu., May 14-15

Investment Advice—TIAA/CREF will offer one-on-one counseling in T-1720. For an appointment, call (877) 209-3140, ext. 2614.

Sunday, May 19

Pasadena Young Musicians Orchestra—While the 90-member group performs excerpts from Gustav Holst's "The Planets," JPL will present a multi-media show that will focus on the Mars, Jupiter and Venus portions of Holst's work. JPL is participating in the community outreach event as part of a year-long celebration of the 40th anniversary of the first spacecraft to another planet, JPL's Mariner 2. To be held in Pasadena City College's Saxon Auditorium, 1570 E. Colorado Blvd., starting at 4 p.m. For more information, call (626) 797-1994 or visit <http://www.pymo.org>.

Tuesday, May 21

Investment Advice—Fidelity Investments will offer one-on-one counseling in T-1720. For an appointment, call (800) 642-7131.

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

Wednesday, May 22



"Einstein at Caltech: Publishing the Collected Papers of Albert Einstein"—Dr. Diana Buchwald, professor of history and editor and director of the Einstein Papers Project at Caltech, will lecture at 8 p.m. in Beckman Auditorium. Free admission. Call (626) 395-4652.

JPL Toastmasters Club—Meeting at 5 p.m. in the 167 conference room. Guests welcome. Call Joy Hodges at ext. 4-7041 for information.

Thursday, May 23

Award for Excellence Ceremony—To be held at 1 p.m. on the mall. Limited seating. For more information, see the Employee Services and Recognition website, <http://eis/sec614/reward>.

Caltech Architectural Tour—The Caltech Women's Club presents this free service, which is open to the public. The tour begins at 11 a.m. and lasts about 1 1/2 hours. Meet at the Athenaeum front hall, 551 S. Hill St. Call Susan Lee at (626) 395-6327.

JPL Stories—Marc Montgomery, manager of the Institutional Business Systems Division and the New Business Solutions Project, will present "Automated Business Systems: The Myth, Mystery, and Magic" at 4 p.m. in the Library, Building 111-104. For questions about the story series or participation information, call Teresa Bailey at ext. 4-9233.

Saturday, May 25

The Race for Our Future—Building Bridges, a Caltech community service organization, is sponsoring this fundraiser for college scholarships that will support two promising students at Blair High School. Races vary in length from 100 to 5,000 meters and will be held, rain or shine, at the Caltech track and North Field. To participate and/or make a donation to the scholarship fund, visit <http://bbridges.caltech.edu/race.html> and send the appropriate form to the address posted. Signups are due May 17. Call (626) 676-1666.

Bonus Awards presented



Photo by Carol Lachata / JPL Photolab

From left: Dr. Tom Prince, Eric Rignot, William Read, Gerhard Klimeck, Dr. Edward Stone. Not pictured is Gerard van Belle.

Eric Rignot, Section 334, for "Penetration Depth Of Interferometric Synthetic-Aperture Radar Signals In Snow And Ice," *Geophysical Research Letters*, Volume 28, No. 18, Sept. 15, 2001.

Gerard van Belle, Section 383, for "Altair's Oblateness and Rotation Velocity from Long-Baseline," *Astrophysical Journal*, Oct. 1, 2001

Up to four awards in this category will be given each year. In return, each recipient will be asked to give a public lecture to the JPL community related to the work for which she/he is being recognized. The lectures will be spread through the year.

ONE YEAR LATER

DR. CHARLES ELACHI ON MAY 1 MARKED THE FIRST ANNIVERSARY OF HIS TENURE AS JPL DIRECTOR. HE DISCUSSES THE PAST YEAR AND PROSPECTS FOR THE COMING YEAR WITH UNIVERSE.

BY MARK WHALEN

has the year seemed to go by quickly?

Yes. It's amazing how time goes by when you're enjoying what you're doing. It's been a busy year, but also a rewarding one, for me and I think for the Lab as well. Clearly, the successes of the last year speak for themselves—Mars Odyssey going into orbit, the Deep Space 1 flyby of Comet Borrelly and the successful launches of Genesis, Grace, Jason and AIRS—are a result of all the hard work of our employees. This shows in the morale at the Lab as well as outside perceptions of JPL.

What do you feel has been the most significant thing that has happened for you and the Lab in the last year?

The one thing I'm particularly proud of is the improved communication between employees and senior management. I believe that employees now better appreciate some of the challenges senior managers have, and senior managers have become more aware of and proactively addressing issues important to employees.

One thing I can assure people about is that each and every comment I get in my meetings with employees is discussed and acted on. That doesn't mean it satisfies everybody, but each comment is taken very seriously and is explored to see if we can have a better environment for the employees to excel in their work.

What are some top-priority issues senior management is working right now?

One key thing is the investment we are now able to make in long-term research. NASA has agreed to allow JPL to have a Research and Technology Development Program, for which we can invest up to 3 percent of our budget each year. This is our investment in the future and to keep our leadership in space and Earth exploration.

We've also significantly increased the funding for our technical infrastructure. This area will take a few years of increased funding to address our needs and keep us at the leading edge.

Another thing employees indicated they wanted a year ago had to do with job grades. There are now two senior levels, and we have also established a fellows grade, which will allow engineers, scientists and researchers to get to the level of a division manager without actually becoming a manager.

In almost every area I discussed a year ago, we have taken some positive steps. A couple of examples: The new JPL Rules! website that replaced DMIE is streamlined and easier to access, and many documents have been simplified or eliminated. Another challenge I gave myself was to regularly meet with all employees; I am now doing that and also meeting with all section managers every quarter,

and group supervisors every six months. I enjoy this tremendously because I learn a lot and get a first-hand assessment of the state of the Lab.

Shortly after taking office, you reorganized the Executive Council, and also created the new management councils. Has this worked out well?

We have a first-rate Executive Council team that I am confident will lead the Lab very successfully in the coming years. The management councils we established are also allowing a broader engagement of employees into decision-making. Each management council has members from outside the EC, some of whom are engineers, scientists, and program managers or project managers.

The system is working well so far, but it's early in the process. I feel good about this arrangement and we intend to continue the management councils for the foreseeable future.

Last month, NASA Administrator Sean O'Keefe outlined a new strategic vision for NASA. What is your opinion of that vision, and where does JPL fit in?

The vision O'Keefe laid out for NASA came out of a series of meetings with all NASA center directors and all the enterprise associate administra-

tors at Headquarters. I actively participated in defining that vision and I'm fully aligned with it.

One key part of the vision is understanding and protecting our planet; I would expand that to include protecting our way of life. That encompasses understanding how weather, climate and our environment are changing, how natural hazards may affect our lives, and applying the science and technology that NASA has developed to better understand the changes in our environment and thus better our lives. And that's clearly an area where JPL is, and will continue to be, a major player.

The next major area of the NASA mission is "to explore the universe and search for life." That's one of the most exciting intellectual endeavors that humans can do—understanding where we come from, where are we going, and whether or not we are alone in the universe. This is also an area in which we have played and will continue to play a major role, in both our planetary and astrophysics programs.

The third one—nurturing the next generation of explorers—encompasses not only explorers. I know that Sean O'Keefe feels very strongly about investing in and strengthening science and engineering education in this country, because this is the foundation that led to the economic growth of our nation, and is critical for future growth. I am fully aligned with this goal and we will continue to expand our education and outreach activities to help in this area.

If 10 years from now we can look back and say we've accomplished these three missions, I think the nation will continue to be proud of NASA and feel that is a critical and essential part of our government.

Recently, the Executive Council went on a retreat. Any news to report from that series of meetings?

There were two key things we focused on. First, we are living in a more competitive environment, one that creates a new level of energy and imagination. I think we should espouse it fully. We have always fared well in such an environment—more than half of our current missions, and those in development, have been won competitively—and we have always been in competition in the area of instrument development and scientific research.

We might not win each and every competition, but I'm confident that we will continue to fare extremely well and have a vibrant organization and exciting work in the future.

The second key objective we discussed in the retreat is that we at JPL are perceived as being world-class at what we do. However, we need to do a better job in how we do things, particularly in the financial area. I want JPL to be a model of technological innovation as well

"I SEE THE EXCITEMENT IN THE EMPLOYEES' EYES. EVERY EMPLOYEE FEELS THEY WANT TO CONTRIBUTE TO OUR NATION'S QUEST OF EXPLORATION, AND THAT MAKES JPL A VERY SPECIAL PLACE."



Tech contributors receive cash awards

By Mark Whalen

JPL held ceremonies last month to honor individuals who contribute outstanding scientific or technical inventions or patents that are sponsored, adopted, supported or used in support of NASA's mission.

At the April 17 event, JPL Director Dr. Charles Elachi honored recipients of Space Act awards, which are issued by the NASA Inventions and Contributions Board. About 60 JPL individual employees and contractors, and team members, received a total of about \$100,000.

Dr. Karina Edmonds of JPL's Strategic Intellectual Assets Management Office said that since Caltech patents are not eligible for the NASA patent award, the Inventions and Contributions Board considers for Space

Dr. Sarath Gunapala, left, and Jobn Liu received the Inventions and Contributions Board's Exceptional Awards at April 17 ceremonies.

Photo by Bob Brown/JPL Photolab

Act awards eligibility any contribution that leads to a Caltech non-provisional patent or patent filing.

The process begins when technologists report new technology by filling out forms for patents or software at the JPL Intellectual Assets Office website at <http://ip>. The deadline for the next round of award eligibility begins May 20.



Edmonds said the Inventions and Contributions Board determines award amounts, which range from \$500 to \$100,000. Awards are guaranteed to contributors whose innovations have been published in NASA Tech Briefs (\$350 per author); for software that has been approved for release to qualified users (\$1,000 for a sole author, \$500 each for multiple authors), or inventions have received approval for patent application by NASA (\$1,000 for a sole inventor, \$500 each for multiple inventors).

Since NASA's inception in 1958, the Inventions and Contributions Board has issued more than 79,000 awards to NASA and its contractor employees—as well as to other government, university and industry personnel—totaling more than \$27 million.

For more information on the NASA Inventions and Contributions Board, visit <http://icb.nasa.gov>. Visit the Intellectual Assets Office website for a list of this year's JPL Space Act Award recipients.

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

Passings

ARTHUR GUSSNER, 54, a senior engineer in Section 513, died of pulmonary fibrosis April 13. Gussner had worked at the Lab since 1985. He is survived by his wife, Jill; daughter Wendy, son Tony and two grandchildren. Burial services were private.

THOMAS LEAR, 71, a retired member of the technical staff in Section 344, died of undetermined causes April 17.

Lear joined JPL in 1956 and retired in 1995. He is survived by his sister, Kathleen, and brother Joel. Memorial services were held April 28 at Cabot & Sons in Pasadena.

WILLARD VAUGHAN, 87, a retired carpenter from Section 662, died April 18.

Vaughan worked at the Lab from 1956-77. He is survived by his wife, Lena; four children, eight grandchildren and seven great grandchildren. Services were private.

Letters

Thank you to all my co-workers for their support following the recent death of my wife's mother. Thank you also for the lovely plant.

Dan and Carolyn Snyder

I would like to thank my many friends and co-workers for expressions of support during the extended illness and the passing of my father-in-law. Linda and I are especially grateful for your understanding of the need for repeated absences from the Laboratory. Linda joins me in thanking the ERC for the beautiful plant sent to our home.

Milton Lavin

Classifieds

For Sale

BABY ITEMS: front carrier, Evenflo, soft, \$7; rear carrier Gerry, hard, \$25; bathtub, Gerry, plastic, \$5; activity gym, Infantino, overhead, \$7; car seat w/base, Century, rear-facing, \$40; bathtub carousel, Safety1st, \$7, all in superb cond., prices are obo. 626/791-6101.

BABY ITEMS: Simons crib, changing table, high chair, bath, playpen, monitor, etc., all best offer. 626/355-9651.

BARBIES: Bob Mackie Fantasy Goddess of The Americas \$125, Mackie Arctic \$150, Faberge Imperial Grace \$195, Enchanted Mermaid \$175, Venetian Opulence \$90, AA Cinnabar Sensation \$75, Nolan Miller Evening Illusion \$75, Vivien Leigh GWTW Scarlet BBO or Drapes \$50, In The Pink Fashion Model \$125, Elizabeth Taylor, White Diamonds \$70 + more, for list www.thevintagekidcollection.net, telicome@yahoo.com.

BED, antique oak & rod iron queen-size w/rails, see picture at JPL Store, \$175/obo. 626/744-9064.

CAMCORDER, Sony compact, hi-res, Hi-8 type, model CCD-TR81, remote, carry case, 8 tapes, works well, \$225. 687-8627.

CART, by Huge Cart, folds flat, brand new, \$35/obo. 626/791-6101.

CHINA CABINET, 1950s Drexel mahogany, for photo: lelson@bigfoot.com, \$500 cash and carry. 353-9367.

COMPUTER, Apple G3/233MHz, 32MB, 4GB HD, 24x CD-Drive, OS 8.5, Apple 15" monitor \$300/obo. 626/229-9953.

DIGITAL CAMERA, Olympus, 3.3 Mega Pixel 3040Z, two months old, exc. cond., wonderful camera, uses 4-AA batteries, a lot of camera for the money, 18mg and 164 mg card included, ownr wants to upgrade, \$475. 661/251-9903.

EXERCISE BIKE, Schwinn Johnny G Spinner, exc. cond., photo on request, \$400. 661/298-2647.

FUTON FRAME, w/matt., very simple conversion from bed to sofa/vice-versa, \$125; **BABY JOGGER,** front wheel quick release, \$80. 626/796-8803.

FUTON SOFA/BED, good cond., can e-mail photo, mvzoff@hotmail.com, \$100/obo. 257-0990.

LAWN MOWER, rotary, 4 HP, w/rear bagger, runs great, \$65; **DINING TABLE,** round, w/4 swivel chairs, dark blue upholstery, \$100. 626/447-6423.

LOVESEAT, like new, overstuffed, hunter green/brown/tan abstract pattern, \$145/obo. 626/254-1550.

MATTRESS, new, full size, Serta, with frame \$150. 626/791-0317.

MICROWAVE, Quasar, 12-1/2 W x 10-1/4 D, great for home or office, \$30; **END TABLE,** oak, w/glass top & lower shelf, S shape, \$20. 897-1203.

MODEL CARS, detailed, limited edition legends, 1/24 boxed models, Midnight Blue Error Shelby GT500 Mustang, Snake, Mongoose, 34 Hot Rod, Twin Mill, Cadzilla, 49 Merc, KP Nascar, 1/64 Sets include, Barris Kustoms, World Record-holders, Signature 57s, \$60-\$100 each, Formula 1/43, 1/18, NASCAR Choice 1/24 LE 5,000 T52 Buzz, Woody, STP, Aerosmith, more, list and photos at www.thevintagekidcollection.net, telicome@yahoo.com.

MODEM, PC, external 56K US Robotics, brand new, still in original box, shrink-wrap opened, \$20/obo. 626/229-9953.

PANCAKE BREAKFAST, Crescenta-Canada YMCA, May 11, 7-11 a.m., all you can eat IHOP pancakes, sausage, fresh Starbucks coffee, freshly squeezed OJ; a great deal for a good cause, \$3 at the door, 930 Foothill Blvd., La Canada.

PLAYER PIANO, Schafer & Sons, cherry wood, model #ps48, exc. cond., w/bench & rolls, \$2,000. 805/987-5766.

PRINTER, Epson Stylus Color 800, \$50/obo. 626/485-7718.

PRO-AUDIO MIXER, 10 x 4 analog Ramsa, 4 effect sends/returns, 3-band EQ, for home studio or band, \$400. 952-6674.

REFRIGERATOR, Frigidaire, 16.6 cu. ft., top freezer, white, 65" H x 28" W x 30" D, 10 yrs. old, very good cond., \$150. 626/794-1716.

REFRIGERATOR, Hotpoint, frost free, white, 15.7 cubic feet, ice maker, exc. cond., \$175; **STOVE,** G.E., electric, self-clean oven, harvest gold, exc. cond., \$200; **BAR STOOLS,** 3, white metal with padded green seats, \$35/ea. 626/445-1013.

REFRIGERATORS, G.E., one is beige, 17 yrs. old, side by side, \$100, other is white, 15 yrs. old, freezer on top, \$100; **TABLE,** dining room, w/leaf, cherrywood tops, black legs, 4 chairs, gd cond., \$150; **SOFA/SLEEPER,** makes into qn-zs. bed, abstract black, blue & mauve design, gd cond., \$300; **BICYCLES,** kids, 4, \$15/ea. 626/357-8210.

SCANNER, color, flatbed, brand new, Memorex 6142u, exc. cond., unopened, purchased a few months ago and never used, features include: 600 x 1200 DPI, supports Windows 98/2000/ME, 9600 DPI enhanced resolution, 42-bit, and 4.3 trillion colors, \$35. 956-3745.

SKI SET, used women's Head 170s Gala radial and poles, Salomon boots, size 7 and bindings, see picture at ERC, \$200/obo. 626/744-9064.

TICKETS, Dodgers, season seats behind 3rd base, loge, sect. 141, row K, 4 seats/game, sell at face value, \$23 seat/game. 790-5902, nsl1020@yahoo.com.

TREADMILL, Sears Lifestyle, 5.0 mph, 5 position incline, 34 HP motor, \$200. 626/447-7817.

WATERBED, queen, 6 tube, half waterbed, half mattress, and box, \$100. 626/345-9957.

WOOD CRAFT SET, Ryobi, multi-tool, in box, never used, \$75; **ARM SAW,** radial, Dewalt, \$150; **EDGER,** Craftsman, gasoline power, Briggs & Stratton engine, \$20. 353-5671.

94 CHEVROLET Camaro, V6, Bose stereo speakers, teal, power windows and doors, 115K mi., exc. cond., 833-7107.

92 CHEVROLET Suburban, 2500 series, 3/4 ton, 454 V8 engine, 130,000 mi., rebuilt transmission warranty (4/03) \$9,500/obo. 424-3798.

89 CHEVROLET Corvette, black, exc. cond., only 71K miles, auto, power seats, climate control, two tops, \$9,800/obo. 323/550-8701.

94 DODGE Stealth RT, white, exc. cond. mechanically and body, 87,000 mi. 909/427-1510.

72 DODGE Dart Swinger, beautiful classic, 2 dr., hard top, 318 V8, auto, p/s, p/b, new a/c, new blue paint, new white top, dashboard, carpets, front and rear seats, looks and runs great, \$4,500. 626/792-3732.

95 FORD Windstar XL, mini-van, rear air, quad seating, console, plus many more features, 86K mi., one owner with all records, runs great,

Vehicles/Accessories

66,000. 626/447-6423.

'93 FORD Escort wagon, white, orig. owner, 5 spd., exc. cond., 1.9L, a/c, pwr. steering/mirrors, roof rack, am/fm/cass, 101K mi., \$2,700. 790-8760.

'91 FORD Explorer XLT, white, exc. cond., must sell by May 20, \$4,000. 626/445-4936.

'87 FORD F-250 PU, 460cid V8, 4:10-1 Diff. auto, A/C, AM/FM, PS/PB, cruise, new tires, 5th wheel hitch/bed cover, 43K mi., good cond., strong tow veh., records available, renewed lic.-Jan., cab top air foil, \$5,500. 626/963-5727.

'92 HONDA Accord EX, sedan 4 dr., 106K mi., gd. cond., white w/blue int., auto., 4 cyl., 2.2 ltr., front whl dr., a/c, p/s, p/w, p/dl, cruise cont., ABS, tilt whl., sun/moon roof, am/fm stereo/cassette, anti-theft, gd. tires, \$5,800. 626/296-9073, Patil.

'91 HONDA Accord LX, 4 dr., 167K mi., black, auto, a/c, p/s, p/w, p/dl, cruise cont., am/fm/cass., exc. engine, body and int. cond., \$3,900/obo. 310/313-0284.

'85 KOUNTRY LITE 5th wheel trailer, 30 ft., orig. owner, alum. frame, 13.5K, A/C, side ba., microwave, TV/ACP avail, new tires/water pump, sips 6, exc. cond., renewed lic.-Mar., \$8,500. 626/963-5727.

'91 OLDSMOBILE Silhouette mini-van, ~140K mi., good cond. \$3,400. 957-3675.

'93 SAAB 9000 CDE, 4-dr. sedan, 5 spd., 72,500 miles, citrin beige, metallic w/tan leather interior, genuine wood dash, loaded, 1 owner, pwr. everything, AM/FM/cassette/in-dash CD/7-band equalizer, clean car, no smoking/eating/drinking/children/pets, good cond., new clutch, radiator, and water pump in last 6 mo., sell \$680 below Kelley Blue Book, \$6,900. 626/794-2965.

'94 SATURN, 4 dr., 5 sp., ~150K miles, fair cond. \$1,950. 957-3675.

'97 TOYOTA Camry LE, auto, 57,800 mi., white w/gold trim, alloy wheels, moonroof, great cond., \$11,000/obo. 626/290-1970.

'93 TOYOTA Camry LE, 84K mi., 4-cyl, dark blue, exc. cond., ABS, alloy wheels, a/c, p/s, p/w, p/dl, cruise, tilt str whl, am/fm stereo cassette, new tires, \$6,500 626/577-0068.

'89 TOYOTA Camry, sedan, 4 dr., automatic, 1 owner, A/C, front wheel dr., 4 cyl., 2.0L, good cond., clean, \$3,200/obo. 626/282-1821.

'00 VOLVO \$40, leather, CD, auto, spoiler, loaded, moonroof, salvage title history, 21,000 mi., \$13,500. 909/599-3230.

'00 VOLVO \$80, auto, heated leather power seats, moonroof, 20K mi., CD, loaded, salvage title, \$19,995. 909/599-3230.

Wanted

GUEST HOUSE/DUPLEX in safe, quiet neighborhood for single female, prefer no more than 15 minutes from JPL, one or two bedrooms/den, bath, kitchen w/stove, 541-9210, Fran.

HOUSEKEEPER, part-time, light housekeeping/child care, weeknight evenings and weekends, La Canada, \$9/hr. 790-1893.

HOUSING, for visiting professor & family, mid-June thru early-Sept., near JPL, Caltech, or public transportation preferred, knickels@trinity.edu.

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

WALKERS/SPONSORS for California Liver Walk on June 1 at Griffith Park; will join thousands working to raise dollars to help find a cure for hepatitis and other liver diseases. 626/355-1765, Holli Leonard.

Free

CAT, female gray, rescued from a car lot, very friendly, 1 year old, litter trained, groomed, spayed, does not like dogs. 626/287-9433.

FUTON, single mattress w/spare cover & wooden frame (ikea); **COMPUTER DESK,** L-shaped (needs assembly); small glass shelf. 626/398-6419.

MULCH, good for covering weeds, Fire Dept. approved, works great in gardens, makes terrific compost, free delivery to local JPL area, have tons. 626/798-6405, after 6 p.m.

For Rent

ALTADENA, furnished garage apartment newly remodeled with new appliances, 1 bd., 600 sq. ft., utilities paid, quite neighborhood, short-term lease preferred, non-smoker, no pets, \$850. 626/791-0317.

ALTADENA, 1-bd. guesthouse, fenced yard, secure, clean, quiet, Florencia area above E. lot, walk to JPL, avail. 6/1, \$495 + 1/3 utilities, \$600 sec. dep. 626/794-6076.

ALTADENA, 3 bd., 2 ba., private family home, fireplace, remodeled kitchen and bath, 2-car garage, laundry, spacious back yard, great view, gardener included, \$1,500. 909/392-7554.

ALTADENA house, charming 2 bd., 1 ba., near Christmas Tree Lane, hardwood floors, fireplace, appliances, fenced backyard, fruit trees, roses, incl.

water, gardener, trash; see www.alumni.caltech.edu/~chris, \$1,650/negotiable. 626/794-9579.

CRYSTAL VIEW, 1 bd., guesthouse, on .75 acre, very private, rose garden, patio, fruit trees, Direct TV, car port, \$875 includes util. 352-6778, Ann.

GLENDALE, unfurn. bd., share ba. in roomy 2 bd., 1 ba. home, full house privileges, laundry, garage, yard, quiet neighborhood, 15 min. to JPL, no pets, no smoking, female preferred, avail. June 1, \$625 + 1/2 util. 507-5632.

LA CANADA/FLINTRIDGE, room, private ba., kitchen privileges, BBQ, pool, parking, 2 mi. from JPL. 790-1280.

LA CRESCENTA homette, furnished bd., kitchen privileges, all linens provided and washed, TV included, no pets, month-to-month, 7 mi. from JPL, \$600 + deposit. 951-0455.

MONTRÖSE, detached bachelor apt., 10 min/JPL, \$525. 626/445-0884.

PASADENA apt., share 2+2-loft in luxury security complex near Colorado and Lake, living room and kitchen fully furn., DSL/balcony/pool/Jacuzzi/gym, \$750. 626/644-5431.

PASADENA, furn., 2 bd., 1.5 ba., townhome-style apt., a/c, parking, patio, laundry facilities, no pets, great for co-ops, \$1,195 util. 626/351-9641.

PASADENA, furnished apartment to share, 2 bd., 1.5 ba., a/c, parking, patio, laundry facilities, no pets, \$595/each, plus utilities. 626/351-9641.

PASADENA, spacious 2-story condo, 3 bd., 2.5 ba., prestigious community, beaut. inter., bright ktch., prof. landscape, ctrl. air & heat, close to shop., cozy lvr with f/p, end unit, frml dr, hdwd. flrs., immac. cond., close to schls. \$1,750. 626/396-9024.

Real Estate

COLORADO, 10+ level acres nr. Rio Grande, N.M. border, two adjacent, 5-acre lots on St. Hwy 248, sell one or both for \$1K/acre/obo. 626/254-1550.

SHOW LOW, Ariz., 3 bd. house, .43 acres w/ ponderosa pines, nat'l gas, sewer, in town subdivision, close to skiing and fishing, great investment property, house nds. help, \$30K/obo. Randall.Mielke@fijivillage.com.

SILVERLAKES, Calif., resort, golfer's dream, 4 wks free golf anytime each year, vac. club membership, 2 bd. condo for up to 6 people, 2 lakes, many amenities, private PGA-rated course w/driving range/putting greens, less than 2 hours/Pasadena, exchange rights w/3,000 resorts, res-duced to sell due to illness, \$16,500. 805/967-7725.

WILLIAMS, Ariz. area, (10 mi. away), 85 acres w/2-rm house, seasonal pond, wildlife everywhere, house on top of cliff w/great views, 4-mi. dirt road access year round, great investment, \$68K cash/obo. Randall.Mielke@fijivillage.com.

Vacation Rentals

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

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

CANCON, time share condo, A Royal Resort, July 6-13, sleeps 6, 2 bd., 2 ba., on North Shore, full kitch., resort offers restaurants, bars, mini-market, 2 pools, tennis, bicycles, sailboats, 18-hole golf course nearby, \$700/wk. 805/577-0990.

HAWAII, Kona, ocean front on Keahou Bay, house and guest house comfortably sleep 6, 3 bd., 2 ba., rustic, relaxing and beautiful, swimming, snorkeling, fishing, spectacular view, near restaurants, golf and other attractions. 626/584-9632.

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., 4/15-12/14 \$105/nite/2, 12/15-4/14 \$120/nite/2, \$15/nite/add'l person. 949/348-8047 or jackandrandy@cox.net.

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

OCEANSIDE condo, fully furnished, 2 bd., 2 ba., fireplace, full kitchen, quiet, relaxing, beautiful beachside setting; BBQ, pool, spa, game room, great ocean view, easy walk to pier and restaurants; sleeps 6, weekly or monthly. 909/981-7492 or dhfaage@yahoo.com, Darlene.

PACIFIC GROVE hse, 3 bd., 2 ba., f/p, cable tv/vcr, stereo/CD, well eqpd. kit w/microw, beaut. furn, close to golf, bches, 17 Mile Dr., Aquarium, Cannery Row, JPL discnt. 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., elegant Nob Hill honeymoon suite, sleeps 2 max., full kitch., maid service, concierge, reserve early, \$145/nite, \$870/wk. 626/254-1550.

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I n s i d e

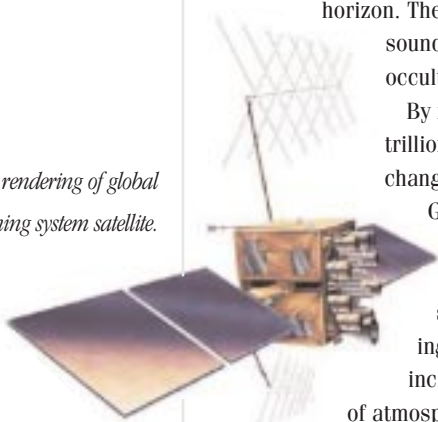
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GPS technology may enhance atmosphere monitoring

By Alan Buis

Artist's rendering of global positioning system satellite.



Dr. Thomas Yunck

The Earth

A new, cost-effective technology based on the venerable global positioning system (GPS) may soon revolutionize the way Earth's atmosphere is monitored.

Scientists at JPL are excited by early analysis of data from their prototype instruments aboard two international scientific spacecraft in low Earth orbit. Blackjack GPS receivers aboard the German Challenging Mini-satellite Payload, or "Champ," and the Argentine Satellite de Aplicaciones Cientificas-C (Scientific Applications Satellite), fitted with special antennas that focus on Earth's horizon, are tracking the radio signals broadcast by each of the 28 high-orbiting global positioning system satellites as they rise and set on Earth's

horizon. The process is called GPS limb sounding (also known as GPS occultation). By measuring—to within a few trillionths of a second—the subtle changes in the time it takes for the GPS signals to arrive at the spacecraft as they travel through Earth's atmosphere, scientists can derive a surprising amount of data. These data include extremely precise profiles of atmospheric density, pressure, temperature and moisture content. Additional analysis can yield global pressure contour maps, critical climate variables and even the stratospheric wind fields that affect airline routes.

Preliminary evaluations indicate this technology will be applicable to fields as diverse as weather prediction and climate research, Sun-Earth interaction research, solid Earth dynamics and oceanography. It may also be used to create the first 3-D images of Earth's ionosphere, a turbulent and mysterious shroud of charged particles that, when stimulated by solar flares, can disrupt communications around the world. "GPS occultation is a novel, cost-effective technology that augments current methods of Earth remote sensing from space," said Dr. Thomas Yunck, manager of JPL's GPS Observatories Office. "It offers accuracies and resolutions that rival those of instruments aboard weather balloons, while filling in large global coverage gaps. Such precise measurements of the lower atmosphere have never before been accomplished from space. Our prototype instruments are serving as vital develop-

mental test beds for GPS remote sensing. NASA looks forward to a blossoming of this remote sensing research as we continue to refine our knowledge of this new data source."

Tens of thousands of occultation soundings have already been made. Dozens of scientists worldwide are investigating how to best apply the data to Earth research.

GPS limb sounding offers numerous attractions. It can probe Earth's atmosphere from the top of the stratosphere (50 kilometers, or 31 miles up) directly to the Earth's surface. It can operate in all weather conditions. It can calibrate itself, resulting in stable measurements that can be compared between all occultation sensors over time. Its fully independent measurement of pressure and height permits atmospheric wind fields to be derived without external calibration or reference. In addition, it has numerous applications outside of atmospheric science.

The technology's biggest advantage may well be its low cost. GPS receivers, comparable in size and complexity to a notebook computer, can be built for a fraction of the cost of traditional spaceborne sensors and placed unobtrusively on many low-orbiting spacecraft. Since most Earth satellites already carry such devices for timing and navigation, upgrading those instruments for science purposes might possibly ignite a revolution in Earth remote sensing.

Yunck says the potential from even a small array of such instruments is impressive. A single GPS receiver in low orbit could acquire more than 500 soundings a day, spread uniformly across the globe—comparable to the number of weather balloons launched worldwide every 12 hours. When combined with Russia's 24-satellite GPS-like Global Navigation Satellite System and Europe's planned 32-satellite GPS-like Galileo system, a single GPS sensor could conceivably collect more than 2,000 soundings a day.

GPS limb sounding data from the Argentine Scientific Applications Satellite and Champ are available through JPL's GPS Environmental and Earth Science Information System at <http://genesis.jpl.nasa.gov>. The database is one of a new generation of data systems created under NASA's Earth Science Information Partners program, which seeks to create government-industry partnerships to advance Earth science. Additional information on this program is available at <http://www.esipfed.org>.

Free lunch for staff on June 6

All personnel contribute to the overall success of the Laboratory. In celebration of a job well done, a free



lunch will be served to all JPL badge holders on the mall or on the Café 303 patio on Thursday, June 6, from 11:30 a.m. to 1 p.m.

Enjoy your choice of chicken, beef or vegetarian kabob, served with a seasonal fresh fruit salad, barbecue potato chips, cheesecake and assorted soft drinks or bottled water. Live music will be featured on the mall only. A JPL badge must be worn to participate.

In support of the thank-you celebration, JPL Café schedules for June 6 will be modified. 190 Crater Café will be open from 6:30 to 9 a.m. Grill service will not be available after 8 a.m., and 190 will be closed for lunch and afternoon break. The 303 Orbit Café will be open 6:30 a.m. to 3:30 p.m., with no grill service after 9 a.m. The lunch menu is limited to hot entrees, pizza, salad bar and Grab 'n Go. The 167 Red Planet Café will be open 6:30 a.m. to 3:30 p.m., with no grill service after 9:30 a.m. The lunch menu is limited to hot entrees, salad bar, and demo station.

JPLer resolves orbits for newly found Jupiter moons

By Guy Webster

The discovery of 11 small moons orbiting Jupiter leapfrogs the number of that planet's moons to 39, nine more than the record of the previous champ, Saturn.

A team led by astronomers from the University of Hawaii made the discovery based on images taken in December 2001 and later follow-up observations. Orbits were determined by collaborators at JPL and the Harvard-Smithsonian Center for Astrophysics, Cambridge, Mass.

Researchers estimate the new-found natural satellites are each about two to four kilometers (one to two miles) in diameter, and were probably passing rocks captured by Jupiter's gravity long ago.

The discovery-team leaders, Scott Sheppard and Dr. David Jewitt of the University of Hawaii, also discovered 11 other small satellites of Jupiter in 2000.

The new moons were discovered by Sheppard, Jewitt and Jan Kleyna of Cambridge University, England. They used the Canada-France-Hawaii 3.6-meter (142-inch) telescope with one of the largest digital imaging cameras in the world to obtain sensitive images of a wide area around Jupiter.

The digital images were processed and searched using computers. Candidate satellites were monitored in the succeeding months at the University of Hawaii's 2.2-meter (88-inch) telescope to confirm their orbits and to reject asteroids masquerading as satellites.

JPL's Dr. Robert Jacobson and Harvard-Smithsonian's Dr. Brian Marsden determined the satellites' irregular—highly elongated and tilted—orbits. All 11 objects orbit in the direction opposite to the rotation of the planet.

The orbits of the irregular satellites strongly suggest an origin by capture. Since no efficient contemporary capture mechanisms are known, it is likely that the irregular satellites were acquired when Jupiter was young, possibly still in the process of condensing down to its equilibrium size. As yet, nothing is known about their surface properties, compositions or densities, but they are presumed to be rocky objects like the asteroids.

The new discoveries bring the known total of Jovian satellites to 39, of which 31 are irregulars. The eight regular satellites include four large moons discovered by the astronomer Galileo Galilei and four smaller moons on circular orbits closer to Jupiter. Jupiter's nearest rival for having the largest number of known satellites is Saturn, with 30, of which 13 are irregular.

The satellites were formally announced by the International Astronomical Union on Circular No. 7900 (May 16, 2002). More information about them is available online from the University of Hawaii at <http://www.ifa.hawaii.edu/~sheppard/satellites/jup.html>. Other information about the Jupiter system is available from JPL at http://www.jpl.nasa.gov/solar_system/planets/jupiter_index.html.

News Briefs

Cassini still going strong

JPL's Cassini spacecraft continues to fly in good health, speeding toward a July 1, 2004, appointment to begin orbiting Saturn.

Test images of a star taken in early May provide strong encouragement that a haze problem noticed on a Cassini camera lens is clearing up as anticipated, said Cassini-Huygens Program Manager ROBERT MITCHELL.

A 60-day period of warming the spacecraft's narrow-angle camera to a temperature just above freezing ended May 1. Heaters were built into the camera in anticipation of potential lens hazing; warming treatments have corrected similar hazing on other spacecraft.

Cassini's narrow-angle camera performed flawlessly for the spacecraft's December 2000 flyby of Jupiter. The haze first appeared last year, during the cruise between Jupiter and Saturn. Warming the camera to 4 degrees C (39 degrees F) for eight days ending in January 2002 produced improvements, so the same heating was repeated for 60 days. Another warming treatment, to last 26 days, began May 9.

Planet Finder studies chosen

As part of its quest to find Earth-sized planets around stars and look for telltale chemical signatures of life, NASA has chosen two mission architecture concepts for further study and technology development.

The two architectures are being explored for the JPL-managed Terrestrial Planet Finder mission, which is part of NASA's Origins Program, also managed by the Lab. Each concept would use a different means to achieve the same goal—to block the light from a parent star in order to see its much smaller, dimmer planets.

The Infrared Interferometer, using multiple small telescopes on a fixed structure or on separated spacecraft flying in precision formation, would simulate a much larger, very powerful telescope and would reduce the starlight by a factor of 1 million. The Visible Light Coronagraph, a large optical telescope with a mirror three to four times bigger and at least 10 times more precise than the Hubble Space

Telescope, would collect starlight and the very dim reflected light from planets. The telescope would have special optics to reduce the starlight by a factor of 1 billion, thus enabling astronomers to detect the faint planets.

The two candidates were selected based on results from four industrial-academic teams that conducted a 2-1/2 year study of more than 60 possible designs. The two architectures were determined to be sufficiently realistic to warrant further study and technological development in support of a launch of Terrestrial Planet Finder by the middle of the next decade.

Aerogel gets Guinness record

A new version of aerogel, the particle-collecting substance on JPL's Stardust spacecraft, has been recognized by Guinness World Records as the solid with the lowest density.

JPL's DR. STEVEN JONES, a materials scientist who helped create the aerogel used by Stardust, has created a lighter version that weighs only 3 milligrams per cubic centimeter (.00011 pounds per cubic inch.)

Guinness World Records approved the new aerogel's application for the least dense solid in March. Jones' aerogel beat out the previous record holder, an aerogel that weighed 5 milligrams per cubic centimeter.

Aerogel is pure silicon dioxide and sand, just as is glass, but aerogel is 1,000 times less dense than glass because it is 99.8 percent air.

Use of JPL password to expand

Within the next few weeks approximately 3,000 DocuShare users will be notified by library managers or librarians when access to electronic libraries converts to the new multi-purpose JPL Password. Further implementation of the JPL Password will occur in the months ahead in order to reduce the number of unique passwords that JPL personnel are required to maintain.

For more information about the JPL Password, see <http://eis.jpl.nasa.gov/dir/jpldir/password.html>. An overview of all frequently used Lab passwords is provided at <http://icis.jpl.nasa.gov/passwordmatrix.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.

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

Gay, Lesbian and Bisexual 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.

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

Working Parents Support Group—Meets the third 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.

Saturday, May 25

The Race for Our Future—Building Bridges, a Caltech community service organization, is sponsoring this fundraiser for college scholarships that will support two promising students at Blair High School. Races vary in length from 100 to 5,000 meters and will be held, rain or shine, at the Caltech track and North Field. To participate and/or make a donation to the scholarship fund, visit <http://bbridges.caltech.edu/race.html> and send the appropriate form to the address posted. Call (626) 676-1666.

Wednesday, May 29

"Modeling Relationships Using Graph State Variables"—A key architectural theme of the Mission Data System is explicit modeling of states. Certain essential states are relative, since they are defined in terms of reference points rather than absolute quantities. In this noon presentation in conference room 167, Matthew Bennett of Section 341 will describe graph state variables and show example representations for relative states such as spacecraft orientation, location, trajectories, dynamics and kinematics.

Thursday, May 30

Asian Pacific American Heritage Month Talk—Dr. Min Zhou, professor of sociology and chair of the Asian American Studies Inter-departmental Degree Program at UCLA, will present "Asian Americans Today: Demography, Diversity, Contributions, and Challenges" at noon in conference room 167. The talk is presented by JPL's Asian American Council. For more information, visit <http://www.sscnet.ucla.edu/soc/faculty/zhou>.



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

Saturday, June 1

"California Liver Run/Walk 2002"—Participants and sponsors are sought for this event that seeks to raise dollars to help find a cure for hepatitis and other liver diseases. The 10K run and 5K walk will be held at Griffith Park in Los Angeles. Call Holli Leonard, ext. 4-5589 or (626) 355-1765. For more information, visit <http://www.liver411.com>.

Tuesday, June 4

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

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

Wednesday, June 5

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

Thursday, June 6

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

Saturday, June 8

Folk Music—Singer/songwriter Katy Moffatt will appear in Caltech's Dabney Lounge at 8 p.m. Tickets are \$12 for adults and \$4 for children under 12. Call (626) 395-4652 or visit <http://www.cco.caltech.edu/~folkmusi>.

CloudSat climbs to mesa for tests

JPL engineers earlier this month conducted successful tests on the CloudSat antenna. CloudSat is an experimental satellite that will use radar to measure the vertical structure of clouds and cloud properties from space. Launch is planned for April 2004 from Vandenberg Air Force Base.

At that time, the quasi-optical transmission line—which provides signal relaying and duplexing—will be integrated with the antenna.

CloudSat Deputy Principal Investigator Deborah Vane said integration and tests of all subsystems are scheduled for next year.

CloudSat will provide the first continuous global orbital survey of cloud structure and physical properties. The data gathered will improve the models used to describe clouds in global climate and weather prediction models.

Since clouds are a basic part of the link between energy and water cycles present in the Earth's atmosphere, understanding their physical characteristics and associated seasonal and geographical variations is fundamental to meteorology.

CloudSat's 94 GHz cloud-profiling radar is expected to be several orders of magnitude more sensitive than available weather radars and will yield detailed observations of the water droplets and ice crystals in clouds. Unlike the recent DC-8 Airborne Cloud Radar aircraft experiment, CloudSat's continuous data will allow the seasonal and geographical variations of clouds to be captured.

The absorption present when looking through precipitation from the ground severely limits the radar sensitivity, thus the advantage to remotely sense the clouds from above.

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. The antenna was built by Composite Optics of San Diego.

For more information, log on to <http://cloudsat.atmos.colostate.edu>.



Photo courtesy of Suzanne Spitz

Andy Rose (left) oversees unloading of the CloudSat antenna on JPL's mesa, where it underwent testing. Looking on are Greg Jones and Suzanne Spitz.

The preliminary tests, conducted on JPL's mesa antenna range area, confirmed that the three-mirrored antenna's far-field range was working properly, according to cognizant engineer Suzanne Spitz. The instrument was then moved indoors for further testing in the near-field chamber. When this portion of the testing is completed, by early June, the antenna will be transferred to the Spacecraft Assembly Facility for integration onto a support structure.

Service awards

The following JPL 2002 Second Quarter Service Award Recipients celebrating 20 or more years of service were invited to attend a luncheon and ceremony in their honor on June 5.

45 years:
Hershal Fitzhugh.

40 years:
Charles

Bryant, Edgar Davis, Richard Emerson, Robert Hall, Alan Hoffman, Ronald Howe, James Johnson Jr., Clayton LaBaw, Frank Leppa, Warren L. Martin, Kenneth Peralta, Robert Polansky, Raymond Prizgintias, Thomas Shain, Jimmie Tomey, Alvin Willems.

35 years: Stanley Butman, George Danielson Jr., Joe Foster, Arthur Franzon, H. Kent Frewing, William Hurd, Patricia McLane, John Meysenburg.

30 years: Richard Cardenas, James Fuhrman, Ingrid Hsu, Susan Linick, Robert Miller, Jose Miranda, Allison Owens, Ted Peng, George Rinker, Gary Yagi.

25 years: Frederick Akers, Charles

Avis, Julian Blosiu, Barbara Bonzo, Larry Bright, Robert Cesarone, Charles Cruzan, Kirk Gerbracht, Ronald Hellings, Jose Landeros, Linda Lee, Thomas Logan, Albert Magallanes, Lee Mellinger, Donald Rockey, Yvonne Samuel, Chester Sasaki, Donald Sevilla, Barbara

Sherrod, Jeffrey H. Smith, Jan DM Smith, Clara Sneed, Gerald

Snyder, Thomas Starbird, Curtis Tucker Jr., Joseph Wackley, Yvonne Zieger.

20 years: Donna Bonorris, Natividad Chavira, David Childs, Paul Chodas, Deirdre Darrow, Robin Dumas, Randall Foehner, Ivan Gall, Dwight Geer, Gail Linehan, Kathleen Lynn, Leon Maldonado Jr., Scott Markham, Thomas Meehan, Sandra Menotti, Barbara Mochrie, Steven Moniz, William Neiderheiser, William Poirier, Christopher Porter, Paul Rapacz, Audrey Ridley, Mary Romejko, James Rooney, James Shmitka, Krishna Sinha.

For information on JPL's Employee Services & Recognition Program, log on to <http://eis/sec614/reward>.



DC Honors JPL's 40th



JPL'S CELEBRATION

of the 40th anniversary of the first U.S. planetary mission, Mariner 2, and the 25th anniversaries of

Voyagers 1 and 2, made its way to Washington, D.C. on

May 7 with "Journey to the Planets and Beyond," an event held at the Smithsonian Institution's National Air and Space Museum. In attendance were Lab Director Dr. Charles Elachi and all surviving former directors, as well as other JPL and NASA officials, members of Congress and special guests.

The celebration included a new video produced by the Office of



David M. Seidel (left), manager of Pre-College Programs, Education and Public Outreach Office, and Randii Wessen, Manager, Origins and

Astrophysics Program, Mission and Systems Architecture Section, set up a display. Elachi, at center, introduces participants in a panel discussion; from left are Tom Young, mission director of the 1976 Viking landings on Mars and former director of NASA's Goddard Space Flight Center; Pickering; Murray; and Stone. Dr. Ed Weiler, NASA's associate administrator for space science, greets U.S. Rep Adam



Communications and Education on JPL's history and current missions. A videotape of the Smithsonian event is being prepared for archiving on the Daily Planet, JPL's online news source (<http://dailyplanet>).

Clockwise from top: Viewing a 2003 Mars Exploration Rover model are Shaun Parkin (left), aide to Utah Senator Bob Bennett, and Kevin Burke, an engineer from JPL's Mars Exploration Rover Project. From left: former JPL Directors Dr. William Pickering (director from 1954-76), Dr. Edward Stone (1991-2001), Dr. Lew Allen (1982-90), Dr. Bruce Murray (1976-82) and Elachi.



Schiff (D-Pasadena). From left: NASA Administrator Sean O'Keefe, U.S. Rep. David Drier (R-San Dimas), and Caltech President Dr. David Baltimore. Karen Yuen (left), Earth outreach theme lead, and Dr. Andrea Donnellan, deputy manager, Earth and Space Sciences Division, chat with O'Keefe.



40 years later, a Dodger game just for JPL, campus

Right: Dodger Stadium on Opening Day, 1962.



Just as JPL is celebrating the 40th anniversary of planetary exploration this year, another Southern California institution is also celebrating its 40th—Dodger Stadium. Four years after moving to Los Angeles from Brooklyn, N.Y., the Dodgers opened their new home, still considered one of the best ballparks in the major leagues. Today, the Dodgers are offering JPL and Caltech staff a special deal. Tickets are still available at the JPL Store and the Caltech Credit Union in La Cañada for the Dodgers' Saturday, June 1 matchup against the world champion Arizona Diamondbacks. Tickets are \$10 for Lab and campus employees, with pregame activities including a carnival (face painting, clowns, games, and much more) starting at 11 a.m. Game time is 1:10 p.m. Bus transportation to the game from Caltech is also available for \$3 per person. For more information, log on to the JPL Store website at <http://www.jplstore.caltech.edu/dodgers.html>.

Passings

WILLIAM TIEDGE, 77, retired manager of Space Flight Operations Facility operations and engineering support, Section 663, died of cancer April 29. Tiedge worked at the Lab from 1956-79. He is survived by his wife, Mary; sons Brian and Jeffrey; and three grandchildren. Services were private.

CLARENCE TUTTLE, 85, a retired engineering test associate in Section 345, died of Alzheimer's disease May 9. Tuttle joined JPL in 1950 and retired in 1982. He is survived by daughters Signe, Eileen and Cathy; six grandchildren and two great grandchildren. Services were held May 15 at Eternal Valley in Newhall.

Retirees

The following JPL employees retired in May: Theodore Pavlovitch, 38 years, Section 381; Richard Haga, 33 years, Section 341; Douglas Griffith, 28 years, Section 920; Dennis McCreary, 28 years, Section 341; Chaw-Kwei Hung, 27 years, Section 369; Eugene Vosicky, 13 years, Section 185.

Letters

I would like to thank all those who worked with my husband, Ed Christensen, who passed away March 19. I received so many beautiful flowers and comforting cards of condolence from everyone who worked with Edward (Chris) in the past and present. Chris enjoyed his years at JPL and felt especially proud to have worked with so many talented and caring people. Along with others at JPL, he was there for milestones in space and also worked in Houston when man walked on the moon. His years at JPL were not wasted, for it was where he wanted to be. Thank you for making his journey so worthwhile.

I was so comforted to see all those who attended the funeral; and I know that he was touched to see how much you all cared, because he truly cared for you. And thank you to those who could not make the funeral but called and sent beautiful messages. I enjoyed hearing your stories of Chris and hearing how much you cared. God bless you all. I remember you in my prayers.

Jan Christensen

We would like to thank the JPL community for its supportive response during our Mother's recent illness and passing. It makes a big difference. We appreciated all your kind thoughts and help.

Mike and Stan Sander

My wife and I extend our thanks to all at the Lab for the beautiful plant sent to our home at our time of grief. After a long illness, my wife's mother passed away on April 2. Thank you again for thinking of us in this time of need.

Kirk and Mary Bonner

I would like to thank my friends and co-workers for their support following the recent passing of my father. Your kind thoughts and words have been a great help during this time of mourning. Thanks to JPL for the plant.

John V. Sisino

Classifieds

For Sale

BABY ITEMS: front carrier, Evenflo, soft, \$7; car seat w/base, Century, rear-facing, \$40; bathtub carousel, Safety1st, \$7, all in superb cond., prices are obo. 626/791-6101.

BAKERS RACK, with wine rack/chop block, exc. cond., never used, \$100. 798-8071.

BED, antique oak & rod iron, queen sz. w/rails, \$150/obo, see picture @ERC. 626/744-9064.

CAMERA, Mamiya M645 SLR, A & E prism, 220 back, w/120 & 220 roll film holders and inserts, deluxe power motor dr. lenses, 45 mm, 80 mm & 105-210 zoom, Sunpak auto flash, mod. 555, alum. case, \$2,200. 323/257-7668.

CARPET, beige/light brown, exc. nylon, new, never used, \$300; **HEADBOARD,** queen size, blue vinyl, \$50. 798-8071.

CART, by Huge Cart, folds flat, brand new, \$35/obo, 626/791-6101.

CARTRIDGE DRIVE, Syquest, 44MB, \$15; **CARTRIDGES,** Syquest 44 MB, \$1 apiece; 50 CD **JEWEL** cases, \$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, email for photo, lelson@bigfoot.com, \$500, cash and carry. 353-9367.

CHIPPER-SHREDDER, Mantis, yard waste shredder, 5 HP Honda motor, handles 2" branches, \$100. 626/564-1384.

COOKBOOKS: Good Housekeeping 1965 Encyc. of Cooking, 3-vol. boxed set, \$15; Better Homes & Gardens Encyc. of Cooking, 20 vols., \$40; Microwave Cooking Library, 14 vols., \$40; **MAGAZINES,** African Violet, 40 issues, misc. years 1957-75, \$30. 626/357-0209.

COFFEE TABLE, light pine, glass top, carved legs, 49 x 28, 3 mo. old, exc. cond., \$150. 249-0573.

EXERCISE EQUIPMENT, NordicTrak, perfect cond., all black metal and wood, 'no frills' model, perfect for woman or lightweight man, \$150/obo. laurel@ekit.com.

FREON 22, unused, unopened 30 lb bottle, 3 blocks from JPL, \$60/obo. 352-7892.

FURNITURE: Ethan Allen loveseat, blue velvet, \$45; Henredon sofa, 80," white w/pastel wildflowers & loveseat, \$400; storage chest, low 78," 4-door, on wheels, \$45; coffee table, mahogany, \$50, coffee table w/drawer, 52"x32," \$50; sofa-bed, white tweed, full-size, \$100. 626/357-0209.

GARAGE DOOR OPENER, Stanley, 8-foot rail, chain drive, exc. cond., 2 new transmitters, \$85. 909/596-8117.

GUITAR, acoustic, 00016 Martin, solid spruce top, rosewood inlaid fingerboard, scale 25.4", bracing hand carved, rarely played, immac., hardshell case, orig. owner/papers, \$900/obo. laurel@ekit.com.

HOT TUB, seats 4-5, 2 years old but hardly used, came with house; gas heater, cover and supplies; must pick up, originally \$2,700, sell for \$950/obo. 626/798-6488, Gordy.

MOVING SALE: Treadmill, Pro. Form 365 SI, folds against wall, like new, \$200; Typewriter, IBM Selectric, needs cleaning, \$25; 2 lg. end tables, gold leaf top, \$20/ea; 2 headboards, twin, \$10/ea; rocking chair, blue velvet, \$25; chair, orange velvet accent, \$25; TV, 13", color, w/remote, \$50. 353-3836.

PIANO, Chicago upright, Weiser & Son, \$400/obo. 353-2772, after 5 p.m.

SKI SET, used women's Head 170s, Gala Radial & poles; Salomon boots, sz. 7 & bindings, see picture @ ERC, \$150/obo. 626/744-9064.

SOFALOVESEAT, brown, exc. cond., \$200/both; **SWIVEL CHAIR,** matching, \$50; **TABLE,** dining room, with leaf, cherry wood tops, black legs, 4 chairs, good cond., \$150; **SOFASLEEPER,** makes into queen size bed, abstract black, blue and mauve design, good cond., \$300; **BICYCLES,** children's, 4, \$15/ea. 626/357-8210.

TABLES, coffee + 2 end, oak with beveled glass inset, \$100/all. 661/254-7443.

TICKETS, Dodgers, various games throughout the season, 2 seats on loge (orange) level near first base, \$23 per ticket. 626/296-1253.

YARD SALE, 2100 block of Galbreth Rd., betw. Craig & Allen, Sat.-Sun., June 1-2, 8 a.m.-3 p.m.; treasures, '50s collectibles, toys, kitchen items, children's/men's/women's clothes, desk, computer tables, glassware; items too numerous to mention.

Vehicles/Accessories

'86 ACURA Legend, orig. owner, passed smog 5-8-02, 183K mi., well maintained, service docs, stick shift, \$2,300. 626/335-9361, Dan.

'94 CHEVROLET Camaro, V6, Bose stereo speakers, teal, power windows and drivers seat, 115K mi., exc. cond., \$6,200. 833-7107.

'82 CHEVY Blazer K5, 4 x 4, red, removable white top, new clutch/trans/transfer case, Flomaster exhaust w/33" tires and Ranco susp., can e-mail pics emailarbi@yahoo.com, \$5K/obo. 635-9800.

'99 DODGE Ram 1500 truck, 5.2L V8, 8' bed, lock-ing shell, 41K mi., must sell, \$12K. 909/593-6379, eves.

'97 FORD Taurus GL sedan, 83K mi., V6 auto., 4

dr., a/c, pwr. steering/ABS brakes/window/doorlocks, dual airbags, cruise contr., metallic silver, super clean, Michelin tires, \$4,995. 626/798-1765.

'96 FORD Escort LX, 2 dr. hatchback, stick shift, A/C, stereo, only 60K mi. \$4,650. 909/985-6806.

'94 FORD T-Bird, red, auto, pwr. steering/brakes/doors/windows/seat, tilt wheel, cruise control, am/fm/cassette, new tires, alarm w/keyless entry, one owner, all maint. records, 125K mi., exc. cond. inside and out, \$3,900. 909/596-8117.

'87 FORD F150, black, V8, 5.0, A/C, power doors/windows/brakes, auto, cruise control, 1/4 cab & bedliner, towball, wiring, HD springs, good cond., \$2,900. 951-3653.

'01 HONDA Accord EX, silver, gray int., auto, orig. owner, all options, tinted glass, 31,000 mi., \$18,450/obo. 909/468-9966.

'98 HONDA Civic LX sedan, 4 dr., white w/gray cloth interior, 46K mi., automatic, pwr. brakes/door locks, AM/FM stereo, a/c, tilt steering, cruise control, tinted glass, driver and passenger side airbag, deluxe wheel covers, rear defroster, 1 owner, great cond., \$11,400/obo. 956-8060.

'92 HONDA Accord EX sedan, 4 dr., 106K mi., gd. cond., white w/blue int., auto., 4 cyl. 2.2 ltr., front whl dr., a/c, p/s, p/w, p/dl, cruise contr., ABS, tilt whl., sun/moon roof, am/fm anti-theft stereo/cassette, gd. tires, \$5,500. 626/296-9073.

'81 HONDA Interstate SilverWing, shaft drive, water cooled, ProLink suspension, just over 6,000 mi., garage kept, near mint, second seat for passenger, see <http://home.attbi.com/~macmaven/sw/index.htm> for pictures. \$2,250. 353-2103.

'93 KAWASAKI Ninja 600R, 16K mi., exc. cond., clean, black with turquoise/purple stripe, black leather tank cover, see picture at JPL Store, \$3,600/obo. 501-8161.

'72 MERCEDES 280 SE 4.5, tan, 4 dr., 4.5 liter V8, a/c, recent brake work, tires, battery, 87K mi., runs exc., needs cosmetics, minor work, \$3,500. 714/840-3688.

'97 TOYOTA Camry LE, good cond., automatic, a/c, power locks/windows, sunroof, premium wheels, white w/gold trim, 58,000 mi., \$10,500. 626/290-1970.

'96 TOYOTA Avalon XL sedan, 4 dr., 92K mi., exc. cond., golden color, auto 6 cyl., a/c, p/s, p/w, cruise contr., ABS, am/fm/stereo, gd. tires, new battery, 1 owner, \$10,200/obo. 909/865-1049.

'96 TOYOTA Corolla DX 4 dr., 57K mi., a/c, am/fm cassette, pwr. windows and door locks, exc. cond., \$7,950. 626/798-5835.

'88 TOYOTA Celica ST, runs great, clean, air, power, automatic, \$2,500/obo. 626/831-8868.

Wanted

ANVIL & BLACKSMITH TOOLS, 626/798-6588.

CARPOOL PARTNER, part-time, to JPL fr. Laguna Nigue/Irvine area. 949/363-2418, Michael.

HOUSEKEEPER, part-time, light housekeeping and child care, weeknight evenings and weekends, La Canada. 790-1893.

HOUSING, for male JPL engineer starting mid-summer, non-smoker, quiet, commuting to visit family on weekends, neat, handy, musical, willing to do chores. futilitarian@attbi.com or 730-5807.

HOUSING, mid-June thru mid-Sept., nr. Caltech or in Glendale. 626/793-2271, alina@ieee.org.

SHOPPERS, "Shop Till You Drop" May 29, 5:30-8 p.m., Arcadia Elks Lodge, 27 W. Huntington Dr., free admission, latest spring/summer fashions from Nordstrom, Macy's, Robinson's-May and Bloomingdale's; 50-70% off store prices; sizes 4-24, girls dresses, handbags, scarves, jewelry; all proceeds donated to disabled children in CA and Hawaii. 626/447-2025.

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

SPONSORS for Avon Breast Cancer 3-Day walk, from Santa Barbara to Malibu in Oct.; see <http://www.brownwrap.pledgepage.com>, click on 'links.'

VOLLEYBALL PLAYERS, coed, no beginners please, every Tuesday night 8 to 10 at Eagle Rock High School, \$3/nt. 956-1744, Barbara.

Lost & Found

FOUND, ladies sunglasses in case, in Bldg. 601 parking lot, also found at a different time, a gold tone cross. 4-9550, Barbara.

Free

CAT, male, neutered, 3 yrs. old, gray stripes, shots current (Feb.), litter trained, lives with two females who do not treat him well, he is friendly and likes to be held. 626/914-1241.

DOG, Pongo, loving full-blooded black Labrador 7 months old, needs good home with big backyard, plenty of love and attention, great with kids, all shots, loves water. 626/290-6199.

For Rent

ALTADENA mini-mansion, 4 bd., 2 ba. huge yd. w/ pool & jacz., basketball court, bar, patio, cent. heat & a/c, fireplace, stove, washer/dryer, security gates, Brinks, off-st. parking, close to JPL, gardener 2x month, \$1,950 +first and last. 790-1893.

ALTADENA, 3 bd. house, 1/2 mi. / JPL, new kitch. & bathroom, fenced shaded yd., water, trash pd., non-smokers, avail. July 1, \$1,400. 382-4751.

ALTADENA, 1 bd. guesthouse, fenced yard, secure, clean, quiet, Florecita area above E. lot, walk to JPL, avail. 6/1, \$495 + 1/3 util. + \$600 security dep. 626/794-6076.

GLENDALE house to share, unfurn. bd., share

ba., in roomy 2-bd. home, full house privileges, laundry, garage, yard, quiet neighborhood, 15 min. from JPL, no pets, no smoking, female preferred, avail. June 1, \$625 + 1/2 utilities. 507-5632.

LA CANADA/FLINTRIDGE, room, 2 mi./JPL, priv. ba., kitch. privileges, pool, BBQ, parking, 790-1280.

LA CRESCENTA house, extra nice, 2 bd., 1 ba., fireplace, 5 min./JPL, cent. heat, formal din. rm., water and gardener inc., no smoking or pets, \$1,550. 805/659-1742.

MONROVIA/ARCADIA—area house, 2 bd., 1 ba., stove, refridg., washer/dryer hookups, front yard, covered patio, \$825, water/gardener/trash paid. 626/447-5725.

PASADENA, studio apt., with balcony, new paint and carpet, very private, 2 blks. from PCC, no pets, \$500 w/6-month lease. 590-2793.

PASADENA, spacious 2-story condo, 3 bd., 2.5 ba., prestigious community, beaut. inter., bright kitch., prof. landscape, ctrl. air & heat, close to school/schls, cozy l/r with f/p, end unit, frml d/r, hdwd. flrs., immac. cond. \$1,750. 626/396-9024.

PASADENA condo, S. Oak Knoll, 1 bd., 1 1/2 ba., a/c, carpeting, laundry facilities, patio, refrigerator, stove etc., \$1,250, \$1,500 security deposit. 626/744-3243 or 626/791-3831.

PASADENA condo: large, covered balcony; 2 bd., 2 ba.; secure parking; central air & heat; nice quiet neighborhood; no pets; \$1,350. 626/826-9868.

PASADENA apt., 1 bd., 1 ba., new carpet/paint/ bathroom/kitchen, laundry facilities, unfurn., 2nd floor in a gated building, parking underneath, nr. Caltech & Lake, \$800. 626/577-9965, Carol or 626/786-2464, Wang; ask for Mrs. Li's apt.

PASADENA, townhome-style apt., furn., 2 bd., 1.5 ba., a/c, parking, patio, laundry facilities, no pets, co-ops welcome, \$1,195 + util. 626/351-9641.

PASADENA, furnished apartment to share, 2 bd., 1.5 ba., a/c, parking, patio, laundry facilities, no pets, \$595/mo. each, plus utilities. 626/351-9641.

Real Estate

BARSTOW, small 2 bd., 1 ba., on 2 acres, nr. Calco Ghost Town, fenced w/lots of pine trees, very quiet, perfect weekend getaway home or frequent Goldstone assignments, \$49,500. 760/254-2379.

PASADENA/SIERRA MADRE, 8 mo. new, 3 bd., 2 ba., 2,300 sq. ft., architecturally designed contemporary home, open floor plan, 12' ceilings, walls of glass, emphasizes steel, glass, stone and wood, magnificent views from every room, 3 decks, gourmet kitchen, top of line SS appliances, granite counters, hardwood, marble flooring, \$699,000. 626/345-9111.

SHOW LOW, Ariz., 3 bd. house, .43 acres w/ ponderosa pines, nat'l gas, sewer, in town subdivision, close to skiing and fishing, great investment property, house nds. help, \$30K/obo. Randall.Mielke@fijivillage.com.

SUN VALLEY/SHADOW HILLS, 10 mi./JPL, luxury townhouse, very nice gated complex, 3 bd., 2.5 ba., fully remodeled throughout, wood flooring, new kitch. cabinets, granite countertops, brand new appliances, recessed lights, new carpeting, custom drapes, beautiful, cozy and secluded backyard w/fruit trees, rose bushes & nice sitting area, beautiful mtn. view. 504-6256.

WILLIAMS, Ariz. area, (10 mi. away), 43 acres w/2-rm house, seasonal pond, wildlife everywhere, house on top of cliff w/great views, 4-mi. dirt road access year round, great investment, \$42K cash/obo. Randall.Mielke@fijivillage.com.

15 BICYCLE MINUTES/JPL, charming, colorful, sturdy, historic Spanish house; unique character, retiring artist's residence; 7,650 sq. ft. lot, 2,112 sq. ft. structure, 10 rooms, hardwood floors, tiled kitchen/all appliances included, tiled baths, beautiful antique fireplace, landscaped gardens, 20 trees, detached 2-car garage, very green, very private, gated, very well kept, many special features, move-in cond.; mid \$400Ks. 626/398-3332.

Vacation Rentals

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

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

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., 4/15-12/14 \$105/nite/2, 12/15-4/14 \$120/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 equi'p'd kitch. incl. microwave, D/W, cable TV, VCR, phone, balcony w/mtn. view., Jacz., sauna, streams, fishponds, close to Mammoth Creek, JPL disc. 626/798-9222 or 626/794-0455.

OCEANSIDE condo, fully furn., 2 bd., 2 ba., fireplace, full kitch; quiet, relaxing, beautiful beachside setting; BBQ, pool, spa, game room; great ocean view, easy walk to pier and restaurants, sleeps 8; weekly or monthly. 909/981-7492 or dflhaug@yahoo.com, Darlene.

PARIS: duplex apt. in stylish new bldg, short-term rental; slps 2, fully eq'p'd, beautifully furn.; centr. located yet completely quiet. 626/792-5942.

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.

VENTURA beach house, 3 bd., 1 ba.; 1 queen, 1 full and 2 twin beds; short walk to beach and Marina Park, \$125/nt. 248-0521.

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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.